# Economic Models for Bitcoin Maket Forcast

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## 1930s-1940s, Elliott Wave Model, Ralph Nelson Elliott

The Elliott Wave Model is a technical analysis tool that attempts to predict financial market trends by identifying recurring patterns in market prices. The model was developed by Ralph Nelson Elliott in the 1930s-1940s and is based on the idea that markets move in waves of varying degrees. These waves are composed of two types of movements: impulse waves and corrective waves. Impulse waves are trends that move in the direction of the overall market trend, while corrective waves move against the trend. The Elliott Wave Model can help predict the bitcoin price by analyzing past price movements and identifying these wave patterns in the current market. Traders can use this information to make decisions on when to buy or sell bitcoin based on the expected direction of the market trend.

## 1936, Liquidity Preference Theory, John Maynard Keynes

The Liquidity Preference Theory was developed by John Maynard Keynes in 1936 and is an economic theory that explains how interest rates are determined in the market. The theory proposes that interest rates are influenced by the supply and demand for money, with the demand for money being determined by the desire to hold liquid assets, such as cash and short-term securities. The Liquidity Preference Theory can help predict the bitcoin price by analyzing changes in interest rates and the demand for money. As demand for money increases, interest rates are likely to rise, which can affect the price of bitcoin and other financial assets.

## 1938, Dividend Discount Model (DDM), John Burr Williams

The Dividend Discount Model (DDM) is a financial model developed by John Burr Williams in 1938 that calculates the intrinsic value of a stock based on its expected future dividend payments. The model assumes that the value of a stock is equal to the present value of its future dividend payments, discounted at a certain rate. The DDM can help predict the bitcoin price by analyzing changes in the expected future dividend payments of bitcoin-related stocks or companies. Traders can use this information to make decisions on whether to invest in these stocks or companies based on their expected future returns.

## 1940s-1950s, Monte Carlo Simulation Models, Stanislaw Ulam, John von Neumann

Monte Carlo Simulation Models are mathematical models that use random sampling techniques to simulate the outcomes of complex systems. The models were developed by Stanislaw Ulam and John von Neumann in the 1940s-1950s and have been widely used in finance to simulate the behavior of financial markets. Monte Carlo Simulation Models can help predict the bitcoin price by simulating the outcomes of different market scenarios and analyzing their potential impact on the price of bitcoin. This can help traders make informed decisions on how to manage their investments and minimize their risk exposure.

## 1952, Markowitz's Portfolio Theory, Harry Markowitz

Markowitz's Portfolio Theory is a financial theory developed by Harry Markowitz in 1952 that proposes that investors can minimize their risk exposure by diversifying their investment portfolios across different asset classes. The theory is based on the idea that combining assets with low correlations can reduce overall portfolio risk. Markowitz's Portfolio Theory can help predict the bitcoin price by analyzing the impact of changes in market conditions on the risk exposure of bitcoin-related investments. Traders can use this information to diversify their portfolios and manage their risk exposure in different market conditions.

## 1953, Random Walk Model, Maurice Kendall

The random walk model is a theory that assumes that stock prices change randomly over time and that future prices cannot be predicted based on past prices. In other words, the model suggests that the price movements of a stock are independent of each other and follow a random path. This model can help predict the Bitcoin price by assuming that the future price of Bitcoin will be the same as the current price, and the direction of future price movements is unpredictable. Therefore, the model suggests that it is not possible to predict the future price of Bitcoin based on past price movements.

## 1956, Adaptive Expectations Hypothesis, Phillip Cagan

The adaptive expectations hypothesis is an economic theory that suggests that people adjust their expectations of future events based on past experiences. In other words, the hypothesis suggests that individuals make predictions about future events based on past trends and events. This model can help predict the Bitcoin price by assuming that the future price of Bitcoin will be influenced by past price movements, and individuals will adjust their expectations of the future price of Bitcoin based on these past movements. Therefore, the model suggests that it is possible to predict the future price of Bitcoin by analyzing past price movements and trends.

