CEX.IO Compass Q2 2022:

Topline Trends for the Crypto Curious and Serious

CEX.IO Market Research Team

Table of Contents

1. DeFi by the numbers 6

DeFi total value locked (TVL) performance 6

DeFi quarter two performance by category 7

YTD performance by category 8

Chains and dapps by revenue 9

2. Ecosystem and DeFi notable events 10

The Collapse of Terra and UST 11

Luna, UST, and how the Terra protocol failed 12

The market's role in Terra's collapse 15

Where is Terra now? 15

3. DeFi trends to watch: Ethereum block space war 17

What is gas and how does it work? 18

What is layer 2? 19

Importance of L2 19

The block space war 20

Ethereum transaction share 20

Gas is used to finalize L2 transactions on-chain 24

What could happen? 26

Gas prices experience less pressure 27

Gas prices experience more pressure 27

4. Defi trends to watch: stETH decoupling and why 1 ETH ≠ 1 stETH 29

What is liquid staking? 31

Why is liquid staking on Ethereum different from other networks? 31

Why is stETH/ETH breaking down? 32

Liquidity overview 33

What does this mean for stETH holders? 36

Decoupling impact on leveraged holders 36

Decoupling impact on holders wanting to swap stETH or liquid stake ETH 37

Justifying why stETH and ETH don't have to trade at parity today 38

High-level example 38

5. Bitcoin by the numbers 44

Price 44

Quarter two and year-to-date performance 44

Historical monthly performance 45

Network-level 45

Hash 45

Difficulty 46

Active addresses 47

Supply level 48

Illiquid supply 48

Lightning 49

Derivatives 50

Futures open interest 50

Futures funding rate 51

Futures term structure 52

Hodler behavior 53

Spent output age bands 53

Exchange balance 54

Realized losses 55

6. BTC Notable Events 57

7. BTC trends to watch: miner capitulation and the impact of capital markets on the network 59

Source of miner woes 60

Hash price 61

Adding context 63

Signs of capitulation and growth slow down 63

Hash rate 64

Hash ribbon 64

Balance held by miners 66

Diminishing safety net and sources of growth 67

Selectiveness of lenders 68

Secured debt and the value of miner collateral 68

The rising cost of capital 71

Where do miners go from here? 72

Capitulation 72

Squeeze on capital sources 75

1. DeFi by the numbers

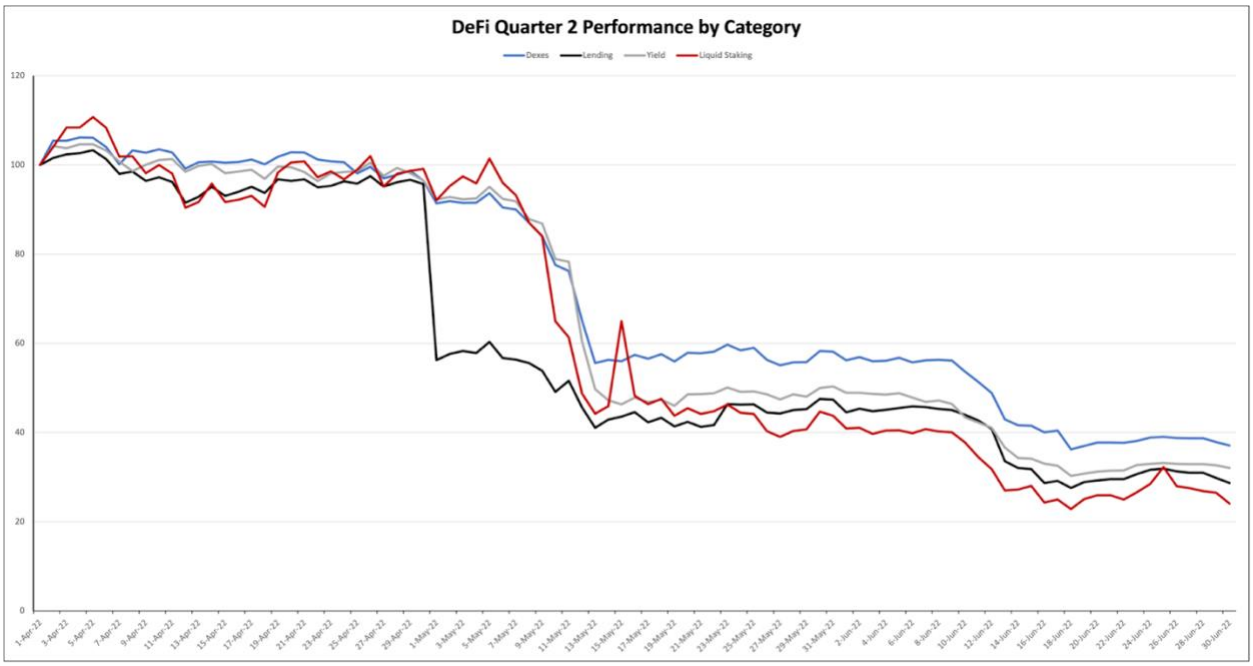
DeFi total value locked (TVL) performance

Source: Glassnode

Performance overview

- January 1, 2022 - $235.8 billion
- April 1, 2022 - $220.2 billion
- June 30, 2022 - $72.8 billion
- YTD change – (69.12%)
- Quarter 2 change – (66.94%)

DeFi quarter two performance by category

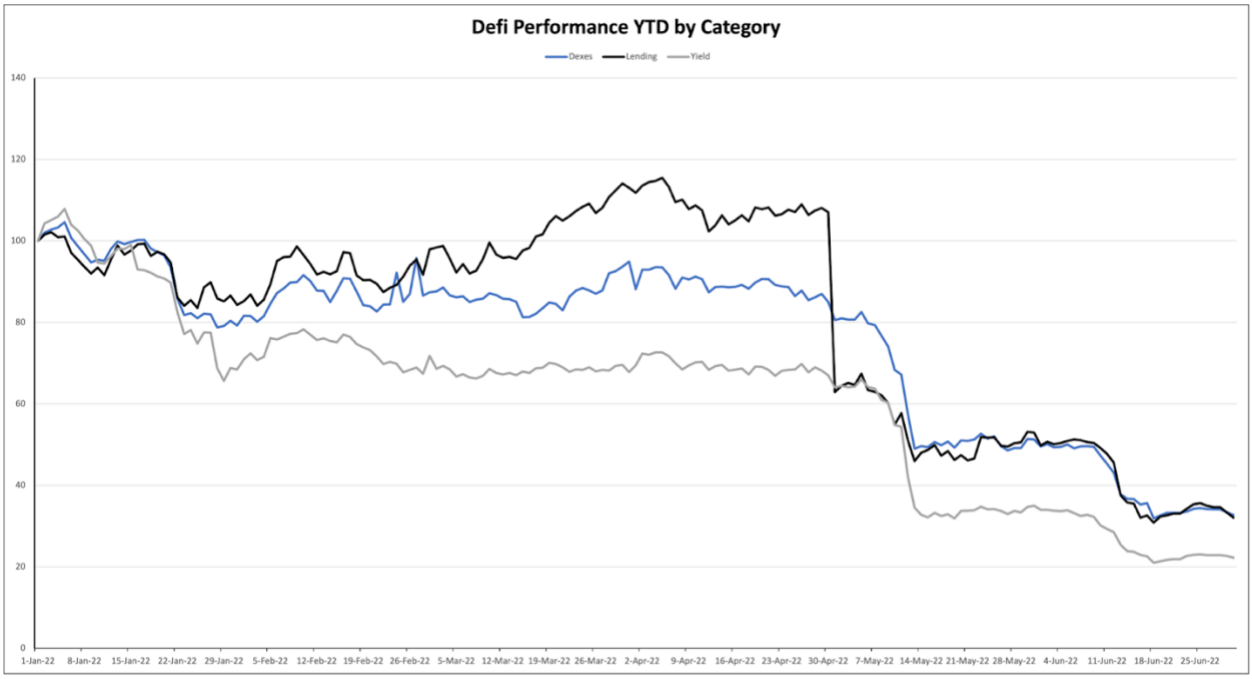


Data Source: [DeFi Llama]

Performance overview

- Dexes – (63%)/ $23.22 billion TVL
- Lending – (71%)/ $15.19 billion TVL
- Yield – (68%)/ $6.53 billion TVL
- Liquid staking – (76%)/ $5.53 billion TVL
- Cumulative DeFi – (66.94%)/ $72.8 billion

YTD performance by category



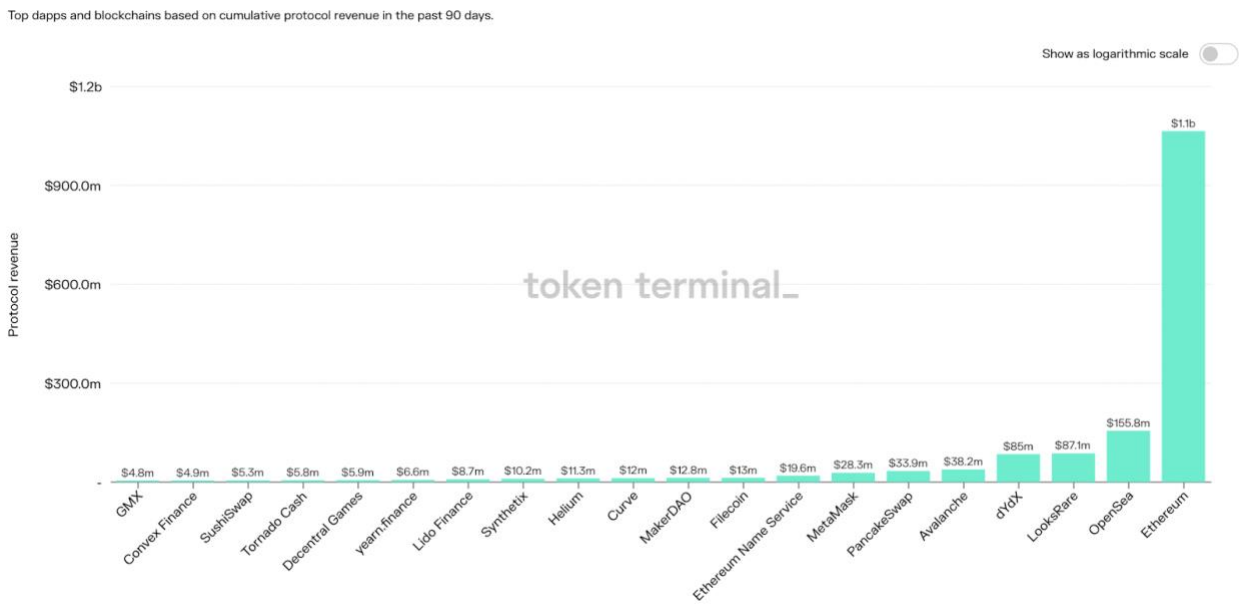
Data Source: DeFi Llama

Performance overview

- Dexes - -67%
- Lending - -68%
- Yield - -78%

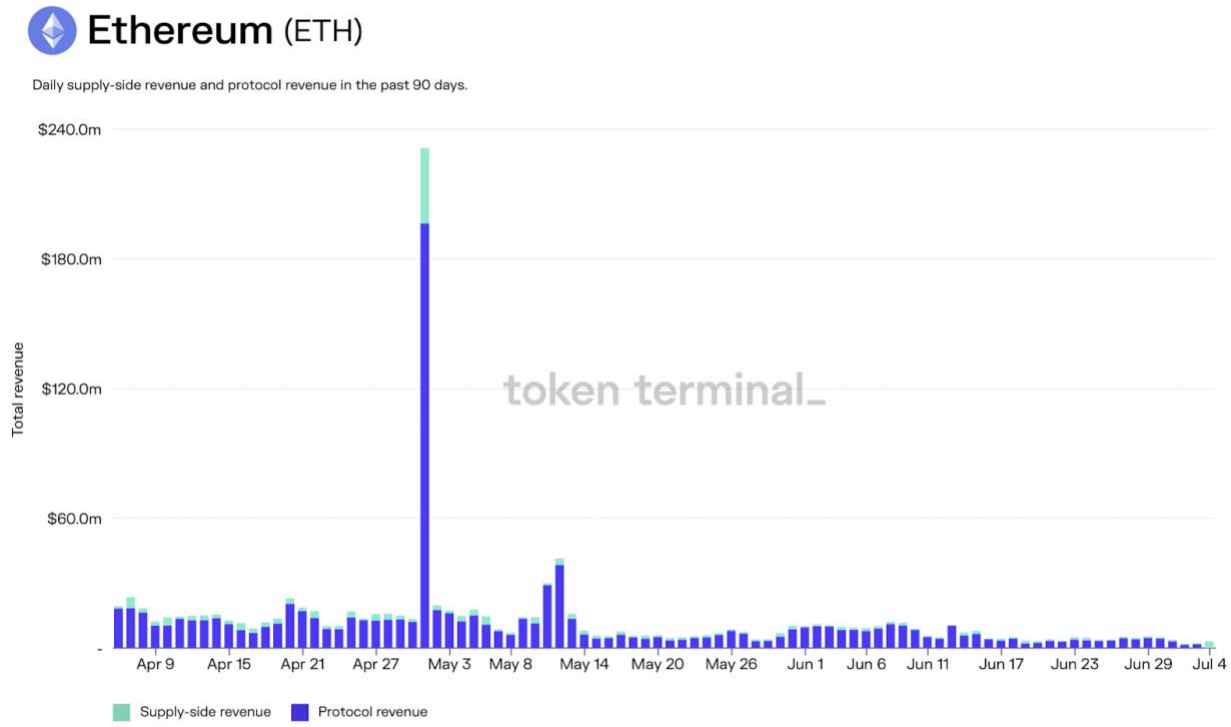
Chains and dapps by revenue

Earning users a total of $1.1 billion over the 90-day period ending June 30, Ethereum closed the quarter as the largest chain or dapp by cumulative revenue. Open Sea was the second largest, earning users around $156 million (about 14% of the revenue generated by Ethereum).



Source: Token Terminal

Most of the revenue paid out on Ethereum came from protocol revenue, or the revenue paid out to holders of ETH. In the case of Ethereum, protocol revenue is the share of transaction fees that are burned (removed from circulation) as users execute actions on the network. Burning ETH puts deflationary pressure on its supply that allows value to better accrue to the coins that remain in circulation. Supply-side revenue is paid out to those mining ETH.



Source: Token Terminal

2. Ecosystem and DeFi notable events

- Robinhood self-custody web3 wallet (1)
- CB letting users tap ETH dapps from exchange wallet (1)
- CB enables a wallet feature allowing users to trade on dexes (1)
- A16z $4.5 billion raise (1)
- UST depeg (1 | 2)
- Moonbeam (Polkadot) is adding liquid staking through Lido (1 | 2)
- APE holders want tokens on Ethereum (1)
- SEC investigating UST and Terraform (1)
- Argentina's central bank bans crypto transactions in the banking system (1)

- Optimism exploited for $20 million 2 weeks after airdrop (1)
- Circle to support USDC on Polygon (1)
- Oracle pricing error on Luna Classic leads to $2 million exploits (1 | 2)
- Odyssey event to explore L2 takes Arbitrum to new highs (1 | 2)
- STEPN's decentralized exchange becomes the largest dex on Solana (1)
- Solana NFT marketplace Magic Eden raises $130 million at a $1.6 billion valuation (1)
- Solana Mobile announces Saga web3 smartphone (1)
- Goldman Sachs wants to raise $2 billion in event of Celsius fallout (1)
- Citadel and Virtu to partner to build crypto marketplace (1)
- Paypal enables crypto transfers on the platform (1)
- Cristiano Ronaldo partners with Binance (1)
- The U.S. charges Open Sea's Nathaniel Chastain with insider trading (1)
- *What is crypto lending and what happened to Celsius? (1)

The Collapse of Terra and UST

The collapse of the Terra protocol and its native stablecoin, UST, was the most-watched event in DeFi over the last 90 days. The network encapsulated around $30 billion in value before UST's reflection of the Dollar snapped and the chain halted operations. The following is an explanation of the network's purpose, what triggered the collapse starting in early May, and what the protocol attempted to do to save the stablecoin.

Luna, UST, and how the Terra protocol failed

The relationship between UST and Luna can be viewed as a relationship between assets and liabilities on a company's balance sheet. Whereas the value of UST (the promise of $1 worth of value) in circulation is the liability, and the value of Luna (the asset that backs the promise of UST) in circulation is the asset. To properly function, the total value of UST and LUNA, or liabilities and assets, must be always in equilibrium. Maintaining the symmetry between assets and liabilities, or Luna and UST, is the central problem the Terra protocol seeks to address.

