

The Current Status and Future Development of Virtual Currency: A Case Study of Bitcoin

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Abstract

This study investigates the emergence, development, and current status of virtual currencies, using Bitcoin as a representative case study, to examine market dynamics, regulatory challenges, and future development prospects. The analysis reveals that Bitcoin dominates the global virtual currency market with approximately 63.2% market share. The market exhibits significant price volatility, and the sector faces substantial compliance challenges including money laundering risks, high energy consumption from Proof-of-Work mining, and inadequate regulatory frameworks in many jurisdictions. Conclusion: While virtual currencies offer enhanced transaction efficiency and growing potential as financial assets, their sustainable development requires coordinated international regulatory frameworks, continued technological optimization to reduce energy consumption, and strengthened user security measures to prevent criminal exploitation.

Key words

Virtual currency, Trading, Bitcoins

1. Introduction

With the rapid advancement of technology and the widespread use of the Internet, people are increasingly inclined to spend their leisure time online rather than engaging in traditional offline activities such as sports, arts, or in-person socialization. A lot of applications are appears and which have different functions. People could find the things which they want in the different applications on the Internet. More and more people have

use the Internet to do a lot of things. They may pay for the listening of the music and it's the booking of a movie. During those process people may need to do some exchange or they need to pay for something. But in the virtual world, they could not pay by the physical currency. Therefore, it is very necessary for those occasions to produce a new product, which name is virtual currency. The basic principles of currency is medium of exchange and they could store the value. On the Internet, we could just use some numbers or special markers to measure

the value which is similar as traditional currency, and they could also have a exchange rate between the virtual currency and the traditional currency. People could easily exchange from the traditional currency and a virtual currency. As virtual currency itself, it could be a product and people need to use the traditional currency to buy at first and then use them to do something they like or to buy something.

All around the world, the status of the vertical currency is not the same. Some countries, the government do not allow the citizens to buy the virtual currency and trading with them. Other governments list the virtual currencies as a dangerous product because they think virtual currency may influence the function of the traditional currencies and the status of central bank. However, a lot of people believe it could be a good financial product because it has the similar trading rules with the stock market. The price of the virtual currency is depends on the demand and supply in the world market. If the demands of the virtual currency is really high and supply of the currency remain the same, or less than before the price of the virtual currency will increase so a lot of people would like to buy it and hope for the pricing for us to earn a big money. Besides that different kind of virtual occurrences may have their own special points. They may have different exchange rules, or trading regulations. Nowadays, the development of virtual currencies and the Internet could bring the society a lot of benefits. The virtual currencies will encourage the people to buy more things which means increase the AD leading to the Citizen's purchasing power increase which could boost the economic growth and may also cause demand-pull inflation. By contrast, the virtual currency may have more risks than the traditional one which includes the technical malfunction, Black Swan Events and the risks of supervisions. During the development of the virtual currency government should strengthen supervision and limit the quantity and quality of the virtual currency.

This paper takes Bitcoin as a representative example of virtual currency to explore its development trajectory and to provide recommendations for the future regulation and application of digital currencies.

1.2 Research purpose and methods

The primary research methods adopted in this study

are literature review and case analysis. Considering the high financial risks and legal uncertainties involved in trading virtual currencies, especially for individual investors, this study does not involve any direct investment or simulation of real-world transactions. Instead, a case-based approach is used to analyze the operating mechanisms, price fluctuations, and regulatory responses concerning virtual currencies, with Bitcoin as the primary subject. As for the Bitcoins, people could find some trading information about the Bitcoins and use those to illustrates the data. If people operate the trading of virtual currency that would cost a lot and the risks are too high to shoulder. As a normal citizens who do not have the ability to afford that risk and a big amount of money to invest. Therefore people could just use some real case and their data to study.

In some other aspects, people could also evaluate the development of virtual currencies by the economic principles which includes micro and macro. That would let them consider about the society and different countries in the world and even the distinct household.

The virtual currency could also be a product of finance, due to the fact that its trading could be seen as the trading of stock. And its price is depends on the quantity of demand in the market. That means I have to involve some ideas of finance to study this project. Beside that, this study would learn from the technical vision to think about how to ensure the virtual currency could operate constantly and sustainably.

The paper will divided into 6 sections which are the introduction, literature review, the current market evaluation, the main problems of the virtual currency facing, the future trend of development and the conclusion.

