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The Impact of China's Virtual Currency Policy on the Bitcoin Market

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Abstract: This thesis aims to understand and analyze the impact of China's virtual currency policy on the Bitcoin market. This paper will summarize the impact of digital technology on cryptocurrencies, including the development path, technological development, process, and regulation through literature search, data analysis, and government policies to comprehensively analyze the impact of the virtual currency policy on cryptocurrency circulation. Regulators and governments must formulate appropriate policies and measures to ensure compliance and stability in the cryptocurrency market. This paper analyzes the Bitcoin market as an example by using a mathematical model to reflect the trend and direction of the market before and after the release of the policy and using the model to predict future changes in the Bitcoin market. The Chinese government's regulatory measures have led to the closure of several Bitcoin miners, which has affected Bitcoin mining activity. Second, the decline in liquidity in the Chinese market has led to short-term volatility in the price of bitcoin. In addition, some investors may view Bitcoin as a safe-haven asset against an uncertain policy environment. Overall, China's virtual currency policies have had a multifaceted impact on the Bitcoin market, and these impacts are still evolving to some extent. This research provides valuable insights into the dynamics of the global Bitcoin market and the impact of virtual currency regulation.

Keywords: Virtual currency policy, Regulation, Global Bitcoin market, Cryptocurrency circulation

1. Introduction

Bitcoin is an electronic currency that has grown in popularity since its introduction in 2008. Transactions in the Bitcoin system is stored in a public transaction ledger ("blockchain") that is stored in a decentralized peer-to-peer network. Bitcoin provides decentralized currency issuance and transaction clearing. The security of the blockchain depends on the computationally intensive algorithms of Bitcoin mining, which prevents double spending on Bitcoin and tampering with confirmed transactions. Each node in the network stores a (full or partial) copy of the blockchain. New transactions are rapidly propagated across nodes in the network. Transactions are transfers from a source of funds (inputs) to a destination (outputs). Transaction inputs and outputs are independent of accounts or balances: inputs are references to transaction outputs not used by the sender in previous transactions. Before forwarding a transaction to its neighbors, each node first validates the transaction, including checking the syntax and structure and whether it is a valid transfer of many unspent

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transaction outputs. Each node independently validates received transactions, propagates valid transactions, and constructs a pool of valid transactions. [1]. Garcia et al. delved into the correlation between social signals and Bitcoin price, exploring a feedback loop within social dynamics. Kristoufek examined the connection between digital currencies, including Bitcoin, and online search trends using Google Trends and Wikipedia. Moore and Christin empirically analyzed the risks associated with Bitcoin exchanges. Glaser's analysis explored the potential links between intra-network Bitcoin transactions and on-exchange trading volumes, aiming to categorize Bitcoin as an asset or a currency [2].

By intercepting and selecting the closing price data of Bitcoin between September 15, 2014, and August 24, 2023, a Weak stationarity test is created for its daily and weekly data changes and increases, which includes ARMA(p,q) identification——daily PACF Model, weekly ACF Model, and daily PACF Model and weekly ACF Model, and Residual test——Actual value Give model definitions and predict future trends, as well as find out how China's policies are affecting the size and changes in the global Bitcoin market. Among them, Bitcoin is one of the most famous and iconic cryptocurrencies, and its price volatility and market performance have been in the spotlight. However, the performance of the global Bitcoin market is not only influenced by market factors but also significantly affected by governments' regulatory policies on virtual currencies. In this regard, the Chinese government's virtual currency policy measures have generated extensive attention and research.

China has consistently held a significant role within the realm of virtual currencies. As one of the world's major hubs for Bitcoin mining and trading, China occupies a prominent position in the global Bitcoin landscape. Notably, on May 18, 2021, the China Internet Finance Association, China Banking Association, and China Payment Clearing Association collectively issued a statement titled "Announcement on Preventing the Risks of Virtual Currency Transaction Speculation." This announcement emphasizes that virtual currencies lack tangible backing in real-world assets, are highly susceptible to price manipulation, and entail various risks associated with speculative trading. These risks encompass the potential for fictitious assets, business failures, and investment speculation. Furthermore, based on China's established legal practices, it's important to recognize that virtual currency trading contracts do not enjoy legal protection. The consequences of investment transactions, as well as any resultant losses, are generally borne by the involved parties themselves.

