

Exploring Financial Risks and Risk Mitigation Strategies in Digital Currencies

Ziyu Wu

Department of Finance and Economics, Shandong University of Science and Technology, Jinan, China

ABSTRACT

This paper comprehensively analyzes the financial risks faced by digital currency, using digital renminbi as a case study. The risks include operational risks, privacy risks, legal and regulatory risks, currency sovereignty risks, and the impact on traditional financial systems. Corresponding risk mitigation strategies are proposed. By strengthening system architecture, employing advanced encryption technologies, enhancing legal and regulatory frameworks, maintaining policy stability, and promoting financial integration, these measures effectively mitigate financial risks associated with digital currency, fostering its sustainable development and innovation.

KEYWORDS

Digital currency; Financial risks; Risk mitigation strategies

1. INTRODUCTION

In recent years, with the transformation of the global financial system and the rapid development of blockchain technology, digital currency has emerged as a highly prominent economic phenomenon. Against this backdrop, the introduction of China's central bank digital currency (CBDC), known as digital renminbi, has attracted widespread attention and research. The launch of digital renminbi not only represents a significant attempt at financial technological innovation but also signifies the integration of the financial system with modern technology. However, along with the rise of digital currency comes a series of financial risks, such as operational risks, privacy risks, and ethical risks. These risks may pose threats to the stability of financial markets and the security of users' assets. Therefore, conducting in-depth and systematic research on the financial risks of digital renminbi is crucial for promoting the healthy development of digital currency, achieving a balance between financial security and innovation, and providing strong support for sustained economic growth and innovation in the financial industry.

2. INTRODUCTION TO DIGITAL CURRENCY: CONCEPTS AND CHARACTERISTICS

Digital currency, a form of innovative currency based on digital technology, utilizes cryptographic algorithms and other security technologies to ensure the authenticity, tamper resistance, and anonymity of transactions. Unlike traditional physical currencies, digital currencies exist only in electronic form and can be transferred and traded on the internet and other digital platforms. Figure 1 shows the price movement of Bitcoin. Currently, digital currencies can be divided into two main categories: non-legal tender digital currencies and legal tender digital currencies.

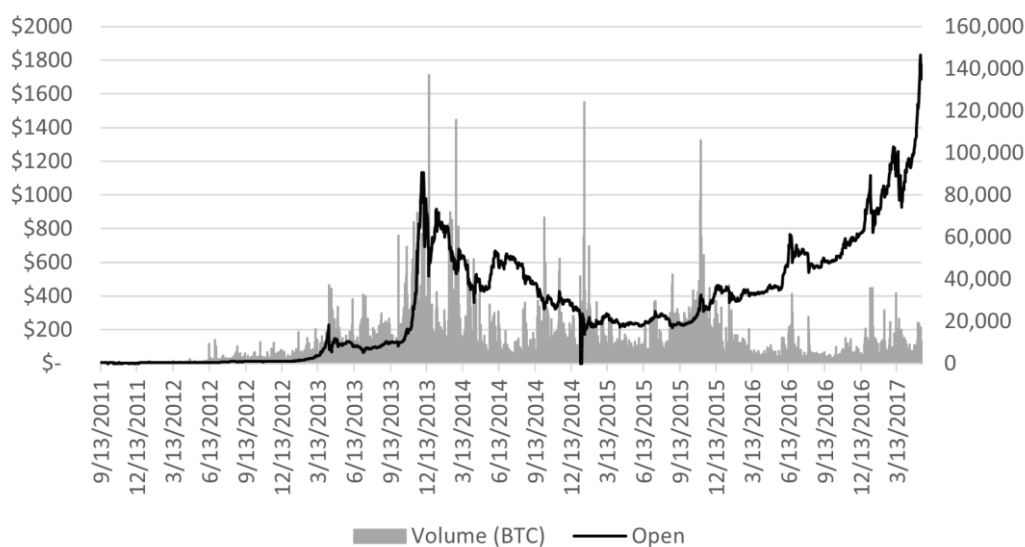


Figure 1. Bitcoin price fluctuation and trading volume over a period of time.

2.1. Non-Legal Tender Digital Currencies

Non-legal tender digital currencies, also known as cryptocurrencies, are digital currencies without the backing of a central issuing authority or regulatory body. They primarily exhibit the following characteristics:

Decentralization: Cryptocurrencies utilize decentralized blockchain technology, with no central authority controlling or managing their issuance and transactions. All transaction records are stored on distributed ledgers, verified, and recorded collectively by participants in the network.

Anonymity: Cryptocurrencies employ encryption algorithms and anonymous addresses to conceal the real identities of transacting parties, thereby protecting user privacy. This anonymity enables users to transact without disclosing personal information.

Global Scope: Cryptocurrencies are traded and circulated globally, without geographical restrictions, facilitating cross-border payments and transfers, making them more convenient and efficient.

