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Valuing Bitcoin

AN ANALYSIS OF METHODOLOGIES FOR VALUING BITCOIN

This research report will identify and analyse the different methodologies for valuing Bitcoin. We will use each of these methodologies to better understand the different trends in relevant data points for the crypto asset over time. This report will focus on five unique metrics: the Network-Value-to-Transactions (NVT) Ratio, the Network-Value-to-Realized-Value (NVRV) Ratio, the Network-Value-to-Hash-Rate (NVHR) Ratio, the Active Addresses metric, and the Cost of Mining method.

In addition, we will analyse the various market sizing analyses done for Bitcoin including comparisons to the global remittances and gold markets. Finally, we will conduct an intrinsic valuation calculation for Bitcoin using the Equation of Exchange. As a whole, the metrics suggest that the Bitcoin bear market is truly over – with a further sustained drawdown extremely unlikely – and that Bitcoin's fundamentals are likely to support further growth in the market over the next 18 months.

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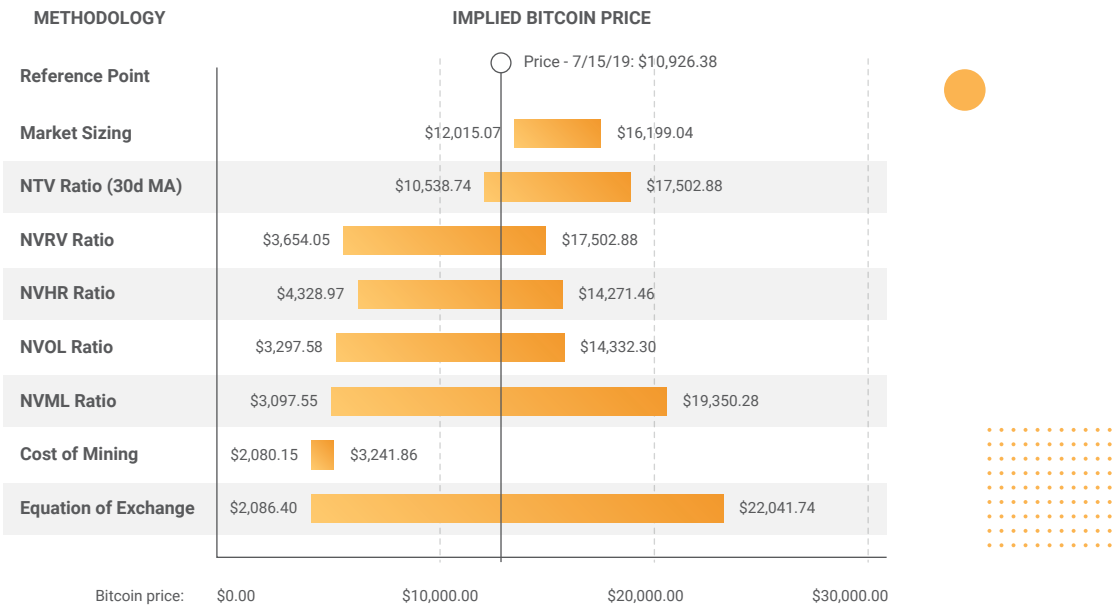
Summary

This report[1] aims to value Bitcoin in a similar way to the valuation methodologies available for traditional financial assets. This report builds on the wealth of research already carried out on valuing Bitcoin and uses the most credible methodologies — such as Market Sizing, the NVT Ratio, and NVRV Ratio — to ascertain price ranges for Bitcoin as shown below (**Fig. 1**).

Our key finding is that, based on the current valuation methodologies at our disposal, Bitcoin's current price seems to be trading within an acceptable threshold based on its fundamentals. Given the nascent valuation methodologies and the crypto asset's volatility, the price ranges shown by some of these new methodologies, such as the Equation of Exchange Method and the Cost of Mining, are quite wide or off the mark; nevertheless, we believe that certain valuation methodologies such as Market Sizing, the NVT Ratio — though a lagging indicator — and the NVRV Ratio are useful in better understanding the relationship between the market's current pricing of Bitcoin relative to its fundamentals.

Figure 1: Valuations Price Ranges



Assumptions

For the NVT, NVHR, NVRV, Network-Value-to-Metcalfe's-Law (NVML), and Network-Value-to-Odlyzko's-Law (NVOL) Ratios, the implied Bitcoin ranges have been calculated by using the maximum and minimum values of the respective metric during the period July 15 2018 to July 15 2019, and then calculating the implied Bitcoin price assuming that the fundamental metric within the denominator of each ratio (transaction volume, hashrate, and realized value) was equal to its value on July 15 2019.