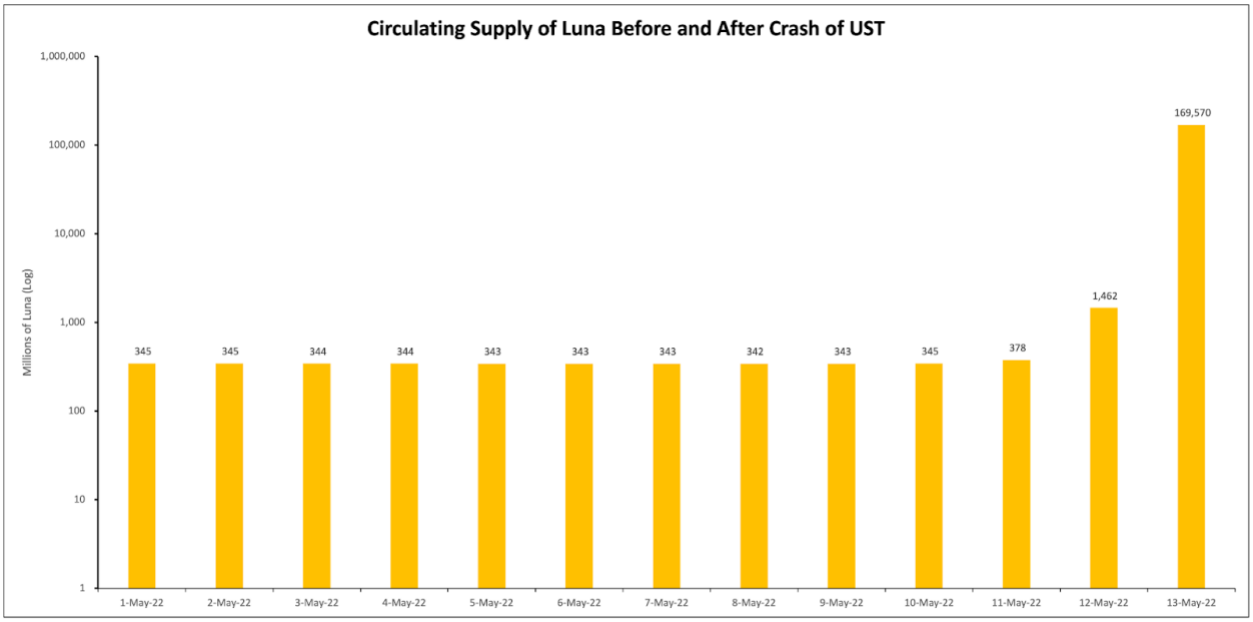
The following highlights how the relationship between UST and Luna fell out of equilibrium and ended up in a situation where assets fell short of liabilities within the protocol.

	Assets (Luna)	Liabilities (UST)
1) User buys $70 of Luna	$70	$0
2) Luna rises to $120	$120	$0
3) User mints UST with their Luna	$120	$120
4) The value of Luna drops to $100	$100	$120

There are two mechanisms the protocol leverages when assets and liabilities don't align, and UST and Luna fall out of equilibrium:

1. Buy UST with protocol reserves (demand side) or,
2. adjust the supply of Luna (supply-side).

In last week's event, the protocol was forced to hyperinflate the supply of Luna after depleting its reserves (primarily BTC) for UST failed to fill the gap between assets and liabilities. An address publicly associated with the protocol shows that the roughly 71,000 BTC it accumulated was exhausted trying to save UST. Only 313 BTC are connected to this address today. The chart below tracks the supply of Luna's hyperinflation, which was done in an attempt to bring UST back into equilibrium with the Dollar. On May 13, 2022, supply grew by nearly 11,500% in 24 hours. This was the trigger that sent the price of Luna tumbling, which created a perpetual negative feedback loop resulting in a widening gap between assets and liabilities within the protocol.



Source: Messari

In addition to the demand/ supply mechanisms that are intended to keep UST's 1:1 reflection of the dollar, there is a third line of defense in arbitrageurs trading off the UST/ Luna relationship. The role of arbitrageurs is less impactful than the aforementioned measures and only benefits UST so long as they can offset the market's sell or buy pressure on the asset that the previous measures can't counterbalance. In the case of UST collapsing, arbitrageurs had little impact given the magnitude of the pressure from the market.

Luna is the gatekeeper to UST, meaning a user must hold Luna before they can mint UST. Users can mint 1 UST for every $1 worth of Luna they hold. Upon minting UST, the Luna previously owned by the user is removed from circulation (burned). This puts upward pressure on the price of Luna depending on the magnitude of the action. The process is a revolving door, as Luna can be minted through UST; putting upward pressure on the value of UST as it is burned. Both avenues can be used to bring the protocol's balance sheet back into equilibrium depending on if UST is trending above or below the value of a dollar.

These processes allow users to carry out actions on the network but also serve as an incentive for arbitrage traders to maintain UST's reflection of the dollar. Arbitrage traders burn Luna for UST when the price of UST is below the intended $1 and burn UST for Luna when it's below $1.

The market's role in Terra's collapse

The role of arbitrageurs points to an important counteractive force faced by the protocol: the market. The protocol and its reserves are used by holders for several reasons independent of their purposes within the protocol, which range from holding or trading them for the potential of financial gain to using them for actions across the ecosystem. This means the protocol must face and counteract the actions of market participants in its job of defending UST's reflection of the dollar.

As it played out, the market made it more difficult for the protocol to revive itself. Exacerbating the situation were investors piling on BTC and Luna short positions, the forced selling of Luna and BTC via liquidations, and the panic selling of UST, Luna, and BTC. The culmination of these events, which ultimately marked the end of Terra and UST, further reduced the value of Terra reserves and the asset directly backing it and cut demand for UST.

Where is Terra now?

Terra was forked after a community vote in the weeks following its collapse. The new chain, Terra2.0 or Terra, replaced the old one (now called Terra Classic) and exists without UST. It functions similarly to other Layer 1 smart contract platforms. Many of the apps that existed on the now Terra Classic carried over to the updated chain and new apps. Despite offering similar utility and opportunities for users as Terra Classic did before the collapse, the updated network has failed to gain traction. Terra2.0 captured about $270 million in value for $2.12 per token as of June 30. This represents a near 82.5% drop since it went live in late May.

3. DeFi trends to watch: Ethereum block space war

Key takeaways

- Layer 2 supplements a blockchain's capability to scale. L2 solutions leverage alternative methods of confirming transactions that are less intensive than that of a network's base layer.
- Layer 2 lowers the direct and indirect impacts of high costs on a network and allows the base layers of networks to take the most robust measures around security and decentralization.
- The share of Ethereum transactions on mainnet has begun to diminish against transactions on Optimism and Arbitrum. Making up less than 4.5% of Ethereum transactions on average through the last 60 days of 2021, transactions on Optimism and Arbitrum now occupy more than 35%
- Average Ethereum on-chain activity through 2021 was 1.22 million transactions per day, compared with an average of 1.09 million transactions per day so far through 2022 (a near 11% decline in activity on average). Optimism and Arbitrum activity have seen about a 711% cumulative increase in activity with a 2022 average of 142,650 transactions per day.
- The percent of Ethereum gas spent on L2 transaction finalizations is up nearly 6x year over year.

Ethereum's volatile and (sometimes) expensive gas fees have opened the door for layer 2 (L2) solutions to rise in popularity among users. While Ethereum L2 has been

widely used over the last 18-plus months (peaking at a total value locked of around $7.4 billion), on-chain Ethereum transactions have been more prominent. However, there is a noticeable shift towards Ethereum L2 that is being picked up in on-chain data.

What is gas and how does it work?

Gas is the fuel needed to execute actions and processes on the Ethereum network. Different types of actions cost varying amounts of gas, depending on their complexity. For example, a simple transfer of ETH requires less gas than swapping assets on an ETH native decentralized exchange (dex). Each block on the network has an upper bound on the amount of gas it can accept (gas limit) before it becomes invalid; the gas limit of blocks changes over time. Thus, not all transactions at any point in time will end up in a single block.

Since every action on the network requires gas, and there is a limit on the amount of gas used in each block, miners confirming transactions choose those with the highest gas payment (reward) as they come through the funnel of pending transactions to be confirmed. The rest get put in line to be confirmed later or don't get selected at all (failed transaction). Thus, the gas acts as a user's bid for block space to get their transactions executed. This dynamic (referred to as a single global state fee market) allows for a more secure means of confirming actions on a network by limiting potential points of failure or exploitation. However, it results in expensive network fees when an increased number of users are bidding to get their transactions confirmed.

What is layer 2?

Layer 2 supplements a blockchain's capability to scale. L2 solutions leverage alternative methods of confirming transactions that are less intensive than that of a network's base layer (or layer 1). This makes transactions and processes cheaper and faster by using a framework that exists outside of a network's layer 1. Actions executed on a network's layer 2 are often referred to as "off-chain" transactions for this reason. They are conducted without having to be recorded on or acknowledged by a network's layer 1 (or recorded "on-chain") until they need to be finalized. So, a user can execute any number of transactions off-chain (cheap fees and fast confirmation) while only having to pay for a single on-chain transaction (higher fees and slower confirmation) upon finalization.

Importance of L2

Layer 2 solutions are important for two reasons:

1. They lower the direct and indirect impacts of high costs on a network and,
2. they allow the base layers of networks to take the most robust measures around security and decentralization.

Network costs include time (how long it takes to confirm a transaction) and money (fees to transact). Networks with high costs pose barriers to entry for users and dampen productivity. This doesn't align well with the purpose of the technology and can stunt the growth and reach of a network. L2 solutions limit the impact of high costs by lowering barriers to entry for users and cutting costs.

Furthermore, L2 solutions allow a network's base layer to focus on security and decentralization without compromise. The trade-off of a robust layer 1 is often high costs on the fronts of time and/ or money. L2 allows networks to take appropriate measures for a secure base layer while allowing its greater ecosystem to gain from a more efficient operation. L2 finalizes transactions on a network's base layer, allowing users to benefit from the security and decentralization of a network's L1.

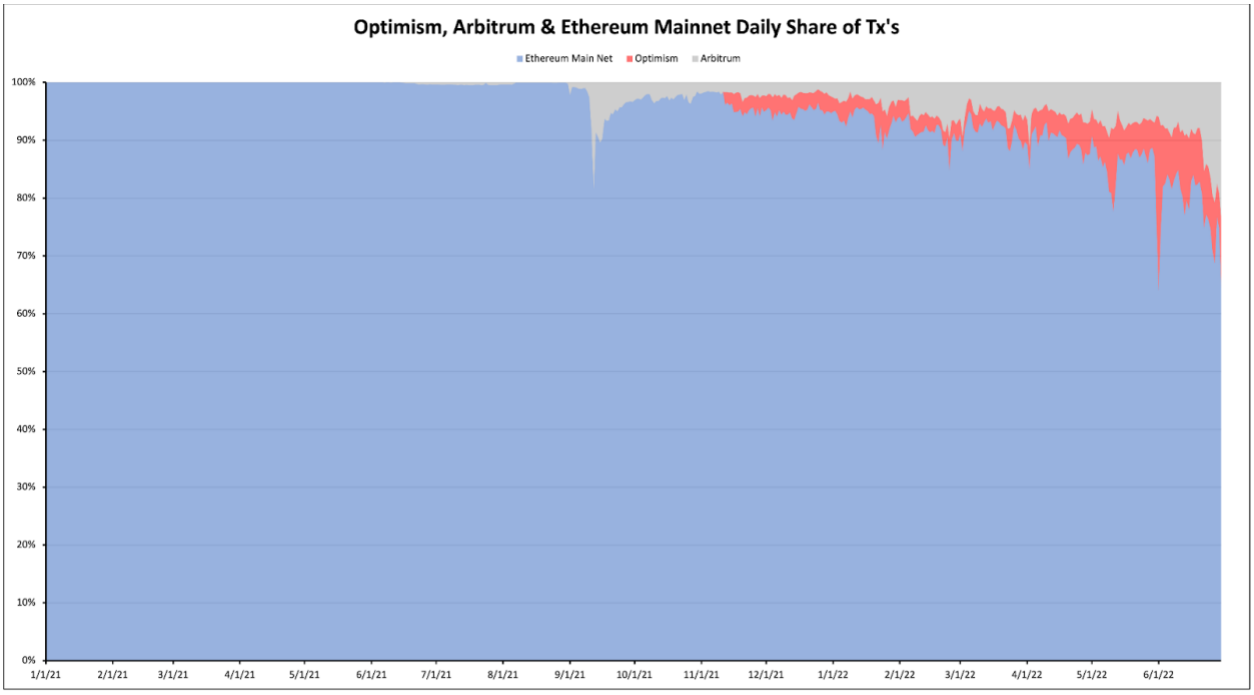
The culmination of these points allows new use cases to be developed. The higher throughput, lower fees, and new technology of L2 equates to better user experiences and the development of new applications.

The block space war

A clear trend in the use of Ethereum L2 solutions is forming, which suggests a battle between L2 solutions and on-chain executions for Ethereum block space is underway. Ethereum transaction share and the amount of gas used by L2 solutions to finalize transactions on-chain highlight this case.

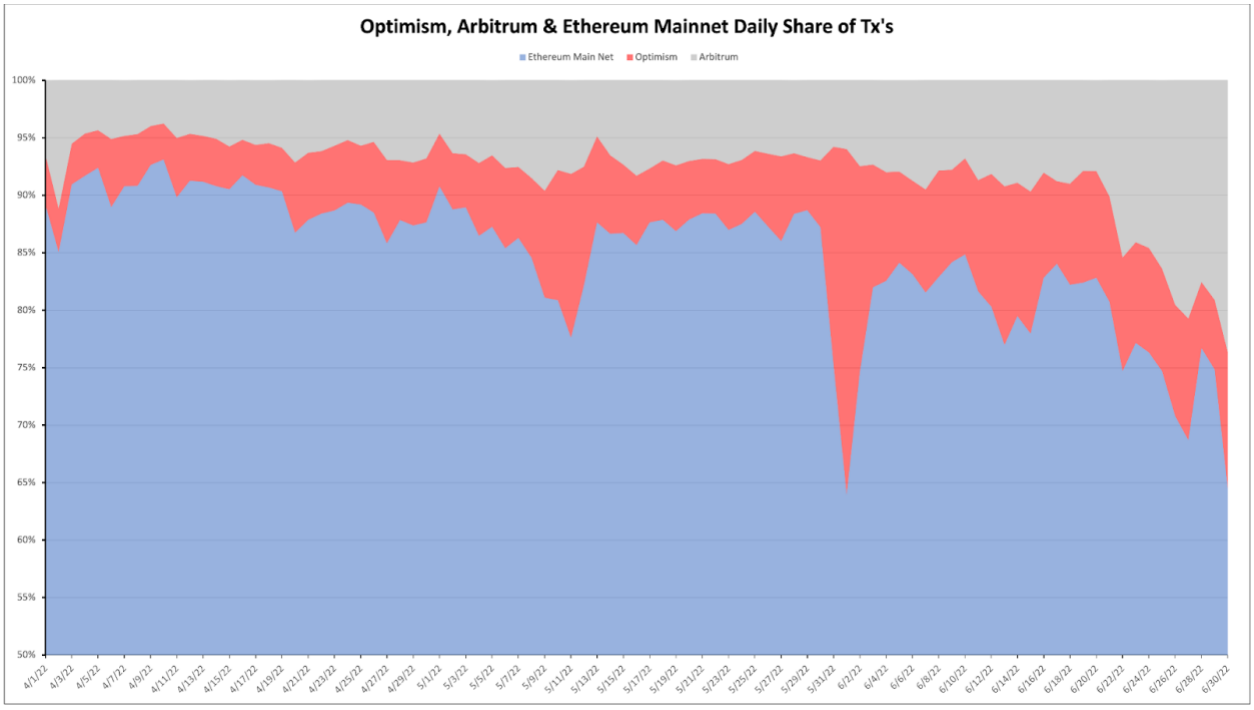
Ethereum transaction share

The share of Ethereum transactions on the mainnet has begun to diminish against transactions on Optimism and Arbitrum, two of the leading Ethereum L2 solutions. Making up less than 4.5% of Ethereum transactions on average through the last 60 days of 2021, transactions on Optimism and Arbitrum now occupy more than 35%. This is a near 8x jump in Optimism and Arbitrum transactions relative to the number of on-chain Ethereum transactions over the last six months.



