The Investment Case for Layer 1s: Big Value in the New Internet

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Bitcoin: Been Around the Block

PM Notes:

1. We see a 324% upside in our Base Case target of $167,864 using a trailing network value to transaction (NVT) multiple of 53.10.
2. Our Bull Case, without multiple expansion, implies upside of 482% and a price of $230,487. In the Bear Case, we still see upside of 168% with the same NVT and 70% transaction growth for an implied price of $106,111. Reduced retail and institutional enthusiasm weigh on the ecosystem as governments become dismissive and take regulatory action against the digital asset.
3. Living its best life – Bitcoin has remained resilient in the face of a consistent barrage of attempts to declare it not useful, non-functional or dead…instead Bitcoin's motto is YOLO. Since inception, it is a textbook example of the Lindy effect – the longer an idea persists, the longer it will survive.
4. 1 BTC is 1 BTC – Bitcoin has demonstrated its use as a store of value over time and a reliable medium of value transfer. It has a global reach for borderless exchange. The network processes $16Bn daily on an average 90 day interval and has processed $35.5Bn at its peak in November 2021. Growth of daily average transaction values are up 14x, a 1300% increase, since 2019.
5. Sliced – In Q1 2024, another halving will occur which will reduce Bitcoin's block reward by half, further tightening its network inflation.
6. Alternative Universe – Circulating and total supply may not be what you think. In our bonus valuation method, instead of 21M total BTC, we assume 16.3M BTC is all that will ever be mined. In this scenario, we assume the market has not priced in 3.7M lost BTC and 1M BTC of Satoshi's stash that may never make it back into circulation. We find the immediate-term value of one Bitcoin to be $52,556, which is undervalued by 33% when compared to the current price.

Category: Layer 1 Protocol

BTC/USD: 39,569.97

https://bitcoin.org/

Bitcoin Block Explorer

Consensus Mechanism:

Byzantine Fault Tolerance (BFT)

Validator Selection Mechanism:

Proof-of-Work

Staking Yield: N/A

Circulating Token Supply:

19,021,118 BTC

Locked Token Supply:

N/A

Fully Diluted Tokens:

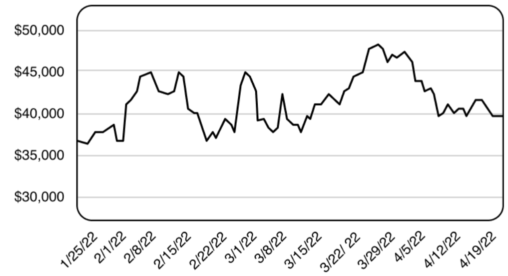
21M

US$ Circulating Market Cap:

$752.67Bn

Crypto Market Cap Rank #: 1

BTC 90 Day Price



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Model Assumptions

In our investment thesis, we assume a 1.76% supply inflation rate until March 2024, where inflation drops to .88% YoY due to the halving. We assume the 2024 Bitcoin halving takes place in March 2024. We also assume a total supply of 21M BTC and a current circulating supply of approximately 19M BTC. Our Bonus Case assumptions for total and circulating supply are different (see section below).

INVESTMENT THESIS

NVT = Market Capitalization ($)/Transaction Volume ($); Bitcoin Circ. Mkt Cap ≈ $752.67Bn

	BTC	DOT	SOL	ETH	AVAX	ADA
Tx Daily Volume ($)	28.18Bn	61.24M	367.70M	2.39Bn	28.34Bn	15.30Bn
Tx 90 Day Avg Volume ($)	16.00Bn	164.87M	608.59M	5.87Bn	19.60Bn	30.97Bn
NVT (Daily)	26.71	293.84	90.89	148.63	.68	1.4
NVT (90 Day Trailing Avg)	53.10	89.13	54.92	49.14	.99	2.05
FD NVT	52.02	122.52	84.12	49.14	1.46	1.29
Circ. Market Cap ($)	752.67Bn	18.05Bn	33.42Bn	354.60Bn	19.39Bn	29.94Bn
FD Market Cap ($)	831.85Bn	20.20Bn	51.20Bn	354.60Bn	28.60Bn	39.96Bn

(Figure 1) Comparable L1s – NVT Multiples; Source: Coin Metrics, CoinMarketCap, Osprey Funds; Tx = Transaction, FD = Fully Diluted

Base Case – $167,864: We find upside of 324% and a price of $167,864 is possible after three years of $USD transaction growth at the current rate of 1.43x. We also consider a network value to transaction (NVT) ratio of 53.10 and factor in the next halving event in 2024 that will temper circulating supply inflation projections.