For market sizing, the implied Bitcoin range was calculated by taking the minimum and maximum values of the predicted Bitcoin prices on the date July 15 2020. Moreover, the Cost of Mining implied Bitcoin range was calculated by taking the minimum and maximum values of the implied calculated Bitcoin price under the method during the range July 15 2018 and July 15 2019. Finally, the implied Bitcoin range under the Equation of Exchange method was calculated using the maximum and minimum values for on-chain transaction volume in the twelve months prior to July 15 2019 which were then used as inputs in the Equation of Exchange model.

Traditional Valuation Methodology Overview

Traditional valuation typically uses one of three approaches to value a business or asset.

Cost approach

Simply stated, the cost approach is a valuation method that states the price of an asset should be equal to the costs incurred to build, replace, or procure that asset. The cost approach is a popular method for valuing assets like gold. Because many researchers believe that gold and Bitcoin share a similar roles as a store of value or as a tool for hedging, the cost approach may provide a strong framework for valuing Bitcoin. However, it is important to note that the intricacies of the concept of mining difficulty in Bitcoin may impact the effectiveness of the cost approach in valuing Bitcoin.

Market approach

The market approach values assets, also known as the relative value approach, by comparing the asset to others with similar characteristics or by using transactions of similar size in similar industries to derive its value. The two most common market approaches to valuation are:

Public comparable companies

The asset is valued by comparing a set of its relevant financial ratios to those of a set of comparable assets that are selected based on metrics like industries and geographies served, company size, etc. By comparing the asset to its peers, this approach can develop a price estimate or price range for the asset based on the best, worst, mean, or modal metric values for the peer group. Selecting the appropriate metrics and companies is of the utmost importance with this methodology, however, as unrelated assets or industries will produce values that have little relevance to the asset being valued.

Preceding transactions

The asset is valued by analyzing the price paid for similar companies in past M&A transactions. For this reason, preceding transactions may also be referred to as M&A comps. This approach is useful because it considers the market's appetite for the asset and values the asset accordingly. One drawback to the preceding transaction approach, is that an acquirer in a preceding transaction may pay a premium for a particular asset that is not reflected in the asset being valued in this approach.

Discounted Cash Flow Approach

The discounted cash flow (DCF) approach, also known as the intrinsic value approach, posits that the value of an asset is the present value of its expected future cash flows. These future cash flows are the projected year-end cash flows for the asset after relevant costs and expenditures are subtracted from revenue.

The DCF approach values the asset by discounting these back to the present day using an appropriate discount rate. The DCF approach is one of the most widely used valuation methodologies in both professional and academic contexts thanks to its focus on the actual business environment a company or asset is operating in, which allows investors to determine whether an asset is properly valued. One must use caution when using the DCF approach, however, as unexpected economic changes and incorrect growth projections may produce valuations that diverge significantly from an asset's actual real world value.

Traditional Valuation Methodology

Cost Approach

Market Approach

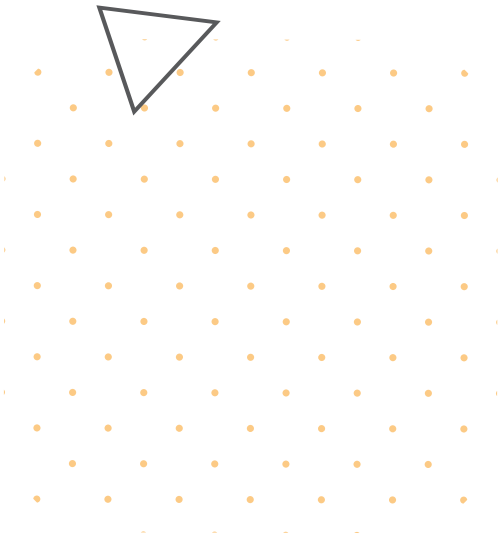
DCF/Intrinsic Approach

Bitcoin Valuation Methodology

Cost of Mining Method

Market Sizing Method
NVT Ratio Method
NVRV Ratio Method
NVHR Ratio Method
Active Addresses Method