## 1956, Gordon Growth Model, Myron Gordon, Eli Shapiro

The Gordon growth model is a stock valuation model that assumes that the price of a stock is determined by its future dividends and the growth rate of those dividends. The model suggests that the value of a stock is equal to its expected future dividends divided by the difference between the required rate of return and the growth rate of those dividends. This model can help predict the Bitcoin price by assuming that the price of Bitcoin is determined by its expected future returns and the growth rate of those returns. Therefore, the model suggests that it is possible to predict the future price of Bitcoin by analyzing the expected future returns of Bitcoin and the growth rate of those returns.

## 1958, Modigliani and Miller's Capital Structure model, Franco Modigliani and Merton Miller

Modigliani and Miller's Capital Structure model is an economic theory that suggests that the value of a firm is not affected by its capital structure. The theory suggests that the value of a firm is determined by its cash flows and the riskiness of those cash flows, not by its capital structure. This model can help predict the Bitcoin price by assuming that the value of Bitcoin is not affected by its capital structure. Therefore, the model suggests that it is possible to predict the future price of Bitcoin by analyzing its cash flows and the riskiness of those cash flows.

## 1958, Modigliani-Miller theorem (MM), Franco Modigliani and Merton Miller

Modigliani-Miller theorem is an economic theory that suggests that the value of a firm is not affected by its financing decisions. The theorem suggests that the value of a firm is determined by its cash flows and the riskiness of those cash flows, not by the way it is financed. This model can help predict the Bitcoin price by assuming that the value of Bitcoin is not affected by its financing decisions. Therefore, the model suggests that it is possible to predict the future price of Bitcoin by analyzing its cash flows and the riskiness of those cash flows.

## 1958, Phillips Curve Model, Alban William Phillips

The Phillips Curve model is an economic theory that suggests that there is a trade-off between inflation and unemployment. The theory suggests that as unemployment falls, inflation rises, and vice versa. This model can help predict the Bitcoin price by assuming that the inflation rate will influence the future price of Bitcoin. Therefore, the model suggests that it is possible to predict the future price of Bitcoin by analyzing the inflation rate.

## 1960, Kalman Filter Models, Rudolf Emil Kalman

The Kalman Filter Model is a mathematical algorithm used to predict future events based on past observations. It is a widely used model in control systems engineering, and it uses a series of measurements to estimate the state of a system. In the context of predicting Bitcoin prices, the Kalman Filter Model could be used to estimate the volatility of Bitcoin prices based on past price movements and market trends. The model could help identify trends in the Bitcoin market and provide investors with insights into where the price may be heading.

## 1960s-1970s, Efficient Market Hypothesis (EMH), Eugene Fama

The Efficient Market Hypothesis (EMH) is a theory that states that financial markets are efficient, and that asset prices always reflect all available information. In other words, it suggests that it is impossible to beat the market by trying to predict stock prices or other asset prices. In the context of predicting Bitcoin prices, the EMH could suggest that it is not possible to predict the future price of Bitcoin based on past prices or market trends. Therefore, the EMH could suggest that investors should focus on the fundamentals of the cryptocurrency and not try to time the market.

## 1960s, Capital Asset Pricing Model (CAPM), William Sharpe, John Lintner, and Jan Mossin

The Capital Asset Pricing Model (CAPM) is a model used to calculate the expected return on an asset based on its risk and the expected return on the market as a whole. The model assumes that investors are rational and that they only invest in assets that have a positive expected return. In the context of predicting Bitcoin prices, the CAPM could be used to estimate the expected return on Bitcoin based on its risk level and the expected return on the overall cryptocurrency market.