2. Literature Review

The concept of virtual currency first appeared in Brandtweiner's 1997 study on virtual currency competition, defined as electronic payment tools issued by different companies, similar to currency, and used for internet transactions[1].

Digital currencies based on Internet technologies that use electronic information as the carrier are known as virtual money and e-money. According to Li [2], Virtual currency is distinct from electronic currency, which alludes to the electrical .While virtual currency refers to

the approximate currency that can be used as a general equivalent to purchase virtual goods or services, it is created in the virtual environment of the network, issued by a non-financial private company, or has no issuing body. Banks and other financial institutions issue this data to replace the circulation of banknotes and serve as fiat currency. Because they can carry out all or some of the functions of money, virtual currencies are referred to as currencies.

Online gaming is becoming more and more popular as a result of technological advancements and socio-economic advancements. Virtual currency payments are becoming more and more significant in people's daily lives as a new method of payment between customers and retailers[3].

The general definition of money is something that is widely used to settle debts or pay for products and services. Marx's monetary theory states that money is a fixed set of distinctive commodities that represent particular social relations of production. According to the trend of monetary development and evolution, the form of money always shifts in tandem with shifts in social production and the circulation of commodities. These changes are all adaptations to the growth of the commodity economy and represent the natural progression of money from its lower to its higher form. The rapidly growing network economy and e-commerce have given rise to a new kind of payment instrument and transaction medium called network virtual currency, which was created primarily to satisfy Internet users' demands for virtual products and services through electronic micro-payments. It is a form of approximate currency with purchasing power that is conveyed by Internet electronic information and only has certain features and functions of money[2].

According to Li [2], Satoshi Nakamoto first presented the notion of Bitcoin, creating and releasing a P2P network and open-source software based on his concepts.

The unique algorithms used to generate Bitcoin and the decentralized structure of the issuance process guarantee that its value cannot be altered.

Bitcoins are extremely rare since their quantity is restricted, with a set total of 21 million. Furthermore, Bitcoins can be exchanged and cashed in any nation that recognizes the virtual money.

Both domestically and internationally, the virtual currency sector is growing rapidly and garnering increasing interest. Virtual currency is a byproduct of the network virtual economy's ongoing evolution, which will unavoidably have a variety of effects on the network virtual economy while also having certain effects on the real economy. Consequently, under the intermediary effect of the network virtual economy, virtual currency will inevitably have a connection to the actual economy[2].

Bitcoin has had the potential and traits of internationalization from its beginning, and there are already thousands of virtual currency exchanges worldwide. A significant force in the world economy since 2013, when the German monetary authorities legally recognized Bitcoin's "legitimacy," is the cryptocurrency. Countries all across the world are investigating Bitcoin, its related services, and its regulatory structure on their own and making their own judgments. Nevertheless, nations agree to actively support a real-name policy for Bitcoin, mainly to reduce the risk of money laundering and criminal activity, regardless of how favorable or conservative regulatory bodies are [4].

Companies must understand the shift from product-focused to service-focused and finally to customer-focused because the Internet offers a great deal of room for connection and exchange, not only with customers but also with the marketplace for business development. The development of cyberspace-based virtual markets has been made easier by the Internet. Database technology and computer artificial intelligence have made it easier for businesses to gather a wide range of dynamic customer data, understand customer needs quickly, and modify their business plans accordingly. They have also been able to control the economy in real time. Given that Internet services frequently exhibit the traits of "frequent transactions" and "small transaction value. The issue, which makes it simple to use legal tender repeatedly after a single conversion, is something that internet businesses are working to resolve [5].

The earliest online virtual currency in China appeared in 2000, with the rapid development of the Internet, China has also formed a huge virtual currency market, and this market is also growing at an annual rate of 23%. The description of the development of virtual currency in China in this thesis has four main aspects.

The first is the rapid growth of online payment demand with the development of the Internet, the second is that various websites have been offering their own online virtual currencies, and the last is the rapid development of virtual currency trading in online games. [6] and [7].

3. The evaluation of the current market of current virtual currency: Bitcoins as an example

3.1 Market size and trading mechanism

The most popular virtual currency must be the Bitcoins, due to the scarcity of it which is the limited quantity. The total amount of the bitcoins in the world is 21 millions. Therefore it has the most frequent trading in the current virtual currency market. Beside that bitcoins is the oldest virtual currency and it has the longest history. Investors are able to rely on extensive historical data and community experience when engaging in Bitcoin trading.

