

China's National Digital Currency: An Overview of Digital Currency Electronic Payment

Xiang Zou^{1*}, Qiang Cao²

¹ School of Accounting and Finance, Wuxi Vocational Institute of Commerce, Wuxi, China

² International College, Krirk University, Bangkok, Thailand

* justinzz1989@hotmail.com

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ABSTRACT: Digital Currency Electronic Payment (DCEP) is the Central Bank Digital Currency (CBDC) of China. It is significantly different from electronic currency and third-party payment instruments. DCEP is issued through the dual mode which consists of the central bank and commercial banks. It operates and circulates based on the framework of Digital Currency Registration Center, Identity Authentication Center and Big Data Analysis Center. Compared with the encrypted digital currency based on blockchain technology, DCEP has the characteristics of centralized management. DCEP will have profound impacts on the effectiveness of monetary policy, the operation of banks and payment institutions, the development of digital economy, the internationalization of CNY and even social governance.

Keywords: CBDC, DCEP, FinTech, China.

INTRODUCTION TO CENTRAL BANK DIGITAL CURRENCY

In recent years, with the increasing attention paid to Bitcoin (BTC), digital currency has become a global research hotspot. The innovation of financial technology (FinTech) and the development of digital economy make the form of money evolve continuously. The research on digital currency has gradually changed from its decentralized characteristics to the legal tender which is based on the central bank. Under the support of national credit, Central Bank Digital Currency (CBDC) will become a new situation of various national currencies in the coming future. According to the Bank for International Settlements (BIS), more than 80% of countries have the intention to issue CBDC (Boar, 2020)¹, as shown in Figure 1. It is believed that CBDC is an inevitable trend of the evolution of monetary form in the era of digital economy.

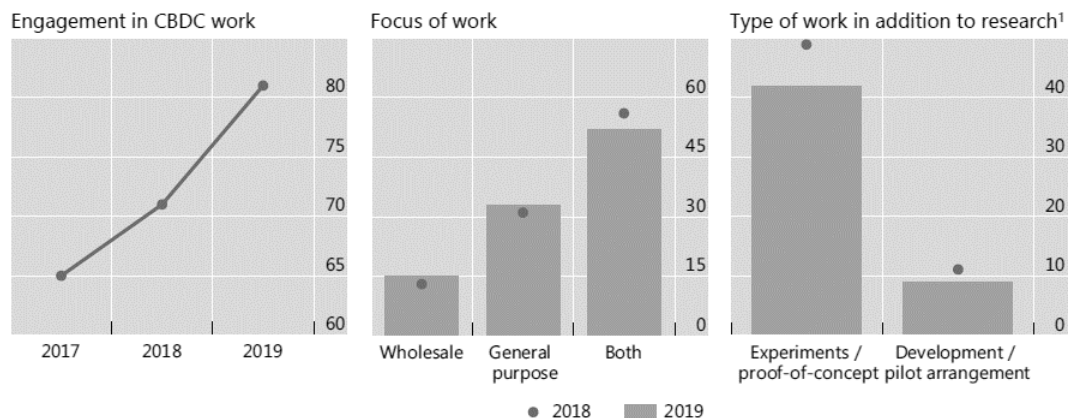


Fig. 1. Central banks continue to work on CBDC

The attitude of the United States towards CBDC is prudent. The Federal Reserve has been working on issues such as financial stability, market structure, security, privacy and monetary policy arising from CBDC. After the release of the Libra white paper, the attitude of EU countries towards CBDC has become positive. The European Central Bank (ECB) has designed the core guidelines for the digital euro which are based on the current euro-system policies (ECB, 2020)². The Bank of England in the United Kingdom also believes that digital currency can use the latest FinTech to make transactions easier and faster for consumers (Bank of England, 2020)³. According to the CBDC report issued by the Bank of Japan in Tokyo, Japan is ready for the changes brought by digital currency and will implement the CBDC project. In addition, Singapore and Thailand have made it clear that CBDC will be launched soon in their countries. The Bahamas and Sweden have planned to complete the technical test and pilot operation of CBDC during 2020-2021. Ecuador, Tunisia, Senegal, Marshall Islands, Uruguay and Venezuela also hope to solve economic and political problems by issuing CBDC (Shilin & Xuejun, 2021)⁴.

