

Central Bank Digital Currency (CBDC) and Its Potential Impact on the Chinese Economy

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Abstract: Digital Gold Currency first appeared on the market in 1996, a digital currency designed based on gold quality. Still, the disadvantage of digital gold currency is that it has no cryptographic protection, and the security needs to be better. Nowadays, with the development of technology, more and more governments have started to study and use digital currencies, which benefits the economic market. This paper focuses on the central bank digital currencies issued in China, combining the current situation and characteristics of the Chinese economic market and the technical characteristics of CBDC, and analyzes the possible impact of CBDC issuance in China on the economic market. The analysis shows that CBDC will benefit the Chinese economic market by accelerating financial inclusion, eliminating the IT gap, reducing government spending, and providing the government with more tools to regulate the economy. The findings can offer strategic insights to the Chinese government or relevant researchers.

Keywords: CBDC, Chinese economic market, digital currency

1. Introduction

Various countries have started researching and developing digital currencies in today's highly developed digital platforms. Some countries have already used it, while others are still experimental. China has made significant progress in developing its central bank digital currencies, Digital Currency Electronic Payment (DCEP). The DCEP is being tested in several cities and used for the 2022 Winter Olympics. CBDC, as a type of digital currency, is an emerging form of money that cross-applies various technologies: distributed Ledger Technology, centralized database system, hybrid technology, and smart contract technology. The application of these technologies gives CBDC different characteristics. The rational use of these characteristics can bring positive feedback to the economic market and provide the government with more tools to regulate the economic market.

This paper overviews existing research on central bank digital currencies (CBDCs). It describes the various types of CBDCs, the conditions for their creation, and the technology required for their implementation. The technology included bridging the IT gap in China, saving on currency issuance costs, improving the national economy's security, and increasing how the central bank regulates the economic market. The authors then focus on the potential benefits of CBDCs for China in the context of the specific conditions for their formation and technical characteristics and explain their content and feasibility in detail.

By summarizing the current research on CBDC, the article aims to provide a comprehensive understanding of this emerging technology and its potential impact on the global financial system. The report outlines the different types of CBDCs, including retail CBDCs and wholesale CBDCs, and explains the key features and differences between them. They also discuss the various factors that must be considered when creating a CBDC, such as the legal and regulatory framework governing the financial system and the technological infrastructure needed to support it.

Turning to the Chinese economic market, the author examines the potential benefits of CBDCs for China, including improved efficiency and security of the payments system, increased financial inclusion for underserved populations, and enhanced monetary policy enforcement. The findings can provide strategic insights for the Chinese government or relevant researchers.

2. Literature Review

Past research has covered various issues related to the development and impact of z China's digital currency, including its role in international trade and finance, its potential to support green finance initiatives, and the challenges and opportunities it presents for commercial banks.

Xu and Wang explored the relationship between digital currencies and macroeconomic volatility in China, and it explains the macro impact of CBDC cross-border use [1]. Also, CBDC has the potential applications of digital currencies in green finance [2]. Christopher and Ma investigate the impact of digital currencies on RMB internationalization in Economic Issues [3]. Wang considers the challenges and opportunities for promoting the orderly development of digital currencies in an article in The Economic Observer. The difficulties of CBDC distribution in China include immature technology, imperfect seeing habits, and low acceptance in all parts of the ecological chain [4]. While Dan, Peng, and Zheng discuss using smart contracts and digital currencies to facilitate the development of commercial banks' business strategies [5]. Shi and Guo explored the mechanism of digital currency to empower RMB internationalization [3,6]. Yang explored the international law implications of the evolution of the digital currency system, which can promote the RMB as a world currency [7]. Ji and Ma gave a basic introduction to CBDC [8]. Finally, Liu and Su discuss China's macroeconomic policy outlook for 2018 in an article in Economic Dynamics [9].

Much of the previous research has focused on how China's digital currency can promote RMB internationalization and how it can be effectively implemented in the economic market. There is a lack of research on the impact that CBDCs may have on the economic market.