Sources: Glassnode, Arbiscan, Optimistic Etherscan

The share of Optimism and Arbitrum activity relative to that of mainnet accelerated over the last quarter. Starting the first week of April with an average share of 10.12%, the two solutions had an average of 28% to end the final week of the quarter. The chart below covers the share of transactions over the last three months (Note: the Y-axis starts at 50% to better visualize the growth in L2 transaction share).

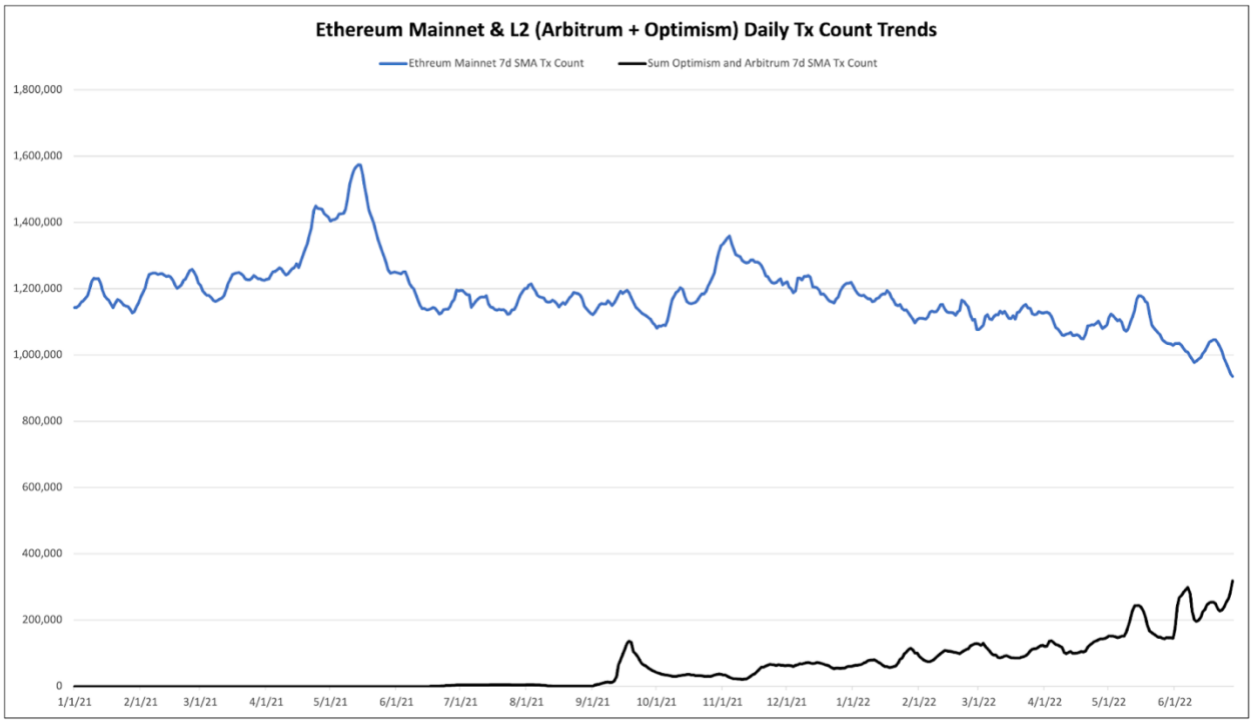


Sources: Glassnode, Arbiscan, Optimistic Etherscan

Assessing the outright number of transactions executed using these two solutions and the number of on-chain Ethereum transactions paints a clearer picture of what this trend looks like. While users are opting to use Optimism and Arbitrum more, the number of daily transactions on the mainnet is seeing a steady decline. This is a sign that L2 is beginning to absorb Ethereum activity that would otherwise have been executed on the mainnet.

Average Ethereum on-chain activity through 2021 was 1.22 million transactions per day, compared with an average of 1.09 million transactions per day so far through 2022 (a near 11% decline in activity on average). Optimism and Arbitrum activity have seen about a 711% cumulative increase in activity with a 2022 average of 142,650

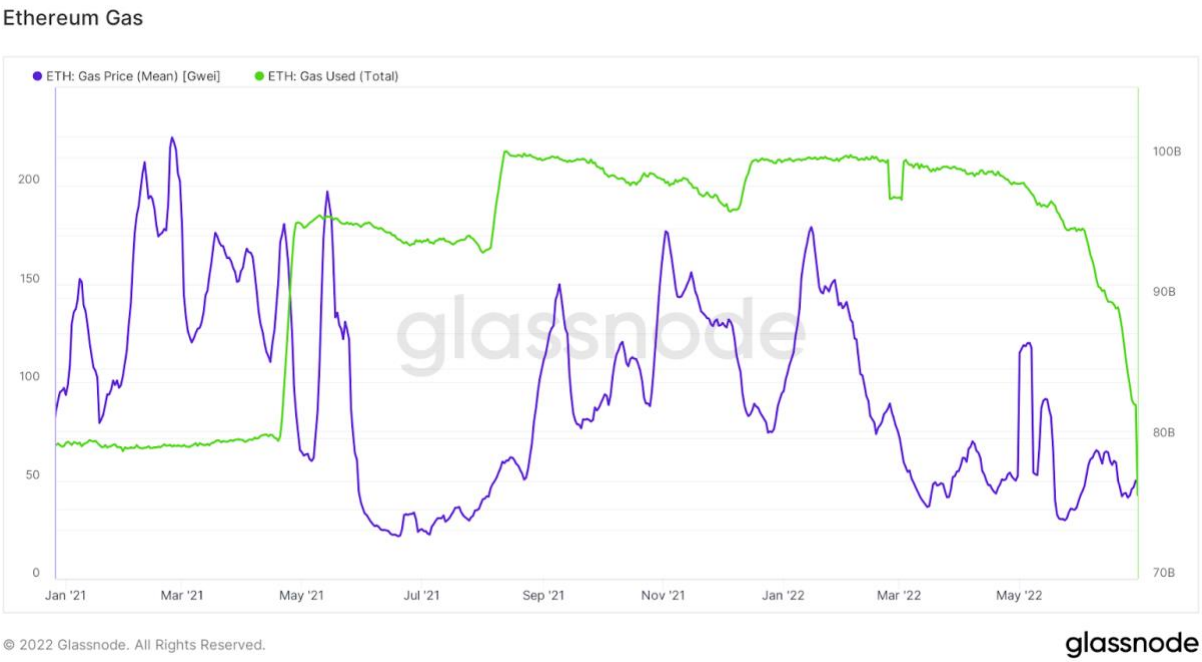
transactions per day; compared to a cumulative 2021 average of 17,600 transactions per day. Strides made in development, and more applications and assets being made available over the last year contribute to the growth experienced by L2.



Sources: Glassnode, Arbiscan, Optimistic Etherscan

This dynamic is unfolding even as the cost to use Ethereum mainnet is lower than it has been for most of the last 18 months (less monetary incentive to use L2). This is due, in part, to a decline in the use of L1 and, by extension, demand for block space from L1. Gas has been higher than the current average price for 80%+ of the last year and a half. Combining this with the strong and sustained growth in L2 highlights that the trends in L2 use are coming on independently of high main net costs, which suggests that L2 use in the future can have demand beyond users wanting to avoid

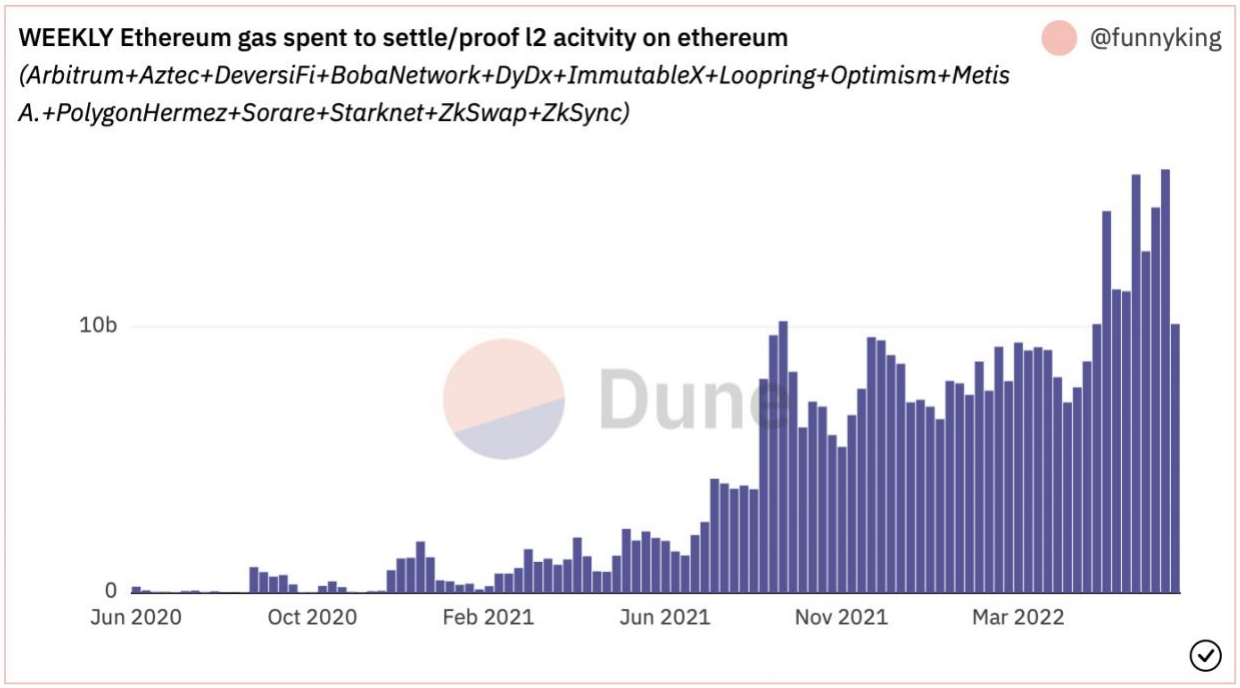
high fees. The rolling correlation between gas prices and L2 use has been mostly negative and insignificant over the last year. This serves as a strong point of support for the future continuation of L2 growth trends as gas prices remain low.



Source: [Glassnode]

Gas is used to finalize L2 transactions on-chain

Gas spent to finalize L2 transactions on the Ethereum mainnet has seen significant growth over the last year. The chart below highlights this trend, including a number of the major L2 solutions and applications across Ethereum every week. Gas used finalizing L2 transactions on mainnet is up 44% YTD and was up as much as 127% in late June.

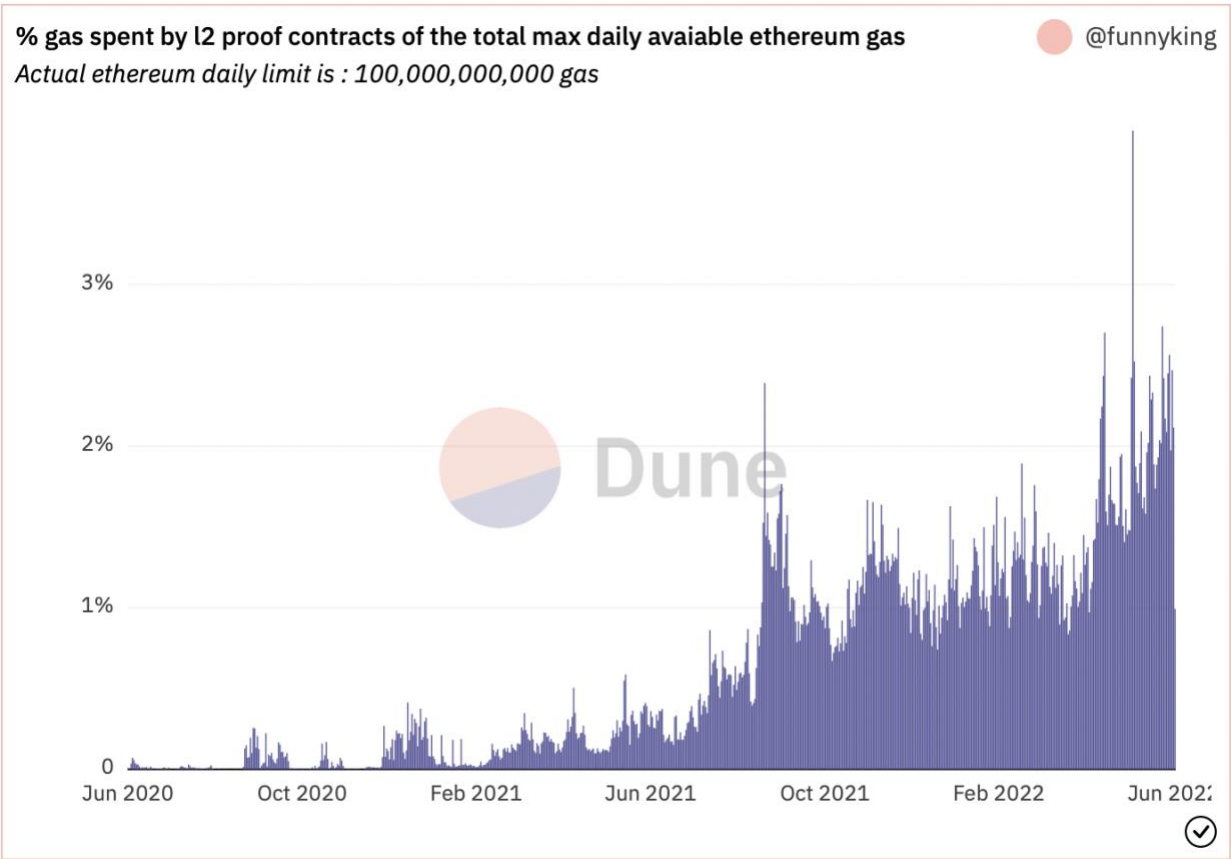


Source: Dune

The following chart highlights the same information as the one above, but from the perspective of a percent of Ethereum's daily gas limit. This perspective (Ethereum's network-wide capacity to operate as the benchmark) better visualizes the mounting block space war, where L1 and L2 are competing for a finite amount of space to store data. It also highlights the strength of L2 adoption by adding relativity to its competitor, L1.

The percent of Ethereum gas spent on L2 transaction finalizations is up nearly 6x year over year. It has grown from averaging between .2% and .5% daily in June 2021, to 2% to 4% in June 2022. This means data produced from L1 use has 1.8% to 3.5% less block space in aggregate to be stored. L1 will have less space to store data and the

competition between L1 and L2 can get more intense as L2's share of Ethereum block space grows.



Source: Dune

What could happen?

The ebb and flow of the block space war will be reflected in gas prices if L2 demand continues to grow. Because block space has an inelastic supply, the competing demand from L1 and L2 will be picked up by gas prices. From this, several conclusions as to how the war might play out can be drawn.

Gas prices experience less pressure

There are two scenarios where gas prices can experience less pressure: 1) L2 can gradually absorb L1 activity or 2) L1 activity flatlines or trends slightly up as L2 grows.

Scenario one is similar to the current dynamic, where L2 activity is growing and L1 activity is declining. Near-term conditions are conducive to this idea as Ethereum users and holders of ETH, and cryptocurrencies in general, exit the market and/ or vacate the network. Fewer users on-chain could equate to less activity on-chain as L2 demand grows among those who are stuck around. This is a beneficial outcome for both L1 and L2 users because it puts less pressure on gas prices as competition for block space is less intense. The same outcome can occur if L1 use flat lines or trends up to a smaller degree.

Gas prices experience more pressure

There's one primary scenario where gas prices go up: demand from L1 and L2 grows in tandem. If demand from both layers rises together, Ethereum could see elevated gas prices as competition for block space intensifies. Gas is cheaper than it has been over the last 18 months, so the incentive to completely abandon L1 because of cost isn't there. This could bolster demand from L1 into strong L2 use trends.

ETH users have historically maintained a high tolerance for gas prices. There could be sustained demand from L1 even if gas prices were to increase sharply, further fueling the competition between L1 and L2. Ethereum has always been the biggest and among the most used smart contract platforms. Users hardly deviated, if at all, over the last two years as gas prices soared and alternative networks were developed. The

following charts compare average gas prices to the number of active addresses on-chain and the percent of ETH supply being moved into smart contracts. Both comparisons highlight Ethereum users' high tolerance for gas prices.

Source: [Glassnode]

Source: Glassnode

Even though the recent dynamic behind L2 growth suggests fees aren't the biggest contributor to adoption (mostly negative and insignificant relationship between L2 growth and gas prices over the last year), users may elect to use L2 more if competition escalates and gas prices squeeze higher.