In order to meet the needs of digital economic development and maintain the order of the national financial market, the People's Bank of China (PBC) began to conduct research on digital currency in 2014. In 2019, PBC clearly proposed the name of CBDC in China as Digital Currency Electronic Payment (DCEP). Since 2020, PBC has successively carried out DCEP internal closure pilot test in Shenzhen, Suzhou, Chengdu, Xiong'an and future Winter Olympic scenarios (Yonghong & Lu, 2020)⁵. With the completion of the fundamental design, functional development and joint debugging test of DCEP, China is accelerating the revolutionary process into the digital economy era. This paper will summarize the impact of DCEP on China's financial system by introducing the concept, characteristics, operating framework and issuance mode, so as to have a more comprehensive and in-depth understanding of the CBDC.

THE CONCEPT AND CHARACTERISTICS OF DIGITAL CURRENCY ELECTRONIC PAYMENT THE DIFFERENCE BETWEEN DCEP AND ELECTRONIC CURRENCY

Understanding the concept of DCEP is helpful to distinguish it from other digital currencies and electronic currencies. Guoping and Huiting (2019)⁶ pointed out that DCEP is the CBDC issued by the Central Bank of China, which is endorsed by national credit. DCEP improves the blockchain technology and realizes the combination of digital currency and electronic payment. From the perspective of currency level, DCEP has the attribute of cash (M0), and its essence is to replace cash in circulation, rather than simply conduct the existing currency electronically. It is noted that China's DCEP used a centralized issuance mechanism, which makes traditional deposit accounts and DCEP accounts exist at the same time (Yan et al. 2020)⁷.

In terms of payment, transformation and settlement, DCEP is as efficient as electronic currency. The significant difference between them lies in the nature of money. The electronic currency is not unlimited legal tender, so the part exceeding the protection limit of the deposit insurance system will cause the risk of bankruptcy loss. However, DCEP has unlimited legal compensation and credit endorsement from the state and the central bank. The electronic currency is a form of digital deposit, which mainly includes enterprise current deposits in M1, enterprise time deposits and personal savings deposits in M2. The electronic currency needs to be transferred through bank accounts, while DCEP does not need to be bound to bank accounts. In addition, the

electronic currency cannot be paid offline, while DCEP supports "dual offline" payment between revenue and expenditure (Yuhang, 2020)⁸. Therefore, the digital currency represented by DCEP will bring new opportunities and challenges to the transformation of monetary form.

THE ADVANTAGES OF DCEP OVER THIRD-PARTY PAYMENT INSTRUMENTS

Although DCEP is a substitute for cash in circulation, its characteristics and operating framework make it significantly different from third-party payment instruments. In order to adapt to the needs of diversified applications, DCEP covers the features of convertibility, convenience, acceptance, availability and low cost. On the other hand, DCEP includes the characteristics of security, continuity, flexibility, availability, scalability and interoperability as well. Additionally, it needs to establish a sound legal framework and clear implementation standards so as to operate effectively. According to the exploration of issuance and circulation mechanisms, Yanhong et al. (2020)⁹ found that DCEP has the characteristics of controllable anonymousness, traceability and programmability, which can provide important support for the development of digital economy. In this context, DCEP can help to carry out anti-money laundering, anti-fraud and combating terrorist financing in a better way.