In three years, we project a circulating market cap of $3.28Tn with a 90 day average transaction volume of $39Bn moving through the network. BTC's comparable 90 day NVT is mostly in line with other layer 1s. We believe the market has formed consensus around Bitcoin as the main network for store of value and density for value transfer that processes anywhere from 175k to 350k transactions per day. Bitcoin deliberately pulls its advantage from not attempting to be like the Ethereums and Solanas of the decentralized finance (DeFi) world. Bitcoin also has a mature multiple in comparison to other L1s, with ~12 years of trading history. As Bitcoin volatility continues to fall, it will attract more capital over time. Separately we estimate that the top global custodians hold about $180Tn. As institutional adoption increases, we conservatively believe Bitcoin can capture a piece of .001% ($18Bn) of these assets.

The protocol has global reach which is evidenced by robust user growth. Active address/wallet counts increasing by 22% year over year (YoY) since June 2018. We continue to see global adoption of the protocol and more usage over time. Terahashes per second, a measurement of mining power dedicated to mining Bitcoins, is at or very close to an all time high. Network participants are willing to invest in equipment and pay the power costs to contribute hashing power to mine Bitcoins. We think this is the ultimate endorsement of the network, as miners are increasingly willing to invest time and money over the long term.

Bitcoin moderates block times and is programmed to target a production of one block every ten minutes. The mining difficulty is adjusted if miners are producing blocks too quickly. Since 2016, mining difficulty has increased by approximately 370x to account for the significant mining power that has come online, dedicated to Bitcoin specifically to keep block production times around the 10 minute mark.

In our base case, we also believe Bitcoin continue additional institutional and retail user adoption as Bitcoin spot ETFs are approved. We think the approval could happen sometime in 2023.

Bull Case – $230,487: In this scenario, we see upside of 482% without multiple expansion as transactions grow at a 50% faster pace over the next three years at 2.15x. The circulating market cap touches $4.5Tn. In this scenario, we see significant institutional adoption, including many pensions and endowments, and Bitcoin captures a larger slice of the .001% of global custodians' assets. We also see heavy adoption of the lightning network.

Bitcoin will become the de facto digital asset to hold as a percentage of an institutional portfolio. In a bull case, governments around the world could ease their stances on Bitcoin, with some declaring Bitcoin as legal tender or even buying it as a reserve asset. While we don't see significant changes in developed governments' viewpoint over the next three years, change can come sooner than we think. In this scenario, accelerated legal and regulatory frameworks accommodative to Bitcoin create certainty for local and global markets and increase adoption rates.

Bear Case – $106,111: In a bear scenario, still without multiple expansion, we see 168% upside at $106,111 in three years based on transactions growing 50% slower than the current rate, or 72%. We project the 90 day average transaction volume in three years to be $39Bn in this case with a circulating market cap of $2.1Tn. While the average transaction volume still grows over a three year period, a culmination of factors external to the Bitcoin ecosystem cause slower growth of the network.

Specifically, Bitcoin spot ETFs are pushed over a three year horizon by unforeseen circumstances and reduce retail and institutional enthusiasm in the Bitcoin ecosystem. Government regulatory frameworks remain uncertain over the next three years, become dismissive and ultimately take legislative action against the digital asset.

A Bonus Case For Immediate Term Value – $52,556:

In our bonus scenario, we look at the current value of Bitcoin in the immediate term and attempt to determine its true value in $USD. In this scenario we specifically look at the circulating and total supplies.

Currently there are 19M Bitcoin that have already been mined, which is 90% of the total supply of 21M. Mining the last 10% will take place over the next 118 years until 2140. Chainalysis estimates that there are 3.7 million Bitcoin that have already been mined that are lost and unrecoverable – forgotten keys, hard drives in garbage dumps or corrupted data – however it happened, these Bitcoins are gone.

There have also been many attempts to identify the total amount of Bitcoin held by Satoshi, the founder of Bitcoin. Multiple estimates land his/her/the group's stash at around 1 million coins. It is possible that these coins will never be moved. Satoshi has yet to move their Bitcoin holdings and while there have been disputes over the true ownership, no one has definitively been able to prove that they own the private key(s) to these coins.

Many Bitcoins were lost in the early days of mining when Bitcoin, a completely new concept at the time, was top of mind and value was an afterthought. While market estimates the total circulating market cap at $752.67Bn, we don't believe it accurately represents the actual circulating supply since it does not take into account Bitcoin that was mined, but will never be accessible. Approximately 20% of the circulating supply that is quoted on popular websites like CoinMarketCap, CoinGecko, etc may not actually be in control of anyone. No one knows for sure, but these are best estimates over the last few years.