An announcement has been made with the intention of raising awareness among the majority of consumers. It emphasizes the importance of cultivating a prudent approach to investment and discourages involvement in speculative virtual currency trading activities. The announcement underscores the need for vigilance in safeguarding personal assets and rights. It encourages individuals to prioritize the security of their bank accounts by refraining from using them for activities related to virtual currency, such as deposits, withdrawals, buying and selling transactions, code recharge, fund transfers, and similar actions. This precautionary measure aims to prevent illegal usage and the potential leakage of personal information [3].

2. Literature Review

2.1. China's Policy Hits Bitcoin Market

In his original analysis, Satoshi Nakamoto, the developer of Bitcoin, showed that as long as an attacker has less than 50% of the computing power in the network, he will generate blocks at a lower rate than expected by other nodes. Thus, the probability of success for a given transaction decreases exponentially as more blocks are added to the chain. Therefore, each block added is considered a "confirmation" of all transactions in the previous block, as it supports their inclusion in the ledger. [4]. In 2020, 36% of small and medium-sized businesses in the U.S. accept Bitcoin payments. The

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same website lists some of the vast and well-known companies that accept Bitcoin, such as Microsoft, Burger King, AT&T, Wikipedia, KFC, Pizza Hut, Overstock, etc., and emphasizes that "today, it is possible to buy almost anything by using Bitcoin" Bitcoin Debit Card "Bitcoin debit cards are issued by Visa or Mastercard. In some cases, bitcoin payments are accepted directly, while others are accepted indirectly. In 2020, 36% of small and medium-sized businesses in the United States accept Bitcoin payments [5]. First of all, concerning the enactment of relevant legislation, it is necessary to amend existing laws or precisely formulate new legislation to formally recognize the existence of virtual property and provide detailed provisions on virtual property and the rights of its owners. Because of the complexity and lengthy nature of the legislative process, we may consider adopting flexible means such as administrative regulations or judicial interpretations to regulate this area promptly. Second, in judicial practice, it will focus on the complex issues that virtual property may face, such as jurisdiction and burden of proof. In-depth analysis and answers to these thorny issues will help better handle cases involving virtual property during litigation, which includes clarifying which court has the authority to hear virtual property disputes and clarifying who is responsible for providing relevant evidence in court, among other aspects [6]. Credit risk due to information asymmetry and inadequate consumer protection is manifested in most programs' need for more transparency. Most ICO projects have only a white paper. The white papers are not perfect for project briefings, and the use of funds in implementing the project is rarely fully disclosed. There needs to be more certainty about the ongoing operation of ICO projects, with unpredictable earnings and returns not in fiat currency. Vulnerabilities and security breaches make it easy for insiders to manipulate the market. Code can be written to leave loopholes in the code intentionally, gain early access to essential trading information, or create rules that initially favor the parties involved [7].

During a meeting presided over by Chinese Vice Premier Liu He, the State Council Financial Stability Development Committee expressed its commitment to maintaining a cautious approach. The committee emphasized the need to enhance comprehensive monitoring and early detection of financial risks. Furthermore, it underscored the importance of advancing reforms for small and medium-sized financial institutions with the aim of risk reduction, particularly in relation to credit risks. The committee also emphasized the importance of bolstering oversight over the financial operations of platform companies. It highlighted the imperative of cracking down on activities related to Bitcoin mining and trading. The committee is resolute in its determination to prevent the spillage of individual risks into the broader social sphere [8]. It's worth highlighting that this marks the Finance Committee's initial proposal to act against Bitcoin mining and trading. On May 18, a significant development occurred when the China Internet Finance Association, the China Banking Association, and the China Payment and Clearing Association, in conjunction with three government departments, jointly issued a notice regarding the prevention of speculative risks associated with virtual currency trading. This notice explicitly addressed the recent surge in virtual currency prices, which subsequently experienced a sharp decline. It pointed out that the speculation surrounding virtual currency trading had resurged, posing a substantial threat to the property and security of the public. Furthermore, it had disrupted the normal economic and financial order, resulting in significant infringements on people's property rights and causing disturbances in the regular functioning of the economy and finance [9].