DCEP is aimed to mitigate the issuance and circulation costs of traditional banknotes, to improve the operation efficiency of financial infrastructure, and to promote the development of inclusive finance. Through the comparison between DCEP and other third-party payment instruments such as Alipay and WeChat payment, we can further understand the difference between DCEP and electronic currency. The summary is shown in Table 1. The advantage of DCEP is that it is endorsed by national credit, does not need to bind bank accounts, and supports offline payment. Therefore, compared with third-party payment instruments and cash, DCEP can provide with safer and more convenient payment options.

Table 1. The Difference between DCEP and Third-Party Payment Instruments

Item	DCEP	Third-Party Payment Instruments
Currency Level	National credit endorsement. Substitution of cash in circulation (M0).	Generally considered as current deposit (M1).
Connection with Bank Accounts	No bank account binding is required. Creation of digital wallet for DCEP usage.	Bank accounts must be bound in order to use third-party payment instruments.
Service Condition	Support online transaction and offline wallet transaction. No network can also be used through NFC technology.	Internet payment must be connected to the network in order to operate normally.
Impact on Monetary Policy	Control currency status through smart contracts. Monetary policy innovation realizes economic adjustment.	Sluggish economic adjustment of traditional monetary policy. Weak direct control of the central bank.

THE ISSUANCE AND OPERATION OF DIGITAL CURRENCY ELECTRONIC PAYMENT

THE MONETARY ISSUANCE OF DCEP

The issuance and circulation of DCEP depends on the dual mode, which consists of the central bank and commercial banks. In this case, the central bank is responsible for issuing DCEP, and commercial banks as well as the Central Bank jointly maintain the normal operation of the DCEP issuance system, as shown in Figure 2 (Chuanwei, 2019)¹⁰. When DCEP is issued, commercial banks deposit 100% of reserves with the central bank. The central bank then issues DCEP to commercial banks and entrusts them to publicly provide services such as deposit, withdrawal, exchange and transfer of DCEP. Compared with the direct issuance of DCEP by the central bank, the dual mode is more suitable for China's national digital currency, which helps to reduce the issuance cost and avoid high financing cost (Shuzhe & Xingguo, 2020)¹¹. Meanwhile, the issuance mode of DCEP can improve the issuance efficiency and circulation security, which can better satisfy the market requirement.

