

De-Coding Crypto

Weekly Analysis

May 13th, 2020

In this week's issue, we look at the potential impact of the halving on miners, and address the growing narrative over the threat of a large-scale withdrawal of processing power.

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Our Market View

May you live in interesting times. Slightly down over the week technically, but more than anything, characterised by extreme volatility – surged over \$9600 resistance on Thursday, touched into five digits briefly, then lost 15% in a single hour on Sunday as we moved all the way back towards \$8000.

As a result, in same range as we essentially were last Wednesday - \$8600 support, hard resistance around \$9600 but generally sitting lower in that range. That \$8600 level continues to be vital – a serious break on it could mark a broader correction, but for now, it seems to have held strong, and our bias remains moderately bullish.

Alts market in general had a worse week – few climbed on BTC's surge, but then took the losses in equal portion as it crashed back down. One bellwether (LINK) held up OK, but for the most part, not a lot of life to speak of.

Please direct all enquiries about this week's research to jedwards@enigma-securities.io.

Major

Ticker	Price	7D	1M	6M	12M	Cap
BTC	8956.71	-4.1%	32.0%	5.5%	13.5%	165B
ETH	190.609	-9.6%	23.4%	4.5%	-28.1%	21.1B
XRP	0.198739	-10.6%	7.3%	-24.3%	-52.7%	8.77B
BCH	234.177	-7.6%	5.9%	-11.8%	-41.4%	4.31B
LTC	42.3026	-10.9%	4.3%	-27.4%	-55.8%	2.74B
EOS	2.44673	-13.3%	1.6%	-27.5%	-62.5%	2.26B
Selected						
Ticker	Price	7D	1M	6M	12M	Cap
XTZ	2.52464	-9.2%	31.6%	118.2%	47.7%	1.79B
LINK	3.70213	-1.4%	8.9%	23.8%	59.5%	1.30B

After the halving: obsolescence and 'miner capitulation'

The halving has come. On 11/05/2020, BTC block 630,000 was mined, and block reward was reduced for the third time in history, from 12.5 BTC to 6.25 BTC.

Our research on April 22nd discusses the long-term implications in more detail, but the short summary is: it wasn't likely to be an aggressive driving factor for demand in the short-term (which we still broadly tend to think was the case in spite of recent positive price action), though it would cause a significant upward pressure in the long-term (as a permanent constricting factor on the supply side).

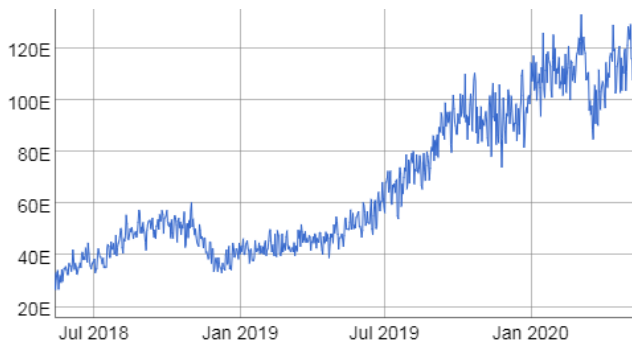
There was one thing that we largely didn't talk about in the piece; that being, the implications for miners, hash rate, and network strength. It's now perhaps worth visiting that in a little more detail, because the narrative is beginning to shift on it.

BTC mining has, over the last couple of years, become a progressively less marginally profitable practice, even as average BTC price has inched upwards. The following is a chart of expected USD revenue from 1 terahash/second of mining power (the lowest-end viable mining rigs generate around 10 terahashes/second) over the last two years:



Credit: Bitinfocharts.

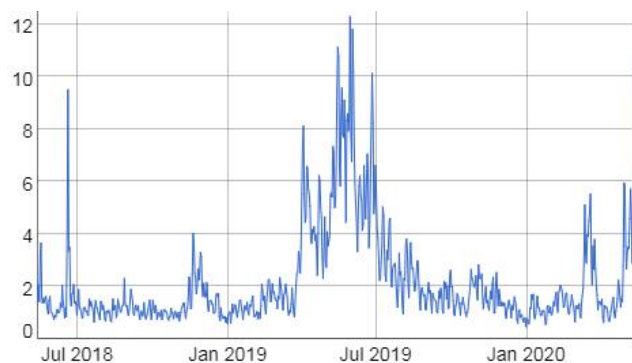
Even with price generally appreciating, the same hardware as a rule produces less and less value month-on-month; in fact, during the bull run earlier in the year, raw revenue was roughly compared to when BTC was trading in the \$3000-\$4000 range last year. The reason for that is simple: the quantity of processing power on the network is almost always increasing:



Credit: Bitinfocharts.

