

# A summary of the research on the influence of central bank digital currency on the financial system

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**Abstract:** *With the popularity of digital currency, the central bank, its advantages such as convenience, improving cross-border payment efficiency, low-cost transaction, traceability, credibility and willfulness will become increasingly prominent, which will have a far-reaching and extensive impact on the financial system. This paper systematically summarizes the positive impact and potential risks and challenges brought by digital currency, the central bank, on the financial system from the aspects of payment system, commercial banks, financial stability and supervision, so as to provide a more targeted perspective for the research and development and policy formulation of digital currency, the central bank of China.*

**Keywords:** *digital currency; the central bank; Payment system; Commercial banks; Financial stability and supervision; Money supply system and monetary policy*

## 1. Introduction

In 2020, the sudden outbreak of COVID-19 epidemic gradually increased the demand for non-face-to-face transactions, and all the major central banks in the world began to actively promote the research and development of the central bank digital currency. In the academic field, many scholars have extensively discussed the influence of the issuance of digital currency by the central bank, and their research perspectives have mostly focused on the transmission of monetary policy, the reform of cross-border payment system, the operation of commercial banks and other specific aspects. However, there are few domestic documents to systematically sort out the latest developments of these studies. At present, only a comprehensive paper by Liu Kai explains how digital currency, the central bank, affects the whole economic system. However, the contents involved in his research were too extensive and sporadic, and he failed to deeply interpret and focus on an important field. This paper attempts to further explore the influence of digital currency, the central bank, on the financial system, so as to provide a more targeted perspective for the research and development and policy formulation of digital currency, the central bank of China.

## 2. The Concept and Classification of Central Bank digital currency

At present, there is no unified definition of central bank digital currency. From the existing literature, we can understand its connotation mainly from narrow and broad perspectives. In a narrow sense, it can be divided into technical attributes and monetary attributes. In terms of technical attributes, Barrdear, Kumhof(2016), Menailin (2022) and other scholars define the central bank digital currency (CBDC) as a new currency that adopts digital encryption technology and blockchain technology<sup>[1][2]</sup>. Digital encryption technology ensures the security and anti-counterfeiting function of currency, while blockchain technology realizes the decentralized issuance of currency, which can effectively reduce the cost of currency issuance and improve the transparency of currency issuance. From the perspective of monetary attributes, Fan Yifei (2016) pointed out that the central bank's digital currency mainly belongs to the category of cash (M0), focusing on achieving efficient substitution of M0, while retaining the essential attributes and core characteristics of cash<sup>[3]</sup>. However, with the progress of digital technology and the in-depth study of central bank digital currency by various countries, the definition of narrow central bank digital currency gradually loses the upper hand, and scholars begin to divide central bank digital currency conceptually from a broad perspective. According to the different authentication methods, Zhou Xiaochuan, governor of the Bank of China (2016) divided the digital currency of the central bank into two forms: account-based and token-based. According to different transaction purposes, the Bank for International Settlements (BIS) classifies digital currency, the central bank, into retail type and wholesale

type<sup>[4]</sup>. In a word, as a new digital legal tender, digital currency, the central bank, not only retains the basic characteristics of traditional currency, but also has many innovations.

### 3. Impact on the payment system

The existing research discusses the role of the central bank digital currency in the payment system from the perspectives of diversification of payment means, simplification of payment process, improvement of payment security and convenience of cross-border payment. First of all, the launch of digital currency, the central bank, is considered to complement the traditional payment tools and form a diversified payment system. Yao Qian (2019) pointed out that in addition to traditional methods such as cash, bank cards and mobile payment, users can also make use of various media and channels such as digital wallets to make payment by the central bank digital currency, thus making up for the inconvenience of carrying cash and the limitation of bank cards on business hours and network environment<sup>[5]</sup>. Secondly, the implementation of the central bank digital currency will simplify the payment process. Yao Qian (2017) pointed out that users can achieve real-time settlement only by completing transactions through digital wallets, without relying on bank accounts, eliminating the cumbersome background clearing and settlement links. Finally, the popularity of digital currency, the central bank, will make cross-border payment more convenient. According to Zhang Le (2021), digital currency, the central bank, has made it an attractive alternative to the traditional cross-border payment system in terms of modernization and convenience by virtue of its currency stability of legal tender and innovative advantages such as encryption technology and blockchain<sup>[6]</sup>. It is expected to make up for the shortcomings that the current cross-border payment involves different countries' financial systems, exchange rates and regulations, and the payment process is complicated and the cost is high, so as to promote the internationalization of the payment system and reshape the cross-border payment pattern. Looking ahead, in order to realize the wide application of digital RMB in the field of cross-border payment, China should actively participate in international cooperation in technology, market structure and legal arrangements to promote the development of digital currency, the central bank (Song Lu, 2023; Liu Danyang, 2021)<sup>[7][8]</sup>. In addition, the implementation of digital currency, the central bank, also has an important impact on the fairness in the payment field, but at present, scholars have little research on this direction. Traditional payment methods often have certain thresholds, such as bank card account opening and cross-border payment, which are cumbersome and costly, making it difficult for some vulnerable groups and small and medium-sized enterprises to enjoy convenient financial services. Digital currency, the central bank, can lower the threshold of financial services, so that more people can enjoy convenient and low-cost financial services, which is conducive to improving the fairness of payment. In the future, how to use digital currency, the central bank, to promote the development of inclusive finance, and help the precise poverty alleviation and the development of the real economy will become an important research direction in the financial field.

