# BITCOIN CYCLE

## THE CYCLES OF GROWTH

RIDE THE HIGHS. LEARN THE CYCLES. WIN THE FUTURE.

by PLAN A

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# Chapter 1

# Why Is It Important to Read This Book

Bitcoin represents a fundamental revolution in the history of value. For the first time, humanity (more precisely someone with a psedoname of Satoshi Nikamoto) has managed to engineer an instrument that possesses the essential properties of money—scarcity, durability, portability, and divisibility—without being tethered to a central authority.

In the traditional financial paradigm, money is a product of trust. We trust governments not to overspend, we trust central banks not to debase too much the currency through inflation, and we trust intermediaries to validate our transactions. Bitcoin replaces this fragile human trust with the cold, impartial logic of mathematics. It is the world's first "trustless" financial system.

## 1.1 The Illusion of the Missed Opportunity

A common sentiment among those standing on the sidelines is one of perceived lateness. One might think: *"I should have invested in Bitcoin when it was just a dollar, or a few hundred dollars; now the price is too high, and the opportunity is gone."*

This book is written to dismantle that misconception. Bitcoin is not a random lottery that only benefited the earliest participants. Instead, it is a system governed by a **fundamental cycle**. This cycle is hard-coded into the protocol itself, creating a rhythmic pulse that influences price, investor sentiment, and global adoption.

## 1.2 Is there a cycle in Bitcoin price?

Figure 1.1 shows the Bitcoin price in US dollars from its first days of trading through August 2026. At first glance, the graph shows some ups and downs, but no clear rhythm or cycle is apparent.

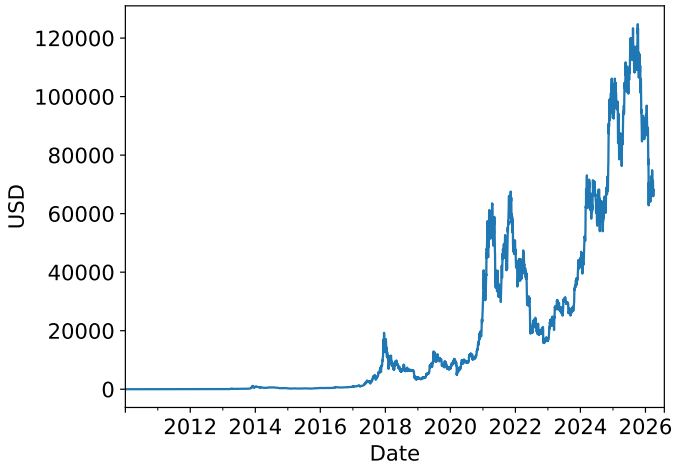


Figure 1.1: Bitcoin Price (Linear Scale) through August 2026.

To better understand potential cycles, it is more useful to plot the price on a logarithmic scale. This is because what matters is not the absolute change in price, but the **percentage change** over time. For example, an increase from \$10 to \$50 is just \$40 in absolute terms, while a rise from \$1,000 to \$5,000 is \$4,000. On a linear scale, the second change looks much larger, even though both represent the same 400% growth. On a log scale, both increases are

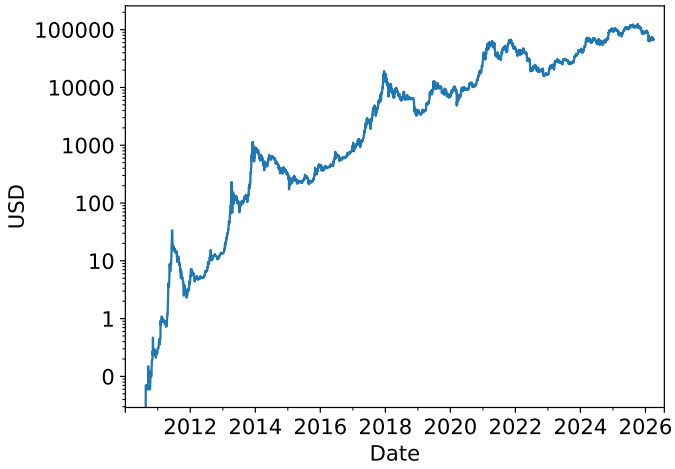


Figure 1.2: Bitcoin Price (Logarithmic Scale) through August 2026.

visually comparable, highlighting relative changes rather than absolute differences. Figure 1.2 presents Bitcoin's price on a logarithmic scale. Here, cycles become more visible. To

make them even clearer Fig. 1.3 where we add red vertical lines marking the halving dates (explained in detail in the next chapter), dashed red lines to mark the middle of the halving period, and highlight the minimum and maximum price points of each cycle, and connect them with straight lines, showing the pattern more explicitly.

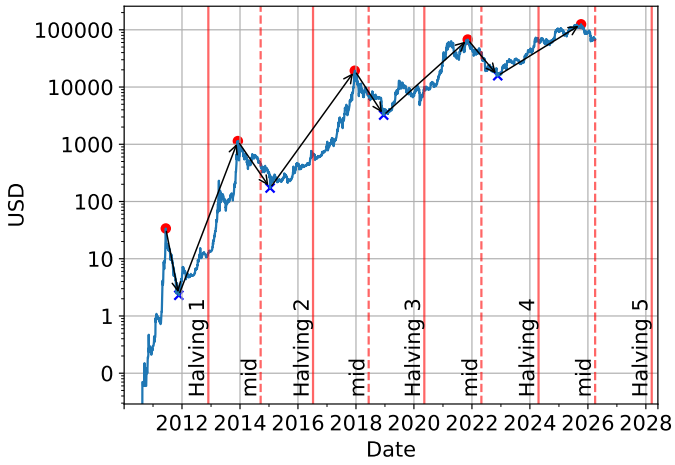


Figure 1.3: Bitcoin Price (Logarithmic Scale) through August 2026.

In this figure we can now clearly observe the cyclical behavior of the Bitcoin price. Looking carefully at Fig. 1.3, we see that each cycle consists of two distinct phases. The first phase is a rising period that lasts roughly three years. During this phase the price increases significantly, and the halving event, marked by the red vertical line, occurs approximately in the middle of this upward movement. The second phase is a shorter correction period of about one year, during which the price declines until it reaches a new cycle minimum. The dashed vertical line, which marks the midpoint between two halvings, typically appears near the middle of this downward phase.

Another interesting observation is that the magnitude of the upward movement becomes smaller with each successive cycle, and the slope of the decline also gradually moderates over time. In this book we will examine these patterns in much greater detail. We will explain how this graph was constructed, explore the mechanisms that produce this cyclical behavior, and discuss how understanding these cycles may help in forming expectations about future Bitcoin price movements.

## 1.3 Mastering the Rhythm

The importance of reading this book is to understand the rhythm of Bitcoin. While Bitcoin is famous for its volatility, that volatility is not chaotic; it is cyclical. Understanding these cycles allows an individual to gain from Bitcoin even today, regardless of the current price.

This book serves as a guide for those who want to move beyond the headlines and the "Fear Of Missing Out" (FOMO). By the end of this book you will understand:

- **The Halving Mechanism:** Why the supply of Bitcoin is mathematically destined to become scarcer every four years.
- **Market cycle:** Why and when we have peaks and bottoms of the price.
- **Strategic Positioning:** How to identify where we are in the current cycle to make informed decisions rather than emotional ones.

Ultimately, this book is for those who want to understand *why* the Bitcoin cycle exists and how to navigate its waves to build and preserve wealth in the digital age.

# Chapter 2

# Short Introduction to Bitcoin and Halving

One of the most remarkable properties of Bitcoin is that its monetary policy is predetermined and transparent. Unlike traditional financial systems, where central banks can change the rate of money creation, Bitcoin follows a fixed issuance schedule that is embedded directly in its protocol. One of the central mechanisms that governs this schedule is the *halving*.

The halving is the primary reason why Bitcoin exhibits a recurring four-year cycle. Approximately every four years, the number of new bitcoins that are created and added to the ledger is reduced by half. This reduction in the rate of new supply is known as the halving event. In this book we will study why this halving event is so significant and its influence on Bitcoin price.

To understand why the halving exists and why it plays such a crucial role in Bitcoin economics, it is necessary to briefly explain how the Bitcoin system operates. Bitcoin is built on two fundamental ideas. The first is the technical structure known as the blockchain. The second is the economic incentive mechanism that rewards participants who maintain the network.

The blockchain is essentially a distributed ledger that records all Bitcoin transactions. Rather than being stored on a central server, the ledger is replicated across thousands of computers around the world. Each participant can independently verify the validity of the ledger, making the system decentralized and resistant to manipulation.

While the technical details of blockchain involve cryptography and distributed systems, understanding those details is not strictly necessary for analyzing the Bitcoin cycle. What is essential is the reward mechanism that incentivizes participants to maintain and secure the network. The halving is a key component of this reward system.

Participants who maintain the network are called *miners*. Their role is to validate transactions and group them into blocks that are appended to the blockchain. For performing this task, miners receive a reward in Bitcoin. The halving mechanism periodically reduces this reward, thereby controlling the rate at which new bitcoins enter circulation.

## 2.1 Bitcoin Reward Mechanism

At its core, Bitcoin is a ledger that records transactions between addresses. Every transfer of Bitcoin from one address to another is recorded permanently in the blockchain. However, there are several important properties of this ledger that are essential for understanding the dynamics of the Bitcoin cycle.

1. The Bitcoin ledger is composed of blocks that are linked together in chronological order, forming what is called the *blockchain*. Approximately every ten minutes a new block of transactions is added to the chain.