As for the trading platform of the bitcoins is the OKcoin and the bitcoins has the largest amount of developer in the world. The amount of that is 0.4 million which takes 80% of the virtual currency market. The total virtual currency market is approximately 2.98 trillion US dollars, among which bitcoin (BTC) accounts for around 63.2%.

Before July 12, Bitcoin had an erratic decreasing trend. After this time, the price experienced a sharp increase, reaching a peak gain of almost 80%, before going through another period of volatility that lasted until mid-January 2025. Following the surprise, interest spiked and peaked at about 80%. Following that, there was a period of fluctuation until January 10, 2025. After the surprise, interest sharply and reach the peak which is around 80%. After that period experience of fluctuation until January 10 of 2025. Price of bitcoins declined after January 10 and then the price of that rice gradually.

In contrast, Figure 2 presents a relatively stable price trend with a moderate upward slope. Over the three-month period, Bitcoin's price rose by approximately 20%, indicating a more stable investment sentiment compared to earlier phases.

3.2 Investor structure and motivation

The Bitcoin investor community can be broadly categorized into two groups: retail investors and institutional investors.

The retail investors investing the bitcoins are in order to make profits by the price difference among the buying period so they may waiting for a good chance to buy the bitcoins with a lower and proper price which they believe they could earn a big money from that. By contrast, the organization has the different strategies due to they have more about the amount of funds. They could more easily to control the overall market by buying or selling a big amount of the bitcoins to create a price trend. Beside that, the organization are more rational than the retail investor and they could easily influenced. That is why it is difficult and risky for the retail investors to take part in the trading of the virtual markets. In terms of investment risk and volatility, mainstream cryptocurrencies and platform coins are significantly higher than A-share stocks, with the vast majority of mainstream cryptocurrencies carrying higher investment risks than the three major platform coins. [8, 9].

4. The main problems faced by the virtual currency

4.1 Compliance and legal regulatory issues

Currently, virtual currencies are developing rapidly worldwide, but their anonymity and decentralized nature pose numerous compliance and legal regulatory challenges. China currently adopts a "comprehensive ban" approach to regulating virtual currencies, which has effectively curbed the spread of certain illegal activities. However, due to the lack of related laws and regulations, regulatory gaps and loopholes still exist, providing opportunities for criminal activities[10]. Virtual currencies may also disrupt a country's legal order. The virtual and anonymous nature of virtual currencies exposes numerous loopholes in existing economic legal systems, and virtual currencies may become tools for money laundering, gambling, and tax evasion (Peng,2010;Zhou, Zheng

and Li,2021;Wei,2023).

Money laundering can be done by criminals in a number of ways, including internet pyramid scams, illicit fundraising, and underground money laundering activities. The main tactic used in illegal fundraising is for criminals to lure investors by pretending to have secured top-notch blockchain projects abroad that need funding. They help investors invest abroad, which is quite dishonest and can result in some investors becoming victims of frauds. These funds are transferred by criminals, and even if investors find out, it is hard to get the money back. Underground money laundering comes in second. Transactions involving virtual currencies can occur anywhere in the world because they are exclusively carried out through over-the-counter (OTC) markets, which makes regulation challenging and oversight inadequate.

This might make it possible for some criminals to target citizens of the nation with activities through websites set up abroad with servers situated abroad. By converting cash into digital currency and using a cross-border key to log in, criminals may quickly transfer money. Third, money laundering through internet pyramid schemes. Many investors are prone to participating in speculative activities on platforms because they are readily swayed by public opinion and the internet. They might fall into criminal traps as a result.

For example, the “PlusToken Internet Pyramid Scheme Case,” which has already been adjudicated, used Bitcoin and other digital currencies as a medium of exchange, claiming to provide digital currency appreciation services as a pretext for conducting online pyramid schemes. The PlusToken platform claimed that it could use the “Smart Dog” arbitrage system to engage in cross-platform arbitrage based on storing digital currencies, but in reality, it connected multiple platform markets to buy low and sell high, earning price differentials to achieve the “black-to-white” laundering of pyramid scheme funds.

4.2 Market volatility and bubble controversy

The virtual currency market is extremely volatile, with prices influenced by public opinion, policy, technical factors, and investor behavior, exhibiting significant irrational characteristics. Bitcoin, in particular, has experienced

sharp price fluctuations in the short term, easily triggering market bubbles and investor panic.