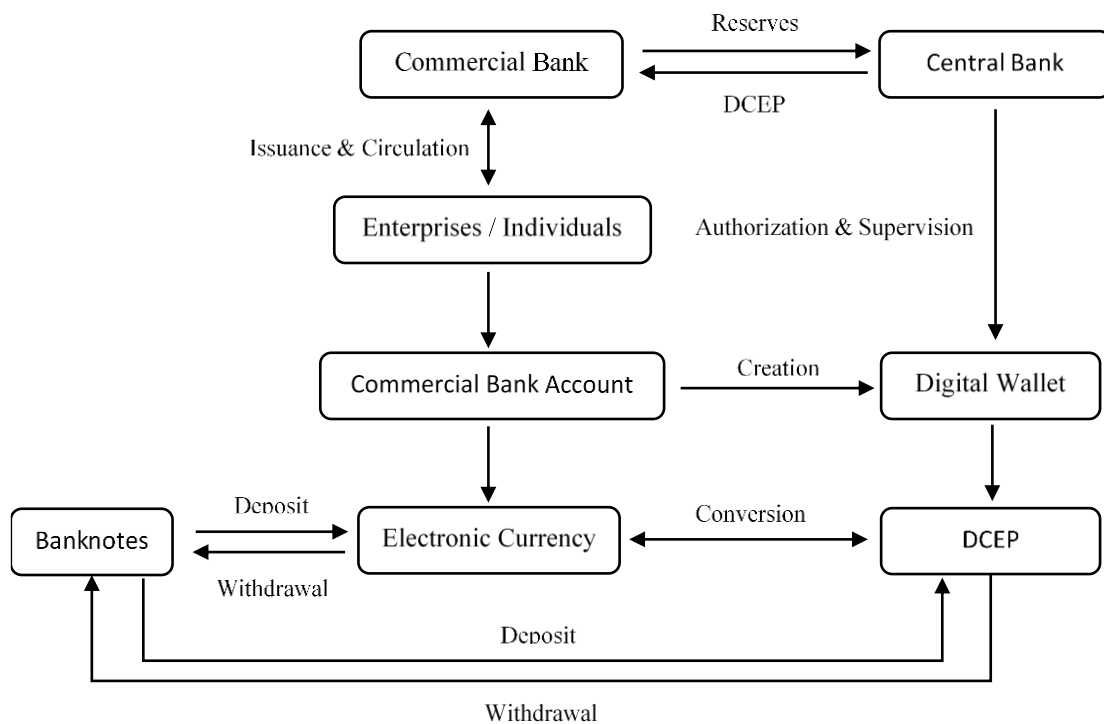


Fig. 2. The Issuing Mechanism of DCEP

THE OPERATING FRAMEWORK OF DCEP

DCEP is the legal tender in digital form issued by the central bank of China. Its operating framework is summarized and shown in Figure 3. Shi (2020)¹² pointed out that DCEP is the only national digital currency in China that is endorsed by the state credit and issued by the central bank. DCEP is equivalent to China Yuan (CNY), meanwhile, it owns the characteristics of centralization. The PBC is the sole issuer and is responsible for issuing DCEP to commercial banks rather than directly to the market. Commercial banks are responsible for the acceptance of DCEP to enterprises and individuals. The Digital Currency Registration Center (DCRC), Identity Authentication Center (IAC) and Big Data Analysis Center (BDAC) are responsible for maintenance and support.

