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The Impact of Bitcoin's Reward Halvings

Research + Insights

GREG CIPOLARO
GLOBAL DIRECTOR OF RESEARCH

Executive Summary

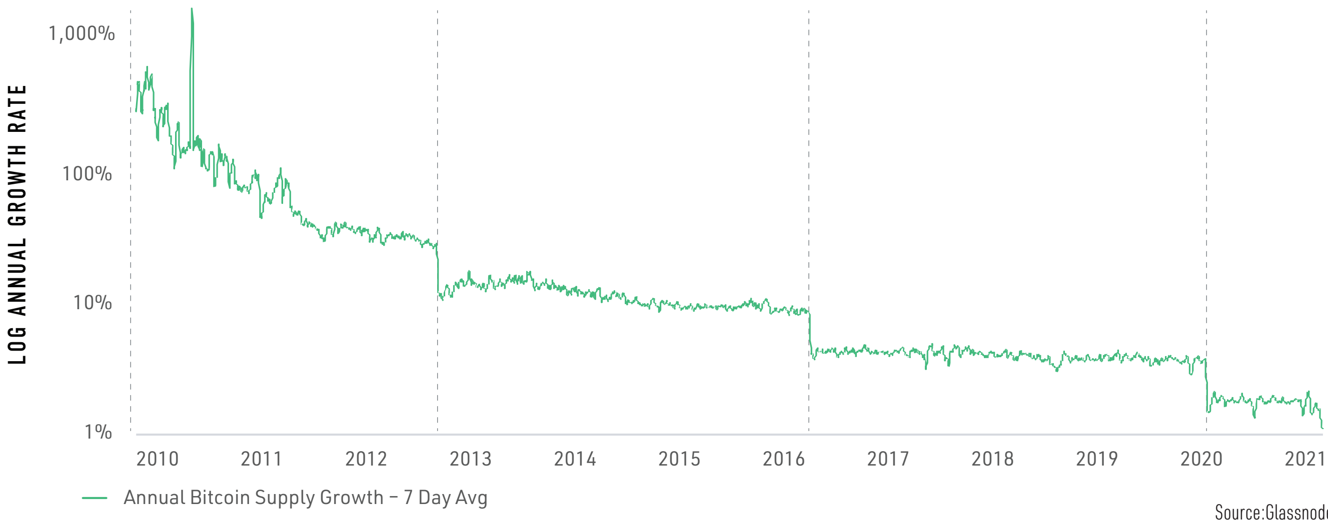
Every 210,000 blocks, roughly every 4 years, the Bitcoin protocol reduces the number of new bitcoins it produces by 50%. This event, called a halving, is an essential function of the asset's fixed supply, which reaches a ceiling of 21M in the year 2140. These halving events are rare and have only occurred three times in Bitcoin's history. This report analyzes those halving events, and the impact they have had on price.

Bitcoin's Programmatic Supply Function

One of Bitcoin's most important properties, in addition to its permissionless, trustless, and censorship-resistant nature, are its fixed supply. Because the creation of new bitcoins is reduced by 50% approximately every 4 years, 210,000 blocks, the production of new bitcoin is programmatically reduced to 0 in approximately May 2140, at which point, there will be 21M bitcoin in existence (technically 20,999,999.9769 because of the data storage type of the transaction output). There was no science behind assigning the 21M ceiling by Bitcoin's creator, Satoshi Nakamoto, just back of the envelope math suggesting that 0.001 bitcoins would one day be worth 1 Euro. Today, 0.001 bitcoins is worth about 47.3 Euro suggesting perhaps Bitcoin has been more successful than even Nakamoto imagined.

Bitcoin's fixed supply and declining annual growth are important financial properties that should make it a hedge against inflation. Unbacked fiat currencies and even precious metals like gold have supply growth that can be described as exponential (for example 2% per year), are uncapped (theoretically even gold), or in most cases, both. The current annual growth rate of bitcoin is about 1.7%, on par with the long-term supply growth in gold (1% - 2%) but well below the annual growth in US M2 money stock, which hit 24.2% in March. Most importantly, the annual growth in bitcoin is programmatically on its path to 0% as a result of quadrennial halvings.

