Edison Explains

Bitcoin's investment thesis

Part eight: Hard to value

Negative **Positive**

	X							

Cryptocurrencies: Irrational hype or financial revolution?

Bitcoin (BTC) and other digital assets have been making headlines in recent months, polarising the investment community with an equal number of strong advocates and fierce critics (even within the same financial institution or research house). Moreover, valid analysis, backed by in-depth research, is mixed up with ideological, poorly researched conclusions both for and against the theme. We have decided to look at both sides of the same (Bit)coin to extract the investment thesis behind this new asset class. Each part of this Edison Explains series looks at one feature of BTC and the broader cryptocurrency landscape (broadly referred to as 'altcoins'). We conclude by summarising our subjective view on how positive or negative we believe the feature is for BTC's investment thesis.

Why it is hard to value BTC

BTC is difficult to value because it does not generate any cash flow (so it is impossible to apply the good old discounted cash flow model) and is not backed by any assets (other than the mining and nodes infrastructure). It also has no implied backing by future taxation (ie you cannot pay your taxes with BTC), except for El Salvador where BTC was adopted as legal tender alongside the US dollar last year. Interestingly, the above is mostly true for gold as well, although the latter is obviously a much more established store of value and has been recognized as such over centuries. Some believe that BTC has no real utility (being a 'solution in search of a problem') and consequently claim that it has no value at all. We have outlined the main characteristics of the Bitcoin network that could underpin BTC's value in the previous parts of our series and conclude that BTC has a certain utility and hence should not be considered worthless.

Edison Insight

BTC cannot be valued using more traditional methods such as DCF. It is currently considered primarily a store of value and portfolio diversifier, suggesting that its total market value will be dependent on the extent to which it captures market share from other assets considered store of value, gold in particular. Several other digital assets offer a distinct utility and often also a staking yield, providing potential additional inputs for valuing them.

Milosz Papst,
director at Edison Group

Valuing BTC as a medium of exchange

There have been a number of attempts to value BTC as a means of payment. This can be done by assuming a certain share of the Bitcoin network in the existing global payments market or some of its subsegments that are more prone to disruption. An example of the latter could be the global remittances market, which is characterised by high fees and long settlement times (assuming a decline in fiat off-ramp costs). The high fees have a particular impact on remittances to low- and middle-income countries. According to data from the Global Knowledge Partnership on Migration and Development (an initiative of the World Bank), the average cost of sending US$200 abroad was 6.4% in Q121, visibly above the target of 3% by 2030 included in the UN's Sustainable Development Goal 10.c.1. Another example is the global unbanked population, of which a significant part has mobile phones with internet access, allowing them to hold and transact in digital assets. According to the Global Findex Database 2017 from the World Bank, there were 1.7 billion unbanked people globally.

An attempt to value BTC as a means of payment could be done using the Quantity Theory of Money (QTM), also referred to as the equation of exchange model (MV=PT). It assumes that money supply (M) multiplied by money circulation velocity (V), that is the number of times a means of payment is used each year to pay for the output of an economy, is equal to the quantity of the annual output multiplied by the average price per unit of output. If we assumed that BTC as a means of payment will represent a given percentage of the total transaction value in US dollars globally, we could theoretically derive the

09/02/2022

value of all BTC in circulation in US dollar terms assuming a given velocity and then divide it by the 21m BTC ever to be minted (optionally adjusted for the coins that are most likely lost forever, see eg Glassnode) to arrive at a valuation per BTC. However, this approach seems to be of limited usefulness because of, among others, the difficulty in estimating the velocity factor (even for traditional currencies) and the interdependence between parameters of the model (this has been discussed for instance by Smith + Crown). Alternatively, BTC could be valued by assuming a certain share in the total addressable market (TAM) for means of payment (capturing some of the so-called 'monetary premium'), which could be approximated for instance by global M2 supply.

However, we note the competition from private stablecoins (cryptocurrencies whose value is pegged to a given fiat currency such as the US dollar) and central bank digital currencies (CBDCs) as a means of blockchain-based payment and the fact that BTC currently seems to be perceived primarily as either a store of value or speculative asset rather than a means of payment (which distorts the estimate of velocity and circulating supply in the QTM model).

Cost of mining method

At first glance, it may also seem reasonable to estimate the valuation floor for BTC based on the cost of mining. However, this approach is not reliable for at least two reasons. First, prices of mining equipment fluctuate together with the BTC price, which means that the cost of mining (including capital expenditures) changes significantly depending on the BTC price level. Hence, the cost of mining approach would require an estimation of the ASIC price at which it becomes uneconomical for producers to remain in the business, which is quite difficult.