3. Explanation of CBDC

3.1. Digital Currency

Digital currency is a form of currency that exists solely in digital or electronic form. It is sometimes called an electronic form of money or cryptocurrency. Similar to conventional currencies like the dollar, the euro, or the yen, digital currencies are made to function as a means of trade.

To control the creation of units of money and verify the movement of funds without the aid of a central bank or other governmental body, digital currencies use encryption techniques. Because of this, digital currencies are decentralized and frequently more secure than traditional ones.

Bitcoin, Ethereum, and Litecoin are examples of digital currencies. They seldom are used to purchase products and services but to make investments in a market for digital currencies. It's crucial to remember that digital currencies can experience extreme volatility and may not be accepted as payment by all businesses. Virtual currencies like Bitcoin may negatively influence the market economy, so it is banned in many countries.

3.2. Bitcoin

Bitcoin, which has become popular in recent years, differs from conventional digital currencies. Bitcoin's encryption algorithm guarantees security. Still, the algorithm then directly limits the total number of issues to 21 million, which results in Bitcoin having a natural scarcity, just like gold [10]. Moreover, governments do not issue digital currencies like Bitcoin and are not backed by credit, and virtual currencies like Bitcoin are decentralized, which leads to three problems.

First, bitcoin can threaten the traditional government-printed, government-backed monetary system, directly affecting government macro-control and leading to fiscal instability. Second, the legal status of Bitcoin could be clearer and more complicated for governments to track, leading to the possibility that it can be used for speculation, money laundering, and other illegal activities. Finally, from an economic perspective, if the total issue is of a fixed value, then the result of the currency is bound to be inflationary.

Because of these problems, China has been cautious about digital currencies for the safety of the national economy and has banned financial institutions from accessing Bitcoin transactions. Of course, the government still allows people to buy and sell bitcoins independently under the premise that individuals do so at their own risk.

3.3. Central Bank Digital Currency (CBDC)

The central bank digital currency (CBDC) is an alternative to electronic forms of money. CBDC issued by China is called DC/EP (Digital Currency Electronic Payment). The Chinese government began researching digital currency in 2014, one of the first countries in the world to do so. In 2016, the governor of China's central bank said it planned to take about 10 years for digital currency to replace the paper currency circulated in China for over 800 years. In 2019, the Chinese government publicly announced that "China CBDC will be issued soon". During the 2022 Winter Olympics, China saw a wider closed test, with a large number of large-scale cross-border transactions during the Winter Olympics to test the risks of the digital RMB further.

4. The Basic Theory of CBDC

4.1. Conditions of CBDC

4.1.1. Necessary but insufficient conditions.

First, central bank digital currency is legally recognized as a negotiable currency. Although no paper money is printed, there is an actual increase in money circulation in the market. The central bank still issues the CBDC and is still a liability of the central bank, which means that the CBDC is the base currency and is equivalent to cash and commercial bank reserves. Because the central bank issues CBDC, it is an electronic legal tender and naturally has legal effect. For example, if a person goes to a store and wants to buy a product, the merchant can refuse to accept it if it is in Bitcoin. Still, if it is in CBDC, the merchant must take it because Chinese law states that merchants cannot refuse to accept RMB, and CBDC is also a kind of RMB, so the phone becomes your wallet.

Second, CBDC is a type of digital currency, so it must be digital and cannot be cash. Then these two premises constitute the basic conditions of CBDC, so payment platforms such as WeChat and Alipay and virtual currencies such as Facebook's Libra and Bitcoin are digital currencies. Still, the status is far less than that of the central bank's digital currency.

4.1.2. Sufficient but unnecessary condition.

Commercial banks' reserve deposits, both base currency and satisfy the digital condition, are not considered CBDCs either. Because to be CBDC, it must fulfill one of the following two sufficient but unnecessary conditions after meeting the two necessary but insufficient conditions above. The value of the CBDC can exist separately from the account without verifying the account's identity. Just like cash, there is no need for an account; each currency exists independently without an attributed account. But commercial banks' deposit reserves must verify the identity of the account, so it does not meet this condition. CBDC is not limited to the operation of financial technology and is highly liquid. The currency application scenario is oriented toward the general public, and users can directly use currency transactions. Therefore, the interbank lending market, deposit reserves, and such do not belong to the CBDC.