2.2. Legal Tender Digital Currencies

Legal tender digital currencies are digital currencies issued by countries with legal status. Taking China's digital renminbi as an example, it possesses the following characteristics:

Centralized Issuance: Digital renminbi is issued and managed by the People's Bank of China, with clear issuing authorities and regulatory mechanisms, ensuring its stability and credibility.

Traceability: Transaction records of digital renminbi can be traced and queried by regulatory authorities, aiding in combating illegal activities and money laundering, thereby maintaining financial market order and security.

Limited Anonymity: Although digital renminbi also offers some degree of anonymity, compared to non-legal tender digital currencies, its level of anonymity is limited and within controllable limits, balancing user privacy and financial security needs.

Convenience and Low Cost: Digital renminbi enables peer-to-peer transfers and payments, reducing transaction costs and time, enhancing the efficiency and accessibility of financial services.

Legal tender digital currencies combine the advantages of digital currencies with the stability of traditional financial systems. By introducing centralized issuance and regulatory mechanisms, they mitigate potential risks, enhance system security and credibility, while also providing governments

with new monetary policy tools and financial market supervision methods, thereby promoting financial innovation and economic development. Although digital renminbi, as an innovative digital currency, offers many advantages, its operation and use also pose certain financial risks, which are the focus of this study.

3. FINANCIAL RISKS ASSOCIATED WITH DIGITAL RENMINBI

3.1. Operational Risks

3.1.1. System Failures and Security Issues

The operation of digital renminbi relies heavily on the stability of technology and systems. System failures, network interruptions, or security vulnerabilities may lead to transaction processing delays, data loss, or unauthorized access. Such risks could adversely affect user fund security, system reliability, and overall operations.

3.1.2. User Operational Errors

The use of digital renminbi involves certain technical and operational requirements, and user operational errors may result in fund losses or transaction errors. For instance, users may mistakenly send digital renminbi to the wrong address due to operational errors or fail to securely store private keys, leading to fund theft.

3.1.3. Security Vulnerabilities in Payment Terminals

Payment terminals for digital renminbi, such as mobile phones, smart cards, or other devices, may pose security vulnerabilities or be subject to malicious attacks, potentially resulting in user fund losses or misuse. Additionally, the reliability and security of payment terminals are crucial factors influencing user trust and adoption of digital renminbi.

3.2. Privacy Risks

3.2.1. Risk of Personal Information Leakage

During the registration, transaction, and supervision processes of digital renminbi, individual users are required to provide certain identity information. If this information is improperly collected, stored, or transmitted, or if it falls victim to hacking attacks or data breaches, it may lead to the leakage and misuse of users' personal privacy. This not only violates users' privacy rights but may also result in financial fraud and identity theft risks.

3.2.2. Confidentiality Challenges of Transaction Data

Despite the anonymity of digital renminbi transactions, in certain circumstances, regulatory authorities or other relevant parties may need to access transaction data for investigations, crime prevention, or financial stability maintenance. However, ensuring the lawful acquisition, use, and storage of this data to prevent misuse and leakage poses a significant privacy challenge. Additionally, if transaction data is intercepted or unlawfully accessed during transmission or storage, it may pose a threat to users' privacy and financial security.

3.3. Legal and Regulatory Risks

As an emerging form of digital currency, the independent operational architecture of digital renminbi is still evolving. There are many legal gaps in regulatory measures at the legal level in its issuance and circulation. Currently, the legal tender in China is mainly traditional paper currency, and digital renminbi has not yet been fully incorporated into the legal currency regulatory framework. For the counterfeiting of paper currency and coins, banks have established a comprehensive identification

and tracking mechanism. However, digital renminbi, due to its intangible nature, differs significantly in counterfeiting methods and regulatory approaches from physical currency. If legal tender digital currency is subject to hacking attacks and counterfeiting, the potential losses could far exceed those of traditional currency. As of now, China's regulation of digital currency still needs improvement, and specific usage norms for digital renminbi have yet to be clarified. When renminbi transitions from physical to virtual form, its legal definition and attributes also need clarification. These legal gaps in digital renminbi may make it difficult for legitimate holders to protect their rights through legal means when their interests are compromised, thereby fostering various illegal activities such as speculation, unauthorized operations, theft, fraud, and financial crimes.

3.4. Legal and Regulatory Risks

With the continuous deepening of China's foreign trade and economic cooperation, the scope of the renminbi's cross-border usage is gradually expanding. The application of digital renminbi in the field of cross-border payments has become a trend. At the same time, countries are actively exploring how to use their central bank digital currencies in cross-border transactions. However, within the current framework of the international monetary system, if countries plan to use central bank digital currencies for cross-border payments, these payments are still difficult to circumvent the three major international financial payment and clearing systems: SWIFT, CHIPS, and CHAPS.

SWIFT, as the organization that establishes, delivers, and converts international interbank message standards, expressed its willingness to cooperate with digital renminbi in early 2021 and jointly established a joint venture with institutions such as the Clearing Center of the People's Bank of China. Fundamentally, the central bank digital currency systems of various countries primarily exist as payment systems, complementing rather than replacing clearing systems. This means that when digital renminbi and other sovereign central bank digital currencies are used in cross-border applications, they still seem to rely on international financial payment and clearing systems.

