**ANSWERS TO ASKED QUESTIONS**

Question: Write a 500 word explanation of Bitcoin Stock to Flow Model and make an argument for why it is a bad model?

Answer:

Stock to flow is a number that shows how many years, at the current production rate, are required to achieve the current stock. It is widely used to determine the abundance or scarcity of a commodity.

SF = Stock / Flow.

The higher the stock to flow value, the higher the price of the commodity.

In other words, Stock to flow is the number gotten when we divide the total stock by yearly production (flow). It tells us how many ears are required at the current production rate, in order to produce what is in the current stock. For example, gold has a production rate of around 3000 metric tonnes and the current stock in the whole world is estimated to be 198,000 metric tonnes. If we put that in the previous formula, we get;

**198000 / 3000 = 66**.

At the current production rate, we would need 62 years to dig out all the gold that’s currently in circulation. The higher the number, the greater the scarcity.

Now, contrasting how this relates to bitcoin. There are around 18 million bitcoins in circulation and 657000 BTC are generated per year. So if we put these numbers in stock to flow formula, we get;

**18,000,000 / 657,000 = 27**

That means that we need 27 years of current bitcoin production in order to produce the current stock.

Bitcoin stock to flow mathematical model can be expressed as;

Model price (USD) = **Exp (-1.84)\*SF3.36**

If we put the bitcoin stock to flow value of 27 into this formula, we get the value of 10,750 USD. This is the price indicated by the model. But, putting into consideration Satoshi Nakamoto’s locked/lost 1 million BTCs, we simply decrease stock amount for 1million BTC. So the stock to flow value would now be;

**17,000,000 / 657,000 = 25.8**

And with applied formula, we get model price in USD to be **8875 USD**

However, reactions to the stock to flow model analysis in the crypto space and mainstream media have been varied, and though some analysts are excited, some remain skeptical. Reason being the fact that the stock to flow model is based on the rather strong assertion that the USD market capitalization of a monetary good is derived directly from their rate of new supply.

No evidence or research is provided to support this idea, other than the singular data points selected to chart (in comparison) – gold and silver’s market capitalization against bitcoin’s trajectory.

Likewise from a theoretical perspective, what the stock to flow model defines as ‘’scarcity’’ is not scarcity by definition. Stock to flow describes scarcity as an asset’s supply growth rate or new production as measured by the stock to flow metric. This assumes that increasing new supply reduces price through increased selling pressure from producers and vice versa. This seems reasonable at first glance until one considers that a high stock to flow represents a dynamic where new supply is insignificant to the current supply.

More so, analysts argued that stock to flow has no direct relationship with gold’s value over the last 115years. Gold’s market capitalization held valuations between about 60billion USD to about 9trillion USD. A range of 8trillion USD is too much proof that other factors asides stock to flow drive gold’s USD valuation.

While a higher stock to flow value may be a necessary feature for a commodity to serve as hard money, the metric itself says nothing about how market participants value said commodity. Many crypto-currencies which utilize bitcoin’s code have the exact same supply schedule has bitcoin and everyone understands that stock to flow values have nothing to do with their future or current valuation.

We are therefore left with a hypothesis that applies to no economic assets except bitcoin and whose only evidence is a linear regression with questionable application and clear selection bias.

**QUESTION**

Yara Inc is listed on the NYSE with a stock price of $40 - the company is not known to pay dividends. We need to price a call option with a strike of $45 maturing in 4 months. The continuously-compounded risk-free rate is 3%/year, the mean return on the stock is 7%/year, and the standard deviation of the stock return is 40%/year. What is the Black-Scholes call price?

**ANSWER:**

Where is the value of the call price = ?

**X** is the strike price = $45

is the stock price = $40

is the standard deviation = 40% = 0.40

**t** is the time in years = 4 months = 4/12years

is the risk free rate = 3% = 0.03

=

**=**

=

= **-0.3525**

**=**

Looking up  **and** values on the standard normal table

= **0.3632**,  **= 0.3121**

* **QUESTION:** (Please show your workings). Over all real numbers, find the minimum value of a positive real number, y such that

y = sqrt ((x+6)^2 + 25) + sqrt ((x-6)^2 + 121)

**QUESTION:** Why is it a bad idea to use recursion method to find the Fibonacci of a number?

**ANSWER:** It’s a bad idea to use recursion because the recursion “overlaps”. For example,

F(5)=F(4)+F(3) = F(3)+F(2)+F(3) = F(2)+F(1)+F(2) + F(3) = F(2)+F(1)+F(2)+F(2)+F(1)

We calculate the same value multiple times to get to F(5). It gets worse when we calculate the latter number in the series.

**ANSWER:**

We want to find the point on the x-axis such that the sum of its distances from the points **(−6, 5)** and **(6, 11)** is minimal.

Consider the symmetric point of **(−6, 5)** with respect to the axis, that is, **(−6, −5)**

The line through **(−6, −5)** and **(6, 11)** has equation **4*x*−3*y*+9=0** and it intersects the x-axis at ***x*=−9/4**.

The minimum value is therefore

+

**= + = 20**