Network hash rate was around 40 exahashes during crypto winter (40 million terahashes), and around 110 exahashes during the 2020 bull run; hence, a given mining rig was only producing 36% as much BTC as before, essentially perfectly offsetting the appreciation in price from said lows.

You can see two big dips towards the end of the revenue graph. The first was the brief drop to \$3900 on Black Thursday; the second was the halving. Miners make almost all of their revenue from the fixed block reward; yes, there are transaction fees, but transaction fees have been near-inconsequential for a long time, rarely climbing above 2% of the block reward, and basically never into double-digits:



Credit: Bitinfocharts.

The only time the rate has ever topped even 15% was at a couple of points during the 2017 frenzy; since falling below it on January 21st, 2018, it has never threatened to break it since.

Hence, the halving in that sense represents an overnight contraction in BTC and USD revenues for miners of close enough to 50% to not be worth arguing over. More important, however, is what comes next.

The halving does mean (and has meant for a long time) that there was to be some network obsolescence coming in. To illustrate the example, we'll use the Antminer S9. Initially launched in 2016, the S9 is essentially the Honda Civic of the BTC mining world - the early market leader, ubiquitous and available everywhere, re-released repeatedly, cheap compared to more modern rigs, not high-powered but power-efficient enough to always turn a marginal profit.

All the 2016-2018 S9 models are broadly similar in efficiency, but for the sake of argument, we'll use the most popular model, the S9 14Th (released May 2018). This is how expected marginal profit has shifted pre and post-halving on different electricity costs so far:

	01/03		01/04		01/05		12/05	
	\$/day	%	\$/day	%	\$/day	%	\$/day	%
\$0.01/kWh	\$1.45	81%	\$1.03	76%	\$1.56	83%	\$0.54	62%
\$0.02/kWh	\$1.12	63%	\$0.70	51%	\$1.23	65%	\$0.21	24%
\$0.03/kWh	\$0.79	44%	\$0.37	27%	\$0.90	48%	-\$0.12	-14%
\$0.04/kWh	\$0.46	26%	\$0.04	3%	\$0.57	30%	-\$0.45	-52%
\$0.05/kWh	\$0.13	7%	-\$0.29	-21%	\$0.24	13%	-\$0.78	-90%
\$0.06/kWh	-\$0.20	-11%	-\$0.62	-46%	-\$0.09	-5%	-\$1.11	-128%
\$0.07/kWh	-\$0.53	-30%	-\$0.95	-70%	-\$0.42	-22%	-\$1.44	-166%
\$0.08/kWh	-\$0.86	-48%	-\$1.28	-94%	-\$0.75	-40%	-\$1.77	-203%
\$0.09/kWh	-\$1.19	-67%	-\$1.61	-118%	-\$1.08	-57%	-\$2.10	-241%

Data via ASICMiner.

The S9 was already barely profitable, but post-halving, is no longer even marginally profitable at a price of above \$0.02/KWh. This, for the most part, makes it non-viable. The general historical benchmark for electricity costs that are sufficient low as to enable a long-term mining operation has been \$0.06/KWh; even the best cases still tend to run somewhere around \$0.03/KWh. There are a few that can reach even lower, but rarely with scale or reliability; those that do tend to be fully vertically-integrated operations, with even cases such as municipal and regional oversupplies on hydroelectric or solar energy (as the Chinese provinces of Sichuan and Yunnan have become famous for) tending to rarely provide below that \$0.03 mark in practice.

As can be seen, the S9 was already struggling to make a profit at \$0.06/KWh pre-halving. The halving has likely killed it off entirely; it would take price appreciation well into the \$15,000 or more range to make it reasonably viable again. Not impossible or even improbable in the long-run, but also bearing in mind that hash rate will likely continue to inch up over time, this basically served as a death knell.

So: without a significant price appreciation, S9s are no longer profitable. This is likely to be true of quite a few older cards, and raises a big spectre - what's generally known as 'miner capitulation'.

'Miner capitulation' is something we have discussed a few times previously. To sum it up briefly: in general, hash rate and hence processing power on the BTC network is almost always in the ascendancy. The only time it really goes into contraction is when the essential marginal production cost of BTC drops below its price for significant numbers of miners, thus causing them to stop mining, which causes hash rate to decline, and which in turn can sometimes end up sending prices even lower due to a) them being put under pressure to start liquidating stored BTC to meet financial obligations, b) hash rate being monitored closely in the community as a signal of miner confidence in BTC's medium and long-term prospects. (there are more esoteric issues with reference to the overall security of proof-of-work networks and the '51% attack', but the BTC network at this point is large and diversified enough that this isn't a serious concern.)

