

THE HALVING IS THE CATALYST TO A NEW PRICE DISCOVERY CYCLE

URI

ED DIGT

CIADC.co | May 5, 2020



What is the halving? Why is the halving important?

What does the halving mean for the miners and the Bitcoin Network?

What does the halving mean for the Bitcoin price?

We have been hearing these questions nonstop.

We are sure you have heard all sorts of answers and a wide range of details surrounding Bitcoin's halving, so in this market analysis we are going to focus on simplifying the *Cryptonomics*¹ behind the halving – the catalyst to a new fair value price discovery cycle...

Like all economies, Bitcoin's digital economy can be measured and valued.

Traditional economies are measured by their gross domestic product (GDP).

GDP is a measure of all imports and exports.

In other words, GDP is a measurement based on all production and consumption. It is an analytical tool used to measure (value) an economy and its growth or contraction.

Similarly, the Bitcoin network's native exchange asset Bitcoin is mined (produced) and exchanged (consumed).

Therefore, we can use similar measures of traditional economics, coupled with *Bitcoin node analytics*², to measure the value of the mining work (production) as well as the network value transfer (consumption) taking place on the network to derive a fair value for the asset.

CIA built a price discovery equation with the goal being to define **Bitcoin's Fair Market Exchange Value (BFV)** based on the measure and status of its digital economy.

Simplified (non-weighted) Equation for BFV:

Bitcoin Fair Value = (COP + S2F + NVT + BEV) / 5

Let's break down the equation to see exactly how we can determine a fair market exchange value for Bitcoin and what variables, if any, will change because of the halving...

¹ https://docs.wixstatic.com/ugd/ea9d6c_ff205c86853b4314ba8d9f9b0e847033.pdf

² https://terminal.bytetree.com/



Cost of Production (COP)

Miners form the core infrastructure of the Bitcoin network. Miners perform work as the producers and validators of the blockchain. The production cost of the miners' work creates a base price floor to begin to measure and value a fair exchange price of Bitcoin. Let's look at a cost of production chart:



(click to enlarge³)

In the chart above, the red cloud represents the production cost range of mining Bitcoin.

The first input is the top line of the red cloud which is the all-in cost for mining Bitcoin @\$7,906.

The second input is the bottom line of the red cloud which is the pure electrical cost for mining Bitcoin @\$4,744.

The first indicator under the chart, Hash Ribbons indicator⁴ (with the blue buy dot signal), calculates the hashrate of the Bitcoin network and quantifies growth and contraction with two different moving averages.

³ https://docs.wixstatic.com/ugd/ea9d6c_b386d7a79dac4c06b1540b948c04d17e.pdf

⁴ https://medium.com/capriole/hash-ribbons-bitcoin-bottoms-60da13095836



When the indicator's moving averages cross it tells us whether the Bitcoin network (digital economy) is experiencing growth or capitulation.

Periods of miner capitulation coincide with Bitcoin price trading between its all in cost and pure electrical costs (when it is least profitable to mine) and times of network growth coincide with Bitcoin price trading above its all-in cost (when it is most profitable to mine).

The relationship between Bitcoin's cost of production and its price cannot be underrated.

Bitcoin's cost of production has historically served as a price floor for fair value exchange.

To learn more about Bitcoin's cost of production value metric you can check out this source:

1. Bitcoin's Production Cost⁵

So, we can update the equation:

Bitcoin Price = (\$7,906 + \$4,744 + \$2F + NVT + BEV) / 5

Next variable ...

Stock to Flow (S2F)

In economics, supply/demand is an economic model of price determination in a market.

The model postulates that, holding all else equal, in a competitive market the unit price for a particular good, or other traded item such as labor or liquid financial assets, will vary until it settles at a point where the quantity demanded (at the current price) will equal the quantity supplied (at the current price), resulting in an economic equilibrium for price and quantity transacted.

A change in supply (production) or demand (consumption) will lead to a new market equilibrium price based on the new levels of supply and demand.

⁵ https://medium.com/capriole/bitcoins-production-cost-88d889462ea7



Scarcity can then be quantified by SF.

S = (Stock) the size of the existing stockpiles.

F = (Flow) the yearly production.

SF = stock / flow

The current S2F value of Bitcoin is \$7,265.

To learn more about the S2F value metric you can check out this source:

1. Modeling Bitcoin's Value with Scarcity⁶

So, we can update the equation:

Bitcoin Price = (\$7,906 + \$4,744 + \$7,265 + NVT + BEV) / 5

Next variable...

Network Value to Transaction Ratio (NVT)

The NVT ratio measures the network price with respect to the value of transactions it supports.

If the price of the network increases while the on-chain activity remains the same, the NVT ratio increases and the market is considered to be top heavy.

Similarly, if the network value falls while the transaction value remains flat, the network is trending towards fair value or becoming undervalued.

Bitcoin's current NVT ratio = \$6784.

To learn more about the NVT value metric you can check out this source:

1. The Network Value to Transaction Ratio⁷

⁶ https://medium.com/@100trillionUSD/modeling-bitcoins-value-with-scarcity-91fa0fc03e25

⁷ https://bytetree.com/insights/2019/08/calculating-bitcoin-s-a-blockchain-s-fair-market-value-the-network-value-to-transaction/



So, we can update the equation:

Bitcoin Price = (\$7,906 + \$4,744 + \$7,265 + \$6784 + BEV) / 5

Next variable...