4. Defi trends to watch: stETH decoupling and why 1 ETH ≠ 1 stETH

Key takeaways

- Liquid staking is a feature that makes staked value more liquid. It does so by creating proxies of staked assets. The derivatives hold similar utility to the

underlying staked assets and can be deployed alternatively all while the base asset is being staked.

- Liquid staking can reduce opportunity costs for networks choosing to primarily benefit from high security or ecosystem growth by bringing liquidity to staked supply.
- Liquid staking on Ethereum works as it would on any other network, but there is one distinct difference: ETH locked in staking contracts is inaccessible until an unknown point after the "merge."
- The value of stETH cratered; some groups were forced to sell as they were liquidated and investors requested their assets back, and some holders panic sold.
- Curve's stETH/ETH liquidity pool held about $640 million worth of stETH and ETH on the last day of June. The cumulative size of the pool was broken up into roughly 148,400 ETH (23.89% of the pool) and 472,700 stETH (76.11% of the pool), or an ETH to stETH ratio of .31. This is among the most imbalanced the pool has been in its history and the least amount of value it has held in over a year.
- The concept of time value of money (TVM) and the rolling disparity between the productivity of stETH and ETH justifies why stETH can trade at a premium or discount to ETH until withdrawals are activated.

stETH has been trading at a discount to ETH for most of the last two months. Most are inclined to think the two assets must trade at parity to each other, or that discounted stETH has negative impacts on every user holding the asset. However, this isn't the case. Understanding what liquid staking is, why the parity between the

assets broke, and how the decoupling impacts holders can offer insight into the future of stETH and liquid staking on the network.

What is liquid staking?

The inaccessibility of coins that are being staked renders their value illiquid when it could otherwise be deployed elsewhere in an ecosystem. This slows ecosystem growth, as it limits the extent to which value locked can be stationed. It puts holders in a position where they are constantly evaluating the opportunity cost of staking and using their assets alternatively. Volatility becomes present in network security (staking relationship with chain security) and network growth as users navigate the opportunity cost.

Liquid staking is a feature that makes staked value more liquid. It does so by creating proxies of staked assets. The derivatives hold similar utility to the underlying staked assets and can be deployed alternatively all while the base asset is being staked. This incentivizes users to stake by default (benefit to network security) while earning yield as they would by previously choosing to not stake (benefit to ecosystem strength and growth). Although it is still developing, liquid staking can reduce opportunity costs for networks choosing to primarily benefit from high security or ecosystem growth by bringing liquidity to staked supply.

Why is liquid staking on Ethereum different from other networks?

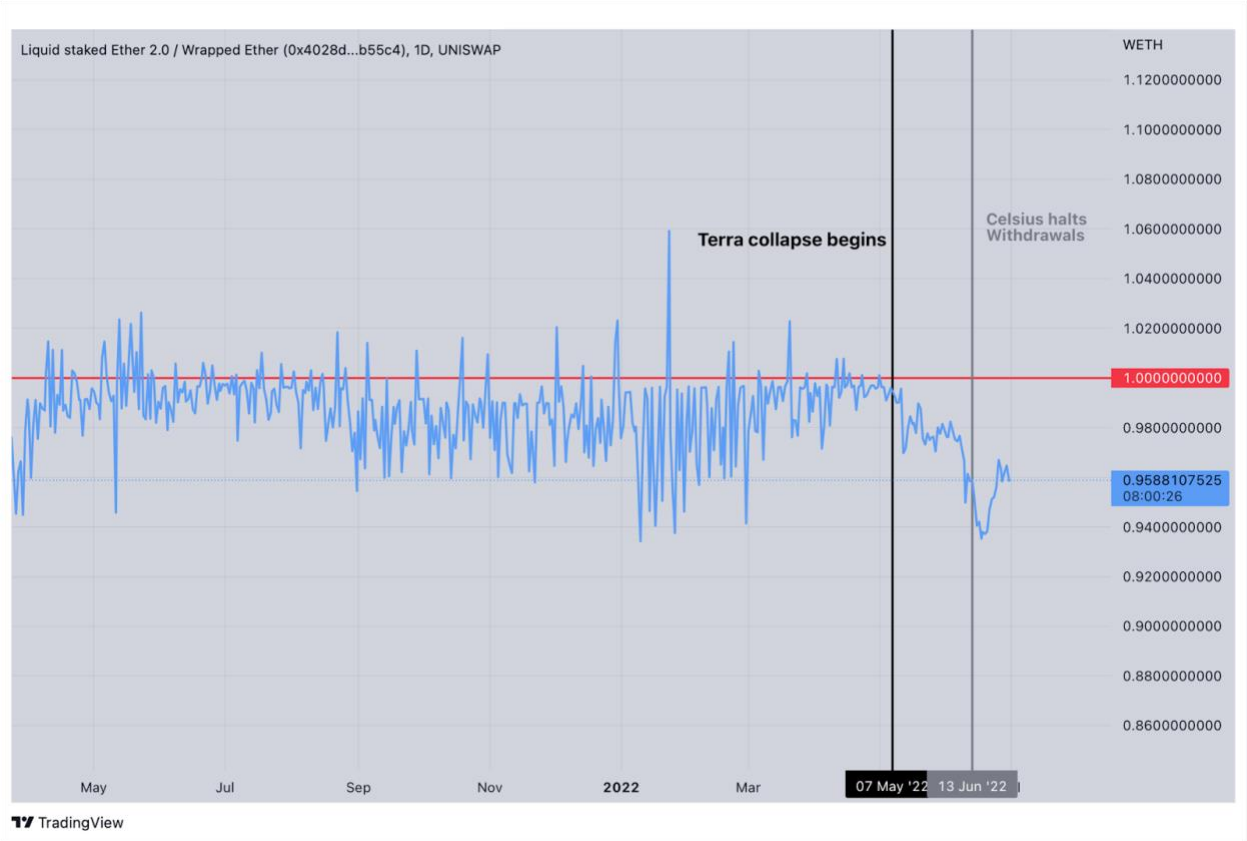
Liquid staking on Ethereum works as it would on any other network (i.e. users stake their assets and receive a derivative in return), but there is one distinct difference:

ETH locked in staking contracts is inaccessible until an unknown point after the "merge." The merge refers to the point at which Ethereum successfully upgrades to its new version that includes a proof of stake (PoS).

This means users can stake their ETH but can't reclaim it (or the rewards if not liquid staking) from staking contracts until some point down the line. This creates a secondary market around stETH where the holders can assign a value that is greater than or less than 1 ETH. This is possible because stETH can't yet redeem an equal amount of ETH from staking contracts. On other networks that support liquid staking, such as Solana or Polkadot, derivative assets can be freely used to unlock staked assets. As a result, secondary markets around the synthetic assets on these networks don't need to exist.

Why is stETH/ETH breaking down?

The breakdown in stETH/ETH began on May 4, 2022, around the same time the UST peg broke and Terra collapsed. Many projects, funds, and users hold stETH and use it for several reasons. Some use it for leverage and some for other yield-generating strategies while they wait for the merge to be complete. As the value of stETH cratered some groups were forced to sell as they were liquidated and investors requested their assets back, and some holders panic sold. The choir of sellers forced large amounts of stETH into the market and withdrew their ETH which drained liquidity as more sellers dumped their stETH. The chart below shows the trend in the value of stETH relative to ETH and marks the key points that lead to the breakdown.



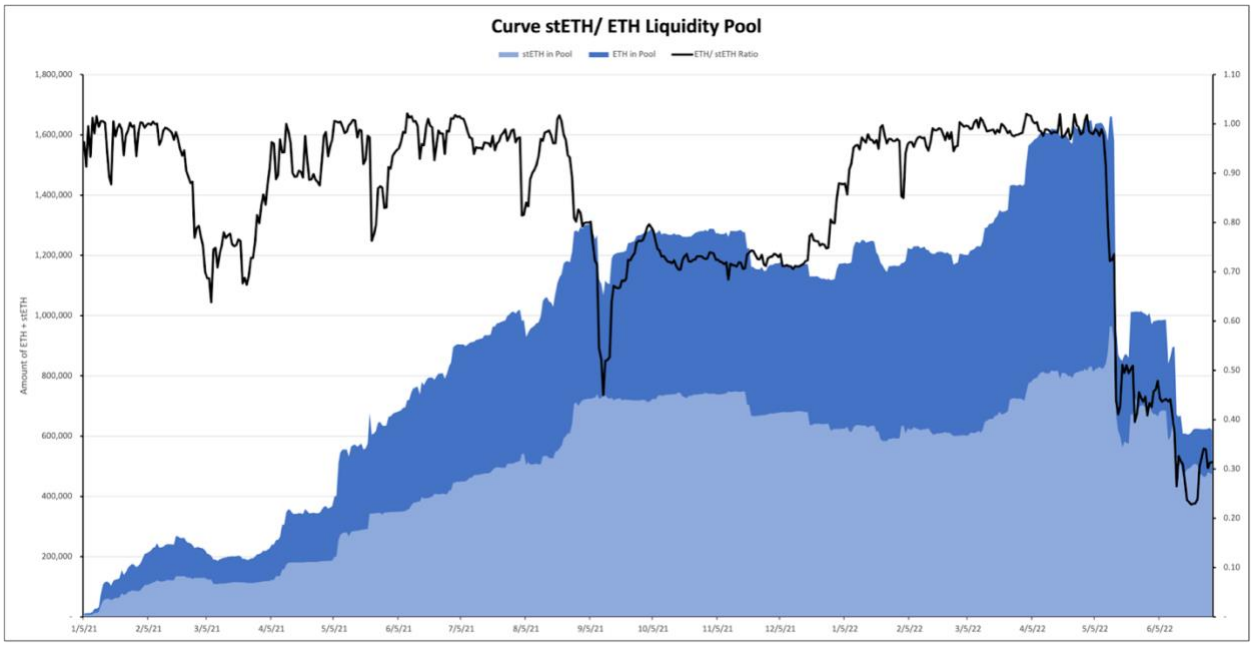
Source: Tradingview

Liquidity overview

stETH is tradable on decentralized exchanges (dexes). The pools of assets behind dexes point to the liquidity crunch seen with stETH. The size and make-up of these pools highlight the level of stETH liquidity as the market navigates the decoupling.

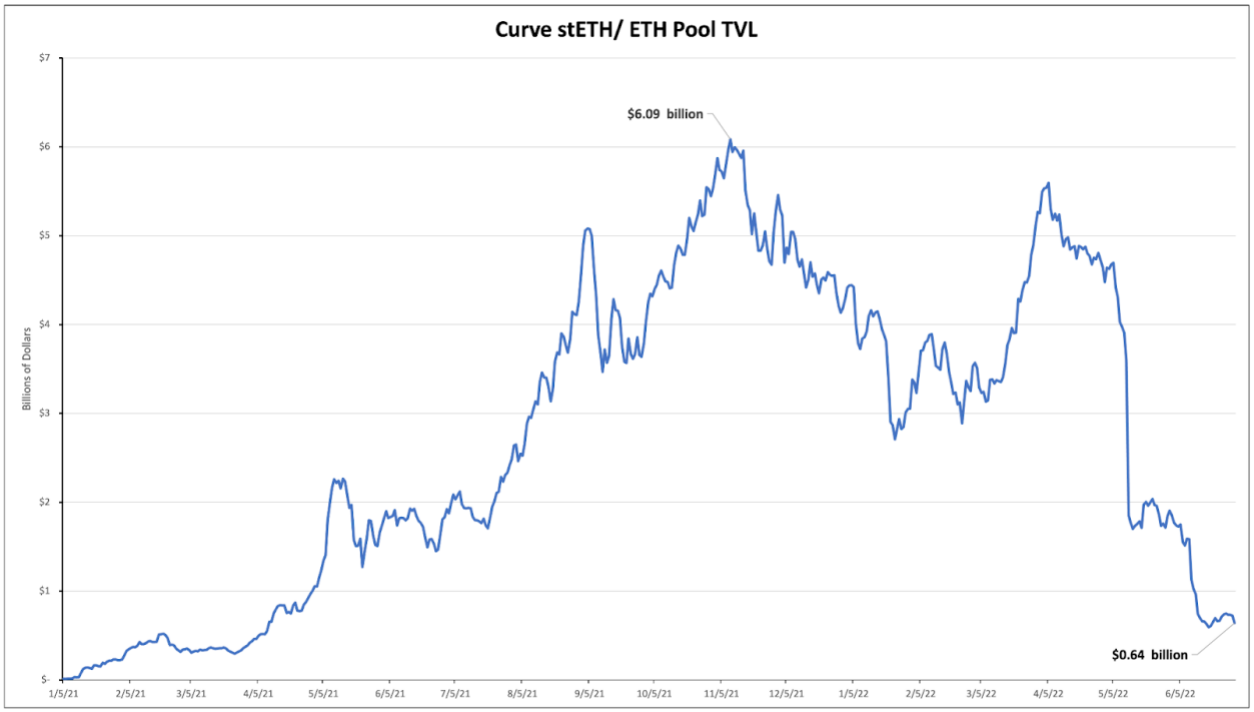
Curve's stETH/ETH liquidity pool held about $640 million worth of stETH and ETH on the last day of June. The cumulative size of the pool was broken up into roughly 148,400 ETH (23.89% of the pool) and 472,700 stETH (76.11% of the pool),

or an ETH to stETH ratio of .31. This is among the most imbalanced the pool has been in its history and the least amount of value it has held in over a year. The disproportion and size of the pool show there may not be enough liquidity to meet all of the demand for stETH withdrawals into ETH. The chart below highlights the historical proportion of ETH and stETH in the curve liquidity pool.



Source: Dune

The total value locked (TVL) of the stETH/ ETH liquidity pool on Curve has dropped significantly over the last month. After reaching an all-time high TVL in dollar terms in November 2021, the pool has lost 89.5% of its value. Three Arrows Capital (3AC) was among the bigger entities pulling their stETH from the pool. The group withdrew 127,762 stETH from the pool on May 11.



Source: Dune

The problem with this imbalance is that there isn't enough ETH available to be withdrawn in the event liquidations or panic force too many holders to swap their stETH. Using Celsius as an example: the group is similar to a bank in that they receive deposits from users and deploy them into various strategies to earn yield. Among their strategies was receiving ETH deposits and liquid staking them through Lido.

The group is estimated to have over 400,000 stETH (indicated by the company's public wallet) that is vulnerable to being sold. On June 30 there were only 148,378 ETH in the Curve pool, meaning Celsius wouldn't be able to withdraw all of the stETH they own for ETH even after draining the liquidity for all of the ETH it has. It also means stETH price would crumble even if Celsius were to swap a portion of

their stETH. Given the current dynamics of the pool, Celsius selling a quarter of their stETH (125,000 stETH) led to the asset trading at a near 16% discount.

What does this mean for stETH holders?

Despite all stETH issued being backed 1:1 by ETH in staking contracts, the price of stETH is not "pegged" to ETH. There isn't a mechanism in place outlining or a promise of stETH trading at parity with ETH. It is up to the secondary market to determine the price of stETH because stETH is simply the key to unlocking an equal amount of ETH in staking contracts when the merge launches on the mainnet. The post-merge ability to withdraw 1 ETH from staking contracts with 1 stETH is the primary market.

The relationship between the post-merge primary market and the secondary market means the current price of stETH only caters to a portion of holders, so long as the option to eventually redeem ETH for stETH is on the table. These holders are 1) those using their stETH for leverage and 2) those who want to swap out of their stETH or liquid stake their ETH right now. Any holder who was previously holding and waiting for the merge is unaffected by the decoupling.

Decoupling impact on leveraged holders

The decoupling can liquidate holders who used their stETH as collateral for leverage. The extent to which they are levered determines how low stETH can go before that point. stETH trading at a discount to ETH means their collateral shrinks against the denomination of the loan (ETH). This is how liquidations occur. The loan to value

(LTV) declines until borrowers are squeezed out of their position, forcing the stETH collateral to be pushed back into the market at whatever price it is willing to offer. Their collateral grows against the denomination of the loan if stETH is trading above 1 ETH. This pushes the LTV down and allows borrowers to redeem some of their collateral if they choose to.

Decoupling impact on holders wanting to swap stETH or liquid stake ETH

Holders wanting to swap their stETH will have to suffer losses, so long it is trading at a discount to ETH. It's part of the price of not holding to the merge when the primary market opens.

Holders wanting to liquid stake more ETH are incentivized to do so differently than they might have in the past. Liquid staking platforms, like Lido, are issuers of stETH. The platforms can only offer holders 1 stETH per 1 ETH deposited as a result. Holders who want to liquid stake more ETH are losing when they go through staking platforms instead of swapping through a dex if stETH is discounted against ETH. In turn, the market can see less stETH being issued through liquid staking platforms and more stETH being purchased through protocols like 1inch and Uniswap (because on Lido: 1 ETH = 1 stETH, and on 1inch 1 ETH = > 1 stETH).