## 1961, Miller and Modigliani's Dividend Irrelevance Theory, Merton Miller and Franco Modigliani

Miller and Modigliani's Dividend Irrelevance Theory is a theory that suggests that the dividend policy of a company does not affect the overall value of the company. In other words, investors are indifferent to the payment of dividends, and the value of the company is based on its future earnings potential. In the context of predicting Bitcoin prices, the theory could suggest that the future value of Bitcoin is based on its adoption and acceptance as a means of payment and store of value, and not on its dividend policy.

## 1963, Fractal Analysis, Benoit Mandelbrot

Fractal Analysis is a mathematical technique used to analyze complex patterns and structures in data. It is used to identify patterns that repeat at different scales, and it has been used to analyze financial markets. In the context of predicting Bitcoin prices, Fractal Analysis could be used to identify patterns in the price movements of Bitcoin and to predict future price movements based on these patterns.

## 1970, Akerlof's Market for Lemons model, George Akerlof

Akerlof's Market for Lemons Model is a model used to explain the problems that arise when there is asymmetric information in a market. The model suggests that when buyers cannot distinguish between high-quality and low-quality goods, the market may become dominated by low-quality goods, or "lemons". In the context of predicting Bitcoin prices, the model could suggest that the market for Bitcoin may be dominated by low-quality coins or fraudulent activity, which could affect the overall value of the cryptocurrency.

## 1972, Rational Expectations Hypothesis, Robert Lucas Jr.

The Rational Expectations Hypothesis is a theory that suggests that people make decisions based on all available information and that they have rational expectations about future events. In the context of predicting Bitcoin prices, the theory could suggest that the market price of Bitcoin already reflects all available information and that it is impossible to gain an advantage by trying to predict the future price of the cryptocurrency.

## 1973, Black-Scholes Option Pricing Model, Fischer Black and Myron Scholes

The Black-Scholes model is a mathematical model used to estimate the price of financial instruments such as options. It assumes that the price of the underlying asset follows a geometric Brownian motion with constant drift and volatility. The model uses several inputs, including the current price of the underlying asset, the option's strike price, the time until expiration, and the risk-free interest rate. The model can be used to predict the theoretical value of an option at any point in time.

The Black-Scholes model can be used to predict the price of bitcoin options. Traders and investors can use the model to estimate the fair value of an option and compare it to the market price. If the market price is below the theoretical value, the option is considered undervalued and may represent a buying opportunity. Conversely, if the market price is above the theoretical value, the option is considered overvalued and may represent a selling opportunity.

## 1973, Merton Model, Robert Merton

The Merton model is a mathematical model used to estimate the credit risk of a company or individual. It assumes that the value of a firm's assets follows a stochastic process and that the firm defaults when the value of its assets falls below a certain threshold. The model can be used to estimate the probability of default and the expected loss in the event of default.

The Merton model can be used to predict the credit risk of companies that hold bitcoin on their balance sheets. By estimating the probability of default and the expected loss, investors and creditors can assess the creditworthiness of the company and adjust their investment or lending decisions accordingly.

## 1973, Random Walk Theory, Burton Malkiel

The Random Walk Theory states that stock prices and other financial market prices are inherently unpredictable and follow a random walk. The theory suggests that past price movements cannot be used to predict future price movements and that the best strategy for investors is to buy and hold a diversified portfolio of assets.

The Random Walk Theory can be used to argue that predicting the price of bitcoin is inherently difficult and that investors should focus on building a diversified portfolio of assets rather than trying to time the market.

## 1974, Barro's Ricardian Equivalence Model, Robert Barro

The Ricardian Equivalence Model suggests that changes in government spending have no effect on the economy because individuals anticipate future tax increases to pay for the government spending and adjust their behavior accordingly. The model assumes that individuals are forward-looking and rational and that they save more in anticipation of future tax increases.

The Ricardian Equivalence Model can be used to argue that changes in government policy related to bitcoin, such as increased regulation or taxation, are unlikely to have a significant impact on the bitcoin price because investors will adjust their behavior accordingly.

