QUESTION

Write a 500-word explanation of the Bitcoin stock-to-flow model and make an argument for why it is a bad model?

ANSWER

On August 1, 2020, The CoinTelegraph read: “the price of Bitcoin surpassed $11,700 and Plan B, a twitter user and the creator of the Stock to Flow model said that BTC rally to $100,000 is well on track.”

The stock to flow model (S2F) potentially tells a story of scarcity. Stock refers to the total amount of the commodity available in use and in reserves. Flow refers to how much of the commodity is produced in a year. The ratio of the stock to the flow gives the number of years required to produce the exact stock available.

This ratio inversely describes supply. The ratio of flow to the stock is the supply growth rate. As the stock flow ratio increases, supply of the commodity decreases. This has the potential to create scarcity of the commodity which can lead to an increase in price. Investors use the stock to flow ratio of commodities like gold and silver to attempt to estimate their price trajectory, because for such commodities, whose usefulness and demand are known, an increase in the S2F ratio reduces supply and creates scarcity, which can lead to increase in price. Bitcoin participants have attempted to apply the same model to estimate the price trajectory of the cryptocurrency.

A notable proponent of this ideology is someone who goes by the Twitter username, Plan B. Unfortunately, his propositions are not without flaws. The aim of this essay is to discuss those flaws. In his 2019 paper, Modelling Bitcoin Value with Scarcity, he begins by boldly proclaiming that Bitcoin is scarce. He argues this by comparing commodities like gold and silver to Bitcoin based on the concept of unforgeable costliness. We know that the difficulty and cost of mining commodities like gold and silver limits their supply. He argues that Bitcoin has similar difficulty and cost to mine due to the massive and increasing amount of electricity required to mine the cryptocurrency. He argues that this unforgeable costliness limits the supply and gives rise to unforgeable scarcity. He also argues that this scarcity is a direct driver of value.

To judge the accuracy of his arguments, it is useful to turn them into questions, thus: Is scarcity a direct driver of value or price? Does unforgeable costliness always lead to unforgeable scarcity? Is Bitcoin scarce? To better answer, it is useful to consider the meaning of scarcity.

According to what we know in Economics, scarcity is the primary economic problem of having limitless amounts of human desires and needs, with inadequate resources. Another important factor we need to keep in mind is choice. When there is scarcity, a customer will need to make a difficult choice - to forgo the commodity or pay a higher price for it (Schenk, 2006). If he chooses to pay at a higher price, the price will increase. But if he chooses to forgo, the price will not increase irrespective of scarcity. Therefore scarcity is only partly a driver of price, with choice being the other contributing factor. His argument is wrong because he ignores the role of choice in the movement of price.

It is important to note the relevance of choice because it is a function of need or usefulness. A consumer will only find the decision to pay higher or forgo a product difficult, if he finds the product useful (if he needs it).

From the definition of scarcity above, we see that scarcity is also a function of need or usefulness.

Mathematically; Scarcity = Need - Supply

This refutes the second argument that unforgeable costliness leads to unforgeable scarcity. Unforgeable costliness only leads to a limited supply. Scarcity is not a function of supply alone, but of need as well.

Need is the root source of value to the determination of price and not scarcity, because it is need or usefulness that consumes the commodity, keeps renewing its demand, and creates the scarcity that pushes its price up when the S2F ratio increases. Scarcity and choice inherit their value to price determination from need or usefulness. Hence if need does not exist, scarcity cannot exist. And if scarcity does not exist, S2F ratio information has no story to tell about scarcity no matter how big it gets, and is therefore useless to the price determination of the commodity.

This leads us to the final question, the deal breaker, is Bitcoin scarce? Does Bitcoin have usefulness?

We know that the usefulness of gold and silver is in their strong resistance to corrosion. This makes them useful for many purposes where such long term purity and stability is coveted: in medicine, dentistry, finance, luxury and jewelry etc. We know the need for gold and we know it is bigger than its supply and therefore scarce. But till now, we have not been able to understand the usefulness of Bitcoin neither have we created a usefulness for it by ourselves. Even Bitcoin’s creator at the point of creation called it useless:

"As a thought experiment, imagine there was a base metal as scarce as gold but with the following properties: boring grey in color, not a good conductor of electricity, not particularly strong, not useful for any practical or ornamental purpose and one special, magical property: can be transported over a communications channel" — Satoshi Nakamoto

This yields the equation:
Scarcity = 0 - Supply

We see that Bitcoin is not scarce, in fact it is theoretically in a constant state of surplus, no matter how big the S2F ratio gets, at least until usefulness is found for it. Hence, S2F cannot say anything useful about the future price of the cryptocurrency. The delusion that S2F can be used to determine the price of bitcoin is probably from researchers going with the dictionary meaning of scarcity, as Plan B admitted in his paper, instead of the economic meaning.