Justifying why stETH and ETH don't have to trade at parity today

The concept of time value of money and the rolling disparity between the productivity of stETH and ETH justifies why stETH can trade at a premium or discount to ETH until withdrawals are activated.

We know the future value (FV) of stETH at the merge ($t = x$) is 1 ETH. Thus, 1 stETH = 1 ETH at $t = x$. For example, a holder can earn .1 ETH in yield between now and the merge by simply holding ETH (FV of 1.1 ETH at $t = x$). Instead, they can demand stETH at a price today (present value or PV) which allows them to have the same amount of ETH upon withdrawals from staking contracts being activated.

The discount rate to determine PV in this instance is the difference between the yield earned (productivity of) from holding just stETH and the yield they could otherwise be earning from holding just ETH. Or *Estimated ETH yield - Estimated stETH yield*. In this light, a stETH PV < 1 ETH when they can earn a higher yield with ETH elsewhere or a stETH PV > 1 ETH when staking yield is higher than the yield earned with ETH elsewhere is justified.

High-level example

The following is a perspective of how stETH and ETH can trade at premiums and discounts to each other in the secondary market, and don't have to be equal until the

merge is completed. To show this, the below assumptions are made:

- The merge will go live on mainnet and 1 stETH can withdraw 1 ETH from staking contracts at $t = x$
- Holders are seeking to maximize the amount of ETH they can stake or redeem when the merge goes live at $t = x$
- Holders are solely seeking exposure to and yield opportunities around stETH and ETH
- 1 period in the analysis is equal to 1 month
- Fiat values are ignored

The floating assumption that dictates stETH price is the number of months until the merge is complete and 1 stETH is redeemable for 1 ETH in staking contracts (x variable in $t = x$). This variable will vary from holder to holder.

The following table assigns a present value to stETH (in ETH terms) using the above assumptions and a positive delta between ETH and stETH productivity. The table assumes withdrawals will be activated in up to 12 months and up to a discount rate of 10%.

	1	2	3	4	5	6	7	8	9	10	11	12
1%	0.999	0.998	0.998	0.997	0.996	0.995	0.994	0.993	0.993	0.992	0.991	0.990
2%	0.998	0.997	0.995	0.993	0.992	0.990	0.988	0.987	0.985	0.983	0.982	0.980
3%	0.998	0.995	0.993	0.990	0.988	0.985	0.983	0.980	0.978	0.975	0.973	0.970
4%	0.997	0.993	0.990	0.987	0.983	0.980	0.977	0.974	0.970	0.967	0.964	0.961
5%	0.996	0.992	0.988	0.984	0.979	0.975	0.971	0.967	0.963	0.959	0.955	0.951

6%	0.995	0.990	0.985	0.980	0.975	0.971	0.966	0.961	0.956	0.951	0.947	0.942
7%	0.994	0.988	0.983	0.977	0.971	0.966	0.960	0.955	0.949	0.943	0.938	0.933
8%	0.993	0.987	0.980	0.974	0.967	0.961	0.955	0.948	0.942	0.936	0.930	0.923
9%	0.993	0.985	0.978	0.971	0.963	0.956	0.949	0.942	0.935	0.928	0.921	0.914
10%	0.992	0.984	0.975	0.967	0.959	0.951	0.944	0.936	0.928	0.920	0.913	0.905

The table below shows the same scenarios but from the perspective of a percent discount to ETH.

	1	2	3	4	5	6	7	8	9	10	11	12
1%	-0.08%	-0.17%	-0.25%	-0.33%	-0.42%	-0.50%	-0.58%	-0.67%	-0.75%	-0.84%	-0.92%	-1.00%
2%	-0.17%	-0.33%	-0.50%	-0.67%	-0.84%	-1.00%	-1.17%	-1.34%	-1.51%	-1.68%	-1.85%	-2.02%
3%	-0.25%	-0.50%	-0.75%	-1.00%	-1.26%	-1.51%	-1.76%	-2.02%	-2.27%	-2.53%	-2.78%	-3.04%
4%	-0.33%	-0.67%	-1.00%	-1.34%	-1.68%	-2.02%	-2.36%	-2.70%	-3.04%	-3.38%	-3.73%	-4.07%
5%	-0.42%	-0.84%	-1.26%	-1.68%	-2.10%	-2.53%	-2.95%	-3.38%	-3.81%	-4.25%	-4.68%	-5.12%
6%	-0.50%	-1.00%	-1.51%	-2.02%	-2.53%	-3.04%	-3.55%	-4.07%	-4.59%	-5.11%	-5.64%	-6.17%
7%	-0.58%	-1.17%	-1.76%	-2.35%	-2.95%	-3.55%	-4.16%	-4.76%	-5.37%	-5.99%	-6.61%	-7.23%
8%	-0.67%	-1.34%	-2.01%	-2.69%	-3.38%	-4.07%	-4.76%	-5.46%	-6.16%	-6.87%	-7.58%	-8.30%
9%	-0.75%	-1.51%	-2.27%	-3.03%	-3.81%	-4.59%	-5.37%	-6.16%	-6.96%	-7.76%	-8.57%	-9.38%
10%	-0.83%	-1.67%	-2.52%	-3.38%	-4.24%	-5.11%	-5.98%	-6.86%	-7.75%	-8.65%	-9.56%	-10.47%

In this case of yield earned from staking being greater than the yield from ETH, the discount rate is negative and stETH would trade at a premium to ETH. The following table uses the same durations as the one above but accounts for the negative discount rate.

	1	2	3	4	5	6	7	8	9	10	11	12
-1%	1.001	1.002	1.003	1.003	1.004	1.005	1.006	1.007	1.008	1.008	1.009	1.010
-2%	1.002	1.003	1.005	1.007	1.008	1.010	1.012	1.013	1.015	1.017	1.019	1.020
-3%	1.003	1.005	1.008	1.010	1.013	1.015	1.018	1.020	1.023	1.025	1.028	1.030
-4%	1.003	1.007	1.010	1.013	1.017	1.020	1.024	1.027	1.031	1.034	1.037	1.041
-5%	1.004	1.008	1.013	1.017	1.021	1.025	1.030	1.034	1.038	1.043	1.047	1.051
-6%	1.005	1.010	1.015	1.020	1.025	1.031	1.036	1.041	1.046	1.051	1.057	1.062
-7%	1.006	1.012	1.018	1.024	1.030	1.036	1.042	1.048	1.054	1.060	1.066	1.073
-8%	1.007	1.013	1.020	1.027	1.034	1.041	1.048	1.055	1.062	1.069	1.076	1.084
-9%	1.008	1.015	1.023	1.031	1.038	1.046	1.054	1.062	1.070	1.078	1.086	1.095
-10%	1.008	1.017	1.025	1.034	1.043	1.051	1.060	1.069	1.078	1.087	1.096	1.106

The table below shows the same scenarios but from the perspective of a percent premium to ETH.

	1	2	3	4	5	6	7	8	9	10	11	12
-1%	0.08%	0.17%	0.25%	0.33%	0.42%	0.50%	0.58%	0.66%	0.75%	0.83%	0.91%	1.00%
-2%	0.17%	0.33%	0.50%	0.67%	0.83%	1.00%	1.16%	1.33%	1.49%	1.65%	1.82%	1.98%
-3%	0.25%	0.50%	0.75%	1.00%	1.24%	1.49%	1.74%	1.98%	2.23%	2.47%	2.72%	2.96%
-4%	0.33%	0.67%	1.00%	1.33%	1.66%	1.98%	2.31%	2.64%	2.96%	3.28%	3.61%	3.93%
-5%	0.42%	0.83%	1.24%	1.66%	2.07%	2.47%	2.88%	3.29%	3.69%	4.09%	4.49%	4.89%
-6%	0.50%	1.00%	1.49%	1.99%	2.48%	2.96%	3.45%	3.93%	4.41%	4.89%	5.36%	5.84%
-7%	0.58%	1.16%	1.74%	2.31%	2.88%	3.45%	4.01%	4.57%	5.13%	5.68%	6.23%	6.78%

-8%	0.67%	1.33%	1.99%	2.64%	3.29%	3.93%	4.57%	5.21%	5.84%	6.47%	7.09%	7.71%
-9%	0.75%	1.49%	2.23%	2.97%	3.69%	4.42%	5.13%	5.84%	6.55%	7.25%	7.95%	8.64%
-10%	0.83%	1.66%	2.48%	3.29%	4.10%	4.90%	5.69%	6.48%	7.25%	8.03%	8.79%	9.55%

The delta between the yield opportunities from holding ETH and stETH separately against the known FV highlights why the two assets don't need to trade equally in the secondary market. While most are inclined to think the decoupling was a catastrophic event, it only impacted those who panic sold or were forced to sell from liquidations. For everyone else hodling to the merge, the price of stETH has little, if any, impact.

5. Bitcoin by the numbers

Price

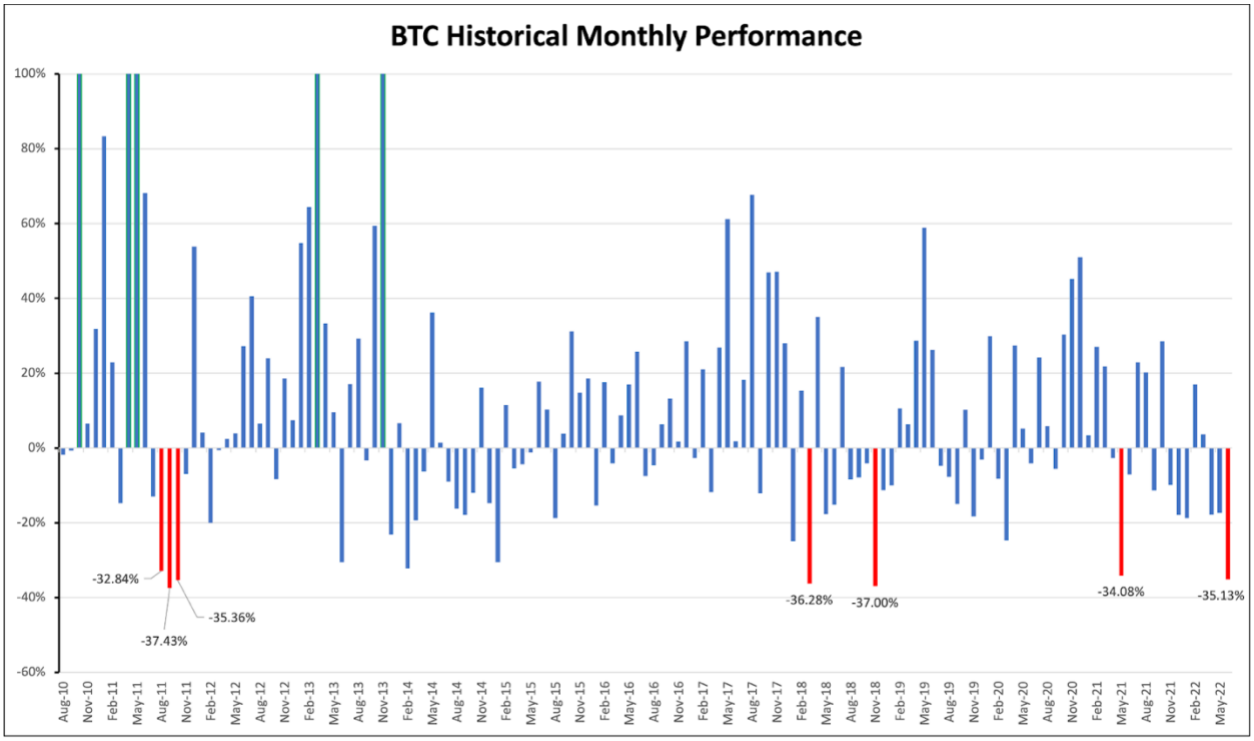
Quarter two and year-to-date performance

Bitcoin's price declined 55.68% over the last three months and ended the quarter down 57.72% YTD at $19,763. Price remained relatively stable in the $20,000 range to end the quarter after a large sell-off in the first half of June.

Source: Glassnode

Historical monthly performance

Down more than 35% in June, Bitcoin experienced one of the worst monthly performances in its history. There have only been four other months since 2010 where the price declined more than it did to the end of the second quarter.



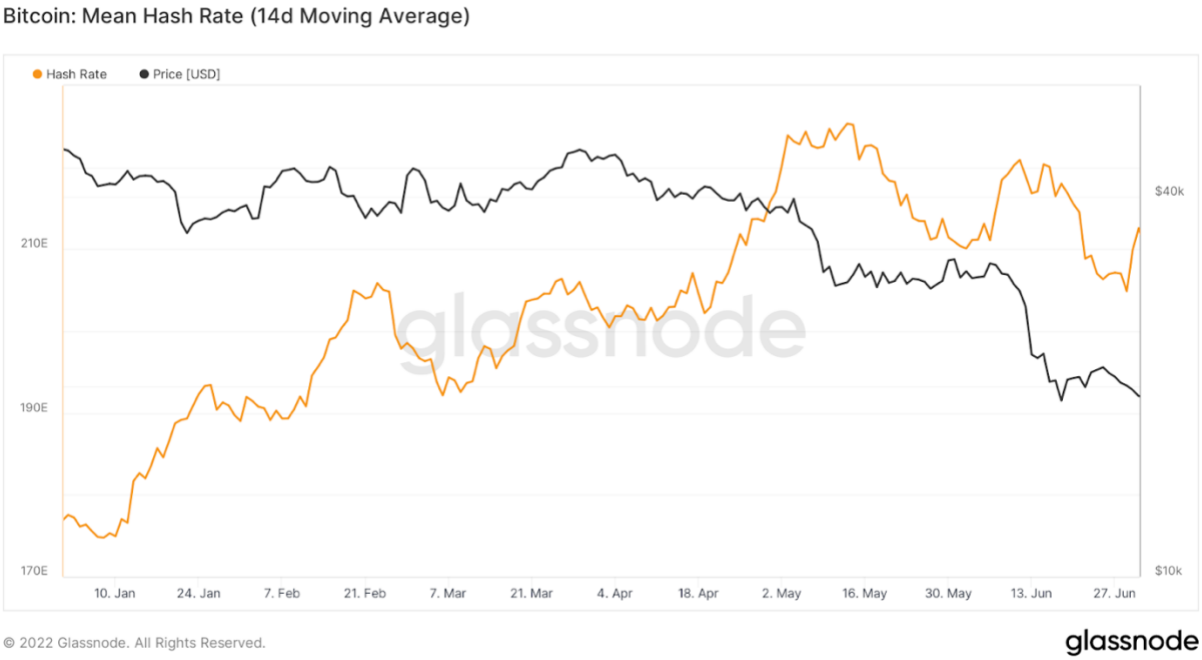
Data Source: Glassnode

Network-level

Hash

Bitcoin's hash rate, or the measure of the cumulative power of miners on the network, has grown by about 3.5% YTD using the 14-day simple moving average (SMA).

Ending the quarter at around 210 million Th/s, hash grew 4.14% through the second quarter and is down 6.83% from the May all-time high.



Source: [Glassnode]

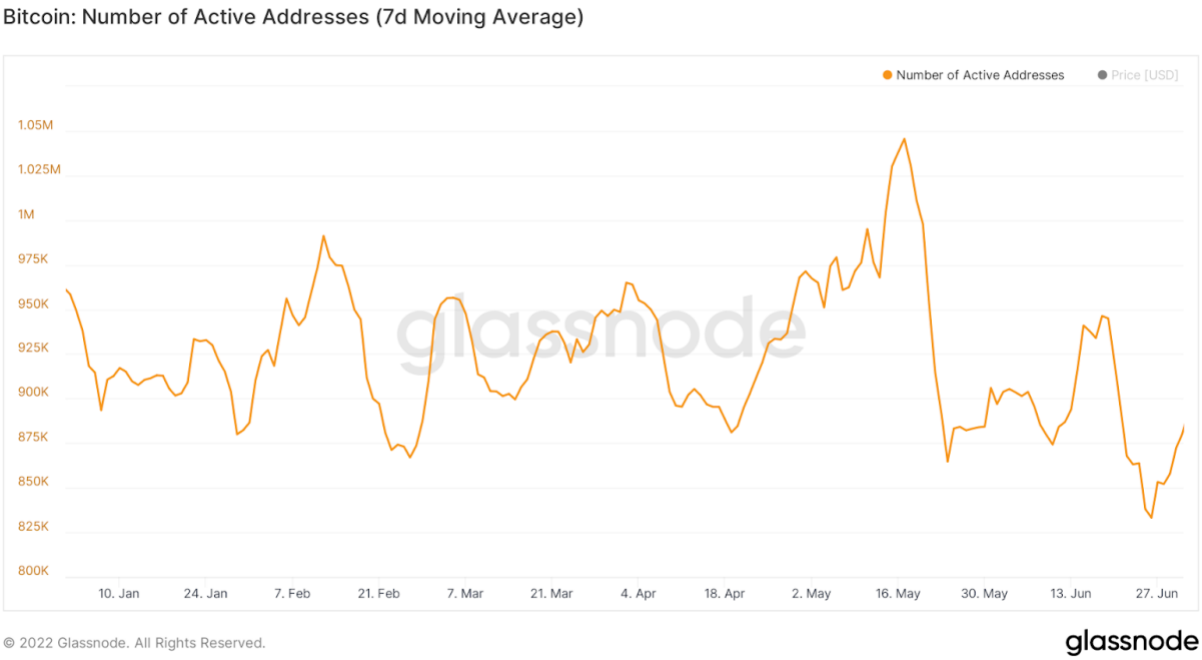
Difficulty

The difficulty, or the amount of work required to discover new BTC, has increased by about 22% YTD and around 3.4% through the second quarter.