Equation of Exchange Method



Market Sizing Method

Overview

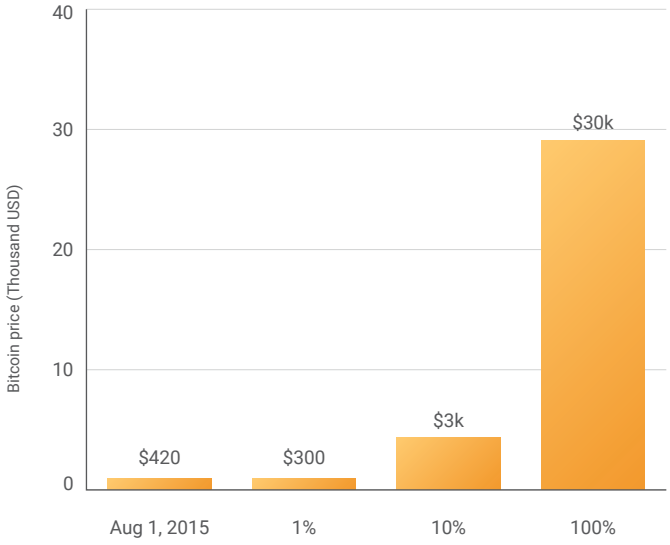
We can use the Market Sizing method to compare the value of the Bitcoin market to other comparable markets such as global remittances (**Fig. 2**) and gold (**Fig. 3**). The price of an individual Bitcoin can then be calculated by dividing the total market value by its fully-diluted circulating supply. The global remittances market has generally been seen as an appropriate comparable for Bitcoin since the crypto asset could theoretically help solve some of the pain points of the industry – for example, high fees and the lack of efficiency. The gold market can also be seen as an appropriate comparable for Bitcoin given their similar functions as stores of values and their comparable properties — (quasi-) fungibility and scarcity, for example.

Market Sizing Method - by Chris Burniske & Arthur V. Laffer[2] (2015)

Burniske and Laffer argued that the remittances market, "characterized by high fees and slow settlements", could be the market most ripe for disruption by Bitcoin. The World Bank[3] estimated that money transferred to developing economies totaled $436 billion in 2014. If the only function of Bitcoin were to exclusively serve the remittances market and the crypto asset were to take the various shares of the market as we have shown in **Fig. 2**, then the price of Bitcoin would be as shown. At a 1% penetration the Bitcoin price would be $300, at a 10% penetration it would be $3,000, and at a 100% penetration it would be $30,000. However, we believe that this approach grossly underestimates the value of Bitcoin because Bitcoin's value proposition is better suited for markets other than the remittances market. Established firms like TransferWise already provide an excellent service for remittances and it is unclear why Bitcoin's other properties – censorship-resistance and decentralization – are valuable when the crypto asset is used as a facilitator of remittance payments. Our method for market sizing Bitcoin, instead, uses the total value of all mined gold – around 190,040 tons according to the World Gold Council[4] – of $8.7 trillion[5].

$$\text{Implied Bitcoin Price} = \frac{\text{Level of penetration} * \text{Value of target market}}{\text{Fully - dilluted Circulating Supply}}$$

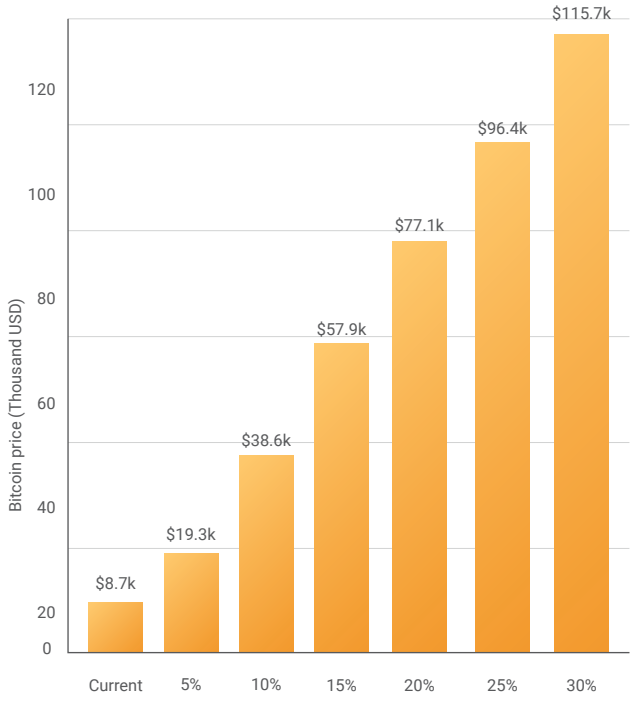
Figure 2: BTC vs Global Remittances



Value of target market - Market value of the market that Bitcoin has been predicted to capture
Level of penetration - The predicted proportion of the target market Bitcoin captures
Fully-diluted Circulating supply - The total number of units of Bitcoin that will ever exist

We believe that gold offers a much better comparable market than that of global remittances given the similarities shared between gold and Bitcoin, like its (quasi-) fungibility, censorship-resistance, and reliable monetary supply. In **Fig. 3** we have calculated the price of Bitcoin assuming different levels of penetration of the gold market. At a 5% penetration of the gold market, Bitcoin's price would be $19,300 and at a 10% penetration of the gold market, its price would be $38,600. Moreover, at a 20% penetration its price would be $77,100, whilst finally at a 30% penetration its price would be $115,700. We can see that our market sizing method leads to substantially higher values of the estimated price of Bitcoin which we see as more reasonable given the range the crypto asset has traded at over the last two years.