2. The ledger is public and transparent. Anyone in the world can view the entire history of Bitcoin transactions. However, although anyone can verify transactions, only one participant at a time is allowed to add a new block to the blockchain.

3. The participant that creates the next block is determined through a competitive process. Miners compete to solve a mathematical puzzle. The first miner to solve the puzzle earns the right to add the next block to the chain and receives a reward.

The reward has two components. The first component is the *block subsidy*, which is a fixed quantity of newly created bitcoins. The second component is the *transaction fees*, which are paid by users who include transactions in a block.

Currently, the majority of miner revenue still comes from the block subsidy, although transaction fees are expected to become increasingly important in the future.

## 2.2 Proof of Work

The mechanism that determines which miner creates the next block is known as *Proof of Work* (PoW). In this system, miners repeatedly attempt to solve a cryptographic puzzle. Solving the puzzle requires computational work, which translates into electricity consumption and specialized hardware.

The difficulty of this puzzle is automatically adjusted by the Bitcoin protocol. This adjustment ensures that, on average, a new block is produced approximately every ten minutes regardless of the total computational power of the network.

Because of this mechanism, the time required to mine 210,000 blocks is approximately four years. Since each block takes about ten minutes, 210,000 blocks correspond to roughly 2.1 million minutes, which is approximately 1458 days.

## 2.3 The Halving Mechanism

The block subsidy follows a precise schedule defined in the protocol. Every 210,000 blocks the reward is reduced by half. When Bitcoin was first launched in 2009, the reward for mining a block was 50 bitcoins. After the first halving event, the reward decreased to 25 bitcoins per block. It was then reduced to 12.5 bitcoins, followed by 6.25 bitcoins, and most recently to 3.125 bitcoins after the 2024 halving.

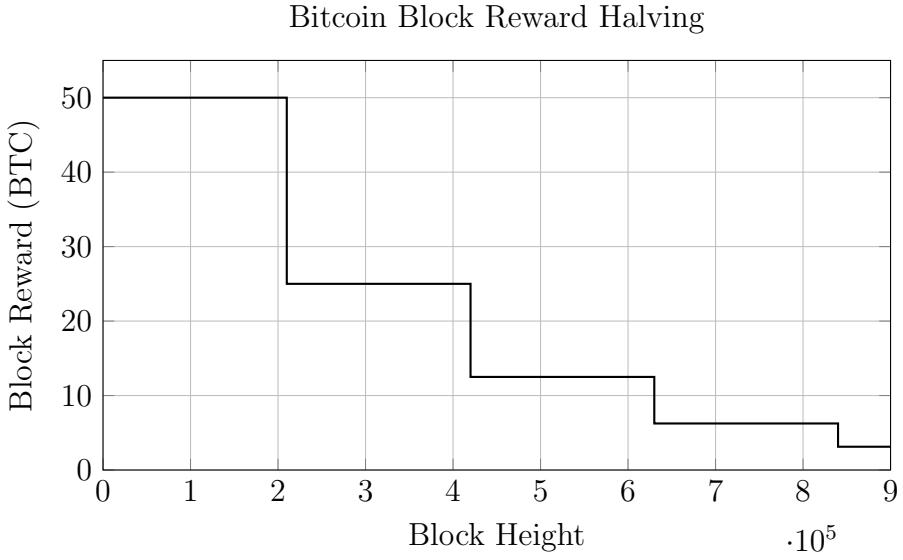


Figure 2.1: Bitcoin block reward schedule. The reward is reduced by half every 210,000 blocks.

| **Approx. Date** | **Block Height** | **Reward (BTC)** | **Phase** |
|---|---|---|---|
| Jan 3, 2009 | 0 | 50 | The Genesis Era |
| Nov 28, 2012 | 210,000 | 25 | 1st Halving |
| July 9, 2016 | 420,000 | 12.5 | 2nd Halving |
| May 11, 2020 | 630,000 | 6.25 | 3rd Halving |
| April 20, 2024 | 840,000 | 3.125 | 4th Halving |
| Expected March 2028 | 1,050,000 | 1.5625 | 5th Halving |

Table 2.1: The Bitcoin Halving History and Projections

## 2.4 Halving Schedule

### 2.4.1 The 10-Minute Target and Difficulty Adjustment

One might ask: "If miners buy faster computers, won't they mine all the blocks faster and trigger the halving early?"

To prevent this, Bitcoin uses a **Difficulty Adjustment**. Every 2,016 blocks (approximately every two weeks), the network evaluates how fast the miners are working. If blocks are being found too quickly (less than 10 minutes), the puzzle becomes harder. If they are too slow, it becomes easier. This "thermostat" ensures that the 210,000-block cycle almost always averages out to approximately four years.

## 2.5 Bitcoin Supply Curve

One of the most important consequences of the halving mechanism is that the total supply of Bitcoin grows more slowly over time. Because the block reward decreases periodically, the number of bitcoins created each year becomes smaller and smaller. This predictable supply curve is fundamentally different from traditional monetary systems, where the money supply can be expanded without a strict upper limit.

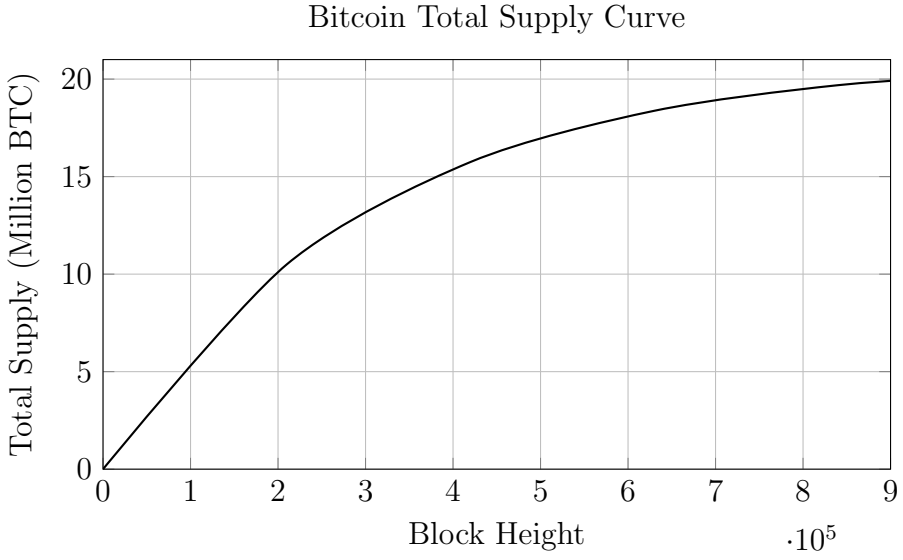


Figure 2.2: Total Bitcoin supply approaching the maximum limit of 21 million coins.

# Chapter 3

# How Bitcoin halving impact bitcoin price and why it creats cycles?

Now that we understand the halving mechanism, let's try to understand how it impact the Bitcoin price and why it creates cycles. We will make two main propositions regarding the mining reward and the mining cost that will help us to explain the halving influence on the price. Each proposition follows a rational explanation behind it.

## 3.1 Two main proposition on mining reward/cost and bitcoin supply/price

Here we claim that mining reward is the new bitcoin supply of the market and the mining cost is proportional to bitcoin price.

**Proposition 1 (Reward is the new supply).** *The mining reward is the new supply entering the market.*

This proposition rests on two pillars: the protocol's issuance rules and the economic constraints of the mining industry.

First, according to the Bitcoin protocol's hard-coded rules, no new bitcoins can be created except through the block reward mechanism. Therefore, from a purely technical standpoint, the mining reward is the sole source of "new" units in the ecosystem.

Second, the mining industry operates as a highly competitive, global free market. While certain jurisdictions (such as China, Egypt, and Qatar) restrict these activities, the business remains accessible in most of the world. In a free market, if mining becomes exceptionally

profitable, new participants enter and existing ones expand, increasing the network's total computational power. Because the protocol keeps the Bitcoin reward constant regardless of the number of participants, increased competition simply raises the average cost of production—primarily through electricity and hardware acquisition. Following standard economic principles, in a perfectly competitive market, the marginal cost of production tends to converge toward the market price. Consequently, miners are "forced sellers"; they must liquidate the majority of their rewarded bitcoins to cover these high operational expenses.

Thus from the two argument above it follows that the supply of new bitcoin to the market is the mining reward.

**Proposition 2 (Mining cost proportion to bitcoin price).** *The cost of mining is proportional to the market price of Bitcoin.*

This proposition states that purchasing a bitcoin on the market should roughly correspond to the average cost of mining a bitcoin. In other words, the cost incurred by miners in producing bitcoins tends to be similar to the market value of the bitcoins they receive as rewards.