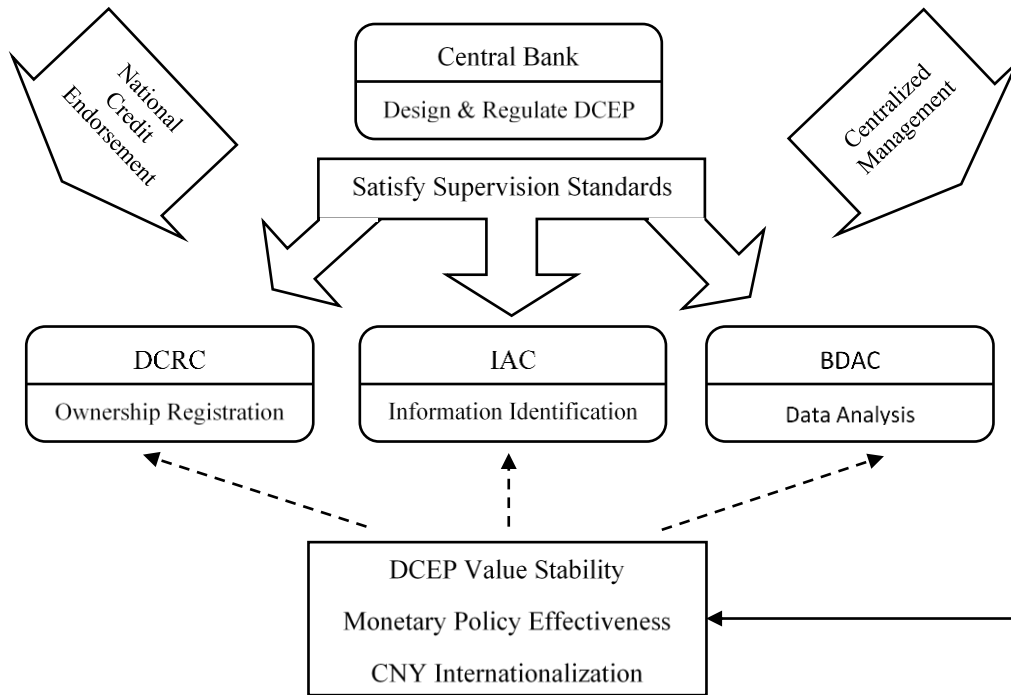


Fig. 3. The Operating Framework of DCEP

The DCRC records the user's personal information and cash flows, so as to carry out ownership registration. The IAC confirms the user identification. The BDAC analyzes transaction data based on big data, cloud computing, blockchain and other technologies, which can effectively supervise the capital operation. ensure transaction security and prevent illegal transactions. In this context, it can ensure the safety of transactions and effectively crack down on illegal business. The operating framework of DCEP is significant to centralized management, which can ensure the independence of monetary policy and the stability of DCEP value. It is conducive to reducing the currency-conversion cost of CNY and accelerating the internationalization of it.

THE STATUS AND PROSPECT OF DIGITAL CURRENCY ELECTRONIC PAYMENT

THE TECHNICAL SUPPORT OF DCEP

Since the successful application of blockchain technology in bitcoin, people have habitually associated encryption currency and digital currency with blockchain. However, whether the CBDC is based on blockchain technology remains controversial. Some academics believe that the infrastructure of the CBDC does not need to rely entirely on the blockchain, but only refers to some parts of the blockchain technology (Jianyu, 2020)¹³. The credit of the CBDC comes from the state. It is not necessary to use the consensus and trust mechanisms of the blockchain to confirm each transaction, which will lead to inefficiency. In the analysis of the relationship between the national digital currency and the blockchain, Tong (2020)¹⁴ found that China's national digital currency would use blockchain technology in the confirmation and registration process.

Following the evolution of digital currency, it can be seen that decentralized public chains are suitable for the application of encryption digital currency such as BTC, while centralized proprietary chains can meet the

requirements of large-scale transactions of CBDC. Blockchain is only a means to achieve decentralized digital currency, while DCEP is a centralized currency, and the central bank does not recommend the transformation of traditional payment system based on blockchain (Shi, 2020)¹². In addition, keeping the characteristics of centralization can greatly improve the transaction efficiency of digital currency. Therefore, if the innovative features such as asymmetric encryption, traceability and smart contracts can be coupled in the issuance, circulation and consumption of blockchain technology, the transaction efficiency can be improved, the transaction cost can be reduced, and the possibility of digital economy can be stimulated.

THE CHALLENGES OF DCEP TO TRADITIONAL FINANCIAL SYSTEM

DCEP is a new type of currency, which has the characteristics that traditional currency does not have, so it may impact the traditional financial system. The issuance of DCEP may cause adverse effects on bank credit, and the central bank may be forced to become the "lender of last resort" to bear the financial risks of commercial banks at all times (Dexu & Bo, 2019)¹⁵. In this context, it poses challenges to financial stability and national security. Distributed ledgers are used in DCEP, which will lead to decentralized transaction information processing, thus increasing the difficulty of supervision. At the same time, the issuance of DCEP may affect the structure of the payment market and reduce the relevant income of commercial banks and Payment institutions due to fierce competition (Wei et al., 2019)¹⁶. The risk-free DCEP provides a safer deposit alternative and may also increase the bank run. Therefore, although DCEP plays a positive role in the digital economy, it is also necessary to carefully assess its possible impact on the traditional financial system.

CONCLUSION

By combing the latest research and development trends, it can be found that DCEP is the national digital currency of China to replace cash in circulation. It is significantly different from electronic currency and third-party payment instruments. DCEP is issued through the dual mode which consists of the central bank and commercial banks. It operates and circulates based on the framework of three centers, namely DCRC, IAC and BDAC. Compared with the encrypted digital currency based on blockchain technology, DCEP has the characteristics of centralized management. DCEP will have profound impacts on the effectiveness of monetary policy, the operation of banks and payment institutions, the development of digital economy, the internationalization of CNY and even social governance. Although China has been at the forefront of digital currency research, there are still many opportunities and challenges for DCEP in the future.

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