

Research on Legal Supervision Issues of Cross Border Payment of e-CNY

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Abstract: As China's e-CNY advances toward internationalization post-domestic pilots like the 2022 Winter Olympics, its cross-border payment system faces legal-regulatory challenges, such as ambiguous jurisdictional frameworks, sovereignty disputes, and fragmented global oversight. This study identifies risks spanning money laundering, privacy breaches, and regulatory arbitrage, driven by gaps in domestic legislation and insufficient multilateral coordination. To address these, a dual-track regulatory model is proposed, including strengthening domestic laws via tech-driven tools (e.g., AI monitoring, blockchain traceability) to balance privacy and public security and leveraging bilateral/multilateral platforms (e.g., Belt and Road partnerships) to harmonize standards on currency sovereignty and risk-sharing. Case analyses underscore the need for adaptive governance that integrates legal rigor with technological innovation, while fostering global consensus on digital currency rules. These insights offer a roadmap for e-CNY's secure global integration, balancing regulatory efficacy with cross-border interoperability.

1 INTRODUCTION

With the development of the digital economy and the advancement of technology, e-CNY, which conforms to the trend of the times, has emerged. China has extensively carried out pilot projects domestically, and the 2022 Beijing Winter Olympics conducted innovative application pilot projects for e-CNY. China is also promoting the international circulation of e-CNY. The Financial Gateway Information Service Co., Ltd., established in January 2021, has stated that SWIFT intends to collaborate with e-CNY to explore cross-border payment and liquidity solutions for future digital goods. The Hong Kong Monetary Authority is conducting technical tests on e-CNY cross-border payments with the Digital Currency Research Institute of the People's Bank of China. The Guangdong Macao Cross Border Financial Cooperation (Zhuhai) Demonstration Zone also intends to pilot the use of e-CNY in cross-border scenarios (Bu & Ma, 2022). However, the hidden legal conflicts and lack of rules in cross-border payments are becoming key constraints on their global application. Currently, e-CNY cross-border payments face multiple legal challenges. Firstly, there is a lack of laws related to e-CNY; Secondly, there is

controversy over currency sovereignty among countries; Thirdly, facing the issue of e-CNY regulation. This article focuses on research of e-CNY regulation issues. At present, the theoretical community believes that China should provide good legal and regulatory rules for the cross-border circulation of e-CNY. At the same time, it is difficult for each country to independently regulate, and the way out lies in establishing an international regulatory legal system (Bu & Ma, 2022; Rao, 2022). The White Paper on the Development Progress of China's e-CNY in July 2021 pointed out that the regulation of e-CNY should follow three principles: maintaining its status as a legal tender, strictly preventing financial risks, and encouraging technological innovation. The main measures include developing specialized business standards, strictly managing operating institutions, preventing illegal activities such as money laundering, preventing personal information leakage, and optimizing the usage environment (Li & Wu, 2023). Therefore, this article aims to evaluate the regulatory issues in cross-border payments of e-CNY through literature review and case analysis, assess the risks of e-CNY regulation, and elaborate on the basic principles of legal regulation of e-CNY, providing suggestions for

the establishment of regulatory rules for cross-border payments of e-CNY.

2 LITERATURE REVIEW

Firstly, regarding the issue of legal deficiency. Scholars have proposed that legal compensation has strict regional characteristics and is currently only applicable to domestic circulation. It does not have enforcement power in other countries and can only rely on the trust of the international community and the independent choice of market payment entities (Li & Wu, 2023). Some scholars also believe that virtual currency is different from traditional currency in that it is not legal tender, lacks legal protection, and its circulation is restricted everywhere (Eyal, 2017). In addition, some scholars believe that unclear or even missing legal provisions may weaken public confidence in digital currencies (Kapsis, 2021). Based on this, this research report believes that it should not be limited to the establishment of a single domestic legal regulation and the definition of legal concepts but should also focus on the joint analysis of domestic law, international law, and technological means.