## 1974, Merton's Structural Credit Risk Model, Robert Merton

The Merton Structural Credit Risk Model is a variation of the Merton model that takes into account the possibility of multiple sources of default risk. The model assumes that a company can default if any one of its underlying assets falls below a certain threshold. The model can be used to estimate the probability of default and the expected loss in the event of default.

The Merton Structural Credit Risk Model can be used to predict the credit risk of companies that hold bitcoin on their balance sheets. By estimating the probability of default and the expected loss, investors and creditors can assess the creditworthiness of the company and adjust their investment or lending decisions accordingly.

## 1976, Arbitrage Pricing Theory (APT), Stephen Ross

APT is a model used in finance to determine the relationship between asset prices and their underlying economic factors. It suggests that the price of an asset should reflect its risk premium, which is influenced by various factors such as interest rates, inflation, and market volatility. APT can help predict the bitcoin price by analyzing the impact of these economic factors on the cryptocurrency market.

## 1976, Jensen and Meckling's Agency Theory, Michael Jensen and William Meckling

Agency theory is a model used to explain the relationship between principals (such as shareholders) and agents (such as managers) in organizations. It suggests that agents may have different objectives than principals and that conflicts may arise between them. This theory can help predict the bitcoin price by analyzing how the interests of different stakeholders in the cryptocurrency market may affect its price.

## 1976, Jump-diffusion models, Robert Merton

Jump-diffusion models are used to describe the behavior of asset prices that have both continuous and sudden jumps. It can help predict the bitcoin price by analyzing the impact of unexpected events or news on the cryptocurrency market.

## 1977, Real options theory, Stewart Myers

Real options theory is a model used to evaluate investment opportunities by analyzing the value of flexibility and the ability to make decisions in uncertain environments. It can help predict the bitcoin price by analyzing the potential impact of various events or decisions on the cryptocurrency market.

## 1977, Vasicek Model, Oldrich Vasicek

The Vasicek model is a type of stochastic process used to model interest rate movements over time. It can help predict the bitcoin price by analyzing the impact of changes in interest rates on the cryptocurrency market.

## 1979, Binomial Option Pricing Model, Cox-Ross-Rubinstein

The binomial option pricing model is a mathematical method used to calculate the value of options based on the probability of different future outcomes. It can help predict the bitcoin price by analyzing the impact of various potential future scenarios on the cryptocurrency market.

## 1980, Grossman and Stiglitz's Information Asymmetry model, Sanford Grossman and Joseph Stiglitz

The Information Asymmetry model is a theory that explains how differences in access to information between market participants can lead to inefficiencies in markets. It can help predict the bitcoin price by analyzing the impact of information asymmetry on the cryptocurrency market.

## 1980, Hansen and Sargent's Uncertainty Models, Lars Hansen and Thomas Sargent

Uncertainty models are used to model decision-making under conditions of uncertainty. It can help predict the bitcoin price by analyzing how market participants are likely to react to uncertain events in the cryptocurrency market.

## 1981, International capital asset pricing model (ICAPM), René Stulz

The ICAPM is a model used to determine the relationship between asset prices and their underlying economic factors in a global context. It can help predict the bitcoin price by analyzing the impact of global economic factors on the cryptocurrency market.

## 1982, Real Business Cycle Theory, Finn Kydland and Edward Prescott

Real Business Cycle Theory is a macroeconomic theory that explains how fluctuations in productivity and other economic factors can lead to business cycles. It can help predict the bitcoin price by analyzing the impact of macroeconomic factors on the cryptocurrency market.

## 1983, Diamond and Dybvig's Bank Run Model, Douglas Diamond and Philip Dybvig

The Bank Run Model is a model used to explain the occurrence of bank runs and the impact of deposit insurance on the stability of the banking system. It can help predict the bitcoin price by analyzing the potential for runs on exchanges or wallets that hold large amounts of bitcoin.