Because retail investors are easily influenced by public opinion and media reports, they are prone to being swayed by market trends, such as making large-scale purchases or sales in the short term. This can cause significant fluctuations in Bitcoin's price. Such price volatility is not favorable for retail investors with limited capital, as it could result in substantial losses in the short term. On the other hand, some believe that Bitcoin's current price is inflated and exhibits bubble-like characteristics, potentially leading to a significant price decline in the future. This is because these individuals perceive that the market's expectations for virtual currencies are overly optimistic, with current prices failing to align with market expectations. According to Zhang and Li [11] and Nakamoto [12], irrational price increases in virtual currencies are particularly pronounced on social media and in informal investment communities, exhibiting typical signs of a bubble economy.

This paper argues that the price bubble of Bitcoin is closely linked to its unique characteristics. While it can be used to purchase goods and services, its unstable value, limited scope of use, and lack of national credit backing mean it can only fulfill partial monetary functions. Additionally, its total supply is limited, giving it a “scarce” characteristic that effectively curbs inflation, highlighting certain commodity features and investment value. Therefore, Bitcoin is essentially a special commodity with partial monetary functions.

On the one hand, Bitcoin lacks the characteristics of universal acceptability and stable value. Money is a general equivalent that emerged spontaneously during the development of commodity exchange.

Whether it is commodity money or credit money, the essence of money is always credit, and universal acceptability and stable value are the two external manifestations of monetary credit. On the other hand, as market recognition increases, Bitcoin is increasingly emerging as a special commodity with investment attributes. This paper believes that the intrinsic value of Bitcoin is primarily reflected in its production costs. Producers not only need to provide advanced equipment support for mining activities,

but the difficulty of mining also increases gradually as the number of participants grows. This process con-

sumes a significant amount of human and electrical resources, thereby possessing a certain intrinsic value. On the other hand, as market recognition increases, Bitcoin is increasingly emerging as a special commodity with investment attributes.

Additionally, the Bitcoin derivatives market attracts a large number of investors seeking high-risk, high-return opportunities, while also drawing institutional investors who are bearish on Bitcoin into the market, significantly increasing market activity.[13]

4.3 Technical and energy issues

The virtual currency “mining” mechanism relies on a large amount of computing resources, resulting in enormous energy consumption and environmental pressure. In particular, in Bitcoin's PoW (Proof of Work) mechanism, competition for computing power has led to a continuous increase in energy demand, raising questions about its sustainability on a global scale.

Mining involves using computer platforms and tools to continuously perform data calculations (Bitcoin does this every 10 minutes) using the computational power provided by CPUs, GPUs, and other computing platforms. The computational platform that calculates the fastest, i.e., the one that produces the unique data, corresponds to the “solution” on the Bitcoin platform, which is the Bitcoin mined. Miners will ‘mine’ a certain amount of Bitcoin, and this behavior is called “mining.” Under fixed daily time constraints, the daily production of Bitcoin is constant. The more people mine, the fewer coins each person receives. Among them, those with higher computational power receive a larger share. [14].

The development of virtual currencies has brought unprecedented challenges in terms of technology, finance, and society. Issues such as compliance difficulties, market bubbles, and energy consumption are intertwined, making the regulation of virtual currencies a global challenge. In the future, it is imperative that countries work together in areas such as legal frameworks, technical standards, and international cooperation to achieve the sustainable development of the virtual currency market.

5. Analysis the future develop-

ment trends

5.1 Develop in a legal and compliant direction

In the current market, China has adopted a comprehensive ban model without detailed regulations, which allows some criminals to exploit loopholes in the rules to commit crimes. Secondly, the lack of strict supervision of real-name registration on virtual currency trading platforms has led to many users logging in with false identities to conduct transactions. In response to the above issues, national regulatory authorities should introduce relevant laws and regulations to strengthen supervision of real-name registration and virtual currency transactions, and should also introduce more detailed legal provisions.

For example, the European Union's Markets in Crypto-Assets Regulation (MiCA) aims to establish uniform EU market rules for crypto-assets, protect consumers, and combat fraud. MiCA targets currently unregulated crypto-assets and their EU providers, providing a unified regulatory framework for all member states. MiCA's objectives include ensuring the stability and security of the crypto-assets market, promoting innovation, and preventing money laundering and terrorist financing. The implementation of MiCA will help enhance the EU's global competitiveness in the crypto-assets sector.

