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The Digital Investor

Implications of Litecoin's reward halving

On 5th August 2019, litecoin (LTC) is expected to go through its second halving, which will reduce its block reward from 25 LTCs to 12.5 LTCs per block. In this article, we look at historical examples and draw conclusions regarding reward halving impact on price, mining profitability, transaction fees and network hashrates. We also use this as a basis for understanding the potential impact of bitcoin halving, which is expected to take place next year.

Through our analysis, we observe that halving is an important event in both litecoin and bitcoin ecosystems with a direct impact on mining profitability. Impact on other factors such as price, transaction fees and network hashrate is not as direct as historical data do not show any clear relationship between them. We believe halving's importance will increase going forward as inflation rates in both litecoin and bitcoin decrease over time.

Introduction

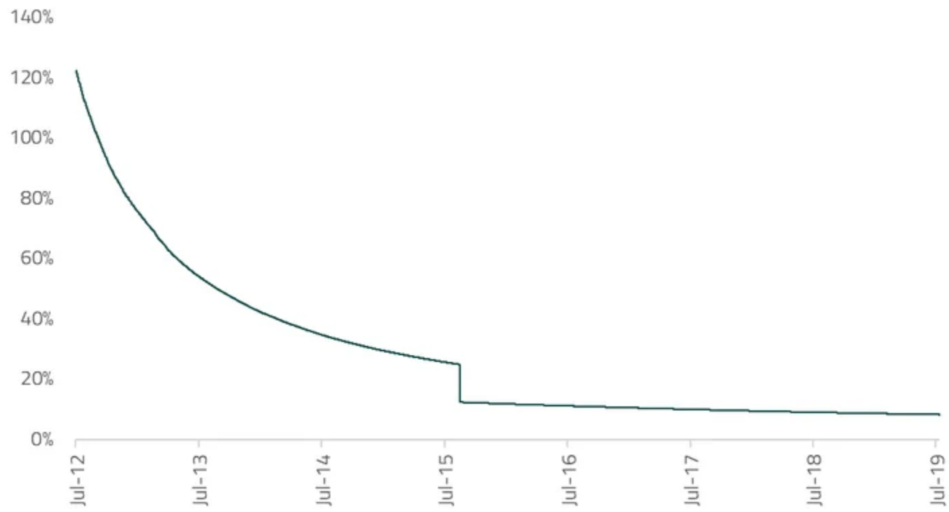
Among the many factors that drive cryptocurrency prices, monetary policy design plays a central role. The supply mechanism of bitcoin and litecoin are designed to create a pre-determined scarcity as there will be only a fixed number of coins that will be mined[1].

From an investment point of view, two monetary features are important for any cryptocurrency. First, whether there is a maximum amount of currency to be issued or not as it defines the degree of scarcity. Second, the block reward (the revenue miners receive for validating transactions and securing the network) is important as it has to be large enough to cover the cost of mining. The price of the cryptocurrency in fiat (for example, USD) also plays a key role as the costs incurred by miners such as hardware and electricity costs – are priced in terms of fiat currency. Against this background, halving is very important for the sustainability of the ecosystem.

What is Halving?

In the context of cryptocurrency, halving refers to the reduction of the block reward by a factor of two after a pre-determined number of blocks have been mined. In the case of both bitcoin and litecoin, halving takes place after every 210,000 and 840,000 blocks respectively (i.e. approx. 4 years in both coins). Litecoin was created in 2011 based on bitcoin's source code, and it shares a supply limit similar to bitcoin, as it also has a maximum total supply of 84mn LTCs that can be mined over time. Halving reduces the rate at which new coins enter into the ecosystem resulting in a decreased inflation rate[2]. The network difficulty, which is a measure of hard it is to mine the next block, adjusts with the changing hashrate[3] of the network which keeps the coin supply in line with the predetermined inflation function[4]. Litecoin's block reward started with 50 LTCs per block and has since halved to 25 LTC per block. The block reward is expected to halve further to 12.5 LTCs per block around 5th Aug 2019.

Exhibit 1: Litecoin Daily Inflation (annualised)



Source – Coinmetrics

Why does it matter?

Halving has an important impact on any proof of work based crypto asset. We see that it has a direct impact on factors that affect mining activities. These include:

- **Mining Profitability**: A direct impact on mining profitability is seen as the block reward is reduced by 50% every four years. Miners will be able to generate fewer coins for the same hashrate, assuming that the price remains constant after halving.