Secondly, regarding the issue of monetary sovereignty. Scholars have proposed that the "positive externalities" and "winner takes all" characteristics of Central Bank Digital Currencies (CBDCs) will lead to strong competition among countries for CBDCs, and e-CNY will face resistance from other countries; Scholars have further proposed that there may be currency substitution of digital currencies by other countries and the substitution of digital currencies by dominant digital currencies of other countries (Bu & Ma, 2022; Li & Wu, 2023). Based on this, this research report believes that the above views tend to be more confrontational and can seek solutions through international cooperation.

In addition, regarding the regulation of e-CNY. Scholars have suggested that, like traditional currencies, Bitcoin is suitable for both legitimate purposes and can be used by criminals for illegal transactions. Digital currencies almost always carry this risk, and e-CNY is no exception (Silva Ramalho & Igreja Matos, 2021). The e-CNY pilot adopts a "controllable anonymity" mechanism, which divides access to users' personal information to different levels based on the value of their transactions. Small transactions are anonymous, while large transactions can be traced. This will enable a large number of transaction subjects to escape the control of China's financial regulatory system, thereby facilitating

international currency crimes. Some scholars have also proposed that users may be affected by uneven legal regulatory systems, and personal data may be transferred to countries with lower protection standards, which may also be accessed by foreign governments without authorization, putting users at risk of international data breaches (Cheng, 2022; Artemov, et.al, 2020; Kieran Murphy et al., 2024). Therefore, the protection of personal data requires a dynamic balance between self and others, private space and public domain (Acquisti, et.al, 2016). In addition, some scholars have further pointed out that there are problems in the allocation of international regulatory responsibilities for cross-border payments of digital currencies, making it difficult to form coordinated and consistent international regulatory rules and standards. It is pointed out that the basic principles of international regulatory cooperation should be ensured, and new models of technology regulation should be added (Li & Wu, 2023). We need to establish specialized regulatory agencies, clarify the division of regulatory responsibilities, develop a regulatory framework that covers entry thresholds, business scope, and risk prevention and control, and pay attention to the precise definition of responsibilities of regulatory departments at all levels. In response to the new business models in the development and application of e-CNY, it is necessary to maintain moderate regulatory flexibility, balance innovation incentives and risk prevention and control (Wang & Zhong, 2020).

Based on this, this paper believes that the above views do not establish specific principles in regulation, do not specify the way of science and technology regulation, and do not specify the specific dispute resolution method when the transaction involves the interests of many countries. For example, how the regulatory power of each country should be allocated and also ignore the situation that some countries in the international community may not cooperate with each other. Therefore, the system and rules can be gradually improved through the "Belt and Road".

3 PRINCIPLES AND RISKS OF CROSS BORDER PAYMENT SUPERVISION FOR e-CNY

3.1 Basic Principles of Cross Border Payment Supervision for e-CNY

3.1.1 Principle of Balancing Personal Privacy and Public Interest

Privacy is a human right, not only an important barrier for individuals to achieve personal dignity, but also an important factor in building a social trust system. In today's rapidly developing digital economy, privacy protection is facing unprecedented challenges and opportunities. Related scholars have proposed that the protection of personal data requires a dynamic balance between self and others, private space and public domain, which is particularly important in the regulatory practice of e-CNY. In the current digital economy, there is a structural contradiction between the efficiency of data circulation and privacy protection (Acquisti et al., 2016). Excessive emphasis on privacy protection may hinder the efficiency of financial transactions and harm socio-economic benefits, but if social benefits are excessively pursued, such as in some countries where open payment data sharing leads to transaction information being abused by commercial institutions, it can cause privacy risks. This dilemma is particularly prominent in the application of e-CNY, as it combines legal compensation and digital features. It requires both enhancing the influence of monetary policy through data circulation and preventing CBDC from becoming a loophole for information leakage.

3.1.2 Balancing Regulatory Legal Systems with Scientific and Technological Principles

In the context of the digital age, the synergistic development of legal systems and scientific technology, which is a mutually empowering and beneficial interaction, has particular practical value in the cross-border supervision of e-CNY.

The legal system plays a supportive role in technological innovation. In response to scientific and technological advancements such as blockchain and artificial intelligence, countries have successively issued normative documents, which not only clarify the legal boundaries of scientific and technological applications but also reserve legal space for key

technological innovations. This legislative wisdom of system first, flexible regulation not only prevents the risk of technological loss of control but also ensures the vitality of technological innovation.