4.2. Two Kinds of CBDC

By arranging and combining the above four conditions, there are two kinds of CBDC in the international arena: Wholesale CBDC and Retail CBDC. Comparatively speaking, wholesale CBDC is mainly used for cross-border inter-institutional settlement, while retail CBDC is more suitable for personal consumption and corporate payments.

4.2.1. Wholesale CBDC.

Wholesale CBDC is oriented to the interbank market and gets rid of the existing model of centralized bookkeeping through blockchain technology. That is to say, the borrowing and lending behavior between two banks will be recorded uniformly in one system, which keeps the cash flow records of both parties, but an advanced system must support this model. With the wholesale CBDC, a distributed bookkeeping model has been realized through decentralized technology, which improves security and efficiency. The major countries developing this model type are Canada, Singapore, Japan, Hong Kong, China, and other countries and regions.

4.2.2. Retail CBDC.

Retail CBDC is a kind of CBDC for the public, and Norway and Sweden are in the first tier of developing this type of CBDC. The retail type is divided into digital accounts for residents of the central bank and digital cash for residents. The first type can be understood as the central bank issued Alipay, and the second type is the digital RMB, or DC/EP, which is essentially special digital cash. In the past, anonymous transactions in currency tended to breed money laundering and other crimes, so China has designed a system of graded limit arrangements for this digital RMB to ensure the security of information for small daily payments. In contrast, large transactions require identity verification, like going to a bank to withdraw cash.

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4.3. The Technology of CBDC

CBDCs are created using various technologies depending on the design and purpose of the currency. Here are some of the standard technologies used in CBDC.

First, distributed Ledger Technology (DLT) is a decentralized database system that makes transactions transparent and safe without intermediaries. CBDCs that utilize DLT frequently have permissioned blockchains, restricting network access to only approved participants. The second technology is the centralized database system. The central bank oversees and maintains the centralized database

system that CBDC employs. This technology's instantaneous transactions and lower expenses make it superior to the conventional banking system. Third, it uses hybrid technology to use the benefits of both technologies, CBDC combines DLT with centralized database technology. For instance, digital currency might be printed on a blockchain but handle transaction processing through a centralized database. The last one is the smart contract technology, CBDC employs this technology to streamline transactions and guarantee legal compliance. With smart contracts, the agreement details between the buyer and seller are directly encoded into lines of code. These contracts self-execute.

5. Benefits of CBDC in China

5.1. Bridged the IT Gap

Some older people do not know how to use mobile payments, which can further widen the gap between the rich and the poor when vulnerable groups in cities cannot access online payments. The annual cash in circulation in the market (M0) grew to 16.7% in 2010, while less than 4% was left in 2018. The net cash put into the financial sector in 2016 was more than RMB 500 billion, and in 2018 only more than 250 billion is left, the pace of the times is moving towards cashless. Secondly, CBDC is more convenient than platforms such as Alipay, which requires binding bank cards, QR codes, and other quick payment methods, a kind of card consumption in disguise. And the central bank digital currency realized the electronic of cash transactions, no network, no POS, and two cell phones touch to pay. This double offline payment function makes the payment more efficient. This payment method is more beneficial to areas with backward infrastructure and can make technology accelerate financial inclusion.

5.2. Save on Currency Issuance Costs

The traditional monetary theory holds that money is primarily a medium of exchange, existing to make market transactions more portable and improve economic operations' efficiency. But today, the cost of printing money is increasing daily. The Federal Reserve reports that printing a \$5-\$50 denomination bill is around 16 cents, and publishing a \$100 denomination bill is close to 20 cents. The banknotes have a life cycle and need to be supported by a system. The complete cycle manager has links such as design, plate making, production, clearing, destruction, storage, escrow, escort, etc. The more links, the higher the cost. At the same time, the design of banknotes is becoming more and more complicated to prevent counterfeiting. If CBDC can be promoted, it directly streamlines the banknotes circulation system and prevents counterfeiting.