- **Network Hashrate**: A reduced block reward can turn mining activity into an unprofitable business for many miners, which may lead to miners closing their operations or switching to other profitable cryptocurrencies. In case a significant number of miners close their operations, the network will see a drop in hashrate. This can make the network more centralised if a disproportionate number of miners leave the network and therefore make the network less secure over time. However, an offsetting factor in light of a reduced hashrate is the reduced mining difficulty[5]. which can lower the cost of mining incentivizing miners to re-join the network

- **Price**: If the difficulty re-adjustment results in a lower cost of mining, all else equal, the price of litecoin will be supported. However, if the cost of mining does not decrease after the difficulty re-adjustments, the price may come under pressure. Empirical data shows that Litecoin and Bitcoin's price saw an increase in a 90-day period prior to halving, while no significant pattern is visible in a similar period post halving.

- **Transaction Fees**: Historical data suggests that halving has little to no impact on transaction fees. Meanwhile, upcoming Layer 2[6] solutions such as the Lightning Network have further created alternatives for users and kept transaction costs low.

Impact on Litecoin during its previous halving event

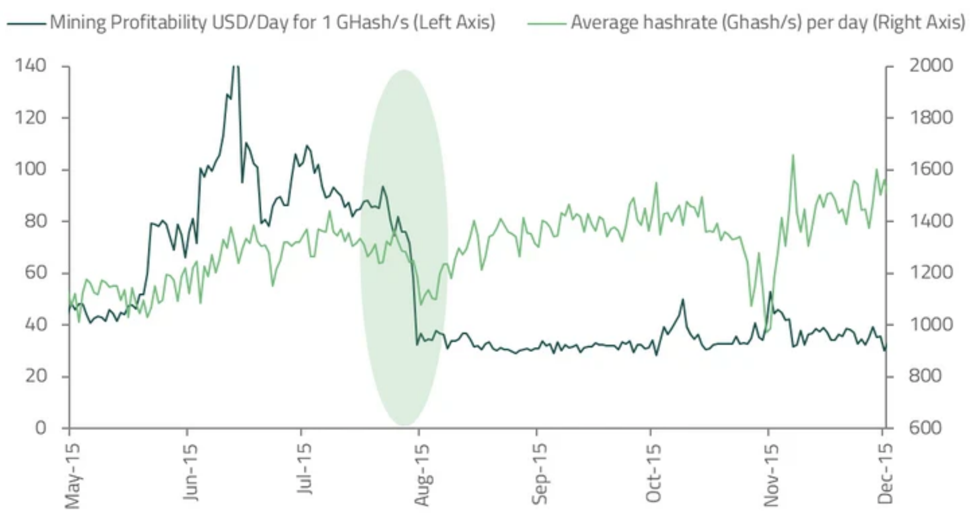
Litecoin's previous halving occurred on 26th August 2015. Its price saw a 60% increase during the 90 days prior to the halving event. Whereas, in the 90 days post halving, litecoin's price stagnated, posting a marginal growth of 6%. (Exhibit 2). Mining profitability saw an increase alongside the pre halving price rally followed by a sharp decline of 50% as the block reward halved on 26th August 2015. In the post halving period, we see that the profitability stabilised at a slightly lower level compared to its pre-rally level.

Exhibit 2: Litecoin price and mining profitability around previous halving event

Source – CryptoCompare, Bitinfocharts

Historically, the impact of halving on hashrate has been limited. The hashrate dropped by approx. 15% around litecoin's first halving but quickly rebounded back to its pre-halving level driven by a reduced difficulty, which reduced the cost of mining and therefore somewhat supported mining profitability (Exhibit 3).

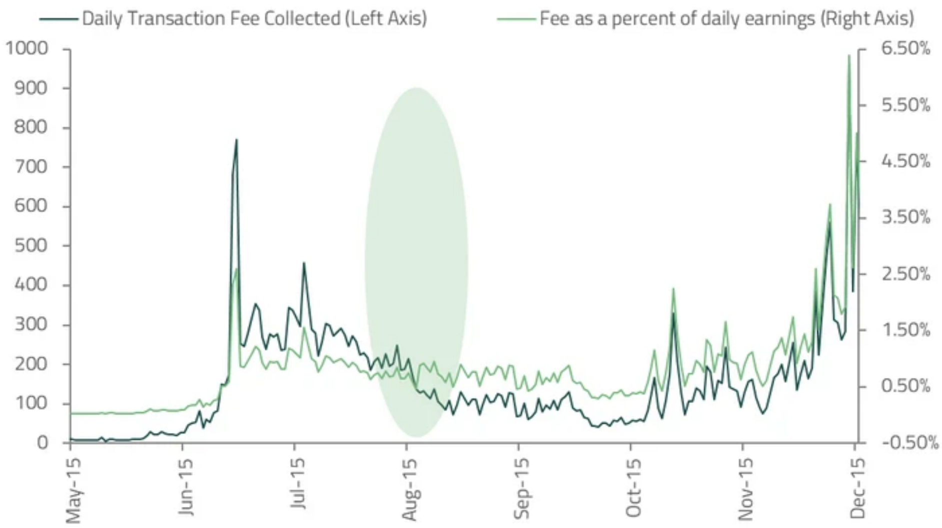
Exhibit 3: Litecoin hashrate and mining profitability around previous halving event