Our November 13th issue has more context on this, but to emphasise how rare a contraction of hash rate has been, network difficulty (essentially a 14-day moving average proxy for hash rate) has only dropped by more than -3% a handful of times since 2017:

Date	Change	Price 0d	Price 7d	Price 30d
26/03/2020	-15.95%	6695	6670	7519
07/11/2019	-7.10%	9346	8766	7535
18/12/2018	-9.56%	3499	4035	3610
03/12/2018	-15.13%	4100	3529	3825
16/11/2018	-7.39%	5571	4268	3181
18/10/2018	-3.65%	6440	6412	5514
17/07/2018	-3.45%	6721	7712	6273
10/11/2017	-6.09%	7150	7847	14601
24/08/2017	-3.80%	4122	4573	3611

Data via BTC.com.

Such contractions front-ran to some degree the crashes in both 2018 and 2019, and to a lesser extent a relatively fallow period during the 2017 bull run (albeit in that case the drop was related to the hard fork between BTC and BCH); as we argued in the aforementioned issue, we tend not to put too much stock into the argument (trends are inconclusive outside of 2018, which was extreme for all sorts of reasons), but it has been something worth paying attention to at the very least.

So: should we be worried about a repeat? As you can likely guess from our repeated use of airquotes, we mostly wrote this piece to pour some water on the notion.

Yes, old rigs are no longer going to be profitable. But: a) this has been on the cards for months, if not years, b) the next generation of rigs, which largely started being shipped in Q3 2019, have no such concerns; for the S-series models, it would take a drawdown to well below \$6000 for that \$0.06/KWh mark to come into question, and even more on slightly more efficient setups:

	T17+		S17+		S19 Pro	
	\$/day	%	\$/day	%	\$/day	%
\$0.01/kWh	\$4.42	85%	\$5.52	89%	\$6.92	90%
\$0.02/kWh	\$3.65	70%	\$4.82	77%	\$6.14	80%
\$0.03/kWh	\$2.88	55%	\$4.12	66%	\$5.36	70%
\$0.04/kWh	\$2.11	41%	\$3.42	55%	\$4.58	59%
\$0.05/kWh	\$1.34	26%	\$2.72	44%	\$3.80	49%
\$0.06/kWh	\$0.57	11%	\$2.02	32%	\$3.02	39%
\$0.07/kWh	-\$0.20	-4%	\$1.32	21%	\$2.24	29%
\$0.08/kWh	-\$0.97	-19%	\$0.62	10%	\$1.46	19%
\$0.09/kWh	-\$1.74	-34%	-\$0.08	-1%	\$0.68	9%

Data via ASICMinerValue.

At the time of writing, we are barely 36 hours removed from the halving, which - even if we assumed that miners are acting perfectly efficiently and turning off rigs as soon as they're marginally unprofitable - wouldn't be enough to draw too strong a conclusion from. Since hash rate is estimated off block time, and there is a great degree of randomness in block time, short-term figures are always extremely noisy:

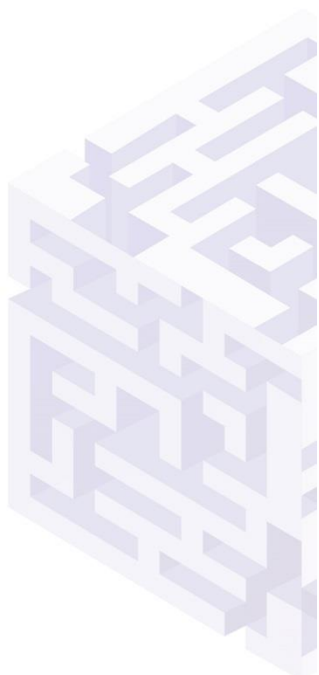



Credit: Coinwarz.

There does appear to have been some slowdown. In the 36 hours following block 630,000, 199 further blocks were produced, against a default expectation of 216 - a contraction of just under 8% (in reality a little more given that difficulty was on course to jump about 5% pre-halving). However, we will have to wait and see as to the full magnitude; the first difficulty adjustment only taking into account post-halving processing won't take place until roughly 1st June.

We do expect to see a small drop in hash rate over the next month or so, and we certainly would not rule out a price correction in general; however, chances of a true cascade now seem low, and chances of a cascade driven by miner behaviour seem much lower.

Until next week – thank you for reading.



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