Research on the Application of Digital RMB to Address the Monopoly and Privacy Issues of Third-Party Payments

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Abstract
Currently, the People's Bank of China (PBOC) attaches great importance to the research and development of legal digital currency and has included digital RMB in the 14th Five-Year Plan (2021-2025) for National Economic and Social Development. The promotion of digital RMB may largely suppress the privacy and security risks and monopoly phenomenon brought by third-party payments. The purpose of this research is to provide a reference for improving the development of digital RMB in China and lowering risks.

Keywords: Digital RMB, Monopoly, Privacy Issues, Third-Party Payments

1. Introduction
Since the 21st century, the digital economy has continued to develop, and electronic mobile payments have become popular. The number of third-party mobile payment users is on the rise, and the transaction volume is expanding quickly. While third-party payments bring convenience, privacy security and monopoly concerns are emerging. The risk of personal payment information leakage has significantly increased along with the rise in payment activity frequency. Additionally, the high level of concentration in the non-bank payment market caused the spread of unfair competition and the exploitation of the dominant market position. The monopoly of third-party payments has seriously disturbed the order of competition in the payment market and led to problems such as "big data-enabled price discrimination". Previous studies have focused on market regulation as a solution to the issues. However, the development and promotion of digital RMB offer new ways to get over the restrictions on third-party payments.

2. Key Concepts
2.1 The Concept and Development of Digital RMB
Digital RMB, or Digital Currency Electronic Payment (DCEP), is a central bank digital currency issued by the PBOC. It has equivalent value with other forms of renminbi, also known as the Chinese yuan (CNY), such as bills and coins. A designated institution manages digital RMB and makes it available to the public for trading. The foundation of digital RMB is a comprehensive account system, which provides loosely coupling applications for bank accounts. In the era of the digital economy, the programmability, traceability, and controllable anonymity of digital RMB have fulfilled the needs of transactional requirements admirably.
In 2014, the central bank set up a research group for issuing legal digital currency and started theoretical exploration. The Institute of Digital Currency was founded in 2016 to carry out research and development on and design digital RMB. Digital RMB pilot tests have been conducted at many locations since late 2019. In January 2020, the top-level design, standard development, and function development of the digital RMB were essentially finished. In 2023, the digital RMB pilot will continue to expand its efficacy by strengthening top-level design and ecological system construction, fostering product and application innovation, coordinating development and security, and gradually establishing a strong management framework. The digital RMB is currently being gradually incorporated into people's daily lives and is currently available as a pilot version of an app on all the major app stores.

2.2 The Concept of Third-Party Payment
Third-party payment can be divided into narrow and broad concepts. In the narrow sense, it is an independent institution with a certain level of strength and credit guarantee, which provides an online payment interface by contracting with banks. In the broad sense, it is a non-financial institution acting as a transaction intermediary, providing network payment, prepaid card issuance and acceptance, bank card acquiring, and payment services designated by the PBOC.

3. Privacy and Security Issues

3.1 The Status of Privacy and Security Issues in Third-Party Payments

3.1.1 Personal information risk
Nowadays, various payment scenarios are emerging, accompanied by more risks of information leakage. Moreover, risks to personal identification rise as privacy information become too dense. Also, numerous instances of third-party businesses inappropriately utilizing users’ personal information have occurred.

3.1.2 Malicious falsification of payment information
Existing payment platforms usually provide network banking interfaces of multiple banks, however, if the technical capabilities of third-party payment platforms are lacking, users’ account information and payment information are highly susceptible to theft or tampering by lawless elements, and value platforms will cooperate with multiple banks, which may even cause losses to network banks on the platform.

3.1.3 Low threshold of platform access and poor security of user information
On the one hand, despite the fact that companies must obtain a third-party payment license to conduct payment business, there are still some companies that exploit the state’s supportive policies and the grey area of the law to engage in illegal financial activities. These companies obtain users’ personal information through payment platforms to conduct illegal transactions. On the other hand, a significant risk to network security is posed by some employees who steal user personal information for their own benefit and divulge it to the wrongdoers.

3.2 The Advantages of Digital RMB in Privacy and Security

3.2.1 Controllable anonymity
Regarding the anonymity of digital RMB personal information, absolute anonymity may lead to criminal activities such as money laundering, while complete removal of anonymity may violate privacy. Therefore, the working group on digital RMB research and development of the PBOC clearly states in the Progress of Research & Development of Digital RMB in China that digital RMB has controllable anonymity, a feature designed to meet the needs of both anonymous payments and privacy protection.

Digital RMB follows the principle of anonymity for small value and traceability for high value. The collection of personal information is based on the principle of "minimum and necessary", and the amount of information collected is less than that of existing electronic payment instruments. At the same time, the storage and use of personal information will be strictly limited. PBOC shall not provide the relevant information to any government agency or third party unless expressly provided by law. The controllability is based on the security of the circulation of digital RMB, which provides reasonable restrictions on users' privacy and provides institutional support for collecting evidence of related crimes, etc. In addition, it is also conducive to the new monetary function of the digital RMB.

To sum up, controllable anonymity can not only protect users’ information and privacy security effectively but also control the risk of the digital RMB circulation system and guarantee currency circulation safety.
3.2.2 National credit endorsement

Digital RMB is issued by the PBOC and is a legal tender in digital form with a national credit endorsement. Backed by national credit, digital RMB is the central bank’s liability to citizens. As a result, citizens’ privacy security can be protected by the government. While the funds of third-party payment platforms, namely customer provision, fall under M1. Money funds like Alibaba’s Yuebao fall under the category of M2. Third-party payments are at risk of insolvency because they rely entirely on the credit of commercial institutions and cannot guarantee solvency. Although third-party payment platforms have access to a lot of customer data, it can be challenging to ensure users’ security and privacy.

