



The impact of expected and unexpected factors on the price of Bitcoin

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ABSTRACT. The influencing factors of Bitcoin price have been an important research direction in academia. In this paper, we categorize the influencing factors of bitcoin price into expected and unanticipated categories, and we choose inflation, a common macroeconomic indicator, as an indicator of expected factors, and the new coronavirus pandemic and the Russian-Ukrainian conflict as indicators of unanticipated factors. The paper analyzes the economics of the impact of these familiar indicators or events on the price of bitcoin, and concludes that inflation has an inverse relationship with the price of bitcoin, that the Covid-19 pandemic affected the price of bitcoin through indirect factors such as panic, and that the Russian-Ukrainian conflict affected the price of bitcoin by triggering the energy crisis in Europe.

Keywords: Bitcoin, CPI, Covid-19 pandemic, Russian-Ukrainian conflict

1 Introduction

Bitcoin is a set of cryptographic codes generated through open-source algorithms and is the world's first distributed anonymous digital currency. Unlike other currencies, Bitcoin's inherent scarcity sets it apart from other cryptocurrencies and traditional currencies, which can be printed by governments and will create an infinite number of new units, but Bitcoin is finite. Since its introduction, Bitcoin has generated considerable interest in financial markets and academia due to its decentralized nature, the potential of new blockchain technology, and unique transaction policies. Beyond its inherent scarcity, Bitcoin has more to offer. Similar to some other cryptocurrencies, deposits and transactions are easier, safer and offer better privacy. Its virtual nature and direct online transactions prevent the risk of loss during the transaction process, thus eliminating the need for third party intervention, thus reducing transaction and deposit fees. Due to its privacy, it is difficult to track and regulate all transactions, which also makes it more difficult for governments to track funds when dealing with money laundering.

Bitcoin as a virtual currency, how its price influencing factors, and how it differs from the influencing factors of traditional currencies and financial products' prices has been a concern in the academic world, and its study is conducive to the discovery of Bitcoin's price influencing mechanism, which is of great significance for the application

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F. Balli et al. (eds.), *Proceedings of the 2023 2nd International Conference on Economics, Smart Finance and Contemporary Trade (ESFCT 2023)*, Advances in Economics, Business and Management Research 261, https://doi.org/10.2991/978-94-6463-268-2_43

of digital currencies, blockchain, and other fintech products in other fields. Inspired by Wang et al.(2022)[1], in this paper, we will categorize the influencing factors of bitcoin price into expected and unanticipated events, explore whether there is a relationship between CPI and bitcoin price, as well as explore the impact of major unanticipated events ((Russian-Ukrainian conflict, Covid-19 pandemic) in recent years on the bitcoin price and analyze the inherent economic and financial principles. The main contribution of this paper is to provide some of the factors influencing the price of Bitcoin and analyze the underlying mechanisms, and to provide an optional reference for investors to buy and sell Bitcoin at different points in time.

2 Literature review

Factors influencing the price of Bitcoin have been a focus of academic interest. Yang and Zhang (2021) find that CPI affects Bitcoin in the short run and support the notion that Bitcoin acts as a hedge[4]. In turn, Bitcoin also affects CPI in the short run and EPU (Economic Policy Uncertainty) at all levels. Cevik et al. (2023), on the other hand, examine the impact of two key events, the launch of Bitcoin futures and the COVID-19 pandemic, on Bitcoin returns and volatility[3]. The launch of bitcoin futures is categorized as an expected event, which positively affects bitcoin price returns, while it does not have a significant impact on volatility; the pandemic is categorized as an unanticipated event, which did not affect bitcoin returns or volatility, which is consistent with the idea that bitcoin is not affected by certain global economic developments. This paper argues that the COVID-19 pandemic could still have some impact on the price of bitcoin through certain indirect channels, which could be caused by influencing investor sentiment, and the impact could be either long-term or short-term, which provides ideas for subsequent empirical work. Chen et al. (2020), on the other hand, investigated the effect of fear induced by a coronavirus pandemic on bitcoin's price dynamics[2]. The results show that fear exacerbates market volatility due to increased interest in searching for coronaviruses. Critien et al. (2022), on the other hand, demonstrate that Twitter sentiment is effective in predicting whether the price of Bitcoin will rise or fall[6].

The aim of this paper is to build on these studies and analyze them through economic principles to reveal the impact of several factors on the price of Bitcoin and their underlying mechanisms.

3 Analysis of economic principles

3.1 Analysis of expected factors: Inflation

The analysis in this paper is all based on the economic background of the U.S. The reason is because it has the world's largest number of bitcoin ATMs, cryptocurrency users, and bitcoin trading volume, and at the same time, compared with the emerging markets in developing countries, the U.S. has a well-developed and stably functioning

financial sector, with greater capital mobility, which is conducive to drawing more accurate conclusions.