Source: [Glassnode]

Active addresses

Active addresses include the number of unique addresses that were active in the network either as a sender or receiver. Ending the quarter with a 7-day SMA of 872,369 active addresses, the network has seen a YTD decline of about 9%. The network shed about 76,200 active addresses through the second quarter for an 8% loss.



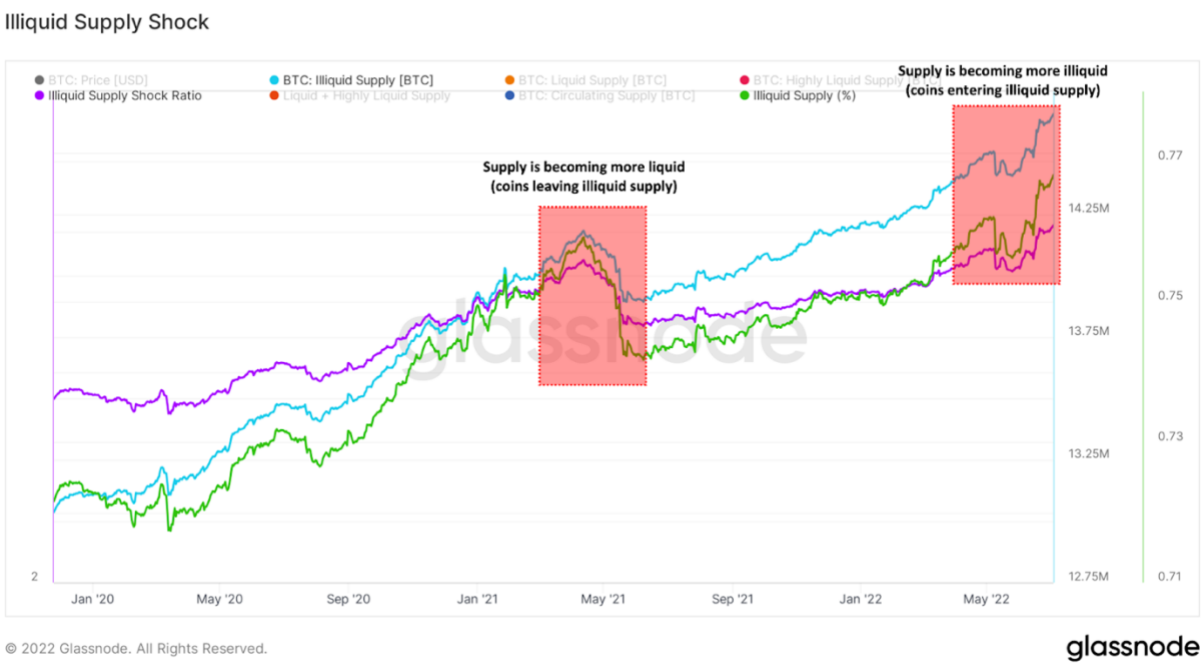
Source: [Glassnode]

Supply level

Illiquid supply

An illiquid supply shock is a ratio between bitcoin's illiquid supply (coins that move infrequently on-chain) and liquid and highly liquid supplies (coins that move more frequently on-chain). The ratio trends upwards as coins leave the more liquid supplies; the opposite is true for the instances when coins enter the more liquid supplies. Illiquid supply shock aims at projecting the likelihood of a "supply shock," which is categorized as a shortage of supply relative to the demand for BTC.

Bitcoin's illiquid supply has grown by 3% (420,522 BTC) YTD and by 1.62% (233,350 BTC) in the second quarter.

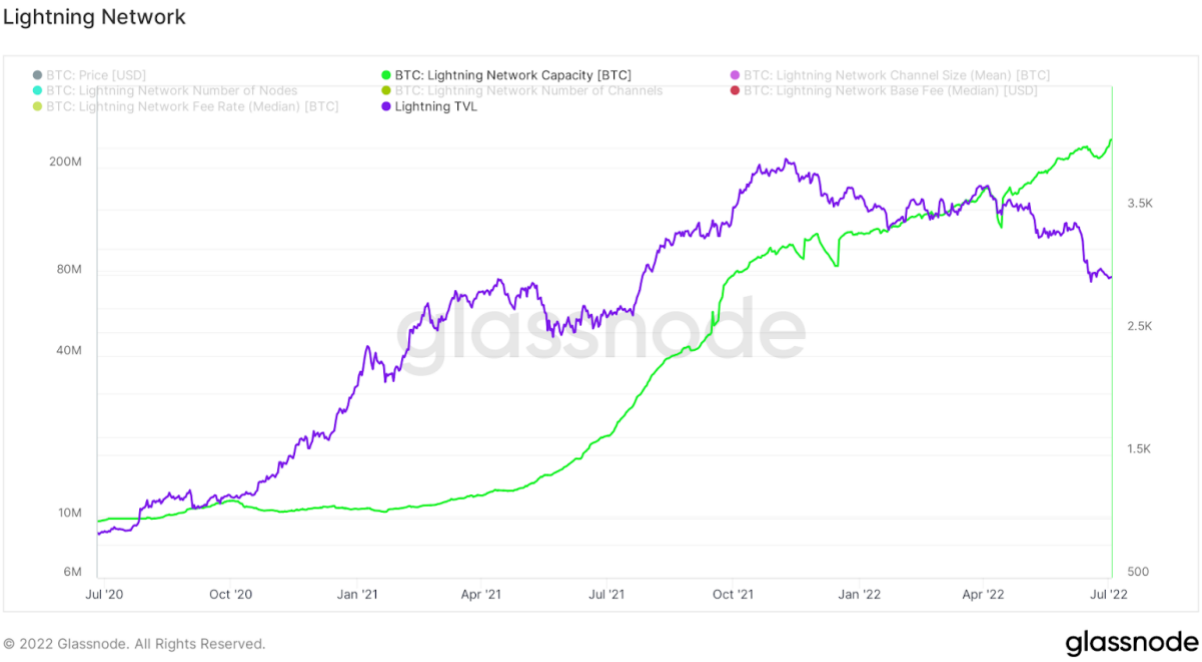


Source: Glassnode

Lightning

The Lightning Network is a Bitcoin layer 2 solution that makes BTC transactions faster and cheaper. Commonly used as the rails for BTC payments, it can be used as a barometer for the use of BTC in everyday commerce.

The number of BTC on Lightning broke through the 4,000 BTC mark to close out the quarter. This is more than double the amount of BTC on the network in June 2021 and 21% more than the roughly 3,300 BTC from January 1, 2022.



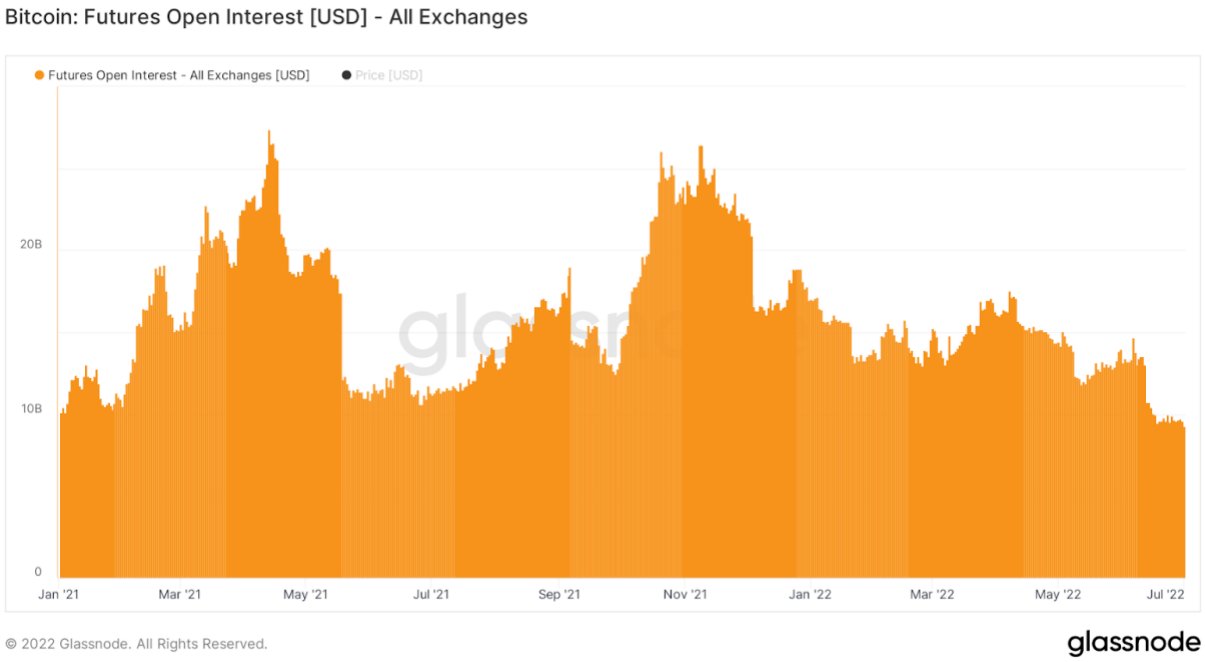
Source: [Glassnode]

Derivatives

Futures open interest

Open interest measures the number of funds devoted to open futures contracts. It can be used as a gauge for speculation or how holders of BTC are hedging themselves when coupled with other metrics (i.e. futures funding).

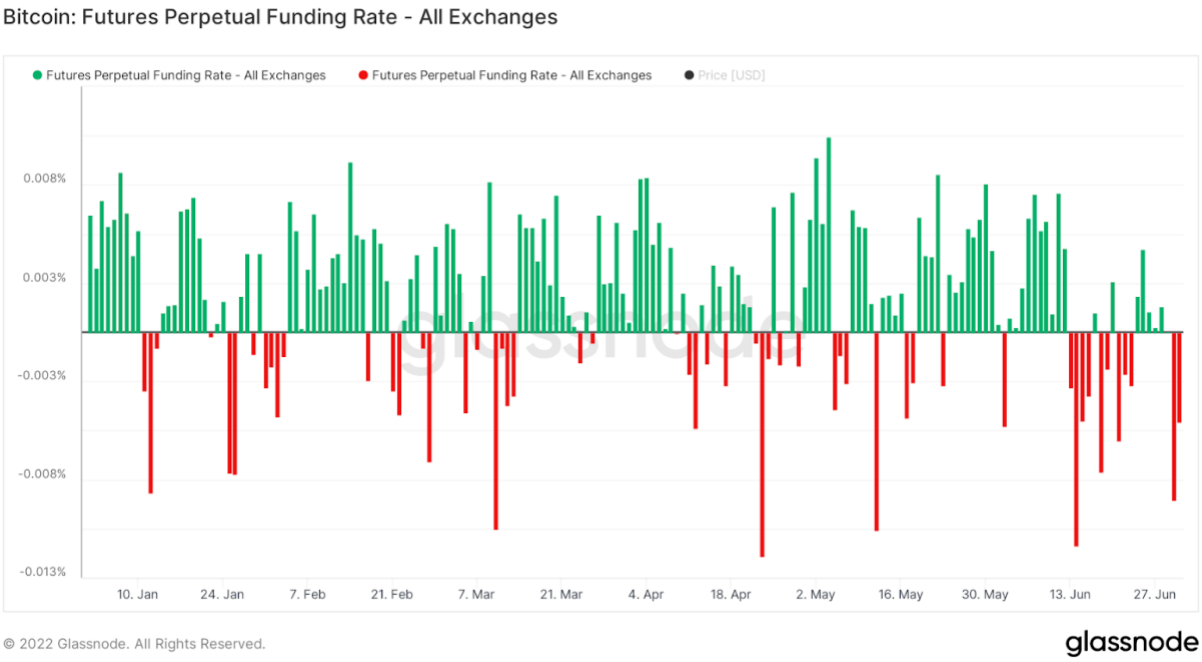
Open interest has steadily declined over the last two quarters, suggesting speculation on BTC is dwindling. Closing the quarter at about $9.5 billion, open interest on BTC futures is down about 65% from the highs reached in May 2021 ($27.5 billion) and about 44% YTD.



Source: [Glassnode]

Futures funding rate

The futures funding rate adds color to which direction speculators are leaning. A positive funding rate means they are leaning increasingly bullish, and a negative rate suggests speculators are increasingly bearish. Speculators ended the quarter more bearish with a negative funding rate of -.009%.



Source: Glassnode

Futures term structure

The Futures Term Structure visualizes the pricing for futures contracts expiring at dates into the future. An upwards slope indicates a premium must be paid to purchase exposure, or delivery, of an asset in the future. A downwards slope indicates a discounted rate on the delivery of an asset in the future.

Contracts expiring June 30, 2023, placed the price of BTC just under $20,000 at the end of the quarter. This is only about 1% higher than the market value after the second quarter.

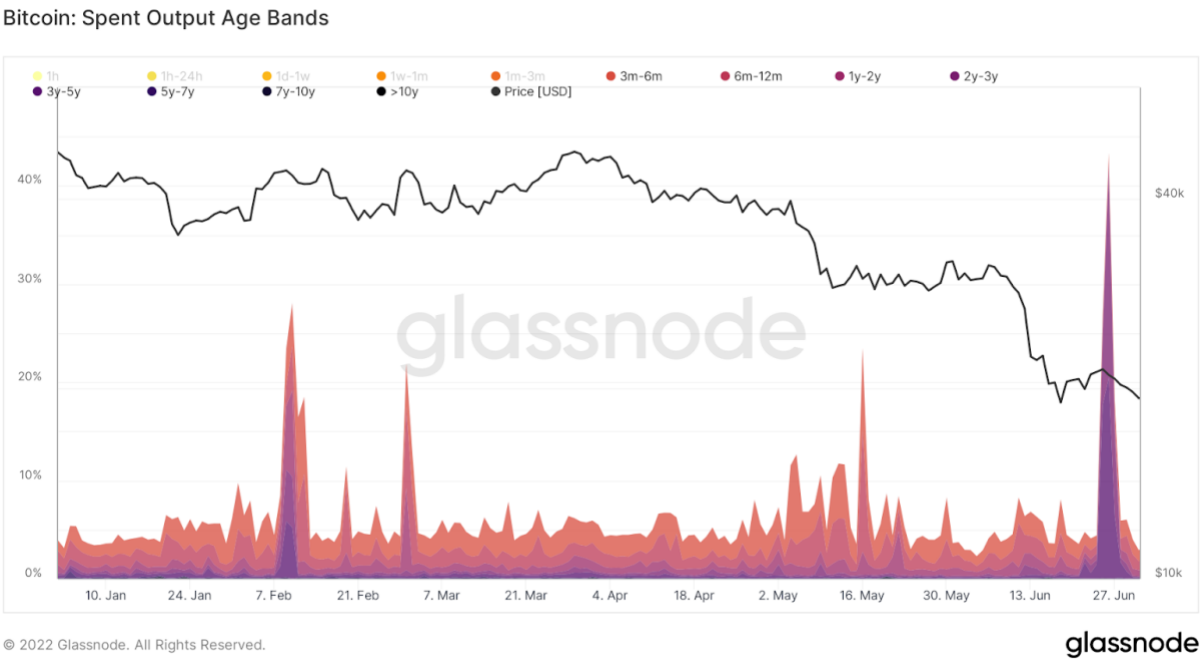
Source: [Glassnode]

Hodler behavior

Spent output age bands

Spent output age bands highlight the age of the coins spent on-chain at any point in time. The longer a coin has remained unspent the older it is. The metric can be used as a gauge for long-term hodler sentiment: low spending from old coins means long-term hodlers are bearing down, while high spending means they might be leaning more bearish. The chart below highlights the spending behavior of coins aged three months to ten or more years; these are coins of longer-term hodlers.

