



## **Bitcoin and Metcalfe's Law**

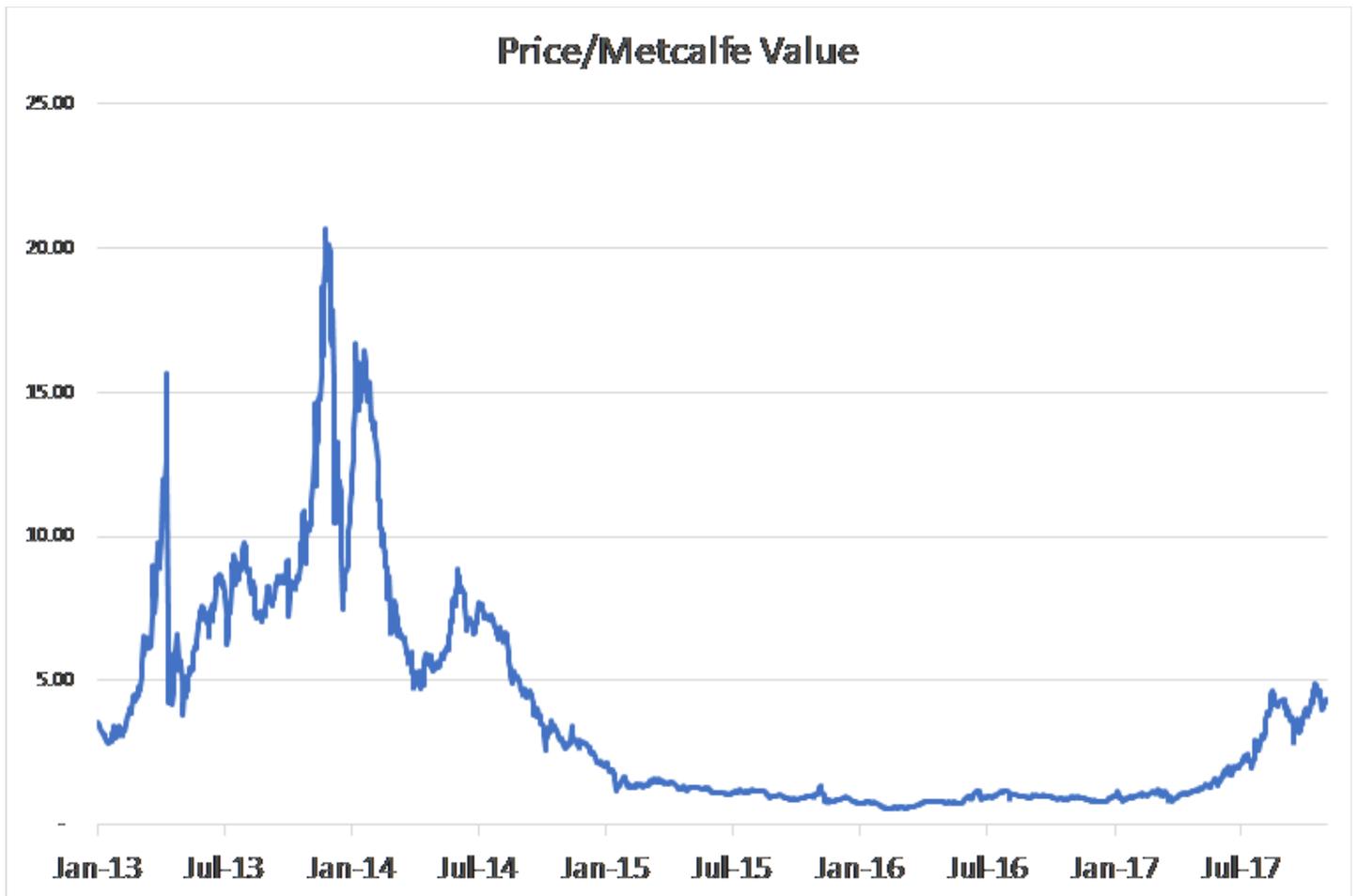
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With the recent run up in the Bitcoin price, cryptocurrencies have been garnering much greater attention from the public at large. A rapid price rise like this presents a difficult situation for potential new investors into the space. On one hand, this price action appears to be a classic asset price bubble, but on the other hand investors can wait years for a meaningful drawdown, all while missing out on the intermediate price appreciation. How then can one determine a benchmark value for Bitcoin? On the most basic level Bitcoin is a distributed payment network, and like all networks should be subject to Metcalfe's Law.

Metcalfe's Law states that a network's value is proportional to the square of the number of users. For instance, it's obvious that if you're the only person with a telephone then that network would have no value, when one additional person gets a phone the network has achieved a tiny bit of value, and if virtually everyone has a phone, then the network becomes extremely valuable. This relationship has been observed in many industries where increased adoption boosts the network's overall usefulness, such as European internet usage, Facebook's value, and more recently Tencent's value. A recent white paper by Ken Alabi finds that blockchain networks also appear to follow Metcalfe's Law, in his paper he states, "it was demonstrated that the growth in the value of the network was related to the number of unique addresses".<sup>1</sup> This intuitively comports with our understanding of how Bitcoin's value should operate, if you're the only holder of Bitcoin it's not very valuable because there is no one to exchange it with for goods and services, however if many people hold Bitcoin then it should be much more valuable since there are now many people to potentially exchange it with.

Given this information, what can Bitcoin's network size tell us about its value and the size of the current bubble? Utilizing Alabi's method we can arrive at Bitcoin's Metcalfe Value through time and compare historic Price-to-Metcalfe Value ratios for Bitcoin. This is somewhat analogous to price-to-book ratio in public equity analysis in that a higher ratio implies investors expect a given network to create more value from a given number of users.



As you can see above, the Price-to-Metcalfe Value ratio seen in the previous Bitcoin bubble of 2013/14 was far larger than where it currently stands. Obviously, the future is unknowable, but given the enormous growth that Bitcoin has seen in its user base, the recent price appreciation may not be as “bubbly” as it appears.

<sup>1</sup> Alabi, Ken. “Digital blockchain networks appear to be following Metcalfe’s Law”, 2017.

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