Source – CryptoCompare, Bitinfocharts

As block rewards halve, miners are incentivized to validate transactions that generate higher fees. This can result in users paying more fees to decrease their transaction time and raising the aggregate transaction fees in the network. Historically, transaction fees have seen a small drop at the time of halving, whereas their share relative to daily earnings (block rewards plus transaction fees) has remained stable (Exhibit 4). Over the next three months, transaction fees saw a gradual increase.

Exhibit 4: Litecoin transaction fees around previous halving event

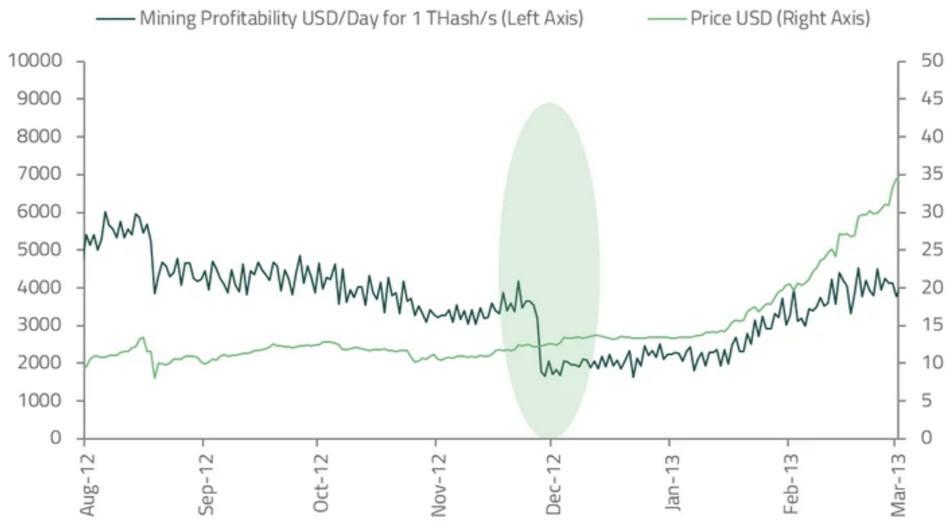


Source – CryptoCompare, Bitinfocharts

Other currencies that have seen halving in the past

Bitcoin has seen two-block reward halvings in the past, with its next halving expected to occur in May 2020. 90-days prior to bitcoin’s first halving its price saw a 15% increase whereas 90-day post-halving price increased by 152%. Mining profitability saw a 50% decrease as the block reward halved on 28th November 2012 but bounced back to its previous level as the price rallied. (Exhibit 5)

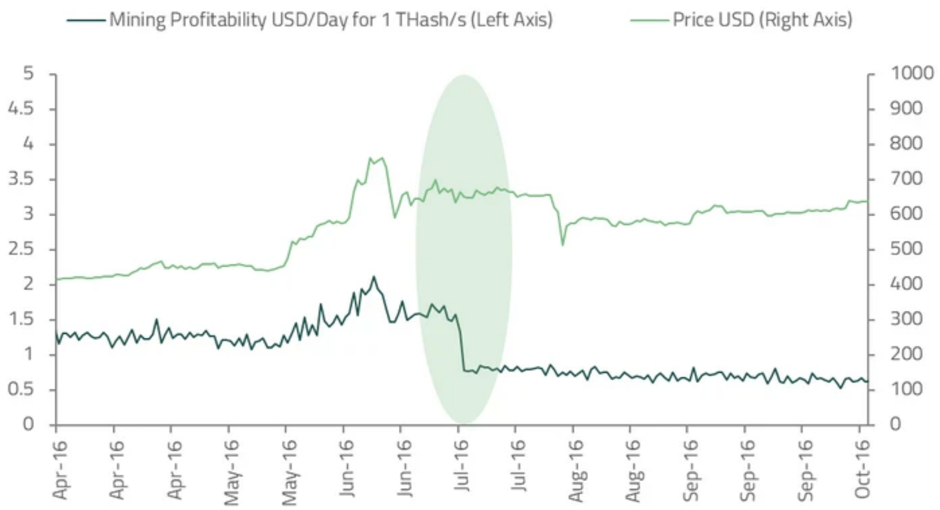
Exhibit 5: Bitcoin price and mining profitability (1st halving; 28th November 2012)



Source – CryptoCompare, Bitinfocharts

During its second halving Bitcoin saw a stronger pre-halving rally with a 55% price increase. However, its price started moving sideways in the post-halving period due to which mining profitability was unable to regain its previous level (Exhibit 6).