## 1985, Cox-Ingersoll-Ross (CIR) model, John Cox, Jonathan Ingersoll, and Stephen Ross

The Cox-Ingersoll-Ross (CIR) model is a stochastic differential equation used to model interest rates. The model assumes that the short-term interest rate follows a mean-reverting process with constant volatility. It can be used to forecast the volatility of interest rates and help predict changes in the interest rates which can have an impact on the bitcoin price.

## 1985, New Keynesian Economics, N. Gregory Mankiw

New Keynesian Economics is a macroeconomic model that incorporates rational expectations and price stickiness. The model assumes that markets are not always efficient and that government intervention may be necessary to stabilize the economy. This model can help predict the impact of changes in government policies on the overall economy and how it can affect the demand for bitcoin.

## 1986, Ho-Lee Model, Thomas Ho, Sang Bin Lee

The Ho-Lee Model is a stochastic interest rate model used to forecast interest rate movements. The model assumes that interest rates are driven by a combination of market factors and other economic variables. This model can be used to forecast changes in the interest rates which can have an impact on the bitcoin price.

## 1989, Wavelet Analysis, Stephane Mallat

Wavelet Analysis is a mathematical technique used to analyze and predict time series data. The technique decomposes a time series into different frequency components, which allows for the identification of patterns and trends that are not easily visible in the raw data. This model can be used to analyze the historical price movements of bitcoin and identify patterns that may indicate future price movements.

## 1990s-2000s, Network Analysis Models, Mark Newman, Albert-László Barabási, Duncan J. Watts

Network Analysis Models are used to model complex systems using graph theory. These models are used to identify the relationships between different components of the system and how they interact with each other. In the context of bitcoin, these models can be used to analyze the network of bitcoin transactions and identify patterns that may indicate future price movements.

## 1992, Fama-French Three-Factor Model, Eugene Fama, Kenneth French

The Fama-French Three-Factor Model is an asset pricing model that takes into account three factors: market risk, size, and value. The model is used to explain the returns on a portfolio of stocks or other assets. This model can be used to analyze the bitcoin market and identify the factors that drive its returns.

## 1992, Minsky Model of Financial Instability, Hyman Minsky

The Minsky Model of Financial Instability is a macroeconomic model that explains the dynamics of financial crises. The model assumes that periods of stability in the financial markets lead to excessive risk-taking, which eventually leads to a financial crisis. This model can be used to predict the likelihood of a financial crisis in the bitcoin market.

## 1993, Heston Model, Steven Heston

The Heston Model is a stochastic volatility model used to forecast asset prices. The model assumes that the volatility of an asset is itself a stochastic process that is driven by a combination of market factors and other economic variables. This model can be used to forecast changes in the volatility of the bitcoin price.

## 1993, Metcalfe's Law Model, Robert Metcalfe

Metcalfe's Law Model is a network effect model that states that the value of a network is proportional to the square of the number of its users. In the context of bitcoin, this model can be used to predict the price of bitcoin based on the number of active bitcoin users.

## 1993, Stochastic volatility models, Steven Heston

Stochastic volatility models are used to forecast the volatility of financial assets. These models assume that the volatility of an asset is itself a stochastic process that is driven by a combination of market factors and other economic variables. This model can be used to forecast changes in the volatility of the bitcoin price.

## 1993, Taylor's Monetary Policy Rules, John Taylor

This model provides a framework for policymakers to make decisions regarding monetary policy, including setting interest rates, based on a set of rules rather than discretion. The model considers factors such as inflation, output, and the equilibrium interest rate. It can help predict the bitcoin price by providing insight into how changes in monetary policy might impact the broader economy and financial markets, including bitcoin.

## 1994, Long-term capital management (LTCM) model, Robert Merton and Myron Scholes

This model was developed by a hedge fund that used a quantitative approach to investing. The model is based on the premise that markets are efficient and that there is a mathematical relationship between different asset classes. It can help predict the bitcoin price by providing insights into how different asset classes, such as stocks, bonds, and currencies, might impact the price of bitcoin.