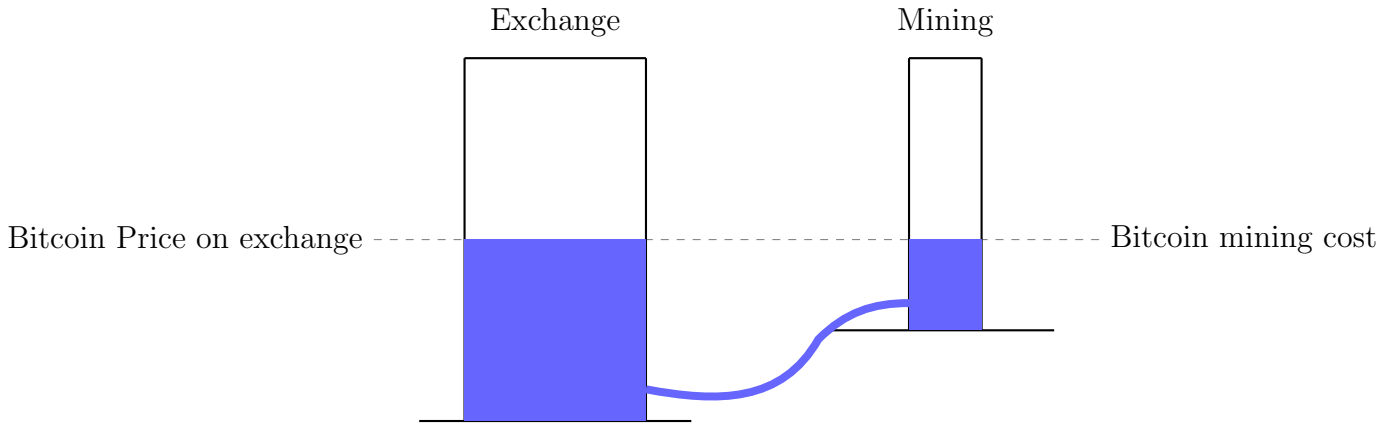


Figure 3.1: The communicating vessels principle provides a useful metaphor for the Bitcoin market. The left vessel represents the exchange, where supply and demand determine the observed market price. The right vessel represents the mining cost, namely the average cost required to produce one Bitcoin through mining. The liquid level corresponds to the Bitcoin price. Just as liquid levels equalize in communicating vessels, market forces tend to push the Bitcoin price toward the production cost of mining. If the price on the exchange is higher than the mining cost, more people and companies will mine, causing the mining cost to rise. Conversely, if the Bitcoin price on the exchange is lower than the mining cost, miners will reduce or stop production, since it is more cost-effective to buy Bitcoin on the exchange.

This propostion is due to the communicating vessels principle. Figure 3.1 illustrates this idea using the metaphor of communicating vessels. The left vessel represents the exchange, where supply and demand determine the observed market price. The right vessel represents the mining cost, namely the average cost required to produce one bitcoin. The liquid level corresponds to the bitcoin price. Just as liquid levels equalize in communicating vessels,

market forces tend to push the bitcoin price toward the production cost of mining. If the price on the exchange is higher than the mining cost, mining becomes more profitable, attracting more participants. This increases total mining expenses and drives the cost of production upward. Conversely, if the bitcoin price on the exchange falls below the mining cost, miners will reduce or stop production, since it is more economical to buy bitcoins on the market rather than mine them.

This dynamic ensures that, over time, the cost of mining remains roughly aligned with the market price of Bitcoin, creating a natural self-regulating mechanism in the system.

## 3.2 The Influence of the propositions on the Market

**Influence of Proposition 1 (reward is the new supply):** The first proposition explains the increase in price observed around the halving date. In particular, it accounts for the approximately straight-line behavior (on a logarithmic scale) observed during the upward periods in Figure 3.2.

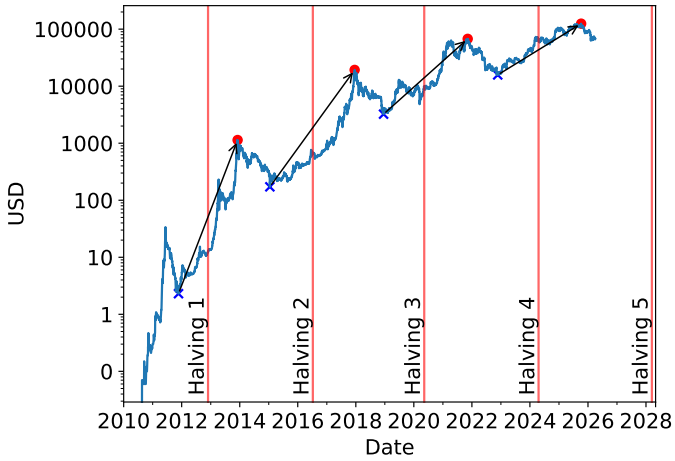


Figure 3.2: Bitcoin price (logarithmic scale) exhibiting linear trends during upward periods

According to Proposition 1, the flow of new supply to the market is determined by the mining reward. At each halving event, this reward is reduced by half. Assuming demand remains approximately constant, a reduction in new supply should lead to an increase in price. Bitcoin's market price is governed by supply and demand. When a halving occurs, the rate of new Bitcoin entering the market decreases sharply. If demand remains relatively stable, this supply shock creates upward pressure on the price.

Importantly, the halving date is known in advance. As a result, its effect is partially priced in ahead of time. Market participants anticipate the reduction in supply, leading to a price increase that typically begins 12–18 months before the halving event. Moreover, the impact

of the halving is not limited to the event itself. The reduced supply continues to affect the market over time, and the cumulative shortage becomes more pronounced. Consequently, the upward trend in price often persists for an additional 12–18 months after the halving.

Overall, this results in an upward phase lasting approximately three years, with the halving event occurring roughly in the middle of this period, as illustrated in Figure 3.2.

**Influence of Proposition 2 (Mining cost proportion to bitcoin price):** The second proposition explains why at some point after a major increase the Bitcoin price will start decreasing. Since the average cost of mining is similar to the average price of Bitcoin, the electricity consumption is proportional to Bitcoin price. If bitcoin price increase too much, at some point, the mining will need to use a big portion of the electricity in the world to mine a bitcoin. This is defiantly not durable and sustainable hence the price will decrease to a reasonable one.

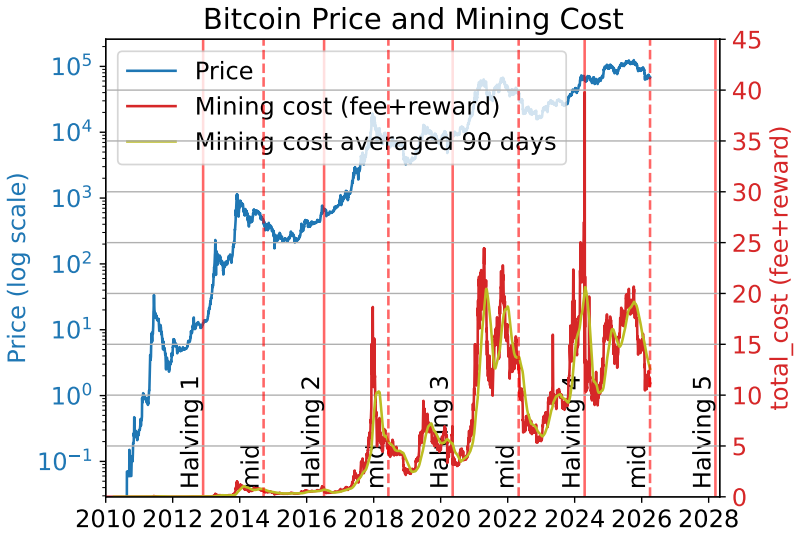


Figure 3.3: Bitcoin price and estimated annual mining cost over time. The blue curve shows the Bitcoin price on a logarithmic scale. The red curve shows the estimated annual mining cost based on total miner revenue from block rewards and transaction fees, assuming that mining cost is proportional to miner revenue. The green curve is a 90 day moving average of the annual mining cost. The figure illustrates that periods of high Bitcoin prices are associated with very high mining costs, which may become economically and physically unsustainable when they exceed tens of billions of dollars per year.

Figure 3.3 presents the Bitcoin price together with an estimate of the annual mining cost. The mining cost is estimated from the total miner revenue, including both block rewards and transaction fees. The red curve corresponds to the instantaneous annual mining cost, while the green curve represents a 90 day moving average that smooths short term fluctuations. The figure was created under the assumption that the total mining cost is proportional to the Bitcoin price. Since miners are paid in Bitcoin, an increase in the Bitcoin price directly

increases the dollar value of the mining rewards. This creates an incentive for more miners to enter the network, invest in additional hardware, and consume more electricity.As a result, the total annual mining cost tends to rise together with the Bitcoin price, as shown in the figure.

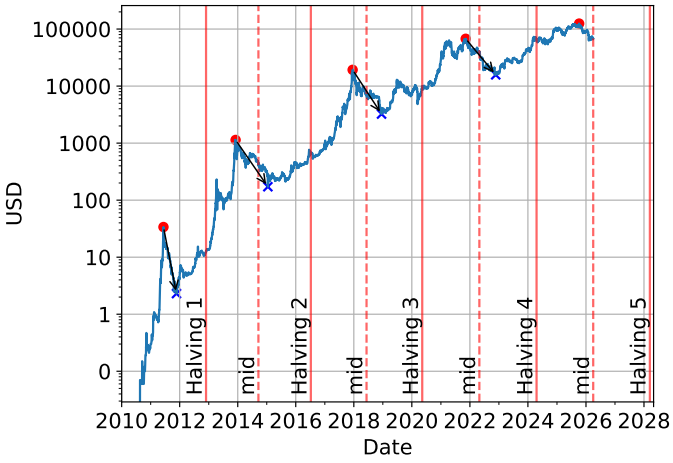


Figure 3.4: Bitcoin price (logarithmic scale) exhibiting linear trends during downward periods

As shown in Figure 3.3, during periods of very high Bitcoin prices, the annual mining cost can exceed 20 billion dollars. Such a level is difficult to sustain over long periods because it implies that a very large amount of electricity, hardware, and physical resources is devoted to Bitcoin mining. In other words, if Bitcoin prices become too high, mining would eventually require an unrealistically large fraction of the world's electricity production. Therefore, once the mining cost becomes too large, the system becomes economically and physically unsustainable, creating a natural pressure for the Bitcoin price to decrease toward a more sustainable level.