According to George Selgin, an economist and senior fellow at the Cato Institute, the Chinese government's initiatives to introduce a central bank digital currency (CBDC) and restrict cryptocurrency transactions are integral components of a larger strategy. This strategy aims to redirect citizens away from widely used private financial service providers like AliPay and WeChat. By implementing a state-controlled digital currency, the government gains the ability to collect extensive data on citizens' daily financial transactions. It also facilitates easier monitoring and control over individuals' access to their funds, among other associated concerns. In essence, these moves are seen

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as part of a broader effort to assert greater influence and oversight over citizens' financial activities and data [10]. Neil Wilson, from Markets.com, has noted that China's actions in exerting pressure on the cryptocurrency space have been ongoing for a while. However, the recent developments represent an escalation in these efforts. He also suggests that other countries might consider similar actions in the future, especially as central banks globally continue to make progress in developing their own digital currencies. This implies that China's actions could set a precedent for other nations regarding their approach to cryptocurrencies and the development of digital currencies backed by central banks [11]. In addition to these, another reason for China's ban, besides the economic benefits, is that virtual currencies such as Bitcoin are mined in a way that leads to large amounts of electricity consumption, which is not in line with China's green development. China is emphasizing sustainable development with green economic benefits, and it wants to control the Chinese currency market by means of the digital yuan, which guarantees and contributes to the people's property.

2.2. Bitcoin Market Development After China's Restrictions

In 2021, China implemented its most stringent measures to date in its dealings with cryptocurrencies. As the price of Bitcoin fluctuated around the $55,000 mark, the Chinese State Council made a significant announcement by formally banning cryptocurrency mining within the country. Shortly after this announcement, the hash rate, which measures the computing power on Bitcoin's network, experienced a steep 50% decline. This sudden drop-in hash rate coincided with a notable decrease in Bitcoin's price, which fell to approximately $30,000 in the subsequent months. These events underscore the substantial impact of China's actions on the global cryptocurrency market during that period [12]. Alex Brammer from Luxor Mining, a cryptocurrency pool designed for experienced miners, the rapid growth of the mining industry in the United States was influenced significantly by the development of mature capital markets and financial tools within the sector. Brammer notes that numerous American mining operators were able to embark on swift expansion initiatives once they secured financing. This was made possible by leveraging their multi-year track record of profitability and using their existing capital as collateral to secure the necessary funding. In essence, the availability of financial infrastructure and a history of successful operations played a pivotal role in the industry's rapid ascent in the United States [13]. The soaring value of Bitcoin has sparked skepticism regarding its true intrinsic worth, with concerns raised about the potential existence of an irrational bubble or even a Ponzi scheme. Despite witnessing substantial growth in both the stock market and Bitcoin prices during the analyzed period, an exciting observation emerged—they exhibited a near lack of correlation. This phenomenon is intricately linked to the extraordinary super-exponential surge in the price of Bitcoin [14].

2.3. Review of the Literature

China's move to ban virtual currencies such as Bitcoin led to a global upheaval in virtual currencies, sparking a global debate about regulation, decentralization, and sustainability. Nevertheless, over time, the global market for Bitcoin gradually recovered, even as China enacted a policy in 2021 that eliminated the market for Bitcoin in China.

3. Design of Research

3.1. Data Sources

This thesis intercepts and integrates Yahoo Financial data on bitcoin market closing prices and dates through Google Chrome to understand the trends of the global bitcoin market and analyzes the closing price changes and trends of the global bitcoin market before and after the ban, using May 18, 2021,

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as a specific date for the ban on the bitcoin market in China. This highlights the impact of China's policies on the global Bitcoin market and predicts future market trends. This paper has chosen to compare and analyze the daily data with the weekly data from the start of Bitcoin by dividing the analysis into two parts to reduce the error and, in this way, to see the trend and magnitude of changes in the Bitcoin market before and after the policy in a macro and micro way.