Inflation, according to the degree of people's expectations can be divided into expected inflation and unanticipated inflation, people can always through various information channels to create an expectation of the next month's inflation rate. Such as in the inflation period, people can predict that prices will rise in the future, so as to take appropriate measures to avoid the impact of inflation on their own, and the government and the central bank will also take appropriate measures to control the inflation rate. In general, inflation and Treasury yields have a positive relationship.

Since the second half of 2021, inflation in the U.S. has been rising and the price of Bitcoin has declined significantly, probably because people are more willing to hold lower-risk treasury bonds and sell riskier Bitcoin under high inflation, using bond products as a "safe haven" under high inflation.

According to the Merrill Lynch Investment Clock[7] and the current economic situation, the U.S. economy will be divided into phases from 2020 to 2023:

3.1.1 Recession phase.

2020 by the impact of the new crown epidemic into the recession phase, this time to hold bonds or cash is the best, bitcoin price in this stage of no significant change;

3.1.2 Recovery phase.

2021 gradual recovery, recession and recovery stage of the common characteristics of the downward trend of inflation, CPI growth rate is low, low Treasury yields, at this time people prefer high yield into investment products, this stage of the bitcoin price soared, once exceeded 60,000 U.S. dollars a piece;

3.1.3 Overheat phase.

2022 into the overheating stage, this stage is characterized by economic upturn (high GDP), inflation upward (high CPI), investors expect inflation will be maintained or continue to go higher, bitcoin price from the beginning of 2022 began to fall sharply;

3.1.4 Stagflation phase.

The U.S. economy will likely be in a stagflationary phase in 2023, when economic growth slows or stagnates while inflation remains high. At this time, the bitcoin price is generally in a period of low shock.

In this paper, by comparing the U.S. CPI and bitcoin price in the same period, we apply the Merrill Lynch Investment Clock Theory and draw the following conclusions, the possible reasons for the overall inverse movement of inflation and bitcoin price are:

Currency depreciation: high inflation will lead to currency depreciation, and people will tend to move their money out of traditional financial institutions, such as banks, to find safer investment channels. Bitcoin, as a relatively new form of investment, may be sought after to a certain extent, but it may also fall in price due to market volatility.

Market Sentiment Impact: High inflation reduces consumers' purchasing power and spending confidence, which in turn affects market sentiment. A deterioration in market sentiment may prompt investors to sell Bitcoin, causing its price to fall.

Policy adjustments: In order to deal with high inflation, the government may adopt a series of policy measures, such as raising interest rates and tightening monetary policy. These policy adjustments may have some impact on the bitcoin market, leading to price declines.

Changes in investors' risk appetite: In a hyperinflationary environment, investors' risk appetite may change. Bitcoin, as a high-risk investment method, may be subject to reduction or selling by investors, resulting in price decline.

All of the above factors are likely to affect the price of bitcoin, providing ideas for empirical research incorporating the Merrill Lynch Investment Clock Theory.

3.2 Analysis of unexpected factors

3.2.1 Unexpected factor one: the Covid-19 pandemic.

An important event in the history of Bitcoin is the Covid-19 pandemic. As Gunay and Kurtulmus (2021) pointed out, in terms of its nature, the novel coronavirus epidemic can be regarded as a black swan event[5].

On Google Trends, the heat of words such as Coronavirus and COVID-19 is selected to construct a daily panic index to represent the impact of panic caused by the epidemic on the investment market. The highest score of vocabulary heat index on Google Trends is 100, and words without enough data get 0.

On March 11, 2020, the World Health Organization announced a global pandemic of the novel coronavirus. We can explore the impact of the epidemic by observing the changes in bitcoin prices before and after that day. As shown in the Fig.1, the market panic spread and the price of Bitcoin plummeted. At the same time, as shown in the Fig.2, the VIX market volatility index of the S & P 500 has risen sharply, which to a certain extent also shows that the investment market at this time has great volatility and high uncertainty. It can be determined that panic will aggravate market volatility. Bitcoin, as a high-risk investment product, has increased price volatility in the context of the new coronavirus epidemic.