Instead we think the circulating supply is somewhere around 14.3M BTC (19,021,118 BTC currently mined – 3.7M lost BTC – 1M Satoshi BTC presumed not accessible = 14,321,118 BTC). We divided the current circulating market cap, $752.67Bn, by the revised circulating supply, 14.3M BTC, that considers lost and forever inaccessible Bitcoin.

We land on $52,556 as the true value of an individual Bitcoin in the immediate term. By this measure, Bitcoin is currently undervalued by 33%. In a fully diluted scenario, we'd arrive at a similar current value for one Bitcoin since total supply and fully diluted market cap scale proportionally. We believe the total supply of Bitcoin, all Bitcoin that will ever be in circulation after mining is complete in 2140, to be 16.3M.

DEEP DIVE: AN INITIATION ON BITCOIN

I'll Take Half

Bitcoin halving cycles decrease the output of Bitcoin for miners approximately every four years. For every 210k blocks that are mined, the block reward is halved. There have been a total of four halving events in Bitcoin's life (2009, 2012, 2016, 2020). Usually after each halving event, we see that the issuance shock causes a delayed effect on the price of Bitcoin 150 and 350 days after a halving event occurs. On each of the halving events, the price has always been higher as a result.

Bitcoin Halving Schedule

Year	Block Reward	Date
2009	50	Jan 9, 2009
2012	25	Nov 28, 2012
2016	12.5	Jul 8, 2016
2020	6.25	May 11, 2020
2024	3.125	Mar 2, 2024

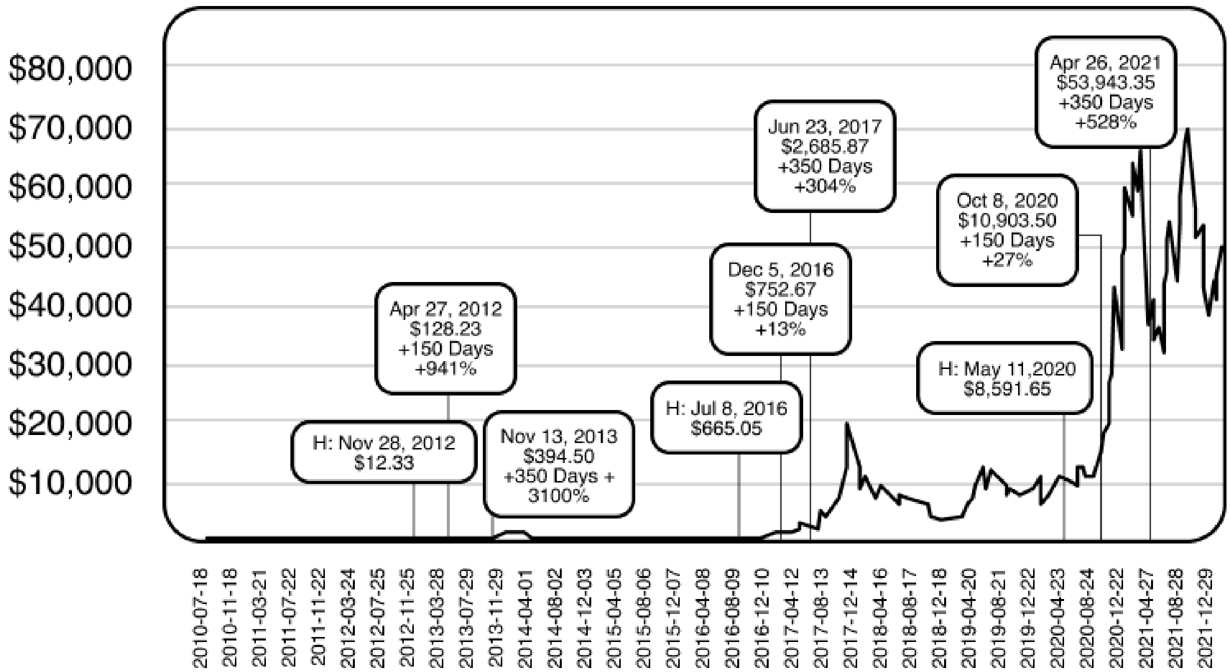
(Figure 2) Bitcoin Halving Schedule; Source: Various

Bitcoin was designed to target a block time of 10 minutes which means that rewards are distributed to miners every 10 minutes. The network specifically adjusts mining difficulty upward if the algorithm identifies that miners are solving mining problems too quickly. Over the last 7 years, Bitcoin 90 day average block times have been cycling between 9 and 10 minutes caused by variances in network factors. This lowers overall average block times below 10 minutes and slightly decreases the time to each halving. The next halving will approximately occur in the beginning of March 2024; however this could vary slightly as time approaches this date.