3.2. Weak Stationarity Test

By using Python to mathematically model the closing price of the Bitcoin global market. To perform a unit root test, which also called smoothness test on the model. In the table 1, for the data at the beginning, this part found that the hypothetical mathematical model is not smooth, so after putting the mathematical model into Stata and executing the Weak stationarity test, the p-value for the return is 0, which is less than 0.1, so the original hypothesis that the model is stable and feasible can be rejected. For the daily data, it shows that the test statistic for the Raw is -1.973, and p-value for Z(t) is 0.6158. 1st order difference of test statistic is -35.171 and p-value for Z(t) is 0.0000. For the weekly data, it shows that the test statistic of Raw is -1.856 and p-value for Z(t) is 0.6771, and test statistic of 1st order difference is -12.559 and p-value for Z(t) is 0.0000. And test statistic of 2nd order difference is -24.327, p-value for Z(t) is 0.0000.

Table 1: ADF Model

Variables	Test Statistic	p-value for Z(t)
	Daily	
Raw	-1.973	0.6158
1st order difference	-35.171	0.0000
	Weekly	
Raw	-1.856	0.6771
1st order difference	-12.559	0.0000
2nd order difference	-24.327	0.0000

3.3. ARMA Model

ARMA is a forecasting model that combines autoregression (AR) and moving average (MA) techniques for analyzing well-behaved time-series data. This model assumes that the time series is stationary, meaning its statistical properties remain constant over time. When fluctuations occur in the time series, ARMA assumes that they do so evenly around a central point in time [15]. Here is the equation for the ARMA Model:

$$B_t = \emptyset_0 + \sum_{i=1}^{p} \emptyset_i B_{t-i} + \alpha_i - \sum_{i=1}^{q} \emptyset_i \alpha_{t-i} \quad (1)$$

So based on the equation above, the $\theta_0 + \sum_{i=1}^{p} \emptyset_i x_{t-i}$ represented by the AR(p) model, this component can be used to predict future market trends and changes in Bitcoin through historical data. And $\alpha_i - \sum_{i=1}^{q} \emptyset_i \alpha_{t-i}$ it is the use of past fluctuations to predict possible future fluctuations and the end part of the model.

3.4. PACF and ACF

Points exceeding the shaded portion corresponding to the X-axis take the value of the order of significant, did not exceed is not significant. In this paper, the maximum value within 10 is chosen. By for using PACF and ACF pairs, it can observe the first log-return series below (Figure 1):

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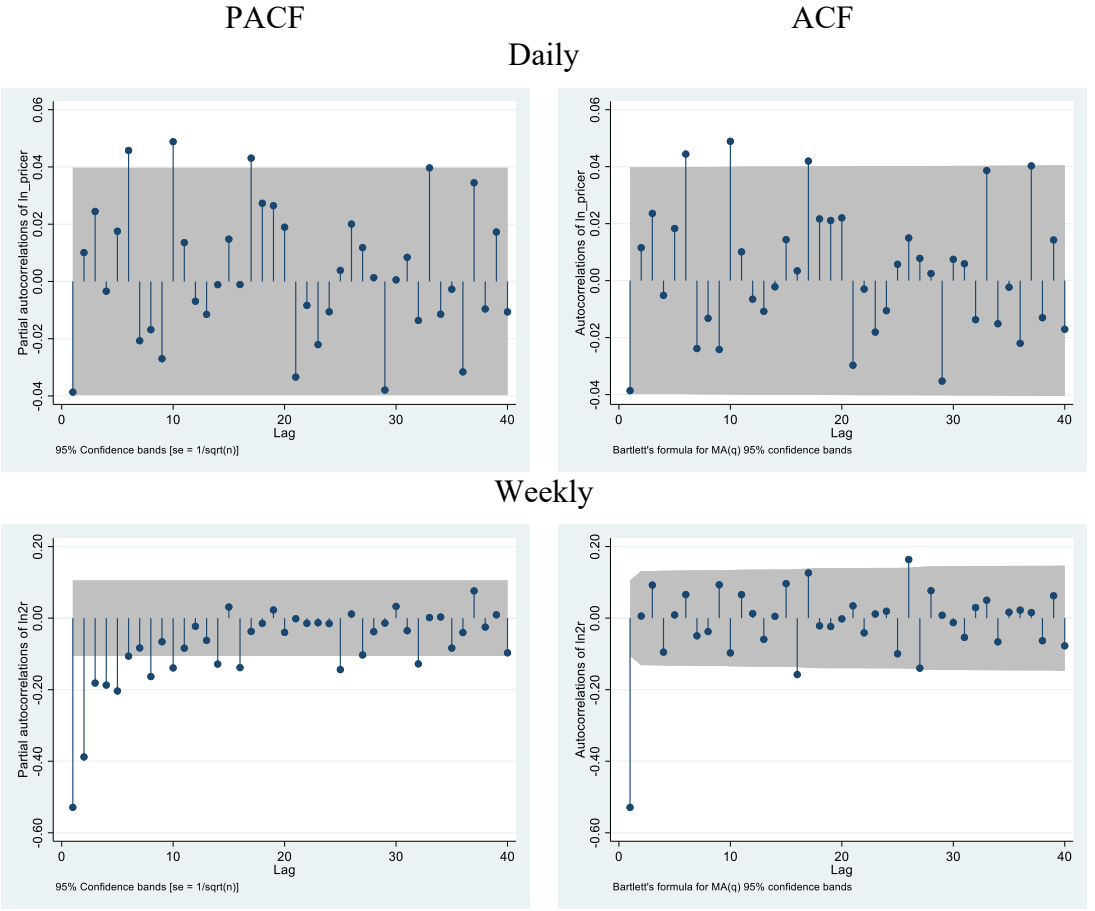