Hence, after the extended upward phase driven by the halving and the reduction in supply, the excessive mining cost eventually triggers a correction. This downward phase is typically much sharper and shorter than the upward phase, lasting roughly one year. Figure 3.4 illustrates these downward periods. Together with the approximately three year upward phase, this produces a roughly four year Bitcoin cycle.

# Chapter 4

# A Misconception Regarding the Four-Year Cycle

The Bitcoin cycle is often dismissed because people interpret the phrase "four-year cycle" too literally. However, the cycle is not determined by calendar years, but rather by the halving mechanism, which occurs every 210,000 blocks. Since blocks are created at random times with an average of about 10 minutes, halvings do not occur exactly every four years, but usually slightly earlier.

Table 4.1: Bitcoin halving dates and the time elapsed since the previous halving

| Halving | Date | Days Since Previous Halving | Years, Months, Days |
|---|---|---|---|
| 1 | 2012-11-28 | – | – |
| 2 | 2016-07-09 | 1319 | 3 years, 7 months, 11 days |
| 3 | 2020-05-11 | 1402 | 3 years, 10 months, 2 days |
| 4 | 2024-04-20 | 1440 | 3 years, 11 months, 9 days |
| 5 (Predicted) | 2028-03-31 | 1441 | 3 years, 11 months, 11 days |

Table 4.1 shows the dates of the halving events and the time elapsed between successive halvings. We can see that the "four-year cycle" is usually closer to 3 years and 11 months.

The reason is that although 210,000 blocks with an average block time of 10 minutes corresponds to approximately four years, the actual average block time is often slightly below 10 minutes. This happens because the hashrate tends to increase over time. When miners add more computational power to the network, blocks are found more quickly until the next difficulty adjustment occurs. As a result, the average time required to reach 210,000 blocks is slightly shorter than four calendar years. In the first cycle, the duration was a few months below four years, but in the more recent cycles, where the percentage increase in hashrate has become more moderate, the cycle duration appears to stabilize around 3 years, 11 months, and a few days.

In Figure 4.1, the dates of the top and bottom prices in each cycle are shown. These dates indicate that Bitcoin does not follow an exact four-year cycle, but rather a cycle that is slightly shorter.

For example, the top of the second cycle occurred in December 2013. An exact four-year repetition would therefore predict the top of the fifth cycle to occur in December 2025. However, the top of the fifth cycle occurs earlier, in October 2025. Similarly, the bottom of the second cycle occurred in January 2015. Under an exact four-year cycle, this would imply that the bottom of the fourth cycle should occur in January 2023. Instead, the actual bottom occurred earlier, in November 2022.


Figure 4.1: Bitcoin price (logarithmic scale) with the dates of the halvings and the top and bottom points of each cycle

In the next chapter, we will consider the cycle in terms of 210,000 blocks rather than calendar years, and we will see how remarkably well the cycle aligns with this interpretation.

# Chapter 5

# Strong Evidence of the Bitcoin Cycle

In this chapter, we provide strong evidence for the existence of the Bitcoin cycle by presenting the data in a different way and by using the block number as the time axis. The first presentation is shown in Figure 5.1. It shows the Bitcoin gain or loss in each block segment, where each cycle of 210,000 blocks is divided into eight equal segments of 26,250 blocks. Thus, Segment S1 in Cycle 1 corresponds to blocks 210,001–236,250, Segment S1 in Cycle 2 corresponds to blocks 420,001–446,250, and so on. Roughly speaking, each segment represents about half a year.

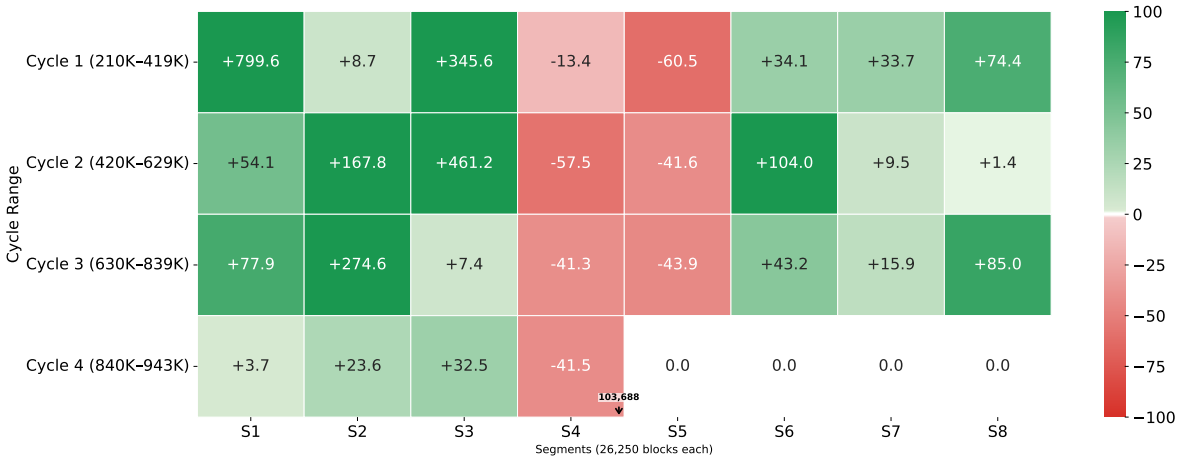


Figure 5.1: Bitcoin gain and loss by segment within each 210,000 block cycle

## 5.1 A Clear Pattern Emerges

Figure 5.1 shows very clearly that in each cycle there are typically two consecutive segments of 26,250 blocks (roughly half a year each) with strongly negative returns, and six segments

with positive returns. More generally, the heatmap in Figure 5.1 shows that Bitcoin cycles are not random, but instead follow a remarkably similar internal structure from one cycle to the next. Each row represents a full cycle of 210,000 blocks, divided into eight equal segments of 26,250 blocks each, and the value inside each cell represents the percentage return during that segment.

The first three segments of each cycle are usually strongly positive. Segments four and five, which are around the middle of the cycle, are usually strongly negative, representing the correction phase after the cycle peak. The final segments usually return to moderate positive growth, reflecting the beginning of the next cycle.

This repeating pattern supports the idea that Bitcoin follows a cycle tied to the halving interval of 210,000 blocks rather than an exact four-year calendar cycle. The heatmap suggests that the early part of each cycle is usually the strongest period, the middle part tends to contain the major correction, and the final part often marks the beginning of recovery before the next halving.

The current cycle, Cycle 4, appears to be following the same structure. The first three segments have all been positive, with gains of 4%, 24%, and 33%, respectively. If the historical pattern continues, the next segments may correspond to the correction phase observed in previous cycles.

## 5.2 Mathematical Evidence for the Existence of a Bitcoin Cycle

So far, we have argued qualitatively that Bitcoin appears to follow a recurring cycle related to the halving mechanism. We now provide a more mathematical argument. This section is not crucial for understanding the main ideas of the book, so readers who are less comfortable with the mathematical formulation may skip it without loss of continuity.

The key idea is simple: if Bitcoin did not exhibit cyclical behavior, then the position within a 210,000 block cycle should not contain useful information about future returns. In other words, the average return in each segment of the cycle should be approximately random.

To test this idea, we divide each 210,000 block cycle into equal segments and calculate the return in each segment. Figure 5.1 presents the result when each cycle is divided into eight equal parts.

Suppose we denote by

$$R_{c,s}$$

the return in cycle $c$ and segment $s$, where $s = 1, \ldots, 8$.

If no cycle exists, then the distribution of returns should be independent of the segment number:

$$E[R_{c,1}] = E[R_{c,2}] = \cdots = E[R_{c,8}].$$

However, the heatmap shows a very different pattern. The first three segments of almost every cycle tend to exhibit strong positive returns, while the fourth and fifth segments are typically negative. The later segments are again moderately positive.

To quantify this effect, we can average the return over all completed cycles for each segment:

$$\bar{R}_s = \frac{1}{C} \sum_{c=1}^{C} R_{c,s},$$

where $C$ is the number of completed cycles.

Empirically, these averages satisfy:

$$\bar{R}_1 > 0, \qquad \bar{R}_2 > 0, \qquad \bar{R}_3 > 0,$$

while

$$\bar{R}_4 < 0, \qquad \bar{R}_5 < 0.$$

Thus, the expected return is not constant across the cycle. Instead, it depends strongly on the position within the 210,000 block interval.

Another way to express this idea is to view each cycle as a vector:

$$\mathbf{R}_c = (R_{c,1}, R_{c,2}, \ldots, R_{c,8}).$$

If Bitcoin cycles were random, these vectors would look unrelated to one another. Instead, the vectors corresponding to different cycles exhibit a similar structure:

- strong positive returns in the early segments,
- negative returns in the middle segments,
- recovery in the later segments.

This means that the correlation between different cycle vectors is positive.

Formally, we may consider the null hypothesis:

$$H_0 : R_{c,s} \text{ is independent of } s,$$

meaning that the position inside the cycle has no effect.

The alternative hypothesis is:

$$H_1 : R_{c,s} \text{ depends on } s.$$

The heatmap strongly supports the alternative hypothesis. Therefore, while it is impossible to prove mathematically that Bitcoin must continue to cycle forever, the historical data provides strong statistical evidence that Bitcoin has exhibited a repeating cycle structure tied to the 210,000 block halving interval.

In this sense, the Bitcoin cycle should not be viewed as an exact four-year clock, but rather as a recurring probabilistic pattern in returns across successive 210,000 block intervals.