5.3. Improving the Security of the National Economy

CBDC can help to improve national economic security through its technology. First, the encryption technology of digital currency allows small transactions within the territory to be anonymous. In contrast, large transactions require identity verification so that large transactions can easily verify the information of the account, which on the one hand, can prevent fraud. On the other hand, the central bank can precisely track the destination of every dollar of digital currency, which is easy to manage and adjust for the government.

Second, CBDCs can help reduce fraud by providing a more secure and transparent payment system. Transactions can be tracked on a blockchain, making it more difficult for criminals to engage in fraudulent activities. Additionally, the use of digital identities can help reduce identity theft.

Third, CBDCs can help improve the payment system by providing faster and more efficient transactions. This can reduce the risk of errors and delays, making the economy more stable and secure.

At last, it can help reduce systemic risk by providing a more stable and resilient financial system. Digital currencies can be used to settle bank transactions, reducing the need for intermediaries, and potentially reducing the risk of financial contagion.

5.4. Increase the Way the Central Bank Regulates the Economic Market

During the upswing period, the central bank usually adopts a tight monetary policy, such as raising interest rates and deposit reserves and reducing the amount of market capital to curb excessive price increases. However, this traditional monetary policy is delayed, and it is difficult for the government to predict the loss caused by the delay. CBDC can improve this situation, as the online platform can issue money and raise interest rates more quickly.

In the future, central banks can also stimulate residents to transfer their deposits to digital currencies for macroeconomic control. For example, suppose banks pay interest on digital money or indirectly raise the interest rate of commercial banks. In that case, the government's monetary policy will be transmitted faster, and the central bank's ability to regulate counter cyclically will be enhanced.

As data tracking becomes convenient with the technology of CBDC, it becomes easier for the administration to grasp the actual situation of market data and improve the refinement management level to achieve optimal governance and even optimal redistribution.

6. Conclusion

The study focuses on the potential benefits of a central bank digital currency (CBDC) for various areas of China's economic market. First, China can help narrow the gap between rich and poor by providing a more convenient payment method for disadvantaged groups. CBDC is more convenient than traditional payment methods such as Alipay and can increase financial inclusion in areas with poor infrastructure. Second, CBDCs can help reduce the cost of currency issuance, simplify the circulation system for paper money, and prevent the prevalence of counterfeit currency. CBDCs can also improve national economic security by providing anonymity for small transactions, reducing fraud, and improving payment systems. Finally, CBDCs can help central banks regulate financial markets more effectively by delivering faster monetary policy transmission, enhancing countercyclical regulation, and improving data tracking for better granularity. Overall, the article argues that CBDCs have the potential to revolutionize the current monetary system and provide numerous benefits to individuals and institutions.

This paper's capacity to broaden and incorporate the features and technological foundation of Central Bank Digital Currencies (CBDCs) into a comprehensive framework gives it theoretical value. Doing so offers an invaluable resource for scholars looking to comprehend the complicated CBDC ecosystem and gives them a robust platform for their future work. Additionally, this research has relevance to the Chinese economy in terms of practice. The essay examines the potential advantages of issuing CBDC in China, which may have strategic ramifications for policymakers and relevant academics. The article, for instance, emphasizes how CBDCs can advance financial inclusion, lower transaction costs, and improve the effectiveness of monetary policy transmission. These findings can help legislators create laws to make the most of this technology and weigh the pros and downs of CBDC issuing.

Overall, regarding its educational value and application to policymakers and academics alike, this work contributes significantly to the body of knowledge on CBDCs. This article contributes to a more excellent understanding of the features and possible advantages of CBDCs, which can help future research and policy choices in this quickly developing area.

This paper lacks quantitative data to support the analysis of CBDC on the Chinese economic market. However, CBDC is still an emerging industry in China, and it is challenging to find exact data to

support the findings of this paper. Future research directions can be based on quantitative analysis of government-published data to verify the impact brought by CBDC with data.

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