Bitcoin Energy Value (BEV)

As humans, our time is limited — it's our most valuable resource.

What we choose to put our energy into, and therefore our time into, is our most valuable choice.

Bitcoin values energy.

The fair value of Bitcoin can be represented as a function of the Joules of energy spent to produce it.

Bitcoin's current energy value equivalent = \$12,155.

To learn more about the Bitcoin Energy Value metric you can check out this source:

1. Bitcoin Energy-Value Equivalence⁸

So, we can update the equation and solve:

Bitcoin Price = (\$7,906 + \$4,744 + \$7,265 + \$6784 + \$12,155) / 5 Bitcoin Fair Value (BFV) = \$7,771

As of the time of this writing Bitcoin is trading for \$8,862.

Bitcoin is currently trading at a + \$1,091 (+14%) premium to its fair value exchange price based on the status of its digital economy.

⁸ https://medium.com/capriole/bitcoin-value-energy-equivalence-6d00d1baa34a



Now that we have gone through the process of economically measuring and valuing the Bitcoin network, <u>let us look at any changes to the BFV</u> <u>equation that will result directly from the halving</u> and determine the effect of any changes on the fair value exchange price of Bitcoin.

AFTER THE HALVING...

Cost of Production (COP)

The halving hits miners the hardest; cost of production doubles immediately.

A quick example:

A miner was mining 1 Bitcoin per month worth \$8862 before the halving.

The miners all in cost was \$7906.

After paying costs the miner profits \$956 for the month.

After the halving (mining rewards reduced by 50%), that same miner will pay the same all-in cost of \$7906.

Bitcoin is still worth \$8862.

This month because of the halving adjustment to mining rewards the farm only mined 0.5 BTC (\$4431) for the same costs.

After paying costs the miner loses \$3475 for the month.

If the miner now wants to mine a full Bitcoin, he will have to mine for two months and the all-in cost of production of a full Bitcoin would be \$15,812.

The halving immediately doubles the cost of production for miners.

So, we can update the equation:

Bitcoin Price = (\$15,812 + \$9,488 + S2F + NVT + BEV) / 5

Next variable ...



Stock to Flow (S2F)

History and observable and repeatable science prove to us that supply and demand is an economic model of price determination in a market.

A change in supply (production) or demand (consumption) will lead to a new market equilibrium price based on the new levels of supply and demand.

The Flow of Bitcoin is going to be reduced by 50% as a result of the halving.

This will give Bitcoin an annual inflation rate of 1.8%, making it the least inflated hard money asset in the world relative to its overall supply.

The S2F value of Bitcoin projected out one year (May 12, 2021) from the halving is \$99,502.

That price is not accounting for an increase/decrease in demand, simply a 50% reduction to Flow as a direct result of the halving.

So, we can update the equation:

Bitcoin Price = (\$15,812 + \$9,488 + \$99,502 + NVT + BEV) / 5

Next variable ...

Network Value to Transaction Ratio (NVT)

The NVT ratio measures the network price with respect to the value of transactions it supports.

Since we are projecting a future value, based on future transactions and price, we do not want to assume there will be more or less transactions (more/less consumption) on the Bitcoin network.

Therefore, to not skew the projection, we will assume a steady demand (or rate of consumption) and leave the NVT input the same.

So, we can update the equation:

Bitcoin Price = (\$15,812 + \$9,488 + \$99,502 + 6,784 + BEV) / 5

Next variable ...



Bitcoin Energy Value (BEV)

The fair value of Bitcoin can be represented as a function of the Joules of energy spent to produce it.

To not skew the projection, we will assume the same amount of energy used before the halving will be used after the halving.

So, we can update the equation:

Bitcoin Price = (\$15,812 + \$9,488 + \$99,502 + \$6,784 + \$12,155) / 5

BFV = \$28,748

As of the time of this writing Bitcoin is trading for \$8,862.

Bitcoin is currently trading at a - \$19,886 (-224%) discount to its roughly estimated fair value exchange price around May 12, 2021 (not taking into account NVT variable change or network size and difficulty increases for cost of production and energy value).

Please keep in mind external forces like government bans, global economic stability, or even technological breakthroughs can affect these variables in the opposite direction.

For example, should quantum computing go live and require less total network energy to solve Bitcoin's SHA-256 algorithm, the Cost of Production (COP) and Energy Value (BEV) variables would decrease, thus decreasing BFV.

As you can see the halving is a strategically designed monetary policy that uses the simple laws of economics, that have proven themselves true throughout history, to drive value into the digital economy of the Bitcoin network.

"The price of any commodity tends to gravitate toward the production cost. If the price is below cost, then production slows down. If the price is above cost, profit can be made by generating and selling more. At the same time, the increased production would increase the difficulty, pushing the cost of generating towards the price. In later years, when new coin generation is a small percentage of the existing supply, market price will dictate the cost of production more than the other way around." – Satoshi⁹

⁹ https://bitcointalk.org/index.php?topic=57.msg415#msg415



CIA hopes you now have a clearer understanding of the effects of the halving on the Bitcoin network and price.

Our contribution to the community is our non-weighted equation for Bitcoin Fair Value (BFV).

During bear phases COP & BEV are more important to price.

During bull phases NVT & S2F are more important to price.

You may see it different; great, that is free market.

These are the variables needed to properly measure and value the Bitcoin network and to determine BFV. Adjust the weighting of each variable as you see fit!