

Bitcoin price prediction model

Prediction model and its
use for portfolio modeling
and profitability

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2 Executive summary

The main objective of our effort was to create a model that would allow modelling the evolution of portfolios over a longer time horizon, up to the end of 2030.

Our aim was to create a model for the future development of the bitcoin price in a form suitable for further calculations for portfolio modelling. We therefore created predictions of the BTC price for individual days up to 2030.

It uses logarithmic regression on historical BTC price data from 2010 onwards. This models accelerating then decelerating growth over time. The model generates upper and lower bound price bands that form resistance and support levels rarely breached by historical prices. The model forecasts continued growth long-term but expects prices to remain between the bounds. More extreme short-term spikes are possible.

The model aims to conservatively predict a range of potential BTC prices based on historical trends and patterns. Major external events could alter the forecast.

3 BTC price prediction model

The first step is to create a BTC price prediction model. The first Bitcoin block, the so-called genesis block, was mined on January 3, 2009. We were able to obtain data from the second half of 2010 to the present.

Logarithmic regression

To calculate the future price with a view to 2030, we used the logarithmic regression method. This is a special case of statistical linear regression, where the sample data is interleaved with a logarithmic function. Logarithmic regression is a type of regression that is used to model situations where growth or decline first accelerates rapidly and then slows over time. This corresponds to the historical evolution of the BTC price adjusted for significant bull run highs. Thus, we took the historical BTC price data, and subjected periods of non-significant price growth to a linear regression. These periods are composed of three unrelated periods: 11/11/2010 to 2/5/2013; 1/17/2015 to 3/30/2017; and 12/7/2018 to 7/16/2020.

The equation of the linear model is as follows:

$$Cena\ BTC \sim \log(Cena\ BTC)$$

From the results of the linear model, we obtain the constant and $\log(\text{BTC price})$. Using these values, we construct the equation: $e^{(\text{constant} + \text{coefficient} * \log(x))}$. We have constructed five logarithmic curves. The range between the top two curves (the red band) represents a high level of price resistance that is not exceeded by the BTC price. The range between the lower curves (green band) represents a high level of support below which the BTC price does not fall. The use of this approach seems appropriate as it historically corresponds well to real developments.

Rules taken into account

Furthermore, we have taken into account certain statistically verified rules of BTC price development that can be applied in the future. These are the following four rules:

First rule: Due to the halving effect (which is always indicated by a black vertical line in the chart), the price increases in the first year and a half after the halving. The specific date is not yet known, as it depends on the average time required to mine a block, which depends on the number of miners involved and the computing power.

Second rule: For the medium variant, there is an increase in price compared to the ATH in the last halving cycle. This means that it does not fall lower than the lower minimum of the green band.

Third rule: After reaching the ATH of the next cycle, the price does not fall below the ATH of the previous cycle (at the daily close) in our optimistic version.

Fourth rule: High volatility

The price of BTC has historically been characterized by high volatility. Volatility shows us fluctuations on the price curve, but it tells us nothing about the long-term trend, i.e. nothing about the upward or downward trend. As Warren Buffett said, „Volatility does not measure risk.“

This metric is particularly relevant for traders and even more so for those who create market neutral strategies, i.e. combine long and short positions on the same asset.

Volatility was implemented in our model in the same way for all scenarios. The standard deviation from the trend is 0.02%.

4 BTC price prediction chart

The following chart shows the historical price development and its prediction until 2030. Prices are shown using a logarithmic scale. The colored bands in the chart represent the marginal possibilities of the bitcoin price. These are the bands that the bitcoin price almost never crosses. The green band forms the support of the BTC price and the price usually does not fall below it, at most it forms a touch line. The red band, on the other hand, forms the zone of maximum growth (ATH). In our case, the tops of bull markets pierce it in places. ATHs are exceptional events driven by strong external factors (retail investor FOMO at the first, second and third ATHs, the fourth lacks this clear peak and twice during 2021 reached very similar price levels). For these reasons, we consider the ATHs of the current cycle to be more relevant than the previous ones. The resulting shape of the resistance and support bands can therefore be considered rather conservative.

Chart 1 Bitcoin price prediction by the end of 2030



Explanation:

For the assumption of the BTC price development in the future, the basic landmarks are the red and green bands. We do not expect price development outside this band in our model.

Accordingly, the data in the middle variant (yellow) are designed - our expected Green variant is then optimistic and the Red is pessimistic.

The dark red is catastrophic - this contemplates a very significant swing below the ATH of the last cycle, which in our current moment means a break to a price of 7700 USD/BTC.

The timeline reflects years with a half-year breakdown.

The thick vertical lines show Bitcoin halving data.