Exhibit 6: Bitcoin price and mining profitability (2nd halving; 29th July 2016)



Source – CryptoCompare, Bitinfocharts

Implications on litecoin and other coins

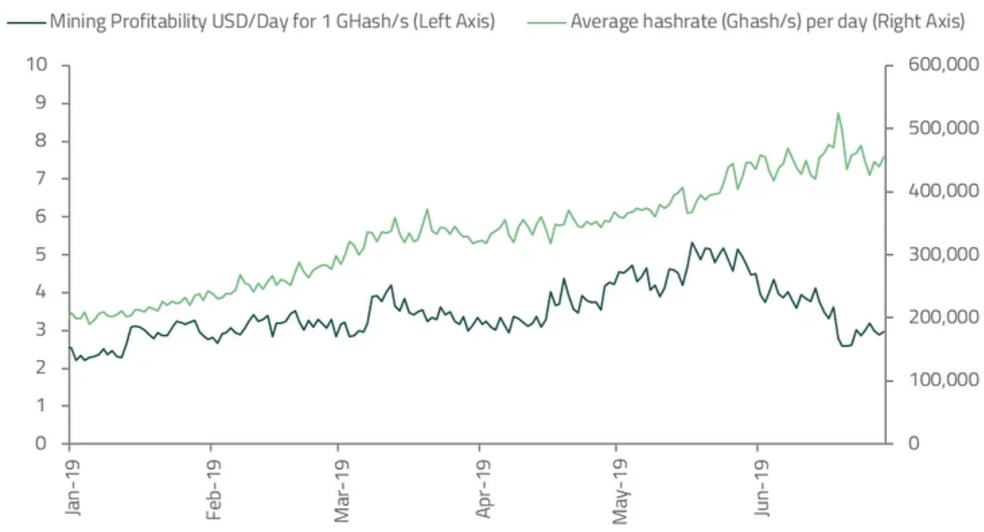
During the past 90 days, litecoin rallied to touch a yearly high of USD 141 and has since then corrected. Litecoin saw a net price increase of 23% in this period (Exhibit 7). The hashrate also saw an all-time high during this period (Exhibit 8). This increase in price and hashrate are in-line with historically observed halvings in both Litecoin and Bitcoin. Going forward, we note that as mining profitability decreases miners could move to other profitable networks. This will result in a reduced network hashrate and potentially higher hashing power concentration. However, according to recent market rumours an advanced version of mining hardware (ASICs) may be launched very soon. This could render litecoin mining more profitable compared to what the current mining equipment are able to achieve, by using less electricity. This could support the overall hashrate of the network.

On the other hand, the price action of litecoin in the post-halving period remains uncertain. Historical data suggests that price action has not been positive in every scenario (Exhibit 9). We believe transaction fees will not be affected by the upcoming halving as the use of layer two solutions has grown over time