## 5.3 Diminishing Returns

Another piece of evidence for the existence of Bitcoin cycles is shown in Figures 5.2 and 5.3. In these figures, the Bitcoin price is normalized so that the price at the beginning of each cycle is equal to 100%. This allows us to compare different cycles directly, despite the large differences in absolute price levels across time.

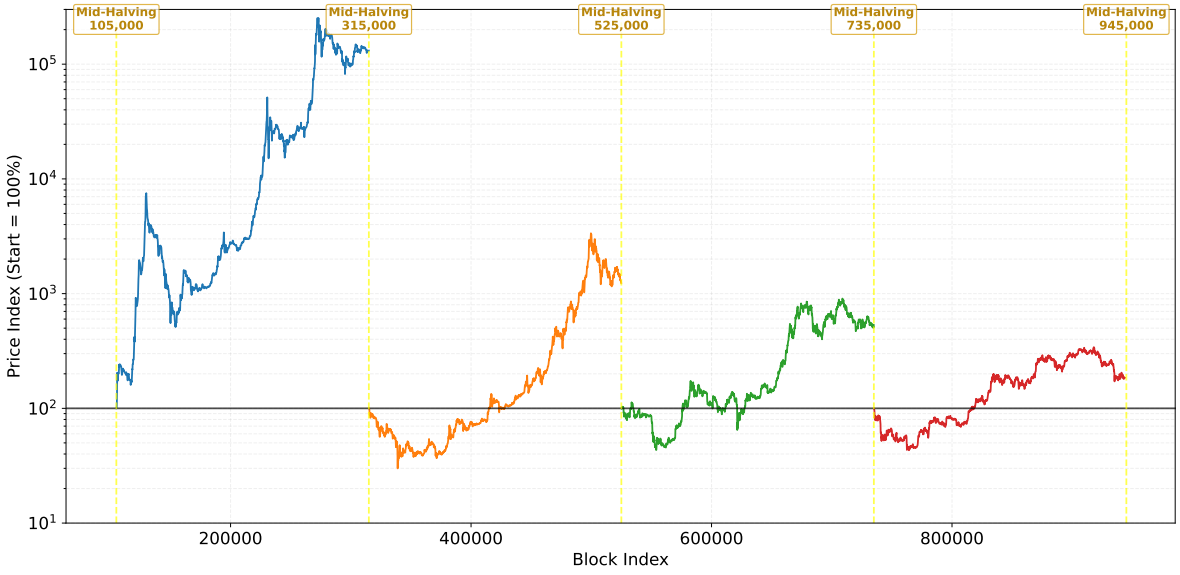


Figure 5.2: Normalized Bitcoin price over block index for different cycles. Each cycle is normalized to begin at 100. The yellow dashed lines indicate the mid-halving points, namely 105,000 blocks before each halving event.

Figure 5.2 presents the normalized Bitcoin price as a function of the block index. The yellow vertical lines correspond to the midpoints between halvings, namely 105,000 blocks before

each halving event. We can see that each cycle exhibits a similar overall shape: a strong rise, followed by a peak, then a decline toward a minimum before the next major upward move begins. This repeating structure provides further evidence that Bitcoin follows a recurring cycle tied to the halving process.

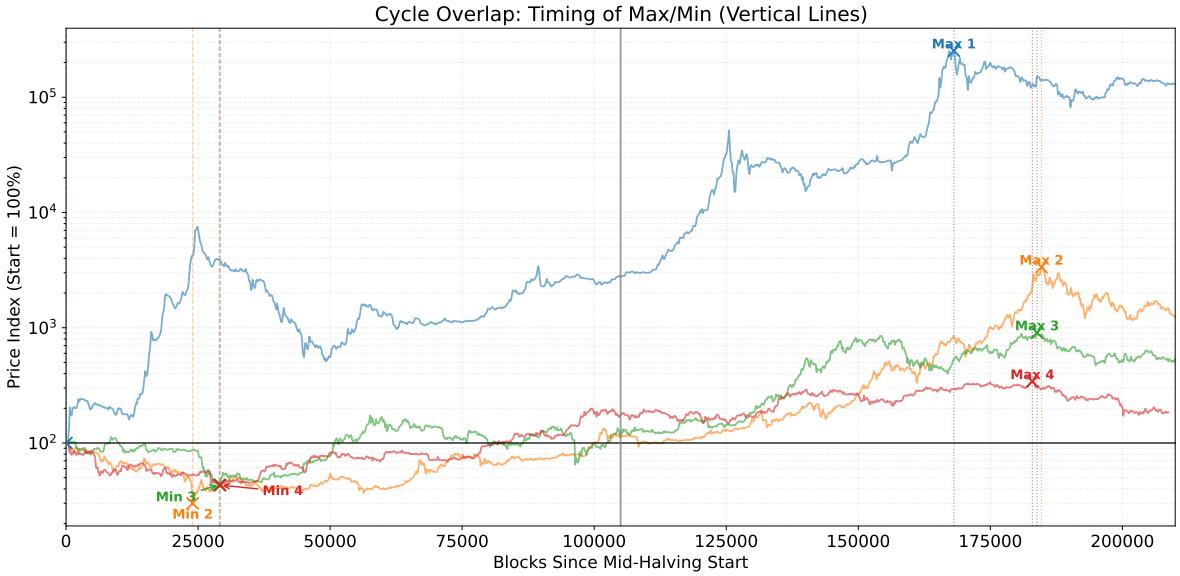


Figure 5.3: Bitcoin cycle overlap after normalization. Each cycle starts at 100 at the midpoint between halvings. The figure highlights the timing of the maximum and minimum points in each cycle.

Figure 5.3 overlays all cycles on top of each other, using the midpoint between halvings as the common starting point. The figure also shows the locations of the maximum and minimum points in each cycle. We can clearly see that the timing of the peaks and bottoms is remarkably similar across cycles. The peaks tend to occur earlier in later cycles, and the magnitude of the price appreciation becomes smaller over time. This phenomenon is known as diminishing returns.

The diminishing return phenomenon can be understood naturally. In the early years of Bitcoin, the market capitalization was very small, and therefore a relatively modest inflow of capital could create very large percentage gains. As Bitcoin became larger and more mature, much larger amounts of money were required to move the price by the same percentage. Consequently, while the cyclical structure still exists, the amplitude of the gains has gradually decreased from cycle to cycle.

I expect that the diminishing returns will eventually stabilize at an average gain of slightly more than a factor of two between cycles. As explained earlier, there is a maximum sustainable mining cost for the system. Since each halving reduces the mining reward by half, the total amount of newly distributed Bitcoin is also cut in half. Therefore, if the Bitcoin price doubles, the total mining revenue and total mining cost can remain approximately unchanged. In addition, over a four-year period there is also general monetary inflation.

Therefore, my personal belief is that the long-term average increase in Bitcoin price may stabilize around a factor of 2.25 every four years.

In the very long term, perhaps more than 40 years from now, the mining reward will become much less significant and transaction fees will likely become the dominant source of miner revenue. In such a case, the cyclical behavior itself may weaken, and Bitcoin may instead behave more like a mature financial asset with a relatively stable long-term return, perhaps around 5%–10% per year. However, at present the mining reward is roughly twenty times larger than transaction fees, and therefore for at least the next twenty years the four-year cycle should remain significant.

One additional insight suggested by Figure 5.3 is that the major bottoms tend to occur earlier in later cycles. This is consistent with the idea that the market increasingly anticipates the halving effect. As more investors become aware of the Bitcoin cycle, some of the price appreciation and correction phases may occur earlier than in previous cycles.

# Chapter 6

# What Can Break the Cycle?

In this chapter we discuss several factors that may break the four-year-cycle theory presented in this book. Broadly speaking, the risk factors can be divided into three categories: factors that break the Bitcoin demand assumption that is needed for the upward phase, factors that break the mining-cost assumption in dollars that break the downward phase, and the appearance of a major "black swan" event.

## 6.1 Breaking the Bitcoin Demand Assumption

There is one main assumption behind the Bitcoin cycle theory presented in this book: Bitcoin demand must continue to increase over time. If this assumption breaks, then the strong upward phase may disappear. In such a case, the Bitcoin price may never reach the levels that make mining costs unsustainable, and therefore the entire four-year-cycle theory may weaken or collapse.

Several factors could cause a significant decline in Bitcoin demand.

### 6.1.1 Quantum Computers Breaking Bitcoin Cryptography

One of the most commonly discussed risks to Bitcoin is the development of sufficiently powerful quantum computers. Bitcoin currently relies on cryptographic techniques such as ECDSA and SHA-256. In theory, a powerful enough quantum computer could break these cryptographic systems.

If private keys could be derived from public keys, users could lose confidence in Bitcoin's

security. Such an event could cause panic and a dramatic collapse in demand.

However, this risk should not be exaggerated. First, most Bitcoin addresses do not reveal their public key until coins are spent. Second, if quantum computing advances gradually, the Bitcoin community would likely have time to adopt quantum-resistant cryptographic methods through a protocol upgrade. Therefore, quantum computing is a serious long-term risk, but not necessarily an immediate threat.

### 6.1.2 Regulation that Bans Bitcoin

Another major risk is aggressive regulation by governments. A coordinated ban on Bitcoin trading, mining, self-custody, or ownership by major economies could significantly reduce demand.

For example, if the United States, the European Union, China, and other large economies simultaneously restricted access to Bitcoin exchanges and imposed heavy taxes or legal penalties, many investors could exit the market.

Nevertheless, Bitcoin is decentralized and global. Even when some countries ban it, other countries often become more friendly toward it. In practice, regulation usually shifts Bitcoin activity geographically rather than eliminating it completely.