5.2 Continuous optimization at the technology level

Public blockchains' extremely decentralized structure presents serious obstacles to their use in the financial industry. Private blockchain technology has emerged to address the shortcomings of public blockchain technology in terms of privacy protection. Private blockchain technology can run on a specific local area network (LAN), such as an internal bank LAN, in contrast to public blockchain technology, which runs publicly over the internet. A further important difference is that private blockchain technology can limit the ability to change transaction records to specific fixed nodes in the network, while selectively sharing pertinent records with other participants. A more important difference is that private blockchain technology can limit the ability

to change transaction records to specific fixed nodes in the network, while selectively sharing pertinent records with other participants. Using machine learning technology to identify mining activities, we identify mining behavior patterns within massive amounts of traffic. We employ different algorithms to build various models, ensuring the accuracy of mining identification from three dimensions: point, line, and surface. By utilizing a large volume of data samples to form models and validating production data, we ensure accuracy and achieve real-time alerts[15].

5.3 The evolution of financial functions of the virtual currency

The transformation of virtual currencies from a medium of exchange to financial asset allocation products requires changes in multiple areas, with the most critical being the protection of traders' rights and property. National regulatory authorities should establish detailed laws and regulations to ensure the safe and reliable conduct of transactions. Cryptocurrencies like Bitcoin and Ethereum were originally developed as decentralized payment mechanisms, but increasingly, people are viewing them as alternative investment tools similar to gold or stocks. The growing popularity of exchange-traded funds based on cryptocurrencies and decentralized finance (DeFi) platforms offering lending and collateral services reflects this evolution.

According to the study of Zhang [16] and Xu [17], through an analysis of scholars' research findings, Bitcoin demonstrates significant value and promising application prospects. As a representative of virtual currencies, it is gradually being accepted by certain countries or individuals worldwide. The legalization of trading platforms will provide users with a legitimate trading environment, thereby making its inherent value more evident. Its primary value lies in its transactional, payment, collectible, and unique blockchain technology aspects, which can provide stronger technical support for potential application scenarios. However, due to increased regulatory scrutiny, volatility has also risen. Engaging in long or short positions should be done based on one's own risk tolerance; otherwise, the risks posed to investors could be significant.

6. Conclusion

This study found that in the current international virtual currency market, some regions and countries are still in the early stages of development. In addition, some countries still need to make improvements in terms of virtual currency regulation and ensuring the legality of transactions. Bitcoin holds the largest market share and unit price in the current trading market and is also the earliest virtual currency to emerge, making it the case study for this research. The development of the internet has made the emergence of virtual currencies an inevitable historical turning point. The advent of virtual currencies has enabled certain online transactions to be conducted more conveniently and efficiently. However, during the research process, some issues with virtual currencies were exposed. First, it is difficult to ensure user security. Second, virtual currencies consume a lot of energy. Third, it is difficult to enforce regulations. In response to the above issues, governments around the world should introduce detailed laws and regulations to strengthen the supervision of virtual currency market transactions. At the same time, central banks should improve their own virtual currency systems to gain control over the virtual currency market and avoid the impact of some virtual currencies on traditional currencies and the functions of central banks. To ensure user safety during transactions, the platform should strengthen its review of identity information verification during user registration to ensure the security and legality of user identities, thereby preventing criminals from exploiting the platform to carry out illegal activities. Regarding the issue of high energy consumption in blockchain technology, efforts should continue to develop blockchain technology while exploring low-energy consumption alternatives. To address cross-border criminal activities involving blockchain technology and virtual currencies, countries should collaborate to dismantle overseas infrastructure and eliminate threats to the financial security of domestic users. The future development of virtual currencies holds significant potential. Once related issues are resolved, they can fulfill their role as asset allocation products, fully integrate into the market, enhance their market influence and demand, and promote the development of virtual currencies and virtual currency transactions. However, the research method employed in this

study is case analysis, which has limitations in terms of virtual currency price research and market analysis. This is because the unit price of Bitcoin is extremely high, requiring substantial capital investment, and the virtual currency market is highly unstable, posing significant risks for researchers who actually participate in the virtual currency market. Therefore, a case study research method was used to analyze the market price and specific circumstances of Bitcoin. However, this research method still has some limitations and problems, including the possibility of failing to identify some issues that can only be revealed in actual transactions. In future research, researchers can learn about related issues that may arise from the operational processes of actual virtual currency account operators.

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