Annual Supply Growth of Bitcoin

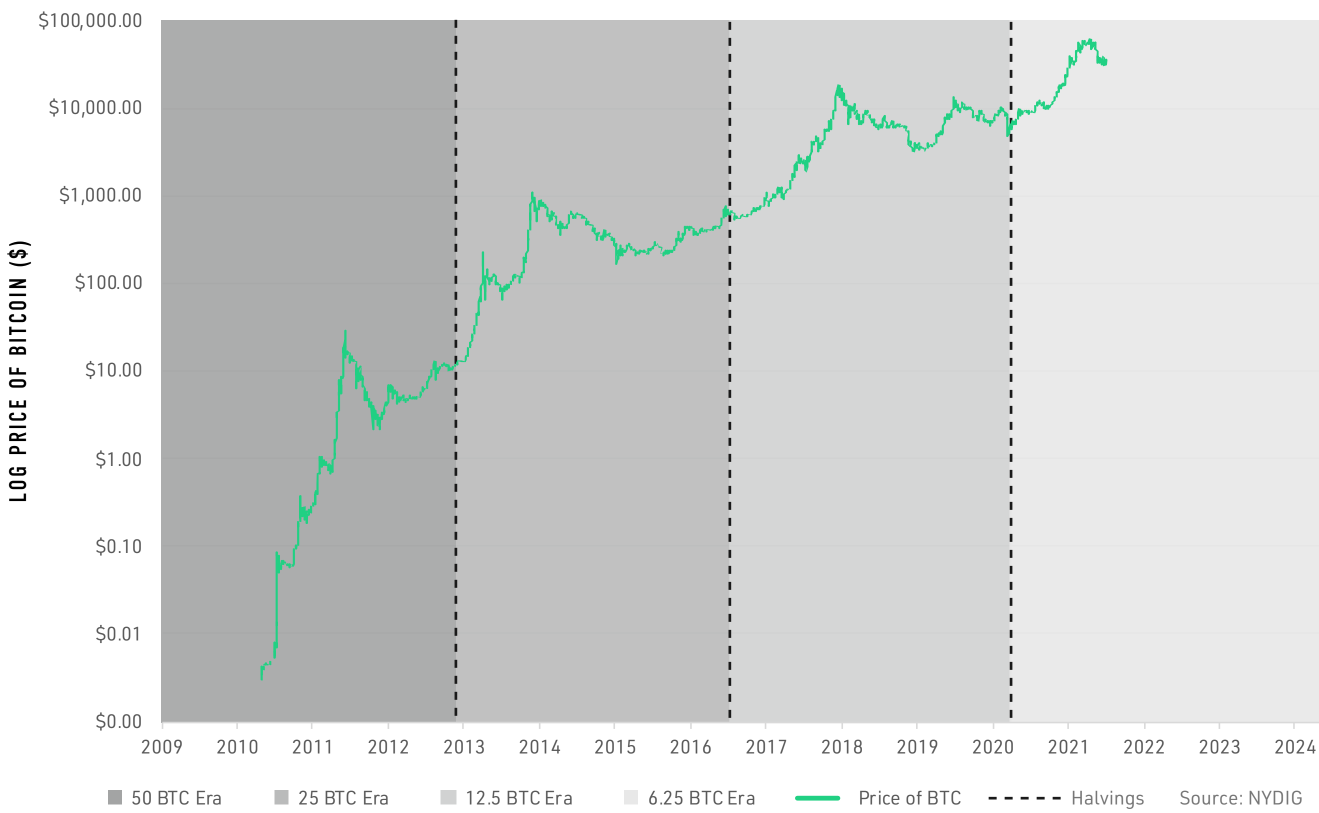


Source:Glassnode

Halvings Define Block Reward Eras

The initial block reward, the prize of newly created bitcoins miners receive for creating new valid blocks, was 50 bitcoins. We have divided Bitcoin's history into "eras" defined by the block reward; thus, we call this first period of Bitcoin's existence the "50 bitcoins era." After the first halving on November 28, 2011, this reward was reduced by half to 25 bitcoins per block and thus ushered in the "25 bitcoins era." Bitcoin has been in the "6.25 bitcoins era" since the most recent halving on May 11, 2020. Bitcoin's next halving is expected to come in May 2024. These eras, along with bitcoin's price (log scale), are depicted in the following figure.

Bitcoin Price, Reward Eras, and Halvings



Source: NYDIG

Repeating Cycles or Efficient Markets?

An important takeaway one might have from the preceding figure is the cyclical nature of bitcoin price appreciation. The cycles appear to be defined by halving events, which seem to occur about halfway between cyclical peaks. An important question to answer is why has this occurred, and will this repeat?