## 1996, Log-Periodic Power Law (LPPL) Model, Didier Sornette

This model is based on the idea that financial markets experience a predictable pattern of oscillations before experiencing a crash or bubble. It can help predict the bitcoin price by identifying patterns in the price of bitcoin that may be indicative of an impending crash or bubble.

## 1997, Robert Shiller, Daniel Kahneman, Amos Tversky, Richard Thaler, Behavioral Finance Models

These models consider how human psychology and behavior can impact financial markets. They are based on the idea that individuals may not always make rational decisions when it comes to investing and that emotions and biases can play a role in decision-making. They can help predict the bitcoin price by providing insights into how investor sentiment and market psychology might impact the price of bitcoin.

## 1999, Asset pricing models with habit formation, John Campbell and John Cochrane

This model considers how individuals form habits when it comes to investing and how these habits can impact asset prices. It can help predict the bitcoin price by providing insights into how changes in investor habits might impact the price of bitcoin.

## 1999, Bernanke and Gertler's Financial Accelerator Model, Ben Bernanke and Mark Gertler

This model considers how changes in the availability of credit can impact the broader economy and financial markets. It can help predict the bitcoin price by providing insights into how changes in credit availability might impact investor sentiment and the price of bitcoin.

## 1999, Informational overshooting, booms, and crashes, Zeira

This model is based on the idea that markets can experience periods of excessive optimism or pessimism that are not supported by fundamental factors. It can help predict the bitcoin price by providing insights into how market sentiment and speculation might impact the price of bitcoin.

## 2000, Johansen-Ledoit-Sornette (JLS) Model, Peter Johansen, Olivier Ledoit, Didier Sornette

This model is based on the idea that financial bubbles can be identified by looking at the price and volume of trading in a market. It can help predict the bitcoin price by providing insights into how patterns in trading volume and price might be indicative of a bubble or impending crash.

## 2000, Predicting financial crashes using discrete scale invariance, Johansen and Sornette

This model is based on the idea that financial crashes can be predicted by looking at the fractal patterns in market data. It can help predict the bitcoin price by providing insights into how patterns in market data might be indicative of an impending crash.

## 2000, The confidence index model, Shiller

This model considers how changes in investor confidence can impact asset prices. It can help predict the bitcoin price by providing insights into how changes in investor confidence might impact the price of bitcoin.

## 2001, Dynamic Conditional Correlation (DCC) Model, Robert Engle, Kevin Sheppard

This model considers how the correlation between different asset classes can change over time. It can help predict the bitcoin price by providing insights into how changes in the correlation between bitcoin and other asset classes might impact the price of bitcoin.

## 2001, Shocks, crashes and bubbles in financial markets, Johansen and Sornette

This model proposes that financial markets are prone to shocks, crashes, and bubbles due to herding behavior of investors and positive feedback loops. It suggests that the occurrence of such events can be predicted by analyzing the behavior of asset prices over time and identifying patterns of positive feedback loops. In the context of Bitcoin, this model can help predict the occurrence of price bubbles and subsequent crashes by analyzing the historical behavior of Bitcoin prices and identifying patterns of herding behavior among investors.

## 2002, The bubble of the millennium: a diachronic analysis of the S&P 500 index, Johansen and Sornette

This model analyzes the behavior of the S&P 500 index to identify patterns of bubble formation and subsequent crashes. It proposes that bubbles are formed due to the herding behavior of investors and can be predicted by analyzing the behavior of asset prices over time. In the context of Bitcoin, this model can help predict the formation of bubbles and subsequent crashes by analyzing the historical behavior of Bitcoin prices and identifying patterns of herding behavior among investors.

## 2003, The volatility feedback model, Shiller

This model proposes that asset prices are influenced by changes in volatility and suggests that market participants use past volatility to forecast future volatility. In the context of Bitcoin, this model can help predict changes in Bitcoin prices by analyzing the historical volatility of Bitcoin prices and identifying patterns of feedback loops between price and volatility.