### 6.1.3 A Strong Entity or Country Attacking the Bitcoin Protocol

A powerful state or organization could attempt to attack the Bitcoin network itself. For example, a country with massive resources could attempt a 51% attack by controlling most of the mining power. Such an attack could allow temporary censorship of transactions or double spending.

Another possibility is a coordinated cyberattack against mining pools, exchanges, or Internet infrastructure that supports Bitcoin.

Although such attacks are theoretically possible, they are difficult and expensive to maintain. Bitcoin mining is geographically distributed, and a successful attack would likely encourage the community to respond quickly through software updates, changes in mining behavior, or emergency consensus measures.

## 6.2 Breaking the Mining Cost Assumption in Dollars

The downward phase in dollars the Bitcoin cycle depends on the idea that mining costs eventually become too high in dollar terms and therefore not sustainble. However, there are scenarios in which the mining cost measured in dollars may no longer be meaningful and can continue to increase due to hight inflation or collapse of the fiat currency.

### 6.2.1 Ultra Inflation

If the United States experiences very high inflation, then the dollar price of Bitcoin may rise dramatically even if its real value does not change very much.

For example, suppose that Bitcoin mining costs remain roughly constant in terms of energy and hardware, but the dollar itself loses purchasing power rapidly. In that case, Bitcoin may continue rising in nominal dollar terms without violating the mining-cost constraint.

This means that under extreme inflation, the Bitcoin cycle measured in dollars may appear much weaker or may disappear entirely, even though the cycle still exists in real purchasing-power terms.

### 6.2.2 Collapse of the Dollar

An even more extreme scenario is a major collapse of the dollar as the world's reserve currency. If the dollar loses its dominant role in the global economy, then measuring Bitcoin in dollars may become much less relevant.

In such a world, Bitcoin may be priced primarily relative to other currencies, commodities, or even directly relative to energy and goods. In this case, the entire idea of a mining cost ceiling measured in dollars may no longer apply.

Thus, the Bitcoin cycle may still exist, but it may no longer be visible in the BTC/USD exchange rate.

## 6.3 "Black Swan" Events

Finally, there are black swan events, namely rare and unforeseen events that are difficult or impossible to predict in advance. By definition, black swan events fall outside the normal

assumptions of the model.

### 6.3.1 Satoshi Nakamoto and His Interests Are Revealed

One possible black swan event is the revelation of Satoshi Nakamoto's identity and personal interests, especially if it is accompanied by movement of the coins believed to belong to Satoshi.

Because these coins are estimated to be extremely large in quantity, their sudden sale could create panic and significantly reduce market confidence.

In addition, if Satoshi's personal views, political opinions, or financial interests become known, they may influence the public perception of Bitcoin. For example, if Satoshi strongly supports another technology, another cryptocurrency, or some controversial ideology, this could create uncertainty and disagreement within the Bitcoin community.

Even if the coins are not sold, the mere fact that Satoshi is active again could create uncertainty about Bitcoin's future.

### 6.3.2 An Unforeseen Bug in the Protocol

Another black swan event would be the discovery of a major bug in the Bitcoin protocol itself.

For example, a critical vulnerability that allows double spending, inflation beyond the intended supply limit, or the theft of coins could severely damage trust in Bitcoin.

Although Bitcoin has been running since 2009 without such catastrophic failures, software bugs are always possible.

### 6.3.3 A Huge Change in the Global Economy

A major shift in the global economy could also affect Bitcoin in unpredictable ways.

For example, if governments introduce central bank digital currencies that are widely adopted, or if there is a major shift toward another technological platform, Bitcoin demand could weaken.

Conversely, severe banking crises, sovereign debt crises, or inflationary collapses could in-

crease Bitcoin demand dramatically.

### 6.3.4 A Third World War

A global war could have unpredictable effects on Bitcoin.

On one hand, Bitcoin could benefit as people seek a portable and censorship-resistant asset during times of instability. On the other hand, war could damage the Internet, electricity infrastructure, financial markets, and mining operations.

In extreme cases, survival and basic necessities may become more important than financial assets, temporarily reducing Bitcoin demand.

Therefore, a world war is a true black swan event whose effect on Bitcoin is difficult to predict in advance.

# Chapter 7

# How to Take Advantage of the Bitcoin Cycle

**Important Disclaimer:** The author of this book is not a financial adviser. Therefore, this book should be viewed as educational content and not as financial advice. Bitcoin investing involves substantial risk, and different people have different levels of risk tolerance. A good financial recommendation depends on understanding the reader's financial goals, investment horizon, income, savings, and willingness to take risk. Therefore, before making any investment decision, readers should conduct their own research and, if needed, consult one or more professional financial advisers.

Once we agree that I cannot provide financial advice, I would still like, for educational purposes, to present several possible strategies for investing in Bitcoin. If you decide to invest in Bitcoin, you should perform additional research and make the decision that best suits your personal situation, or seek advice from experts in the field.

The most important implication of the cycle theory is that even if you strongly believe in the long-term success of Bitcoin, there may still be very large declines due to the cycle. Therefore, investors should be aware of these potential drawdowns and take them into consideration when making investment decisions.

As we saw in the previous chapter, the cycle may break at any time due to many factors. Therefore, everything should be considered probabilistically. Even if we are at the beginning of an upward phase, no one can promise with certainty that Bitcoin will rise significantly over the next two or three years. One can only claim that there is some probability of a major increase.

I would now like to present a few investment strategies in Bitcoin and explain how the cycle

theory may influence them. An investor may also combine several strategies. For example, one part of the investment may follow a long-term "Buy and HODL" approach, while another part may follow a more active strategy of buying at the beginning of the upward phase and selling near the end of the upward phase.

### 7.0.1 Generally, Why should we invest in Bitcoin?

A primary motivation for investing in Bitcoin is diversification. Most traditional portfolios are concentrated in assets such as equities, bonds, and real estate, all of which are closely tied to the same macroeconomic forces and policy decisions. Bitcoin introduces an asset with a fundamentally different structure: it is decentralized, globally traded, and governed by transparent rules rather than central authorities. As a result, it can behave differently from traditional assets and potentially improve the robustness of a portfolio.

To some extent, Bitcoin can be viewed as a form of financial insurance. In countries such as Lebanon, Iran, Argentina, and parts of Africa, high inflation, capital controls, and unstable banking systems have repeatedly eroded personal savings. Even within the Eurozone, the 2013 Cyprus financial crisis demonstrated that funds held in banks are not entirely risk-free: depositors faced losses ("haircuts") and strict withdrawal limits as part of the banking system's restructuring. In such environments, the ability to hold wealth in a system that is not controlled by local institutions becomes extremely valuable. Bitcoin provides an alternative store of value that is accessible to anyone with an internet connection, regardless of local economic conditions.

More broadly, Bitcoin offers protection against inflation and monetary debasement. The modern global economy is characterized by high levels of sovereign debt, including in major economies such as the United States. Monetary expansion, often used to manage these debts, can reduce the purchasing power of fiat currencies over time. Bitcoin's fixed supply and predictable issuance schedule stand in sharp contrast to this model, making it attractive as a hedge against long-term currency dilution.

Another important advantage is its portability. Bitcoin can be transferred across borders quickly and, in many cases, at relatively low cost. Unlike traditional financial systems, these transfers do not depend on intermediaries such as banks, clearing houses, or payment processors. This makes Bitcoin particularly useful in situations where access to financial infrastructure is restricted, unreliable, or subject to censorship.

Bitcoin is also resistant to confiscation when properly secured. Ownership is determined by control of private keys rather than by entries in a centralized ledger. This means that, unlike bank accounts or physical assets, funds cannot be easily frozen or seized by external authorities if the owner maintains proper custody. This property contributes to a form of financial sovereignty that is difficult to achieve with conventional assets.

In comparison to fiat systems, Bitcoin minimizes reliance on trusted third parties. Transactions are validated by a distributed network rather than a central institution, and individuals retain direct control over their funds. This reduces counterparty risk and enables a level of financial independence that is not available in traditional systems.

At the same time, these advantages come with meaningful risks and responsibilities. Bitcoin operates under a model of self-custody: the user is ultimately responsible for securing access to their funds. Losing a private key or password typically results in permanent loss of access. Errors, such as sending funds to an incorrect address, are generally irreversible. Moreover, theft remains a real risk if security practices are inadequate, and there is usually no recourse or recovery mechanism.

In summary, Bitcoin offers a compelling combination of diversification, protection against monetary instability, and enhanced financial autonomy. However, these benefits are inseparable from the need for careful management, technical understanding, and acceptance of the risks inherent in a system without intermediaries.

## 7.1 Buy and HODL

The term "HODL" originated from a famous typo of the word "hold" in a Bitcoin forum post from 2013. Over time, it became a popular expression in the Bitcoin community and now refers to the strategy of buying Bitcoin and holding it for a very long period of time without trying to time the market.

The main advantage of this strategy is that it avoids the difficult task of predicting market tops and bottoms. If Bitcoin continues to grow over the long term, then simply holding Bitcoin may perform well even if the investor buys at a less-than-ideal time.

The main disadvantage is that the investor must be psychologically prepared for large drawdowns. According to the cycle theory, Bitcoin may occasionally lose 50%–80% of its value during the downward phase. Therefore, a HODL investor should avoid panicking during such periods.

The cycle theory can still be useful even for HODL investors. For example, an investor who understands that a major correction is likely after a large rally may be mentally prepared for such a decline and therefore avoid emotional selling.

## 7.2 Dollar Cost Averaging

Dollar cost averaging (DCA) means investing a fixed amount of money at regular intervals, regardless of the Bitcoin price.