3.5. Risks Impacting Traditional Financial Systems

3.5.1. Impact on Traditional Banking Services

The rise of digital renminbi may have an impact on traditional banking services. Due to its convenience, low cost, and global nature, users may prefer to use digital renminbi for payments and transfers, reducing the demand for traditional banking services. This could lead to customer attrition, decreased business volume, and reduced revenue for traditional banks, challenging their profitability and business models.

3.5.2. Issues of Payment System Transformation and Integration

The promotion of digital renminbi will trigger issues of payment system transformation and integration. Traditional payment systems rely on the intermediary role of banks and financial institutions, while digital renminbi facilitates peer-to-peer transactions through decentralized blockchain technology. This requires payment systems to undergo technological upgrades and integration to adapt to the characteristics and demands of digital renminbi. However, such transformation and integration may face challenges such as technical difficulties, compliance issues, and conflicts of interest, necessitating coordination and cooperation among relevant institutions.

3.5.3. Impact on Financial Market Stability

The promotion of digital renminbi may impact the stability of financial markets. On one hand, the convenience and global nature of digital renminbi may accelerate capital flows and financial market integration, improving market efficiency and flexibility. On the other hand, the anonymity and cross-border payment characteristics of digital renminbi may also increase financial market risks, such as capital flight and illegal fund flows. Additionally, if digital renminbi is widely accepted and used, it

may pose challenges to monetary policy, financial market regulation, and cross-border payment systems, requiring risk management and policy coordination by relevant institutions.

4. STRATEGIES FOR MITIGATING FINANCIAL RISKS OF DIGITAL RENMINBI

The promotion and application of digital renminbi have introduced various new financial risks, necessitating the implementation of effective risk mitigation strategies. Firstly, to address operational risks, it is essential to strengthen the security infrastructure and technological updates of the digital renminbi system to ensure its stable operation. Simultaneously, conducting user education and training activities can enhance users' security awareness and operational skills, thereby reducing the error rate. Furthermore, reinforcing the security management and monitoring of payment terminals and establishing a comprehensive registration management mechanism and real-time monitoring system can help identify and respond to security risks promptly.

To safeguard user privacy, advanced encryption and identity verification technologies should be employed. Establishing a personal information protection system to strictly protect users' personal information and prevent data leakage and misuse is crucial. Additionally, strengthening encryption and confidentiality measures for transaction data to ensure the secure transmission and storage of transaction data. While protecting user anonymity, establishing a robust identity verification mechanism and enhancing monitoring of suspicious transactions and abnormal behaviors are essential to ensure the compliant use of digital renminbi.

In response to legal regulatory risks, efforts should be made to enhance legal and regulatory construction, clarify the definition of illegal activities, and increase public awareness and understanding of laws and regulations. Moreover, improving the regulatory framework of digital renminbi, enhancing monitoring and analysis of suspicious transactions and abnormal capital flows, and maintaining financial market order are necessary. Additionally, attention should be paid to the digital divide issue, promoting financial inclusion, and reducing exacerbation of social inequality.

To optimize payment networks, collaboration with other central banks and payment clearing institutions is essential to jointly promote the construction of the digital renminbi cross-border payment network. Establishing bilateral or multilateral central bank digital currency payment systems to provide legal protection for digital renminbi cross-border payments is crucial. Finally, to mitigate the impact on traditional financial systems, promoting the integration of traditional banks with digital renminbi and establishing mechanisms for payment system reform and integration to ensure the smooth transition of payment systems and stable operation of financial markets are necessary.

5. CONCLUSION

In summary, as a legal digital currency, digital renminbi possesses distinct advantages such as efficiency, convenience, and security, aiming to drive financial innovation and enhance economic efficiency. However, concurrently, we must also recognize the multiple financial risks it brings, including operational, privacy, ethical, policy transmission, and impacts on traditional financial systems. Only through effective risk mitigation strategies can we navigate the path of digital currency development, ensuring a harmonious balance between financial security and innovation.

REFERENCES

- [1] Zhang Lili. The financial risk of the application of fiat digital currency and its prevention -- Based on gold Perspective of Consumer rights protection [J]. Guangxi Social Sciences, 2022(05).

- [2] Yu Wei, Wang Yurong, Yi Xianrong. Financial Risks of digital cryptocurrency: Features, Mechanism and prevention [J]. Jianghai Journal, 2022(01).
- [3] Wei Xiaoguang, Zhang Qian, Liu Zeyu. Risk and Supervision of digital currency in the blockchain era [J]. Jiangsu Communications, 2021(04).
- [4] Huang Guoping. Motivation, Opportunities and Challenges of the development of digital RMB [J]. Xinjiang normal University University Journal (Philosophy and Social Sciences Edition), 2022(01).