Hodlers spent their coins at a consistent pace through most of 2022, capturing about 7% of daily spending activity on average. On June 26 the spending of older coins spiked to 43% of daily on-chain spending.



Source: Glassnode

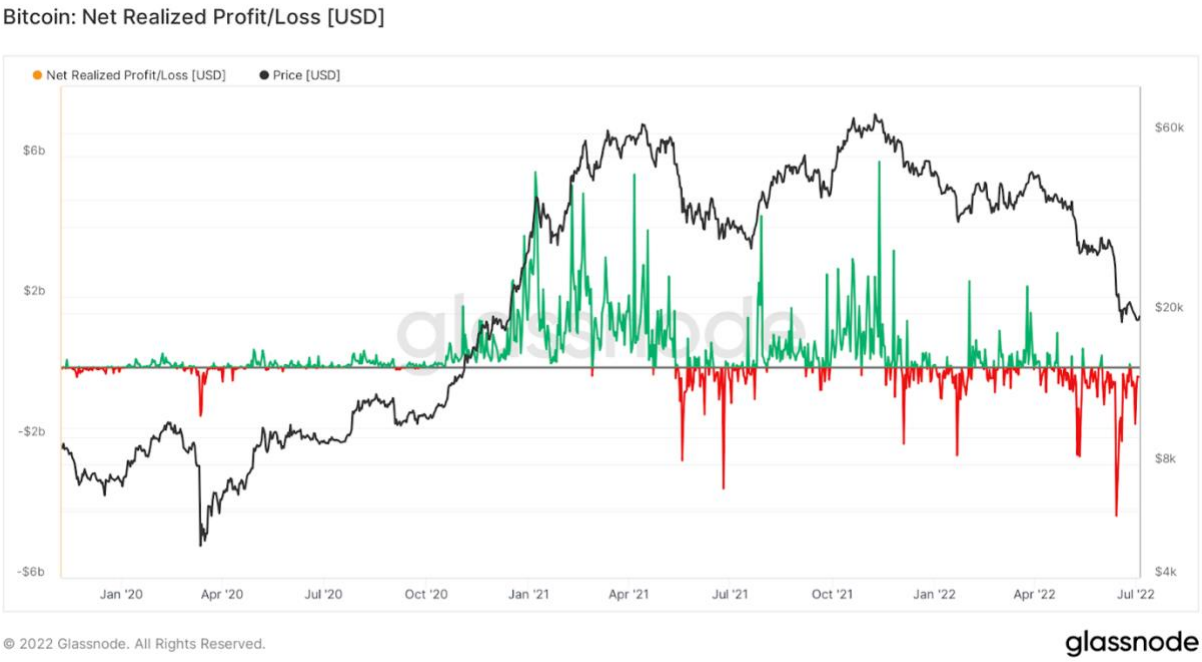
Exchange balance

The amount of BTC on exchanges has steadily declined since reaching its historical peak in March 2020. The quarter ended with about 2.4 million left on exchanges, representing about an 8.7% YTD decline (230,935 BTC removed from exchanges) and a 5.3% drop over the second quarter (136,218 BTC removed from exchanges). Only about 11% of sovereign supply and about 12.6% of circulating supply were held by exchange wallets on June 30.

Source: Glassnode

Realized losses

BTC holders realized the most significant daily loss ever on June 25. Realizing more than $4 billion in losses, this surpassed the largest daily losses realized during the June 2021 downturn and the COVID black swan.



Source: [Glassnode]

6. BTC Notable Events

- Strike x Shopify (1)
- Tesla block and Blockstream partner to mine coin in Texas (1)
- First spot BTC ETF launches in Australia (1)
- Panama gives crypto legal status (1)
- Central African Republic makes BTC legal tender (1)
- SEC approves Teucrium's BTC futures ETF under the Securities Exchange Act of '33 (1)
- SEC approves Valkyrie's futures ETF (1)
- LFG sells BTC to protect the UST peg (1)
- Argentina's largest private bank launched a crypto trading feature (1)
- Tesla: BTC is a good liquid alternative to cash per SEC filing (1)
- Aspen Creek Digital starts mining at a 6 MW solar-powered site in western Colorado (1)
- Germany won't tax BTC, or ETH sold after 1 year (1)
- CFTC chair says BTC, and ETH are commodities (1)
- Cory Booker says BTC, and ETH are commodities (1)
- El Salvador hosts a meeting with 44 central bankers (1 | 2)
- Human rights leaders write to Congress on Bitcoin's impact on financial freedom (1)
- Jack Mallers and Matt Odell speak at the Oslo Freedom Forum (1)
- Swiss-based mining firm White Rock deployed its first flare gas-powered machines in the US (1)
- The Bitcoin Academy was founded by Jack and Jay-Z (1)

- Ava Labs Core web extension wallet has BTC bridge (1)
- Compass Mining facility hosting in Maine terminated after failure to power charges (1 |2)
- SEC rejects GBTC filing to convert to spot ETF (1)
- Grayscale sues SEC over GBTC spot ETF conversion (1 | 2)
- 21Shares launch spot ETF on Swiss exchange (1 | 2)
- CEO and CFO of Compass Mining resign (1)
- South Dakota-based utility company signs a five-year deal for 75MW with a mining unit (1)
- Microstrategy buys 480 BTC (1 | 2)
- Senator Lummis and Senator Gillibrand unveil bipartisan Responsible Financial Innovation Act (1 | 2 | 3)
- ProShares launches short BTC ETF (1)
- El Salvador buys 80 BTC (1)
- Gazprom partners with BitRiver to energize mining farms at oil fields (1)
- Mawson takes a stake in Tasmania Data with plans for a 100% renewable 35 MW mining farm (1)
- CleanSpark buys purchase contracts for 1,800 S19 XPs (1)
- Argo extends its 2021 deal with ePIC to design and built mining machines with Intel chips (1)
- Uzbekistan legalizes solar-powered cryptocurrency mining operations (1)
- Bitfarms acquires $37M in equipment financing from NYDIG (1)
- Luxor launches a hosting marketplace for bitcoin mining (1)
- Bitzero plans a 200 MW operation in North Dakota (1)

7. BTC trends to watch: miner capitulation and the impact of capital markets on the network

Key takeaways

- Drawdowns in miner revenue, as it relates to the current environment, are rooted in two sources: 1) the fiat-denominated price of BTC and 2) the level of competition between miners across the network.
- The last quarter has seen rising competition among miners and a declining price in BTC. The confluence of these forces has put an elevated level of stress on the revenue generated by miners, and by extension their profitability.
- Hash price (a measure of expected daily revenue per 1 Th/s of mining power in Dollars) has dropped 59.43% over the course of the last quarter, and 65.71% YTD.
- February, March, April, and May saw aggressive selling by miners as they gave up around 106% of the revenue they generated over this period.
- The current environment of lenders being more selective, the declining value of the collateral often used to secure debt, and rising interest rates have consequences for miners seeking debt as a capital source for growth.
- Miner capitulation is a natural occurrence rooted within the network and is healthy for its longevity. However, in the near term, it means the hash rate and the number of miners actively competing for BTC will diminish.

Hints of a distressed mining landscape are apparent as BTC trends around $20,000. Miner profitability is the source of the capitulation symptoms that are popping up in hash rate and how miners handle the BTC they generate. In the background are the capital markets miners have increasingly leaned on as sources of funding and growth over the last year. This suggests outside forces are adding additional pressure on miners as they are facing uphill battles within the confines of the network.

Source of miner woes

Drawdowns in miner revenue, as it relates to the current environment, are rooted in two sources: 1) the fiat-denominated price of BTC and 2) the level of competition between miners across the network. While the cost to produce 1 BTC varies between miners (differences in energy used, energy cost, and other necessary costs related to the equipment and facilities used), the reductions in revenue impact the bottom line of all entities contributing hash.

The fiat-denominated price of BTC has a strong influence on miner revenue and profitability, as their operating expenses are priced in fiat. Thus, miners must sell the BTC they earn into fiat to cover these expenses. So as the price drops, they earn less fiat to pay their operating costs and vice versa.

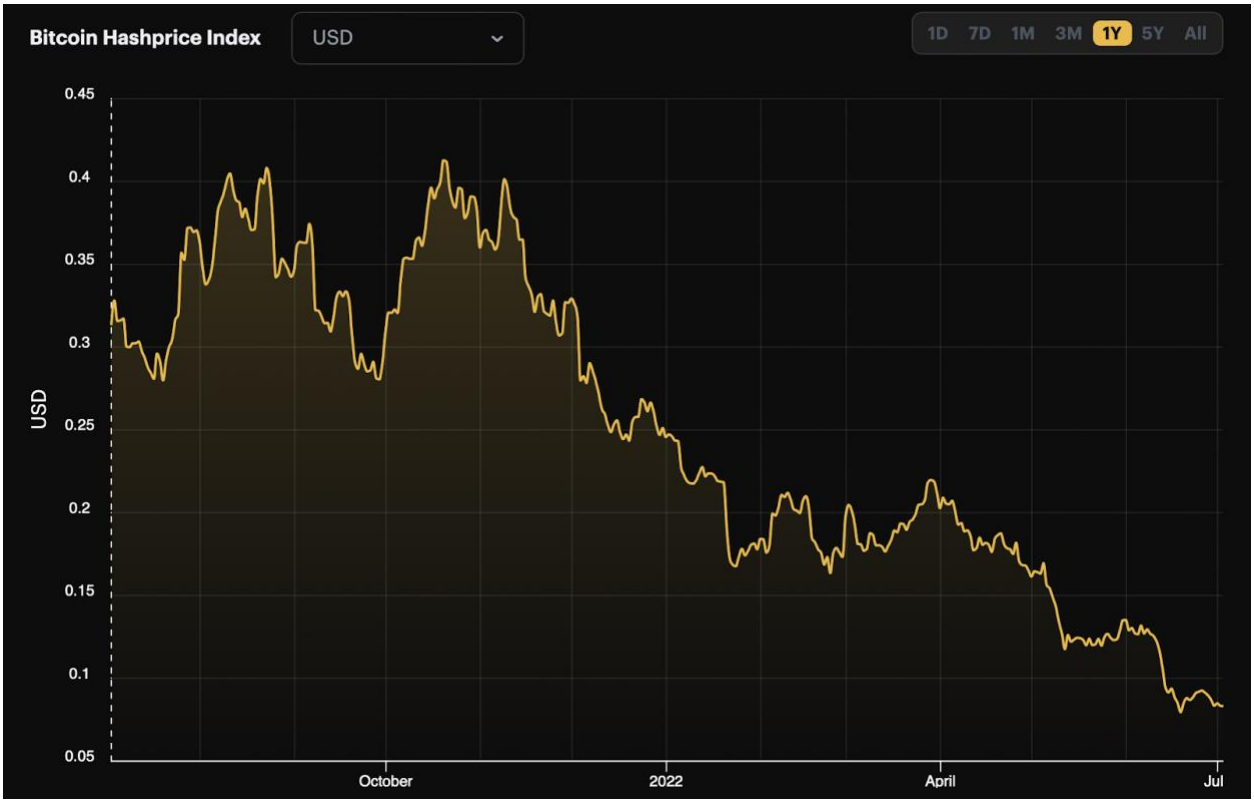
The level of competition between miners also plays a role in the network-wide profitability of miners. The BTC revenue earned by miners daily is intended to be fixed at 900 BTC per day until the next halving in 2024 (sometimes there are deviations from the intended daily revenue as a result of fluctuations in miners'

capability to confirm blocks on the chain). The finite amount of BTC that is up for grabs over any period means there is less BTC (less revenue) per miner as competition increases. This is exacerbated when the price of BTC remains flat, trends downward, or fails to grow equally with the competition between miners. Hash rate and difficulty (amount of computational input required to stamp blocks onto the chain) are measures of the competition between miners; there is a direct relationship between hash and difficulty and competition.

Hash price

The last quarter has seen rising competition among miners and a declining price in BTC. The confluence of these forces has put an elevated level of stress on the revenue generated by miners, and by extension their profitability.

Hash price is a measure of expected daily revenue per 1 Th/s of mining power in Dollars. For example, a miner with 10 Th/s of mining capability should expect to earn about $5 in revenue per day at a hash price of 50 cents. Hash price has dropped 59.43% over the course of the last quarter. This reduction represents the cut in the daily expected revenue of miners inclusive of the drawdown in the price of BTC and the rising competition among those contributing hash.



Source: [Hash Rate Index]

Highlighting the impact of rising competition, Bitcoin's price is down 58.5% year to date (as of June 30) in 2022 while the hash price is down 65.71% over the same period. If hash and difficulty remained flat over this period, the percent drawdown in price would represent the percent hit to miners' expected daily revenue. Instead, increased competition among miners contributed a further cut of 6.91% to miners' expected daily revenue. Or the difference between the drawdown in the price of BTC and the drawdown in hash price.

Adding context

Bitcoin's hash rate ended the quarter at 252.145 million Th/s and a hash price of $.08474 per Th/s, equating to a network-wide expected revenue of $21,366,767.30 per day. This compares to a network-wide daily expected revenue of around $42,638,757.00 at a hash rate of 172.452 million Th/s and a hash price of $0.24725 at the start of 2022. The daily expected revenue is the amount distributed to miners on a pro rata basis depending on the portion of network hash they contribute. For example, a miner contributing 5% of the network's hash rate will receive around 5% of the daily revenue generated.

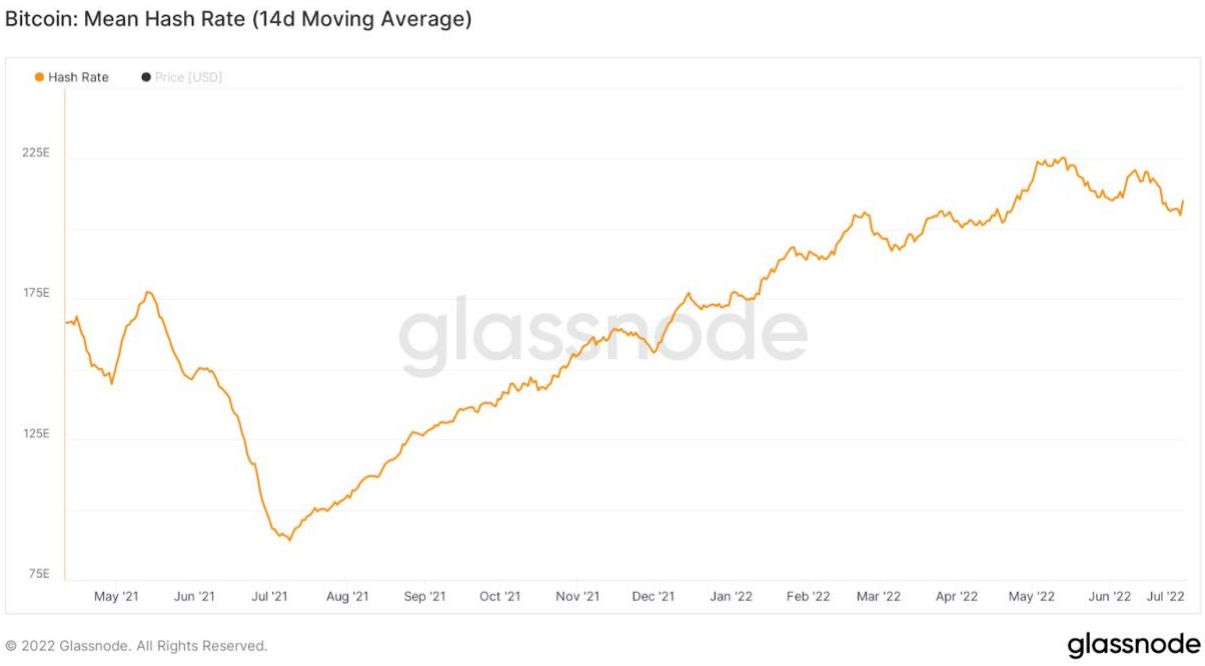
Difficulty and the 14-day moving average of Hash (competition) have grown by 21.82% and 20.22% respectively since January 1 with daily expected revenue down 49.89%. This adds color to the notion that as revenues were dropping in Dollar terms with the price of BTC, increased competition among miners further diluted their revenue. This is due to miners picking at each other's share of the hash rate (and expected revenue) as new ones come online and existing ones add more hash.