For example, an investor may decide to buy $100 worth of Bitcoin every month.

The advantage of this strategy is that it reduces the risk of buying a large amount at the wrong time. When Bitcoin is expensive, the investor buys fewer coins, and when Bitcoin is cheap, the investor buys more coins.

The cycle theory may improve this strategy. For example, an investor may choose to use standard DCA throughout the entire cycle, but invest larger amounts during the downward phase and smaller amounts near the end of the upward phase.

## 7.3 Buy Only at the End of the Downward Phase and at the Beginning of the Upward Phase

A more aggressive strategy is to invest only near the end of the downward phase, when Bitcoin is significantly below its previous peak.According to the cycle theory, the best buying opportunities tend to occur after major corrections, especially near the bottom of the cycle and before the next upward phase begins.

The advantage of this strategy is that it may allow the investor to buy Bitcoin at relatively low prices. The disadvantage is that identifying the exact bottom is extremely difficult. Bitcoin may always fall more than expected, and a cycle may also fail completely. Therefore, an investor using this strategy may prefer to spread purchases over several months instead of trying to buy everything at one exact moment.

## 7.4 Buy at the Beginning of the Upward Phase and Sell at the End of the Upward Phase

Another strategy is to buy Bitcoin near the beginning of the upward phase and sell near the end of the upward phase. This strategy is based directly on the cycle theory presented in this book. The goal is not necessarily to buy at the exact bottom or sell at the exact top, but rather to capture the majority of the upward move.

The advantage of this strategy is that it may avoid the large drawdowns that typically

occur after a cycle peak. The disadvantage is that the investor may sell too early and miss additional gains, or sell too late and suffer a major decline.

This strategy requires more discipline and a willingness to take profits even when the market sentiment is extremely optimistic.

## 7.5 Buy at the Beginning of the Upward Phase and Short at the End of the Upward Phase

A more advanced and risky strategy is to buy Bitcoin near the beginning of the upward phase and later take a short position near the end of the upward phase.Shorting means betting that the Bitcoin price will decline.

If the cycle theory is correct, then after a strong upward phase there may be a major downward phase, which creates an opportunity not only to protect gains but also to profit from the decline. However, shorting Bitcoin is much riskier than simply buying Bitcoin. A Bitcoin short position can lose a very large amount of money if the price continues rising. Therefore, this strategy is only suitable for experienced investors who understand leverage, risk management, and the possibility of large losses.

## 7.6 Links to Websites Where Bitcoin Can Be Purchased

## 7.7 A Prediction Based on the Bitcoin Cycle Theory

As the saying goes, "prediction is given to fools." Therefore, the main goal of the Bitcoin cycle theory is not to provide an exact prediction, but rather to help the investor understand the current state of the cycle, namely whether Bitcoin is in an upward or downward phase, and approximately how long this phase may continue.

As explained in Chapter 6, there are many factors that can break the Bitcoin cycle. Therefore, every prediction in this book should be taken with a grain of salt. There is always a significant probability that Bitcoin will behave differently from the cycle because of external influences, unexpected regulation, macroeconomic events, wars, technological changes, or other black swan events.

It is also important to remember that this book is educational content and not investment

advice. People should invest in Bitcoin only money that they can afford to lose. Otherwise, they may panic during the inevitable drawdowns and make poor decisions such as selling at the bottom.

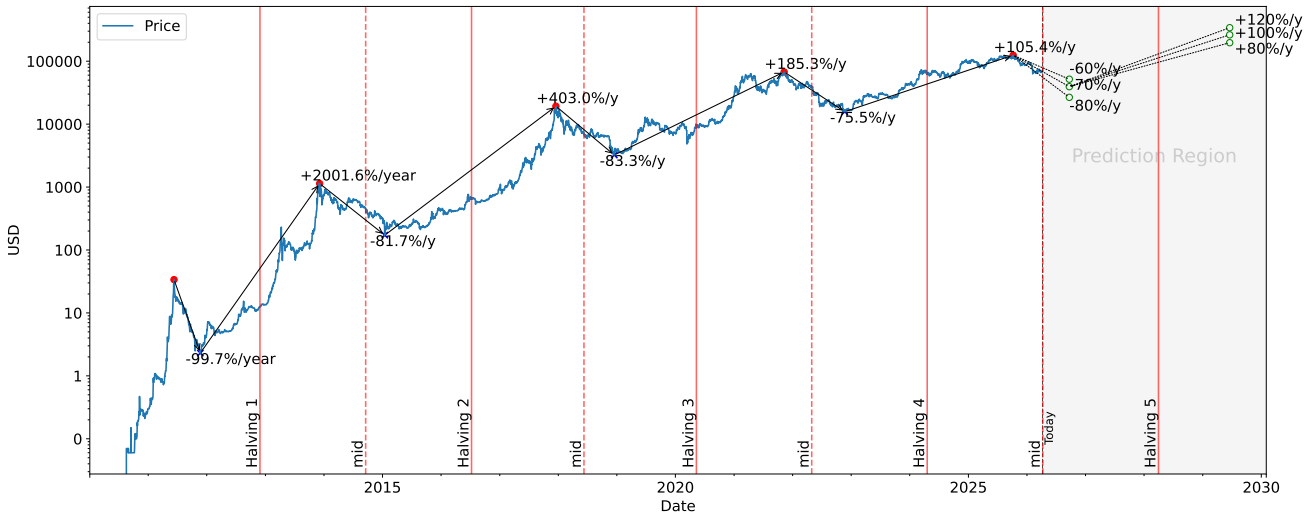


Figure 7.1: Bitcoin price together with the historical cycle tops and bottoms, and a possible prediction for the next cycle. The black lines show the annualized return between tops and bottoms. The gray shaded area denotes the prediction region. The green circles indicate several possible future scenarios after the predicted bottom.

Figure 7.1 summarizes the historical Bitcoin cycle and extends it into the future. The figure shows that the annualized growth between cycle bottoms and tops has been gradually decreasing over time. In the first cycle the annualized upward return was more than 2000% per year, while in the second cycle it was about 403% per year, then about 185% per year, and finally about 105% per year in the current cycle. Similarly, the size of the downward phase has also become less severe over time. The first cycle declined at almost 100% per year, while later cycles declined by roughly 80%, 75%, and then perhaps 60%–80% per year in the next cycle.

The prediction shown in Figure 7.1 assumes that the current cycle reaches a top around October 2025 at approximately $125,000. After that, the model assumes a downward period of about 350 days, resulting in a possible bottom around September 2026 at approximately $40,000. This corresponds to a decline factor of roughly 3.1 from the top.

After the predicted bottom, the figure shows three possible upward scenarios. These scenarios assume annual growth rates of approximately 80%, 100%, and 120% per year for about 1000 days. Under the middle scenario, Bitcoin would reach approximately $260,000 by mid 2029. The more optimistic scenario reaches slightly above $300,000, while the more conservative scenario reaches around $200,000. :contentReference[oaicite:1]index=1

The logic behind this prediction is based on the historical trend of diminishing returns. Each cycle still shows a strong upward move, but the magnitude of the gains becomes smaller from

cycle to cycle. Similarly, the downward phase becomes less severe. Therefore, the next cycle is expected to continue this trend: smaller gains than in previous cycles, but still substantial compared to most traditional assets.

Table 7.1 summarizes the historical Bitcoin cycles together with the prediction for the next cycle. The table lists the end date of each cycle, the top price and date, the number of days from the previous minimum to the top, the upward factor, the minimum price and date, the number of days from the top to the minimum, and the downward factor.

The predicted values are highlighted in blue. For Cycle 4, the prediction identifies a top of approximately $124,776 in October 2025 followed by a predicted bottom of approximately $40,000 in September 2026. For Cycle 5, the prediction assumes a new top around $260,000 in June 2029. The predicted upward factor from the bottom of Cycle 4 to the top of Cycle 5 is approximately 6.5, while the predicted downward factor from the Cycle 4 top to the Cycle 4 bottom is approximately 3.1.

Table 7.1: Bitcoin cycle statistics and prediction based on it

| Cycle | End Date Y-M-D | Top Price | Top Date Y-M-D | Days from Min | Up Factor | Min Price | Min Date Y-M-D | Days from Top | Down Factor |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 12-11-28 | 33.8 | 11-06-11 | – | – | 2.3 | 11-11-22 | 164 | 14.7 |
| 1 | 16-07-09 | 1136 | 13-12-05 | 744 | 494.3 | 172 | 15-01-15 | 406 | 6.6 |
| 2 | 20-05-11 | 19279 | 17-12-17 | 1067 | 112.1 | 3231 | 18-12-16 | 364 | 6.0 |
| 3 | 24-04-19 | 67562 | 21-11-09 | 1059 | 20.9 | 15759 | 22-11-22 | 378 | 4.3 |
| 4 | 28-03-31 | 124776 | 25-10-07 | 1050 | 7.9 | 40000 | 26-09-22 | 350 | 3.1 |
| 5 | 32-03-20 | 260000 | 29-06-18 | 1000 | 6.5 | - | - | - | - |

The predicted values in Table 7.1 are based on the historical trend of diminishing returns and shorter downward phases.

For the predicted Cycle 4 bottom, I chose a value of about 350 days from the top because the previous downward phases lasted 406, 364, and 378 days. Therefore, 350 days appears to be a reasonable estimate and is slightly shorter than the previous cycle, consistent with the idea that bottoms tend to occur earlier in later cycles. Similarly, I chose a downward factor of about 3.1 because the previous downward factors were 6.6, 6.0, and 4.3. Therefore, continuing the diminishing return trend suggests a smaller decline in the next cycle. A factor of 3.1 means that after a peak of about $125,000, Bitcoin may fall to approximately $40,000:

$$\frac{125000}{3.1} \approx 40000$$

Combining the 350 days duration with the expected top in October 2025 leads to a predicted bottom around September 2026.