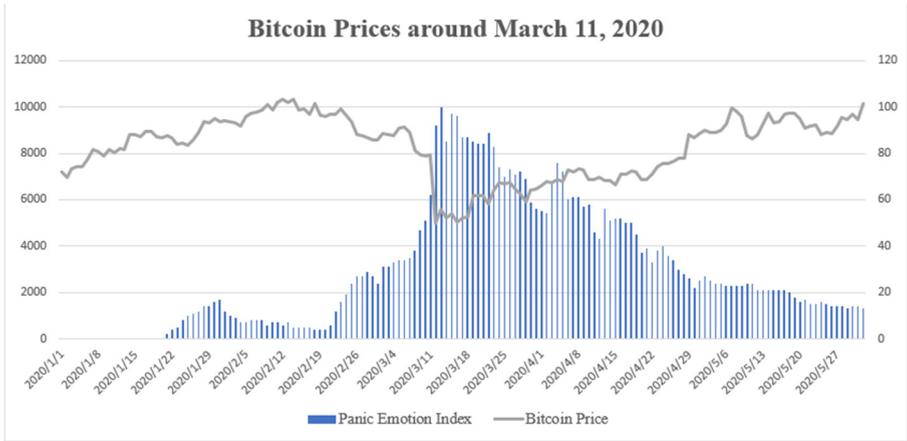


Fig. 1. Daily panic index composed of the search heat of the word ' Coronavirus ' on Google Trends from January 2020 to June 2020. (The situation is similar for words like ' COVID-19 '); Bitcoin price in US dollars; Data from Google Trends and East Money Information Co., Ltd. choices financial terminal software



Fig. 2. VIX market volatility index of S & P 500 in 2020; Data from East Money Information Co., Ltd. choices financial terminal software

3.2.2 Unexpected factor 2: Russian-Ukrainian conflict-European energy crisis.

The Russian-Ukrainian conflict can be considered a black swan event, as it is clear that the outbreak of war was unexpected.

International crude oil and natural gas futures prices from January 2022 to June 2023 were obtained from the Oriental Wealth Choice financial terminal, and Bitcoin hash rate time series were obtained from the website intotheblock.com.

The rise in crude oil and natural gas prices represents, to some extent, a rise in overall energy prices, which is particularly evident in Europe, which has a very low rate of energy self-sufficiency and is highly dependent on natural gas, oil, and other energy sources. In the period following the Russian-Ukrainian conflict, the price of various energy sources in Europe (especially natural gas) rose dramatically, which led to the European energy crisis, and the price of bitcoin fell dramatically during this time period(as shown in Fig.3 and Fig.4). The reason for this may be that bitcoin mining is an inherently energy-intensive process that requires large amounts of electricity consumption, which may affect the profitability of the bitcoin mining business when energy is in short supply or prices rise. In the case of limited or expensive energy supplies, bitcoin miners may reduce their operations or even shut down their mining facilities. Reduced mining activity could lead to a decrease in the overall computing power of the Bitcoin network, which could also affect transaction confirmation times and the overall security of the network. This may have contributed in part to a small number of miners making the decision to exit the bitcoin mining industry and cash out. Those miners who remain have been forced to cash out as well to keep their mining facilities running due to cash flow shortages caused by the increase in energy prices. In addition, pessimistic expectations about the future due to the sharp rise in energy prices may have prompted them to hold on to more cash. All of these reasons likely contributed to the massive sell-off and price collapse of Bitcoin in the period following the outbreak of the Russia-Ukraine conflict.

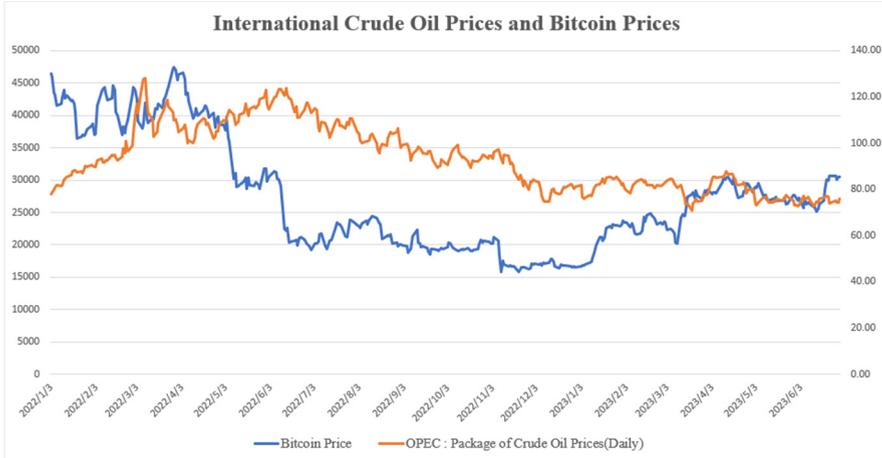


Fig. 3. OPEC Basket Crude Oil Prices (in USD/barrel; secondary axis) and Bitcoin Prices (in USD; primary axis) from January 2020 to June 2023; Data from East Money Information Co., Ltd. choices financial terminal software and finance.yahoo.com