We've mapped all relevant halving dates in the past showing prices 150 days and 350 days past the halving event. In every case, Bitcoin's price in $USD has always increased 150 days out from the halving date. Heftier gains are made 350 days out from a halving event and have never dipped below 300% on a +350 day basis. In every case so far, the period after 350 days shows additional price increases that can also be captured.

Note the next halving on approximately March 2, 2024. 150 days after this date is July 30, 2024 and 350 days after is February 15, 2025. We note the dates for reference – certainly nothing is guaranteed; however the idea generally aligns with our base, bull and bear price targets at the end of 2024.

BTC/USD 150 and 350 Days After Each Halving Event



(Figure 3) 150 and 350 Days After Halving; Source: Coin Metrics, Osprey Funds

Hash It Out

We consider Bitcoin to be a layer 1 network, but many of its properties are different when compared to other proof-of-stake competitors. The most obvious is Bitcoin's proof-of-work architecture compared to proof-of-stake consensus for Polkadot, Solana, Avalanche, Cardano and soon-to-be Ethereum this June after its merge. While proof-of-stake does not require nearly as much power to solve for consensus, it rewards large holders of a protocol's native token with more power to decide what decisions occur on the network.

A proof-of-work regime maintains tight security as the protocol is based on cryptographic, hardened SHA-256 algorithm (SHA = Secure Hash Algorithm) technology that requires significant hardware investment to mine more Bitcoin. Due to the pure processing power allocated towards the network, there is a level of security that make transactions on the network nearly immutable since an actor would have to obtain at least 51% of the network processing power to modify transactions. Even then, there are other factors that make these types of attacks less feasible.

Bitcoin processing power for miners, aka hash rate, is measured in terahashes per second. A terahash is 1 trillion hashes per second. The network mining power is at an all time high around 206.85M TH/s. Although TH/s is a measure of security, we believe it also measures conviction, long term belief and a willingness to invest significant sums of capital by large mining institutions and collectives cementing Bitcoin's dominance for some time.

Miners are distributed globally where six main mining pools (i.e. Ant Pool, Poolin, F2Pool, ViaBTC) make up 56% of the hash power to mine Bitcoins. In these pools, the group agrees to share block rewards proportionally to hash power contributed to the group. 44% of the remaining hashpower is from smaller pools, or participants, like companies mining Bitcoin on behalf of themselves, not contributing to a pool's hashpower.

Lightning, On a Chain

The lightning network is a separate layer from the base Bitcoin blockchain. It is a separate, decentralized chain based around the idea that two or more participants can open a payment channel between themselves but not broadcast their transactions to the main Bitcoin blockchain. First, users must deposit funds on the Bitcoin blockchain. Then they can transact on the lightning network if their transactions do not exceed their deposited amount.

As many payments can take place over the lightning network payment channel as desired where the transactions between participants are netted against one another. When the payment channel is closed by all or one of the participants' choosing (there is no time limit), the underlying Bitcoin blockchain is updated with the net transaction number between the participants.

The lightning network makes promises to scale to billions of transactions per second; however we are still in the early stages and will need to wait to see how the technology develops. The lightning network now has enough nodes on the network with a capacity to process $160M worth of Bitcoin.

A Bit(coin) Risky

While Bitcoin brings stability backed by the largest collective mining operations, popularity across the world, and a deep crypto history, the network remains slow on a transaction per second basis. Currently the network is processes transactions at a rate of 2 to 5 transactions per second. This is certainly the slowest layer 1 in comparison to other proof-of-stake competitors by a longshot. While there are ongoing efforts like the Lightning Network, during periods of heavy congestion, the network in its current form may become unusable and take over a day to process certain transactions, similar to what occurred in 2017.

There is also a risk that Bitcoin's technology as the first cryptocurrency, although reliable, will be overtaken by technology that is at least just as stable and faster in the coming years. This is what many networks are trying to accomplish, but so far, Bitcoin's dominance has not been challenged.

Other risks include an unforeseen exploit in the protocol, such as in 2018 when a security researcher found a memory vulnerability that could crash over half of all nodes on the network, including miners. The problem was kept secret until it could be fixed.

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