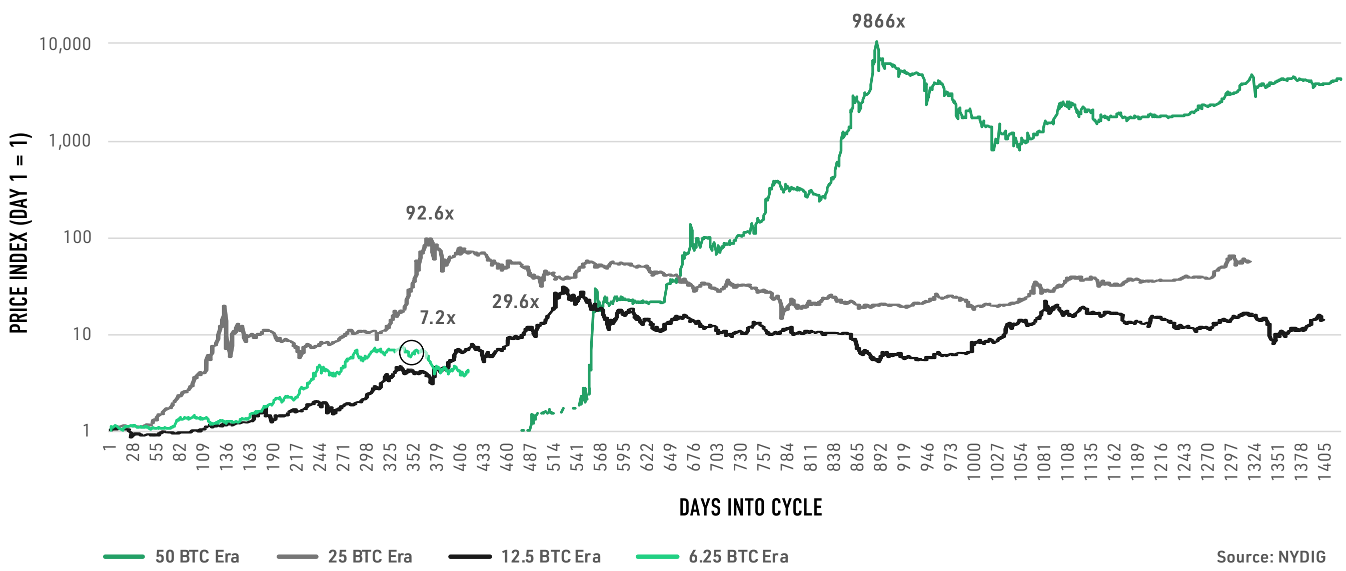
There are several ways to think about bitcoin cyclicality. First, it is perfectly rational to believe the historical pattern is purely coincidental, the market's version of a Rorschach test. With this understanding, it is easy to believe that this pattern will not repeat, and there's good reason to think that it will not. The reason is that a completely new investor class, the institutional investor, is adopting bitcoin for the first time. For most of bitcoin's history, it was an asset predominantly owned by retail investors. It has only been in the past 12-18 months that institutional investors have taken to the asset. Given the $100 trillion managed by the world's largest asset managers, there is a significant secular bull case for price appreciation in this scarce asset.

Second, for those of the cyclical mindset, there are some important implications of the repeating pattern. Primarily, this would be a violation of the Efficient Market Hypothesis, the theory that prices incorporate all available information. Halvings and their dates are as close to perfect information as can be known for bitcoin. Repeating patterns associated with halvings would violate even the weakest form of the Efficient Market Hypothesis. Perhaps there is a behavioral explanation for the cycles, that the increased scarcity caused by halvings, even though it is knowable ahead of time, creates more social awareness that calls investors to action.

What do Previous Halvings Say About the Current Era?

Although we are in the secular growth camp for bitcoin given institutional adoption, we think there is value in tracking prices across halving cycles, which we call eras. We define the first day of the era as the day on which the halving occurred. There are two important facts to understand about this analysis. First, although eras are all 210,000 blocks in length, variability in block times cause the eras to measure slightly differently in terms of number of days. Second, price tracking for the first era, the 50 bitcoins era, differs in its starting point in that there was no price for bitcoin until 2010, over a year after the era started.

Index of Bitcoin Price by Block Rewards Eras



Conclusion

Block reward halvings are important economic functions and market signals for bitcoin. They ensure supply scarcity and the inflation-resistant nature of the asset, important financial properties for investors and an important part of the reason institutional investors are increasingly adopting bitcoin. Given the amount of assets institutions control compared to the size of bitcoin, we think this could make for a continued secular bull case for the asset, despite the cyclical nature of the asset in the past.

Let's get started

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