4. The Monopoly Issues

4.1 The Status of Third-Party Payment Monopoly

According to the report of the China Payment and Clearing Association, electronic mobile payment accounts for a growing proportion and increasing amount. In China's third-party electronic payment industry transaction scale market share in 2021, Alipay reaches 54.5%, ranking first, and WeChat Pay accounts for 38.4%, ranking second. The two together account for more than 90% of the market share, resulting in mobile payment duopoly situation. Major payment institutions have the perfect financial infrastructure and third-party payment chains, master a sizable amount of capital flow, information flow, logistics, etc., and process a large amount of business through the network. These institutions' information systems confront issues including information leakage brought on by outside attacks or operational mistakes, which put their controllability and stability at risk. Third-party payment platforms take advantage of their monopoly, there are violations of the illegal use of consumer privacy data, of which the phenomenon of "big data-enabled price discrimination" is the most typical. These platforms collect and analyze users’ payment transaction data to determine their willingness to pay, and when users need to purchase the same goods or services, they are charged a higher price, undermining their own consumer rights.

The financial industry's long-term growth is further hampered by the monopoly of third-party payment platforms. A large amount of transaction data is monopolized by large platforms and large enterprises, which directly monopolize users' online consumption and payment through big data and their subordinate institutions. As a result, small firms struggle to draw customers, and giant corporations effectively control the market.

4.2 Mechanisms of the Impact of Digital RMB on Third-Party Payment Monopoly

With the introduction of digital RMB accounts, the central bank is likely to dominate individual fund accounts, thus reducing the value of third-party payment wallet accounts.

After the digital RMB is officially landed, third-party payment platforms, such as Alipay and WeChat Pay, will consolidate their businesses. Once the digital RMB hits the streets, users of third-party payment institutions will be diverted, leading to a severe impact on their financial-type businesses, which use traffic to cash in and face restrictions on their commercial space.

To summarize: Digital RMB is more advantageous than third-party payments in terms of protecting users' privacy and security. The reasons for this are as follows. First, legal digital currencies are based on national credit, while third-party payments rely on the commercial credit of the platform. Second, digital RMB can achieve controllable anonymity, whereas third-party payments rely on the accounting system of the bank and the anonymity of transactions is poor. In addition, digital RMB differs significantly from third-party payments in terms of currency positioning, security, universality, and convenience. Details of the comparison can be found in Table 1.

Moreover, third-party payments form a duopoly between Alipay and WeChat Pay. This monopoly holds a large amount of personal information of users and disrupts the order of the payment market. The implementation of the digital RMB may go a long way to alleviate this problem and change the monopoly situation.
To some extent, the growth of digital RMB could prevent major platform businesses from taking unfair use of monopoly advantages. Consequently, it can defend consumer rights and interests as well as their privacy and security, while also enhancing the usability of their payment methods. Based on this, we can explore more innovative approaches to anti-monopoly and financial regulation to promote the development of the

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Table 1 Comparison between digital RMB and third-party payments.

5. Suggestions for the Development of Digital RMB
With its two-tier operating system, extensive user system, loosely coupled support for bank accounts, and dual offline payment multi-terminal options, digital RMB may break the mobile payment monopoly and provide consumers with a diverse choice of payment methods. At the same time, the controllable anonymity of digital RMB, endorsed by national credit, fully considers users' need for payment privacy and security. However, it is necessary to strengthen risk prevention in the new field of digital currency, and fully utilize big data, artificial intelligence and blockchain technologies to enhance risk identification and interception accuracy in the development of digital RMB.

Commercial banks and payment institutions should keep up their implementation of risk prevention and control and take responsibility for their respective roles. The central bank should coordinate and balance risk prevention and control and optimize payment services. In addition, risk prevention awareness must be strengthened in society. To reduce games between consumers and third-party payment platforms, the central bank can regain its dominance over individual fund accounts and stabilize the monetary system. As a result, concerns about privacy and security, as well as data monopolies brought on by third-party payments, would be prevented. The only way to establish a safer market environment for the advantageous development of digital RMB is to continue to step up risk prevention efforts in the digital currency field.

It is important to promote digital RMB more. It can be utilized to leverage its M0 value in a variety of situations, including retail shopping, public transportation, and food service. To ensure the security of private payments, banks should encourage more businesses and individual users to download digital wallets. The central bank is also responsible for researching digital RMB terminals in-depth. By linking digital RMB to specific people, it can encourage more people to participate in the digital economy and make use of easy and secure payment methods while minimizing privacy and security issues and data monopolies.

6. Conclusion
To some extent, the growth of digital RMB could prevent major platform businesses from taking unfair use of monopoly advantages. Consequently, it can defend consumer rights and interests as well as their privacy and security, while also enhancing the usability of their payment methods. Based on this, we can explore more innovative approaches to anti-monopoly and financial regulation to promote the development of the
digital payment market and strengthen China's capabilities for risk mitigation and financial management. Therefore, the widespread adoption of digital RMB can have a significant and advantageous effect on stabilizing the financial system, fostering the growth of the digital economy, elevating people's standards of living, and improving social governance.

7. Reference