Exhibit 7: Litecoin price and mining profitability

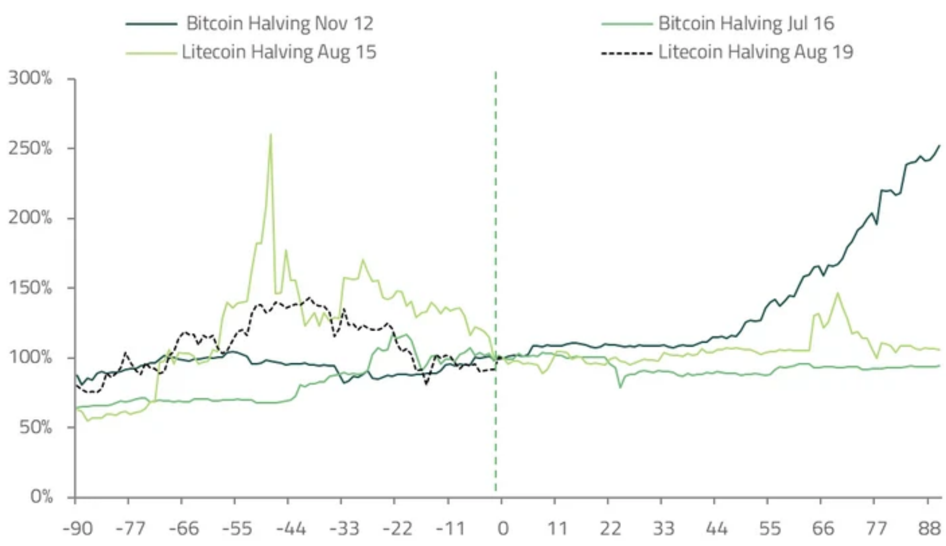
Source – CryptoCompare, Bitinfocharts

Exhibit 8: Litecoin hashrate and mining profitability



Source – CryptoCompare, Bitinfocharts

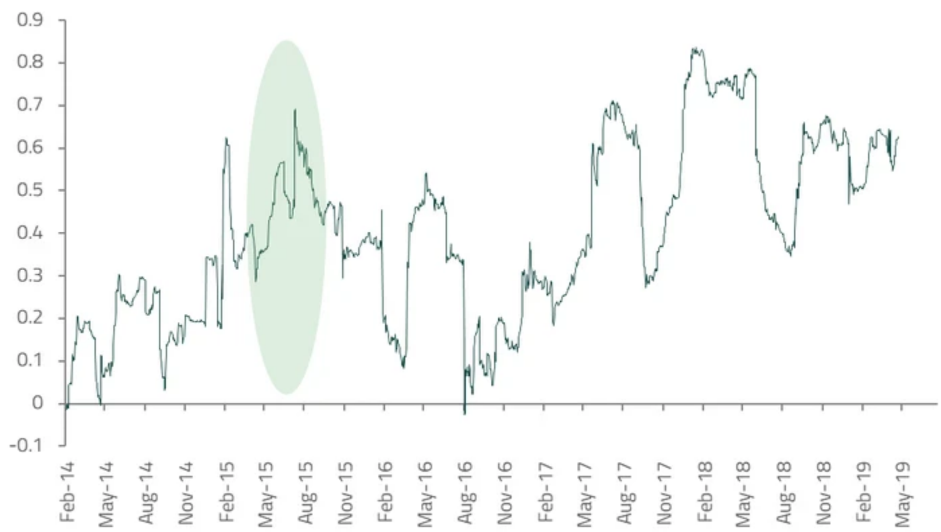
Exhibit 9: Price action around halving events (price rebased to 100 on halving date)



Source – CryptoCompare, Bitinfocharts

As litecoin's mining profitability decreases over time, it will incentivize miners to consider merge mining[7] (aka auxiliary proof of work mining) as an option and mine other cryptocurrencies along with litecoin. This will facilitate diversification and help miners spread their risk. One such example of merge mining is dogecoin (Exhibit 10). This is because dogecoin adopted merged mining which allows miners to mine both litecoin and dogecoin simultaneously without incurring any new hardware or electricity costs. We believe that other small proof of work coins might move towards merged mining to leverage the falling profitability of top crypto coins like Bitcoin and Litecoin. These developments have the potential to make blockchains more secure in the future.

Exhibit 10: 90-day rolling correlations of litecoin and dogecoin



Source – CryptoCompare, Bitinfocharts

Conclusion

We see that halving is an important event in both litecoin and bitcoin's ecosystem, but its impact is not uniformly seen across all the related factors. Halving's biggest impact is seen on the mining profitability, whereas the impact on other factors is not as direct. Therefore, no clear relationship is seen. We believe halvings importance will increase going forward as inflation rate in both litecoin and bitcoin will decrease.

[1] Mining is the process of adding transaction records to any proof of work based public ledger of past transactions. This ledger of past transactions is called the Blockchain.

[2] Daily Inflation rate for a coin is calculated by dividing the number of coins mined in a day by the circulating supply (i.e. total number of coins that have been already mined).

[3] A hashrate in blockchain and cryptocurrency operations is defined as the amount of computational power deployed in a given period of time. Network hashrate refers to the total computational power of all active miners.

[4] Bitcoin and Litecoin have fixed number of coins that can be mined. The supply is controlled by a pre-set code which determines the rate at which the coins enter the ecosystem. This gives us a clear idea of how inflation will react in future.

[5] Difficulty is a value used to show how hard is it to mine a new block in the blockchain. Higher the difficulty more computational power is required to mine the next block.

[6] Layer 2 solutions are used to scale payments, and to do off-chain computations. These solutions are built "on top of" the main chain and are also refers to as off-chain scaling solutions. Layer 2 to solutions are built to make the existing blockchain more scalable without changing its main code.

[7] Merged mining is the process of allowing two different crypto currencies based on the same algorithm to be mined simultaneously

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