Figure 3: BTC vs Gold Market

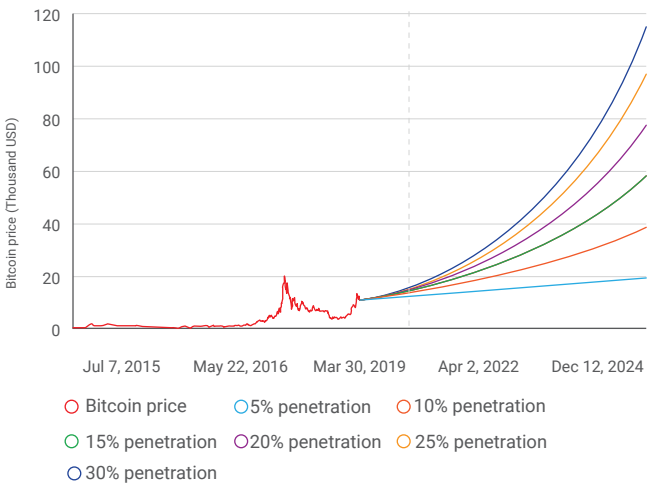


Analysis

In **Fig. 4** we have calculated the possible paths required for the Bitcoin price to reach the different gold penetration levels from July 15, 2019 to July 15, 2025. To reach the 10% penetration target price of $38,600, Bitcoin's average daily rate of return would need to be 0.07%; to reach the 20% penetration target price of $77,100 the average daily rate of return would need to be 0.10%; and finally, to reach the 30% penetration target price of $115,700 the average daily rate of return would need to be 0.13%. We have chosen the year 2025 as it represents a year further enough in the future for Bitcoin to have made significant strides forward on its fundamental value proposition — in terms of improvements in its technological and financial infrastructure — such that the crypto asset could have plausibly captured a significant proportion of its target market. Unlike the majority of other valuation methodologies for Bitcoin, the market sizing method has an intuitive appeal for what Bitcoin's value could be at full maturity.

It is difficult to understand and predict the path the crypto asset will take to reach its indicated values at maturity. Crypto asset returns could be argued to be stochastic over short time periods and the predictions made for the price of Bitcoin fail to take that into account – therefore limiting this method's usefulness over shorter timeframes. While we believe that the gold market currently offers the best comparable market given Bitcoin's value proposition as a store of value, this could change due to microeconomic factors, like changes in technology or the emergence of viable competitors within the crypto asset space, or to macroeconomic factors, like unprecedented government action against crypto assets. In such cases, alternative markets such as peer to peer payments or more complex financial products may be better suited for comparison.

Figure 4: BTC Market Sizing Prediction, 2019-2025



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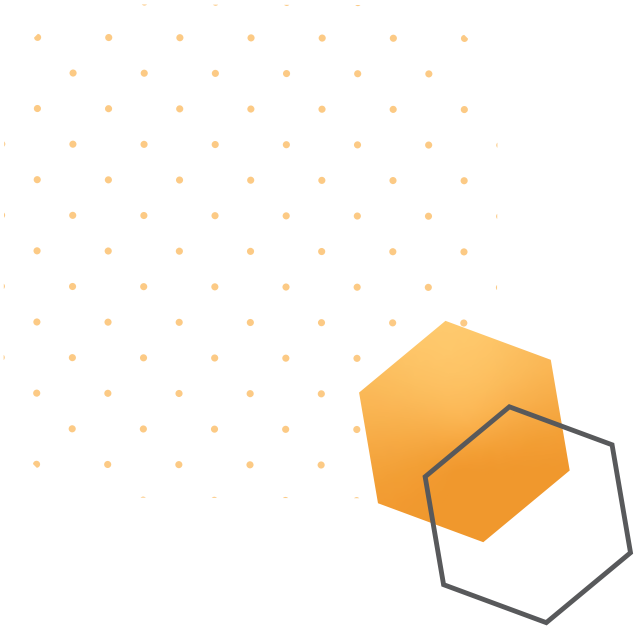

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