Second, contrary to the traditional mining sector, everyone mines BTC from the same 'deposit' and price elasticity of BTC supply is zero. Hence, the cost of mining one BTC is also determined by the share of a given miner in the global hashrate: the higher (lower) the overall hashrate on the network, the higher (lower) the cost of mining a single BTC using a given equipment. The more the BTC price declines, the greater number of (less effective) miners are pushed out of the market, improving the economics of the remaining miners (as a result of mining difficulty adjustment). Consequently, it is more difficult to estimate the market equilibrium point.

This method will become even less important over time as the proportion of BTC mined per annum to total supply declines (ie the stock-to-flow ratio increases further). We would also advise caution when drawing conclusions based on the stock-to-flow model, as discussed in part 1 of our series, particularly because it focuses exclusively on the supply side and completely ignores the demand side.

Valuing BTC as a store of value

Given BTC's fungibility, censorship-resistance, predictable monetary supply and limited correlation to other asset classes (eg equities), we believe that BTC's value proposition comes primarily from being a store of value, which makes it a competitor to other assets perceived as a store of value, most notably gold. This could become even more important if BTC's liquidity improves and its price volatility becomes more moderate. Consequently, BTC could be valued by assuming that it will represent a certain percentage of assets held to store value (see for instance Coinshares' Bitcoin Valuation and Fundamentals report). The simplest approach would be to assume that the combined market cap of gold and BTC represents the size of the market for hedging/insuring against high inflation/currency debasement and/or another global financial crisis. By assuming a certain market share of BTC and dividing it by the total BTC ever to be minted (again, we could adjust for lost coins), we can arrive at an implied fair value per BTC. Alternatively, one could assume that BTC will make up a certain percentage of central bank reserves or global corporate treasury assets, though this approach seems far more speculative.

Another way of looking at BTC as a store of value is to examine the level of global wealth held in financial assets and assume a certain average percentage allocation to BTC, which would indicate BTC's potential total market cap. As a purely illustrative example, taking the US$250tn of global financial assets at end-2020 (according to BCG's Global Wealth report 2021) and assuming an average 1% allocation to BTC, we arrive at a BTC market cap of US$2.5tn. When divided by BTC's supply cap of 21m, it implies a BTC price on a fully diluted basis of c US$119,000. See our previous part for a comparison of BTC's market cap with selected other asset classes.

Supplementary valuation metrics

There are several metrics that, while not allowing us to derive an estimate of the intrinsic value of BTC and being largely backward-looking, are a certain reference point for assessing if recent changes in BTC's market capitalisation (as a proxy to the network's value) correspond to the progress in development and adoption of the network. This includes for instance the network-value-to-transactions (NVT) ratio, which compares BTC's market cap to the value of on-chain transactions settled in a given period (eg daily), discussed in more detail in a report published by 21Shares. This could include both transactions settled on the main chain and on layer 2 solutions (improving Bitcoin network's scalability), such as the Bitcoin Lightning network (see an earlier part of our series for details). Unfortunately, this ratio gets distorted during times of high speculative demand (which may boost on-chain transactions related to moving coins to and from exchanges).

An alternative way of looking at network value is examining the number of possible network connections. For instance, we can refer to Metcalfe's law, which states that a network's value is proportional to the square of all connected devices (users). In the case of Bitcoin, an (imperfect) proxy of the userbase may be the number of active addresses. While a single user may (and often has) multiple active network addresses and a single address can be used by multiple users, some market intelligence companies (such as Glassnode) apply a range of heuristics and clustering algorithms to identify addresses controlled by the same participant. It is possible to estimate a model based on Metcalfe's law (or a similar law based on the number of network connections) that describes historical BTC price evolution in reference to the network's size and, based on this, to try to examine whether the BTC market is in an overbought or oversold territory (for instance, see research done by S. Wheatley, D. Sornette, T. Huber, M. Reppen and R. N. Gantner). Finally, one could also examine the network-value-to-hashrate (NVHR) ratio (also discussed by 21Shares), which compares BTC's market cap with the total computational power used to secure the network. The higher the hashrate, the more expensive it would be to attack the network. However, given the high current hashrate of c 200 exahashes per second, which already makes an attack on the network very expensive, it is difficult to prove that continued growth in the hash power would translate into any incremental value of the network.

There are also a number of indicators which help to understand investor sentiment and potential supply pressure (or the lack thereof). These include for instance the spent output profit ratio (SOPR), market-value-to-realised value (MVRV) ratio or the coin days destroyed (CDD) ratio. Finally, given that BTC is a competitor for gold, we can also look at some key metrics used to analyse the demand and investment sentiment for the latter. These include, among others 1) real interest rates, 2) growth in M2 money supply, 3) US$ index and 4) net non-commercial futures position (eg as reported by the CFTC).