Figure 1: ARMA (p, q) identification
Photo credit: Original

3.5. ARIMA Model

An Autoregressive Integrated Moving Average, abbreviated as ARIMA, is a statistical analysis model employed with time series data. It serves two primary purposes: to gain deeper insights into the dataset or to make forecasts about future trends. In the context of statistical modeling, an autoregressive model predicts forthcoming values by analyzing patterns in previous values. For instance, an ARIMA model could be utilized to anticipate future stock prices by examining a stock's historical performance or to project a company's upcoming earnings by studying its past financial performance over different time periods [16]. By made Table 2 Residual test, to observe the change in data around May 18, 2021, made this date as t_0 and can visualize this change in the graph. Both can clearly see the Actual value and fitted value, daily and weekly, there is a drop on the date May 18, 2021. The original assumption of the residual test is that the residual series is white noise. A model can only be considered to capture the general pattern of a time series if its residuals are white noise. By the table shows below, the model of Local-ARIMA (10,1,10) shows that Portmanteau(Q) statistic is 24.2182 and Prob>chi2 is 0.9769, and the model of Global-ARIMA (10,2,1) shows that Portmanteau (Q) statistic is 24.2776 and Prob>chi2 is 0.9764.

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Table 2: Residual test

Model	Portmanteau (Q) statistic	Prob > chi2
Local-ARIMA(10,1,10)	24.2182	0.9769
Global-ARIMA(10,2,1)	24.2776	0.9764

So based Table 2 Residual test, which means indicates that the regression model satisfies the underlying assumptions. In conclusion, the residuals are white noise, indicating that the model is well fitted, and the residuals are partly pure random data that cannot be captured.