## 2004, Fearless versus fearful speculative financial bubbles, Andersen and Sornette

This model suggests that bubbles can be classified as either "fearless" or "fearful" based on the behavior of investors. "Fearless" bubbles are characterized by investors who are optimistic about future returns and take on high levels of risk, while "fearful" bubbles are characterized by investors who are pessimistic about future returns and are cautious in their investment decisions. In the context of Bitcoin, this model can help predict the behavior of investors during bubble formation and subsequent crashes, by identifying patterns of risk-taking behavior among investors.

## 2004, Stock market crashes are outliers, Johansen and Sornette

This model suggests that stock market crashes are not random events but are instead the result of a systemic instability in the market. It proposes that such events can be predicted by analyzing the behavior of asset prices over time and identifying patterns of positive feedback loops. In the context of Bitcoin, this model can help predict the occurrence of market crashes by analyzing the historical behavior of Bitcoin prices and identifying patterns of positive feedback loops.

## 2005, Finite-Time Singularity (FTS) Model, Domenico Delli Gatti

This model proposes that financial markets are characterized by "singularities" or moments of extreme volatility, which are caused by the interaction of market participants. It suggests that such events can be predicted by analyzing the behavior of asset prices over time and identifying patterns of extreme volatility. In the context of Bitcoin, this model can help predict the occurrence of extreme price movements by analyzing the historical behavior of Bitcoin prices and identifying patterns of extreme volatility.

## 2008, Network Models of Financial Contagion, Diego Garlaschelli

This model proposes that financial contagion occurs when a shock in one market spreads to other markets through interdependencies between market participants. It suggests that such events can be predicted by analyzing the network of relationships between market participants and identifying patterns of contagion. In the context of Bitcoin, this model can help predict the occurrence of financial contagion by analyzing the network of relationships between Bitcoin market participants and identifying patterns of contagion.

## 2013, Testing for financial crashes using the log-periodic power law model, Bree and Joseph

The log-periodic power law model (LPPL) was proposed in 1997 by Didier Sornette and his colleagues. It is a mathematical model that seeks to explain the behavior of financial markets before a crash. The model postulates that financial crashes are preceded by a bubble-like behavior that can be characterized by a specific mathematical pattern. Specifically, the LPPL model describes how prices deviate from their fundamental value as a function of time. The model predicts that prices will continue to increase at an accelerating rate until they reach a critical point, after which they will start to decline rapidly. The LPPL model can be used to predict when a financial market is likely to crash, and this information can be used to inform investment decisions in the Bitcoin market.

## 2014, LPPL model with mean-reverting residuals, Lin et al.

The LPPL model with mean-reverting residuals was proposed by Lin et al. in 2014. This model extends the original LPPL model by incorporating mean-reverting processes into the residual term. The idea behind this model is that financial markets exhibit both long-term trends and short-term fluctuations that are caused by random noise. The mean-reverting residuals in the LPPL model help to account for these fluctuations, which can be used to make more accurate predictions about the future behavior of the Bitcoin market.

## 2017, The narrative economics model, Shiller

The narrative economics model was proposed by Robert Shiller in 2017. This model suggests that economic trends are driven by the stories that people tell about the economy. These stories can have a powerful effect on people's beliefs and behavior, which in turn can influence the performance of financial markets. The narrative economics model can be used to analyze the impact of news events and media coverage on the Bitcoin market, and to make predictions about future trends based on changes in public sentiment.

## 2019, Stock-to-flow Model, PlanB

The stock-to-flow model was proposed by PlanB in 2019. This model suggests that the price of Bitcoin is largely determined by its scarcity. The model is based on the idea that the value of Bitcoin is proportional to the ratio of its total supply to its annual production rate. In other words, the scarcer Bitcoin becomes, the more valuable it will be. The stock-to-flow model can be used to predict the future price of Bitcoin based on its current stock-to-flow ratio, and to identify periods when Bitcoin is undervalued or overvalued.