### 4. Impact on commercial banks

Through reading a lot of literature, it is found that in the current upsurge of research on central bank digital currency, few people pay attention to the influence of central bank digital currency on commercial banks. However, as an important part of the financial system, the business model and profitability of commercial banks are bound to be deeply influenced by digital currency, the central bank. By combing the literature, this paper discusses the influence of digital currency, the central bank, on commercial banks and its countermeasures from the aspects of deposit business, loan business and revenue capacity.

From the perspective of deposit business, scholars' research shows that the influence of digital currency, the central bank, on deposit business is all-round, not only in market demand and operation mode, but also in deposit interest rate. On the one hand, digital currency, the central bank, with its convenient and efficient features, will attract more users to deposit their funds in digital wallets instead of traditional bank accounts, which will have a certain impact on the bank's savings market share. In order to meet this challenge, banks need to improve service quality and optimize deposit products to attract and retain customers (Wang Peng, 2022)<sup>[9]</sup>. On the other hand, the issuance and recovery of digital currency by the central bank is directly controlled by the central bank, which weakens the competitiveness of banks in the deposit business. In order to cope with this situation, commercial banks need to raise the deposit interest rate of cash currency to maintain the deposit market share, which will lead to the expansion of deposit currency scale (Barrdear and Kumhof, 2021)<sup>[10]</sup>. In addition, andolfatto's (2021)<sup>[11]</sup> research also confirmed this view.

From the perspective of loan business, scholars believe that the influence of digital currency, the central bank, has both advantages and disadvantages. On the one hand, Zhou Rong (2022) pointed out that the central bank's digital currency is helpful for banks to improve the efficiency of loan business and expand the scale of credit. The promotion of digital currency, the central bank, makes the examination and issuance of bank loan business more convenient, thus reducing the credit cost. At the same time, the data of digital currency account of the central bank can be used as the basis for banks to evaluate the credit status of loan applicants, which improves the accuracy of loan review. However, in addition to enjoying the convenience brought by digital currency, scholars should also pay attention to its potential negative effects. Huang Shuangshuang (2021) thinks that the extensive substitution of bank deposits by digital currency, the central bank, may lead to the damage of the source of bank funds, which will lead to the tightening of credit market or the increase of loan interest rate, thus adversely affecting investment and economic activities<sup>[12]</sup>. In order to meet this challenge, Grey and Dharmapalan(2017) proposed to build a central bank digital currency system with the function of bank credit. Specifically, they suggested that the central bank's digital currency payment system, which is issued and operated by the state, should be separated from banks, and banks should issue loans in a conventional way, but they need to borrow these loans from the central bank as collateral to realize the endogenous growth of money supply and credit<sup>[13]</sup>.

From the perspective of revenue capacity, digital currency, the central bank, will have an impact on the bank's profit model. The traditional banking business model mainly relies on the difference between deposits and loans as a source of income, but with the popularity of digital currency, the central bank, this model will be impacted, and banks need to seek new revenue growth points. Cheng Xuejun (2022) From a long-term perspective, banks can increase investment in financial technology research and development, and actively lay out new business areas, such as expanding investment banking, expanding insurance business, and deepening financial technology, so as to realize the diversification of business structure<sup>[14]</sup>. Through such measures, banks will bloom a more dynamic new chapter in the wave of digital transformation. Therefore, although digital currency, the central bank, has challenged the traditional deposit-loan gap model, banks are still expected to find new growth points and maintain profitability through opening up new business areas and strengthening technological innovation.

## 5. Influence on financial stability and financial supervision

With the development and application of digital currency technology, the central bank digital currency, as a new payment tool, may have a far-reaching impact on the stability of the financial system and the supervision mechanism, which has become the focus of attention of central banks all over the world and has aroused extensive discussion among scholars.

### 5.1. Impact on financial stability

Scholars have analyzed the influence of central bank digital currency on financial stability from different angles. On the one hand, from the perspective of protecting monetary sovereignty, Wang Weiqing's (2020)research pointed out that the issuance of digital RMB adopts a two-level operation mode of 'central bank-commercial organization' backed by national sovereign credit, which eliminates the moral hazard that may be brought by the issuance of central bank digital currency by non-governmental organizations, strengthens the national monetary sovereignty, and is also conducive to alleviating the pressure brought by excessive concentration of risks to the central bank, helping to disperse and resolve financial risks and ensure the financial system<sup>[15]</sup>. On the other hand, from the perspective of improving risk management and control ability, Chen Fengxian(2024) advocates real-time monitoring of the central bank's digital currency circulation data to improve the ability of financial risk identification, early warning and prevention<sup>[16]</sup>. However, the issuance of digital currency, the central bank, may also breed new financial risks. Fan Yifei (2016) pointed out that the convenient transition of the central bank digital currency during the crisis can promote the spread of panic and risk<sup>[17]</sup>. According to Bindseil's (2019) observation, he predicted that digital currency, the central bank, might lead to the turmoil in the financial system, and increase the possibility of speculative shocks and crowding out risks<sup>[18]</sup>. Huang Yanfei (2022) pointed out that the widespread use of digital wallets may lead to changes in the business model and market share of financial institutions. However, Yao Qian's research shows that digital currency's influence on commercial banks and other fields and financial structures can be managed, even helping to stimulate economic growth. In the long run, the financial system will gradually restore balance under the impetus of competition, thus improving the efficiency of financial stability.