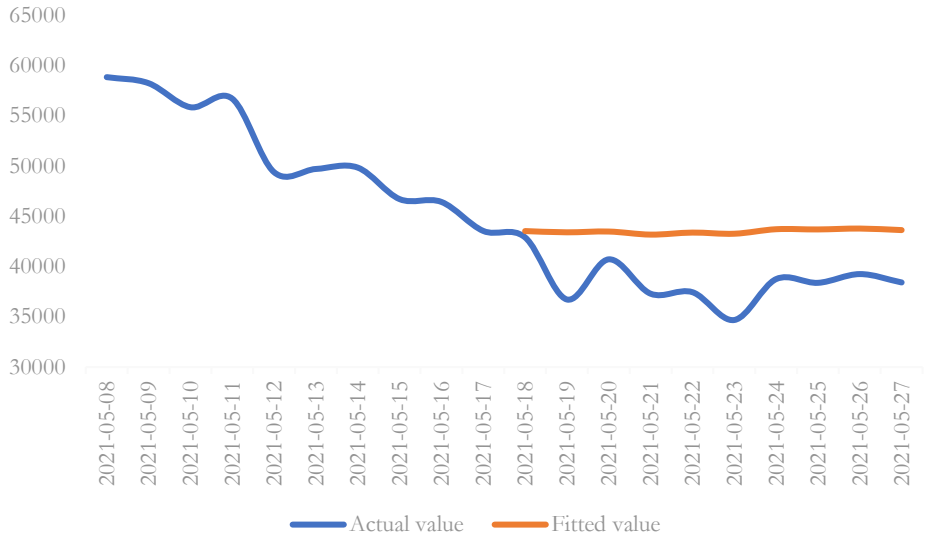

Figure 2: Actual value and fitted value, daily
Photo credit: Original

However, by analyzing the weekly data, the actual value tended to plateau two months after China's policy was enacted. However, after July 11, 2021, the global bitcoin market grew upward. Based on the first graph, it shows that from 2021-5-8, Bitcoin market actual value has dropped from nearly 60000 to 35000 and research the bottom, and the fitted value is almost stay as the same value between 40000 and 45000 (see Figure 2). And actual value is lower than the fitted value, the second graph shows that since 2021-3-14, the actual value has a little drop from 60000 to 50000 and back to 60000, and there is a huge drop from almost 60000 to 35000 between 2021-4-14 and 2021-5-14, but with the time develops, it was increase from nearly 30000 to 40000 after 2021-07-14, which shows that the policy that released by China have a change for the global Bitcoin market in the short term, but not for the long term (see Figure 3).

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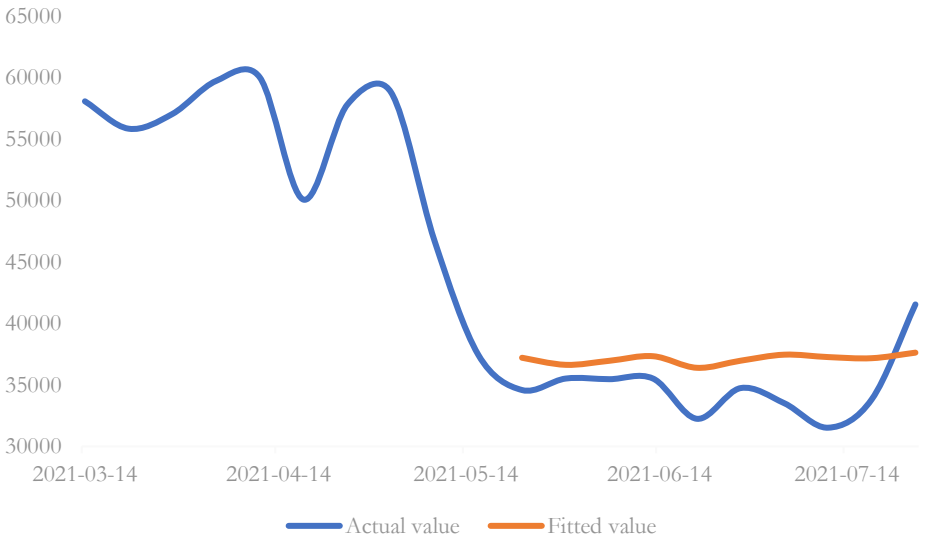

Figure 3: Actual value and fitted value, weekly
Photo credit: Original

4. Conclusion

This thesis aims to study the impact and resultant outcomes of the Chinese virtual currency market on the global Bitcoin market after enacting relevant policies and bans. Through the proof of this paper, the short-term and long-term impacts on the Bitcoin market after the enactment of the relevant policies in China on May 18, 2021, the future trends and directions of the Bitcoin market are observed and predicted at both the macro and micro levels, i.e., for the daily and weekly data in this paper. This paper uses ARMA and ARIMA models and PACF and ACF graphs to analyze and integrate the relevant data and review the closing prices of the bitcoin market before and after the ban to reflect the impact of the policy and the ban on the market.

The main finding of this paper is that when China enacted policies and bans on the Bitcoin market, the global Bitcoin market was highly volatile and over time there was a significant drop in the short term, but in the long term the impact was not sustainable as Bitcoin found an equilibrium and was in a continuous growth trend.

It is argued that China-related policies will cause drops and fluctuations in the bitcoin market in the short term at the micro level. However, the bitcoin market will rise gradually with the changing sequence of time to eliminate the effects of China's policies. So, on a macro level, China-related policies do not bring long-term benefits but only cause market impacts within two months of enacting the policies. Overall, China's policies on the virtual currency market will have minimal impact on the macro level.

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