For Cycle 5, I chose an upward duration of about 1000 days because the previous upward

phases lasted 744, 1067, 1059, and 1050 days. Therefore, 1000 days seems like a reasonable continuation of the historical pattern. Similarly, I chose an upward factor of about 6.5 because the previous upward factors were 494.3, 112.1, 20.9, and 7.9. This continues the diminishing return pattern while still assuming that Bitcoin remains a high-growth asset. Applying an upward factor of 6.5 to the predicted Cycle 4 bottom of about $40,000 gives:

$$40000 \times 6.5 \approx 260000$$

This leads to a predicted top of approximately $260,000 around mid 2029. Although this value is much smaller than the enormous gains of the early Bitcoin cycles, it still represents a very significant increase relative to most traditional assets.

# Chapter 8

# Alternative Models

In this chapter we briefly discuss several alternative models that have been proposed for Bitcoin price. There are many such models, including logarithmic regression bands, Metcalfe's law, on-chain valuation metrics, rainbow charts, moving averages, and macroeconomic liquidity models. However, in this book we focus on two particularly important models that complement the cycle theory presented here: the power law model and the stock-to-flow model.

These two models are among the most popular frameworks used by Bitcoin investors and analysts. Both attempt to explain the long-term evolution of Bitcoin price, but they do so from different perspectives. The power law model focuses on Bitcoin's long-term growth trend over time, while the stock-to-flow model focuses on Bitcoin scarcity and the halving mechanism. Our cycle model is not necessarily in contradiction with these models. Rather, it may be viewed as an additional layer that explains the recurring upward and downward movements around the long-term trend.

## 8.1 Power Law

A popular model for Bitcoin is the power law model. The main idea behind this model is that Bitcoin price follows a long-term power law growth as a function of time.

Mathematically, the model assumes that the Bitcoin price satisfies

$$P(t) = At^b,$$

where $t$ is the time since Bitcoin was created, $A$ is a constant, and $b$ is the growth exponent.


Figure 8.1: Bitcoin power law model. The dashed line represents the fitted power law trend, while the dotted lines correspond to a factor of two above and below the central estimate.

Taking the logarithm of both sides gives

$$\log(P(t)) = \log(A) + b\log(t),$$

which means that if we plot Bitcoin price on a logarithmic scale against time on a logarithmic scale, the result should approximately follow a straight line.

Figure 8.1 shows the fitted power law model for Bitcoin. The dashed line is the central power law fit, while the dotted lines correspond to a factor of two above and below the central estimate. Thus, the upper band is simply twice the fitted price and the lower band is half of the fitted price.

One advantage of the power law model is that it captures Bitcoin's long-term slowdown in growth. In the early years, Bitcoin was very small, and therefore relatively small inflows of money could produce enormous percentage gains. As Bitcoin becomes larger, much more capital is required to generate the same percentage increase, and therefore the long-term growth naturally slows down.

The power law model is also useful because it provides a broad estimate of what price range may be considered historically cheap or expensive. When Bitcoin is close to the lower band, some investors may view it as undervalued relative to the long-term trend. Conversely, when Bitcoin is close to the upper band, some investors may view it as overvalued.

However, the power law model is very different from the four-year-cycle model presented in this book. The power law model focuses on the long-term trend over many years and largely ignores the cyclical structure created by the halving mechanism. In contrast, the four-year-cycle model focuses on the shorter-term oscillations around the long-term trend. One may think of the power law model as describing the long-term average direction of Bitcoin, while the four-year-cycle model describes the repeated upward and downward deviations around that direction.

Therefore, the two models are not necessarily contradictory. Instead, they may complement each other. For example, Bitcoin may follow a long-term power law growth path, while still exhibiting strong four-year cycles around that path. In such a case, a cycle peak may temporarily move Bitcoin close to or above the upper power law band, while a cycle bottom may temporarily push Bitcoin toward the lower power law band.

## 8.2 Stock-to-Flow Model

One of the most influential Bitcoin valuation models is the stock-to-flow model, created by PlanB. The basic idea of the model is borrowed from commodities such as gold and silver. The stock of an asset is the total amount that already exists, while the flow is the amount of new supply that is produced each year. For Bitcoin, the stock is the total number of bitcoins already mined, while the flow is the number of new bitcoins created each year through mining rewards.

The stock-to-flow ratio is defined as

$$\text{S2F} = \frac{\text{Stock}}{\text{Flow}}.$$

The higher the stock-to-flow ratio, the scarcer the asset is considered to be. Since the Bitcoin halving cuts the yearly flow in half every 210,000 blocks, the stock-to-flow ratio jumps sharply after each halving. PlanB proposed that Bitcoin price is largely determined by this stock-to-flow ratio. His model predicts that after each halving Bitcoin should move to a much higher average valuation level.

PlanB deserves enormous credit for this idea. His work was one of the first serious attempts to connect the Bitcoin halving mechanism directly to Bitcoin price. In many ways, his model inspired the cycle model presented in this book. He also indirectly inspired the pseudonym "Plan A," which I use in this book. However, while the stock-to-flow model explains the upward movement after halvings, it does not provide a convincing explanation for the large downward phases that repeatedly occur in Bitcoin. The model suggests a new average valuation after each halving, but it does not explain why Bitcoin should later decline by 50%–80%.

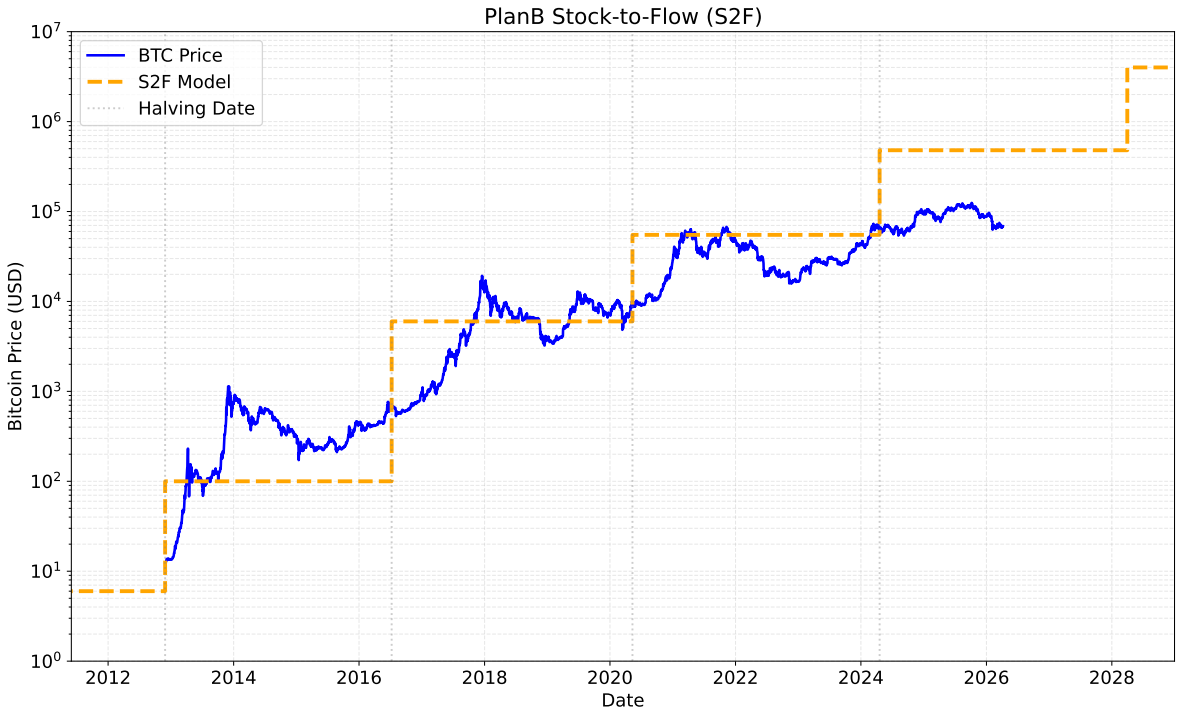


Figure 8.2: **MAKE THE HALVING DATED MORE VISBLE** PlanB stock-to-flow model. The orange dashed line shows the average valuation level predicted for each halving era, while the blue line is the actual Bitcoin price.

Figure 8.2 shows the stock-to-flow levels proposed by PlanB. For example, during the 2024–2028 halving era, the model suggests an average Bitcoin price of roughly \$500,000. According to Proposition 2, the mining cost is proportional to the Bitcoin price. Therefore, if Bitcoin were to stabilize at an average price of \$500,000, then the yearly mining revenue would also be enormous. After the 2024 halving, the block reward is 3.125 BTC per block. Since Bitcoin produces approximately 144 blocks per day, this corresponds to

$$3.125 \times 144 \times 365 \approx 164{,}250$$

new bitcoins per year. At a Bitcoin price of \$500,000, the yearly mining revenue would therefore be approximately

$$500{,}000 \times 164{,}250 \approx 82 \text{ billion dollars per year.}$$

Such a large mining cost seems difficult to sustain over a long period of time. In my opinion, this is one of the main weaknesses of the original stock-to-flow model.

Therefore, I see the cycle model presented in this book as an evolution of PlanB's stock-to-flow model. The stock-to-flow model explains why halvings may push Bitcoin upward, while our model also takes into account the cost of mining and therefore explains why strong downward phases eventually appear.