Signs of capitulation and growth slow down

Signs of capitulation and growth slow down as a result of the pressure on miner revenue are becoming more apparent in on-chain data. Namely, network hash rate, hash ribbon, and the balance of BTC held by miners suggest that miners are under stress.

Hash rate

The 14-day moving average in hash shows growth in the network's cumulative mining power has stagnated over the last couple of months. Now down 7% from the recent all-time high, it is equal to mid-April levels. After nearly a full year of explosive growth, this is a sign that there is a net slowdown in miners bringing computing power online.



Source: Glassnode

Hash ribbon

Hash ribbon uses the relationship between the 30-day and 60-day moving averages of network hash to gauge trends in miner capitulation; or when BTC becomes too expensive to mine. The indicator flashes capitulation signals when the 60-day moving

average crosses over the 30-day moving average. Conversely, it signals that the worst of the capitulation is over when the 30-day moving average crosses over the 60-day moving average.

The 60-day moving average in Bitcoin's hash rate crossed over the 30-day moving average for the first time since the mining migration in Spring 2021. Unlike the current circumstances, a large portion of the network's hash was forced to power down operations at this time. The recent cross suggests that miners are beginning to unplug and vacate the network as BTC becomes increasingly expensive to mine and their margins are squeezed.

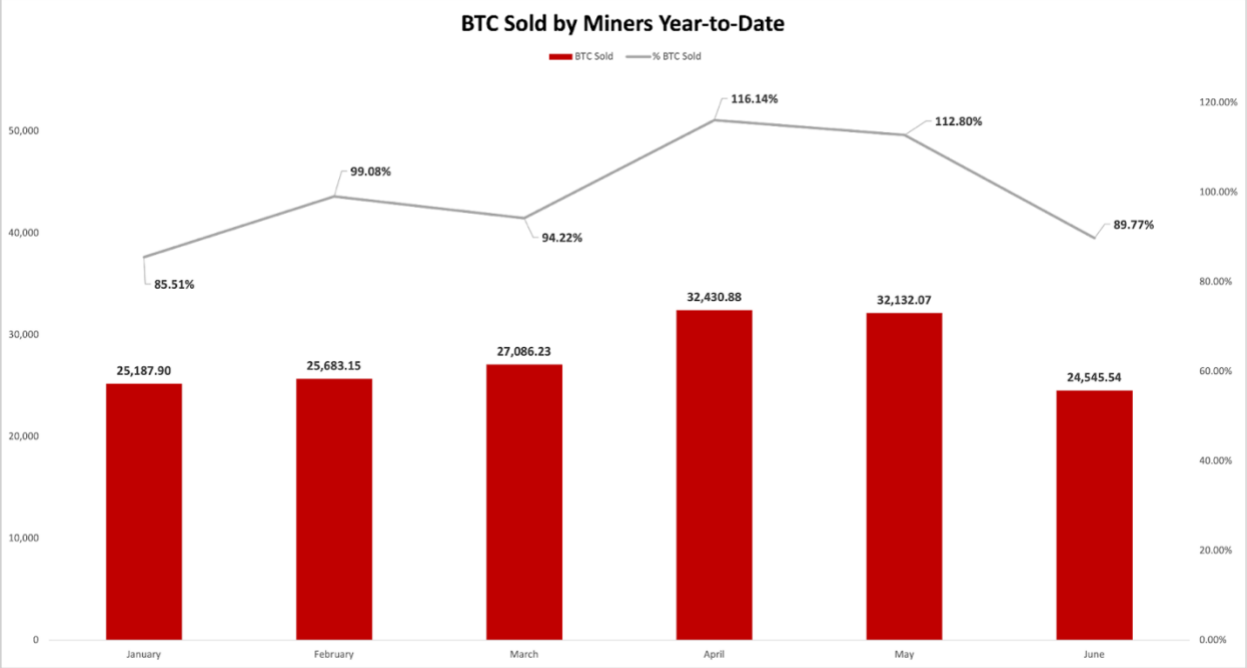
Source: Glassnode

Balance held by miners

Trends in the BTC balance of miners are among the most telling signs of their financial standing. Miners are the only natural net sellers of BTC. They compete for a finite number of coins each day and work to retain as many of them as possible. As a result, they are forced to sell the BTC they hodl at the market's discretion. If the fiat value of the BTC they earn from mining isn't enough to cover expenses, they are forced to sell their reserves. Drops in reserves are indicative of miners selling more than they are earning and retaining. The balance held by miners declined by 5,488 BTC, or .3%, through the second quarter.

Source: [Glassnode]

The monthly BTC revenue earned by miners (including fee revenue) and trends in their cumulative balance offers an idea of the estimated amount of coins miners are offloading. February, March, April, and May saw aggressive selling by miners as they gave up around 106% of the revenue they generated over this period. The selling subsided a bit in June as miners sold 89.77% of the revenue they earned. The chart below tracks the amount of BTC cumulatively sold by miners year to date and its relativity to the amount of BTC revenue, inclusive of fee revenue, every month.



Data Source: Glassnode

Diminishing safety net and sources of growth

Miners have relied on the United States' capital markets as mining in the country has grown since the hash migration in Spring 2021. They have increasingly used debt as

an avenue to bolster their operations and to buy more BTC. Notable instances of this include a $650 million debt raised by Marathon Digital and a $200 million raised by Terawulf late last year. The current environment (rising interest rates, widespread insolvencies, declining miner revenues, etc.) suggests it won't be as easy to source capital this way as it has been in the past. Some of the bigger and more established miners may be able to continue leveraging this option to an extent, but it will be less effective for them.

There are three factors to consider when assessing miners' likelihood to leverage debt:

1. lenders being more selective,
2. the value of the collateral often used to secure debt, and
3. rising interest rates impact the cost of capital.

Selectiveness of lenders

Insolvencies across the space and the downside volatility of digital assets over the last number of months mean lenders can be more selective in the groups they lend to. Argo Blockchain's CEO, Peter Wall, thinks this will be the case; citing miners lacking strategic partnerships and a strong history will be hit the hardest relative to borrowing capital. He stated, "I think miners that have track records, that have existing teams in place and have relationships in place are the miners that are going to be able to grow [and get financing]."

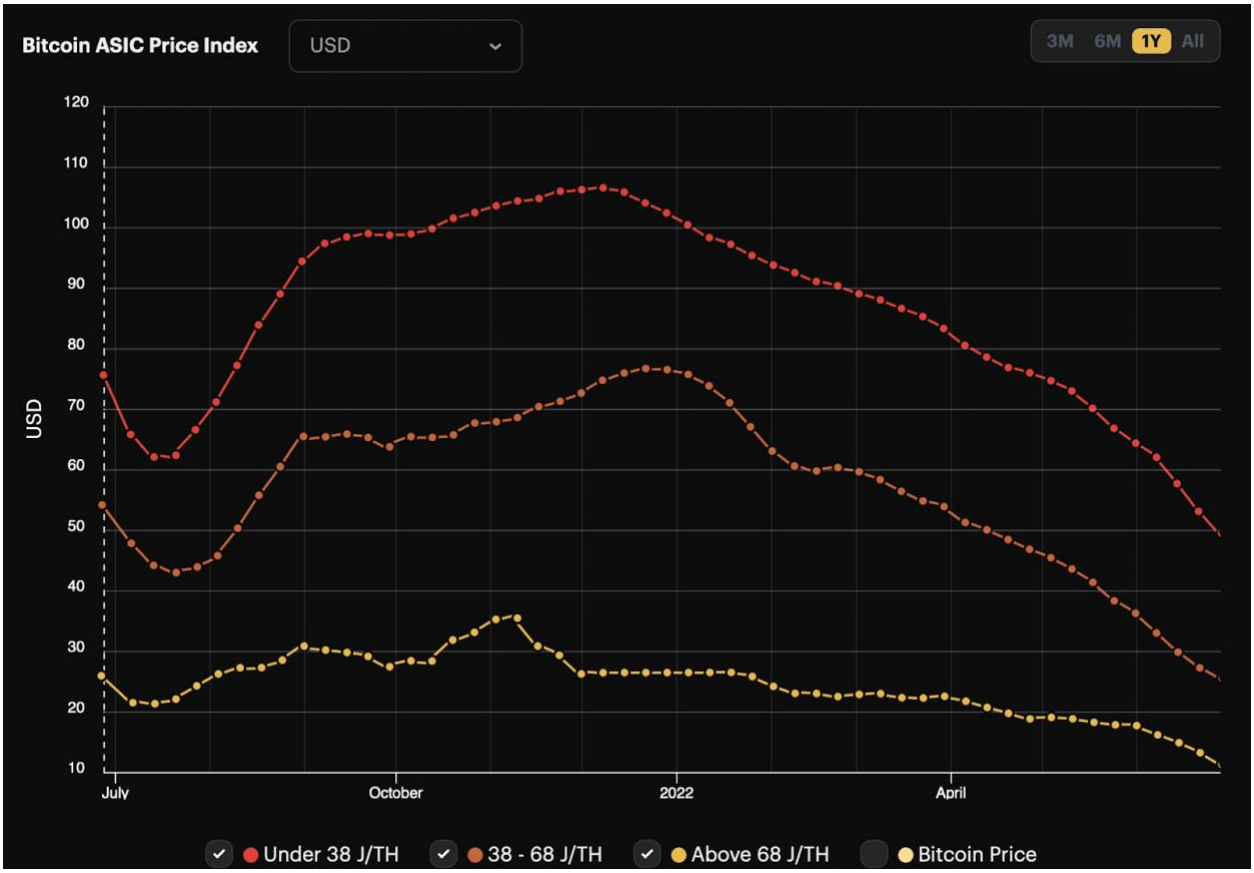
Secured debt and the value of miner collateral

The practice of using ASICs (BTC miners) and BTC itself to secure debt has become common. While secured debt is easier to obtain than other debt-raising options,

miners have to consider the current and rolling values of the collateral they are posting, in addition to the advance rate lenders are willing to offer.

The value of ASICs and BTC have been steadily declining over the last six-plus months. In the case of ASICs, this is due to a combination of the dwindling value they can capture, and capitulating miners beginning to flood the market with equipment. As more miners capitulate, more downward pressure will be put on the value of both ASICs and BTC. Thus, the amount of capital they can be used to borrow today is less than what they could've used to borrow in the past.

Miners who have already used either of these assets to secure debt must consider the impact on their loan to value (LTV) to avoid liquidation or worse. The chart below tracks the value of the different kinds of ASICs by Th/s of output they produce. The most efficient ASICs (under 38 joules per tera hash) are down 50.51% and BTC is down 58.5% year to date in 2022.



Source: [Hash Rate Index]

Additionally, in the current environment lenders are less likely to offer attractive advance rates. Thus, the collateral posted by miners gets them less capital in return. Coupling this with the declining value of the collateral they have at their disposal, it becomes obvious that the means miners have to obtain new capital are less effective than they have been in the past.

The rising cost of capital

Rising interest rates make money more expensive to obtain, which can limit the amount and effectiveness of capital miners can borrow. More revenue must be allocated to servicing debt as the cost of capital rises, which limits the extent to which borrowed capital can help miners grow. Borrowing capital at high costs also impacts how investors may view miners as companies and their operations. Companies with higher weighted average costs of capital (WACC) are deemed to have higher risks connected to their operations. This is because more investor money will be used to service debt. This can have negative externalities on miners' ability to raise debt or equity down the line.

U.S. Treasury debt is the benchmark for pricing borrower rates. Treasury rates have increased sharply over the last year, which offers a point of reference for gauging the battle faced by miners in obtaining debt. The chart below shows the historical rate of U.S. 10-year Treasuries.

Source: Tradingview

Where do miners go from here?

Signs suggest miners will continue to capitulate and sources for growth will be less effective and more difficult to capture. While this can hurt hash and the price of BTC in the near term, it is healthy and required for the long-term growth of the network.

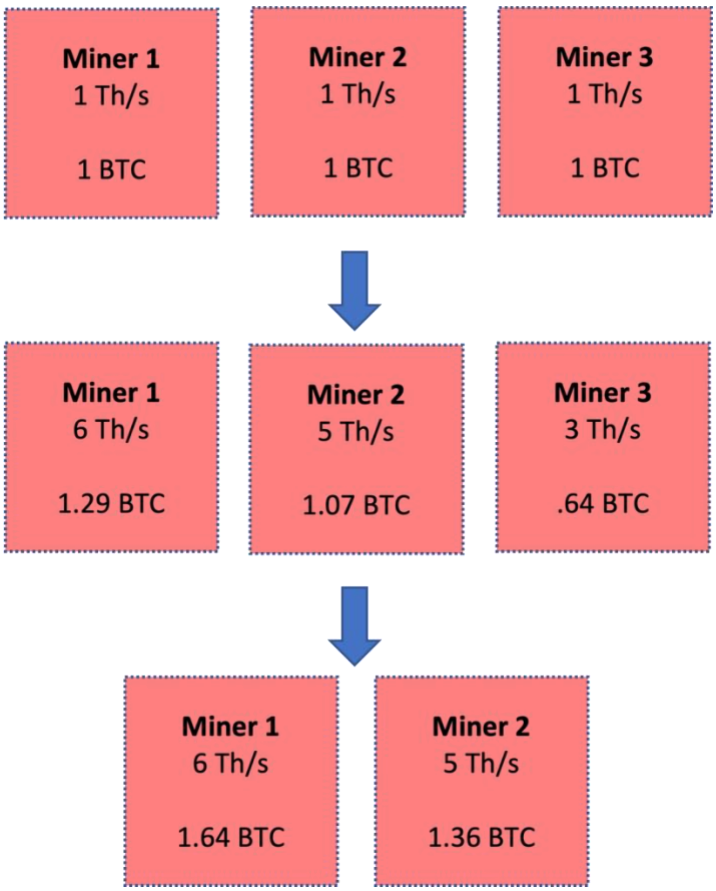
Capitulation

The expulsion of miners is a natural function of the network and is part of the purpose of the mining difficulty mechanism baked into the protocol. It forces the

network to shed inefficiency and incentivizes the most robust and efficient miners to continue operating as hash climbs. This plays out by 1) squeezing the margins of weak miners as price declines and 2) redistributing the rewards they once earned to pad the margins of the robust miners. This helps restore the profitability of the better-suited miners and gives new ones a strong opportunity to come online.

Imagining a network with three miners helps better understand this idea. The visual below represents a network of miners who all hold 1 Th/s of mining power and a daily reward of 3 BTC. Each miner controls an equal portion of hash and earns 1 BTC per day of operation. Over time, all miners contribute more hash to the network which makes their rewards more expensive to obtain and skews the distribution of daily rewards to those who added more hash. As a result, the weak miners' BTC-denominated revenue drops as their cost of operation increases (increasing difficulty). The market price of BTC drops to a level that the declining BTC revenue can't tolerate, which forces some miners to become unprofitable and capitulate.

The rewards they used to earn are distributed to the miners who didn't shut down on a pro rata basis depending on the portion of network hash they contribute. They can then use the newly obtained rewards to financially stabilize and begin adding more hash.



Important points to take away are:

1. the number of miners on the network as the capitulation process plays out,
2. the network-wide hash power as miners capitulate,
3. the redistribution of rewards to the robust miners post-capitulation, and

Understanding this is key because hash and the number of miners will drop as miners close their doors. In the above example, hash dropped by 21.4% and the number of miners on the network by 33% as miner three left the network. While this happened, however, the revenues of the strong miners jumped by 27.1% which incentivizes

them to continue growing their hash contribution. Simultaneously, the amount of power needed to mine coins (difficulty) dropped as hash went offline. This reduces costs to mine at a time when revenue is increasing.

Despite the drop in hash and the number of miners in the near term, the hash is higher (the bar has been raised) than it was at the start. Furthermore, the existing miners have ample resources to take the hash to new highs. Therefore, miner capitulation is vital to the network.

Squeeze on capital sources

Miners may find it to be more difficult and less effective to use debt as a capital source so long as the current conditions persist. This raises questions about how they might fuel growth through the period of stress. Steep declines in valuations of miners make equity more attractive for investors. But this isn't an option for miners unwilling to give up a stake in their operations, which was a catalyst for their turning to debt in the first place. It is also a riskier period for investors to buy equity in mining operations. This can limit the pool of capital looking to enter the BTC mining arena.

The pinch on capital sources also means some miners won't have a safety net to fall back on as cash flows soften. The lack of a bailout of last resort for groups means they will be forced to halt operations as their financial health deteriorates. While this would have negative implications on hash and the price of BTC in the near term, it would put the network on the path toward stronger long-term health outlined above.

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