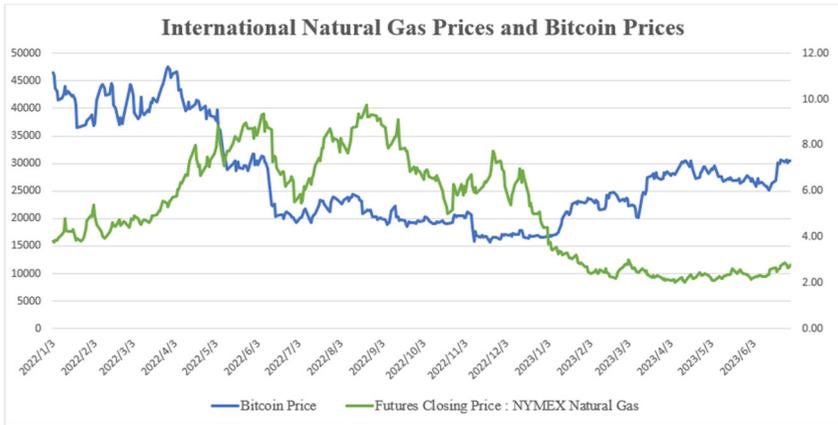


Fig. 4. NYMEX Natural Gas Prices (in USD/MMBtu; secondary axis) and Bitcoin Prices (in USD; primary axis) from January 2020 through June 2023; Data from East Money Information Co., Ltd. choices financial terminal software and finance.yahoo.com

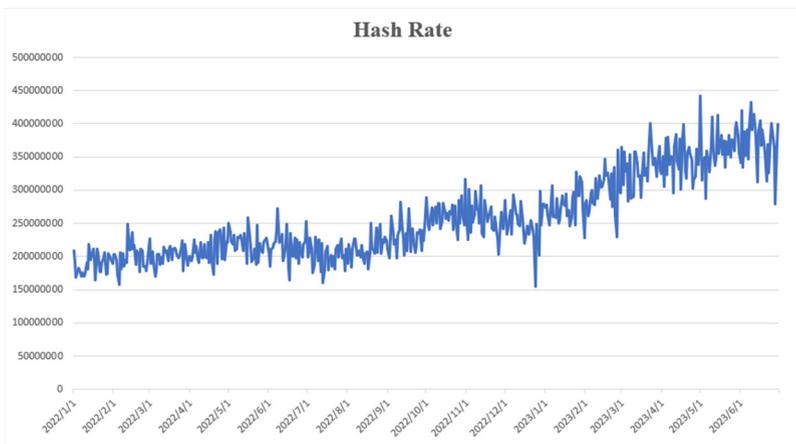


Fig. 5. Bitcoin hash rate (Terahash / s) from January 2020 to June 2023; Data from app.into-theblock.com

On the other hand, let's start with Bitcoin's hash rate. Bitcoin's hash rate is the amount of computing power or computational work being done by miners on the Bitcoin network. It measures how fast miners can solve complex mathematical problems, known as hash functions, to verify and protect transactions on the blockchain. The hash rate represents the number of calculations a miner can perform per second (calculated in Terahash/second in the graph). The higher the hash rate, the more computing power is dedicated to mining on the Bitcoin network, meaning the harder it is to mine. Under normal circumstances, especially in recent years, the Bitcoin hash rate has always been growing in general, and the lack of significant growth or even a small decline in the almost one year since the outbreak of the Russian-Ukrainian conflict (February 24,

2022) may also be related to the energy crisis in Europe(as shown in the Fig.5), where miners have had to hold off on increasing their arithmetic power due to expensive energy prices.

In addition, uncertainty and instability caused by geopolitical conflicts can affect investor sentiment and confidence in Bitcoin and other cryptocurrencies. Similar to the panic transmission mechanism caused by the Covid-19 pandemic, this could also lead to increased volatility in the price of Bitcoin as investors react to the changing geopolitical landscape.

4 Conclusion

This paper categorizes the factors influencing the price of bitcoin into two categories: expected and unanticipated. In terms of expected factors, this paper analyzes the changes in bitcoin price in the context of the U.S. economy from 2020-2023 through the Merrill Lynch Investment Clock Theory, and argues that inflation and bitcoin price have a roughly inverse relationship, which may be due to currency depreciation brought about by hyperinflation, negative market sentiments, policy adjustments, and changes in investor risk preferences. In terms of unanticipated factors, this paper argues that the Covid-19 pandemic has led to increased market volatility through indirect factors such as panic, which has led to a decline in the price of bitcoin to some extent due to excessive risk aversion. Meanwhile, the Russian-Ukrainian conflict, by triggering an energy crisis in Europe, has had an impact on the investment behavior of miners and the overall mining arithmetic (hash rate) of Bitcoin, which in turn has affected the Bitcoin price. These factors affecting the price of Bitcoin provide an economic theoretical basis for future empirical research.

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