Beyond Bitcoin: Yield from utility tokens

Altcoins represent a different and much more diverse potential value proposition compared to BTC. Particularly worth noting are so-called 'utility tokens', which provide access and use rights to a certain digital resource (which may underpin the value of the token). A major subgroup are native tokens of smart contract-enabled blockchains, such as Ethereum, Solana, Cardano, Tezos, Avalanche, Terra, Binance Smart Chain and EOS. While some of them may be considered a 'store of value' by investors (Ether in particular), their primary value comes from their utility as 'digital petrol', which needs to be spent in order to run smart contracts (ie self-executing, trustless, decentralized and transparent programs hosting a set of instructions/procedures that are verified on the blockchain). Hence, the value of native tokens of smart contract-enabled blockchains is dependent on the transaction volume on platforms run by means of these smart contracts on a given blockchain. Smart contracts cover a plethora of use cases, in particular: 1) the decentralised finance (DeFi) sector, which offers services such as borrowing, lending, saving, trading, insurance and payments; and 2) projects based on non-fungible tokens (NFTs) in gaming, fine art, licensing, digital identity and other areas (ie 'tokenisation of everything').

The above represents the demand side of the equation, while the token supply (ie issue of new and redemption of existing tokens) is set out in the protocol of the respective blockchain, which may be modified by network participants based on the blockchain's governance framework. An interesting example is Ethereum, where after a recently implemented protocol change (Ethereum Improvement Proposal (EIP) 1559), an amount of coins equal to the base fee paid for each transaction on the network is being 'burned' (ie removed from circulation), which, in times of high network activity, may offset the new supply of minted coins and make the cryptocurrency deflationary (ie more tokens are 'burned' than issued).

There are also various other utility tokens, such as for instance the LINK token, which allows users to retrieve data from Chainlink's decentralized network of 'oracles' (ie data feeds), or FIL token, which is used to pay for data storage services on the Filecoin network.

Similar to commodities, there are no established methods for valuing these tokens and the focus is often on the analysis of the demand/supply balance. Having said that, we note that the consensus algorithm of a number of the above-mentioned blockchains is proof-of-stake (see our Blockchain adoption report for details). This means, that the tokens can be staked (ie locked up as collateral to secure the network in exchange for staking rewards). In that way, they become yielding assets, with the generated yield dependent on factors such as the inflation rate (ie pace of new token issue), the total number of tokens staked on the network, transactions fees paid by users on the network, as well as the uptime and fees charged by the validator staking the tokens on a given investor's behalf (unless the investor runs their own node); as an example, see details on staking Solana here. These staking rewards are paid out mostly in newly minted native tokens rather than a traditional fiat currency such as US dollar, which means that they resemble to some extent a scrip dividend with an accompanying new share issue or payment-in-kind (PIK) bonds. The current staking yields for the top 10 digital assets by total value staked range from c 5% to 14% (see stakingrewards.com for details). This may represent a certain reference point for the valuation of these tokens, although it is worth keeping in mind that the staking rewards are to a large part a form of dilution.

The QTM model (bearing in mind its limitations described above) could potentially be used for a limited subset of utility tokens, especially for single-purpose tokens, which have a relatively predictable velocity (eg because part of them is locked up as collateral by the service providers on the network and/or tokens used to pay for these services are gradually released over the duration of service provisioning). Still, the potential valuation range may be quite wide given that these tokens/blockchains are a play on the Web 3.0 infrastructure, which is still in its infancy (making it difficult to predict the potential userbase).

A distinct group of utility tokens are governance tokens, which give the holders a voting right on decisions related to the blockchain protocol's prospective development (so-called 'on-chain' governance). Interestingly, holders of some of the governance tokens of DeFi protocols receive (or may at some stage start receiving) part of the fee revenue generated by the protocol. For instance, holders of SUSHI, the governance token of the decentralised exchange (DEX) SushiSwap, can stake their token and receive part of the fees paid by users of the exchange (a 0.05% fee from every trade is earmarked for these rewards). A similar mechanism could be introduced on the largest decentralised exchange Uniswap, as its protocol includes a 'fee switch', which, if activated, will enable the UNI token holders to collect one-sixth of the 0.30% fee currently paid out to liquidity providers active on the DEX.

In that way, part of the value of the protocol accrues to the governance token holders, helping investors to assess the relative attractiveness of the tokens at a given market price. Having said that, given the innovative, open-source and transparent environment in which blockchain protocols and DeFi operates, only protocols with very strong network effects may extract a certain limited fee to governance token holders without the project being forked (ie copied with the protocol fee removed). Moreover, these tokens are subject to a regulatory risk, given that their issuance could be considered an unregistered securities offering.