## 5.2. Impact on financial supervision

While ensuring financial stability, how to solve the security and stability of the central bank digital currency, prevent hacker attacks, protect users' privacy and other issues has also brought new challenges to financial supervision. First of all, Lu Xiumei (2023) thinks that under the background that the central bank's concept of digital currency has not been clearly defined, some private digital currency maliciously imitates the central bank's digital currency, which seriously disrupts the financial order.<sup>[19]</sup> Secondly, Lareina C (2021) pointed out that the security of digital currency, the central bank, is vulnerable to attack and physical tampering from the perspective of the underlying technical loopholes<sup>[20]</sup>. Once a node is attacked, it can not be quickly coordinated and repaired immediately, which may lead to the paralysis of the whole network, which not only threatens the security of personal information and property, but also brings great impact on the stability of the global financial system with the strengthening of the trend of financial internationalization. In addition, Ma Hongxia (2023) made a statement about the leakage of customer data, saying that the centralized processing of digital currency, the central bank, could only reach a controllable and anonymous state<sup>[21]</sup>. Many of them adopt the design method of voluntary front-end and real background identity. In the process of ensuring users' privacy, the information provided to managers with the help of technologies such as cloud computing and big data may also be used or used by illegal elements. Finally, from the perspective of regional promotion lag, Lu Xiumei (2023) pointed out that internationally, due to the inconsistency of regulatory standards, criminals will look for loopholes among central banks in digital currency, disperse cash flow through cross-border and cross-regional global distribution books, and avoid tracking, thus leading to money laundering crimes on the international network, resulting in instability of financial supervision. At home, the unbalanced economic development in different regions leads to the delay in the promotion of digital currency by the central bank, which is not conducive to the central bank's overall monitoring of currency circulation and unified maintenance of financial order, and poses challenges to financial supervision. Future scholars need to further study digital currency's regulatory policies and legal framework. With the development and popularization of digital currency, the regulatory authorities need to formulate corresponding policies and regulations to regulate the issuance, circulation and use of digital currency, so as to ensure the stability of the financial market. Therefore, it is necessary to conduct an in-depth study on digital currency's regulatory policy, evaluate its impact on financial stability and market order, and put forward corresponding policy suggestions and improvement suggestions.

## 6. Conclusions and policy recommendations

This paper systematically summarizes and summarizes the possible impacts of digital currency, the central bank, on the financial system from the aspects of payment system, commercial banks, financial stability and supervision, etc. We can see the positive impacts and potential risks and challenges brought by the introduction of digital currency. First, the existing research has discussed the role of digital currency, the central bank, in the payment system from multiple perspectives, including diversification of payment methods, simplification of payment processes, improvement of payment security and convenience of cross-border payment. Although the impact of digital currency, the central bank, on the fairness of payment has not been thoroughly studied, it has been pointed out that digital currency, the central bank, can lower the threshold of financial services, so that more people can enjoy convenient and low-cost financial services, which is conducive to improving the fairness of payment. In the future, how to use digital currency, the central bank, to promote the development of inclusive finance, and help the precise poverty alleviation and the development of the real economy will become an important research direction in the financial field. Second, the issuance of digital currency, the central bank, has had a far-reaching impact on commercial banks, touching all aspects of their business, such as deposits, loans, revenue capacity and operating costs, and almost reshaping their entire business model. This change brings both challenges and opportunities. In order to adapt to this new financial environment, commercial banks need to respond through technological innovation and business model adjustment. However, the academic discussion on the influence of central bank digital currency on commercial banks is not deep enough. With the continuous promotion of the digital currency experiment and application of the central bank, future research should pay more attention to its specific impact, and explore how commercial banks can use the unique characteristics of the digital currency of the central bank to innovate financial products and services, so as to enhance the competitiveness of commercial banks. Thirdly, the global academic circles pay extensive attention to the influence of the central bank digital currency on the stability of the financial system and the supervision mechanism. Although the digital currency issued by the central bank is expected to improve financial stability, protect monetary sovereignty and strengthen the control of systemic risks, it may also bring new financial risks, such as technical defects, user data leakage and

regional delay in promotion, which will bring unprecedented challenges to financial supervision. Therefore, future research needs to explore the regulatory policies and legal framework of digital currency, the central bank, to ensure that they can effectively support financial stability and economic development, and at the same time overcome the new challenges brought by digital currency, the central bank, such as security, privacy protection and international cooperation.

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