Technology can empower legal regulation. A cross-border fund monitoring system based on big data, which can track the transaction path of e-CNY in real time; By utilizing the immutable nature of blockchain, anti-money laundering capabilities can be significantly improved; The application of smart contract technology enables the automated execution of pre-set regulatory rules among central banks in multiple countries.

It can be seen that the legal system can pave the way for science and technology, provide legal protection and preferential policies for emerging technologies. At the same time, using technology to assist legal supervision can improve regulatory efficiency and expand regulatory scope. Balancing both can better achieve cross-border regulation of e-CNY.

3.2 Risks of Cross-Border Payment Supervision for e-CNY

3.2.1 Breeding of International Money Laundering Crimes

As a digital currency, e-CNY has anonymity, and there are still many unclear regulations in its legal system. There is a risk that criminals may use the legal loopholes between digital currency and traditional currency conversion to commit cross-border money laundering crimes, thereby endangering the security of the country's currency reserves.

In 2013, the Liberty Reserve case was the largest money laundering operation in history at that time (FATF, 2014). In this case, an international trading platform for free reserve dollars and free reserve euros used Liberty Reserve for online payments, with Liberty Reserve serving as an intermediary and bridge in the flow of dollars and euros. Since 2006, the platform has conducted millions of financial transactions, the vast majority of which are related to financial crimes. Due to the low entry threshold of Liberty Reserve, which allows anonymous use and relaxed identity checks on users, a large number of users register with false or even fabricated information, which will greatly weaken the strength of financial regulation and provide convenience for criminals to carry out money laundering and other criminal activities. Also, due to Liberty Reserve's global support, there is no need for credit card

activation, which will lower the threshold for cross-border payments and hide significant international money laundering risks. Although Liberty Reserve does not trade e-CNY, the international crime outbreak in 2013 serves as a warning to countries that the use of digital currencies carries the risk of breeding international money laundering crimes (Silva Ramalho & Igreja Matos, 2021).

3.2.2 Personal Privacy Leakage

The circulation of e-CNY requires registration and authentication of information before it can be circulated normally. There is a risk of data leakage in this process, which may involve personal data or identity information in transactions being obtained by hackers, malicious software, etc. due to security vulnerabilities, resulting in the theft of user identity information, telecommunications fraud, etc.

In the international context of CBDC, data flows across borders. This will result in inadequate regulation due to the lack of unified legal systems in various countries. Personal data may be transferred to countries with lower protection standards, which may also be accessed by foreign governments without authorization, putting users at risk of international data breaches (Kieran Murphy et al., 2024). In addition, in addition to central banks of various countries, some non-central bank organizations may also have the right to participate in various CBDC transactions, and they may not have the ability to ensure relative safety, resulting in additional financial risks (World Economic Forum, 2021).

In addition, the majority of respondents believe that privacy protection is the primary condition for using e-CNY (ECB, 2021). However, due to unclear or even missing legal provisions, it may weaken public confidence in digital currencies, trigger resistance among the masses, and further hinder the development of digital currencies (Kapsis, 2021).

Therefore, in the process of regulating e-CNY, in order to ensure the effective circulation and payment of e-CNY, personal privacy may be leaked, posing a threat to personal privacy security and affecting the popularity of e-CNY.

4 ESTABLISHMENT OF INSTITUTIONAL RULES FOR THE SUPERVISION OF e-CNY

4.1 Domestic Level

4.1.1 Improve Domestic Legislation

In 2020, the People's Bank of China (PBOC) and four other ministries jointly issued the Opinions on Financial Support for the Construction of the Guangdong Hong Kong Macao Greater Bay Area, which clearly proposed the establishment of a "sandbox" for cross-border financial innovation supervision (PBC, CSRC&SAFE, 2020). Regulatory sandbox is a trial-and-error mechanism with conditional regulatory exemptions, which has the advantage of balancing the encouragement of innovation and risk prevention (Wang & Chen, 2023; Zhang, 2018). Therefore, China can apply innovative e-CNY regulatory legislation in pilot zones such as special economic zones, and timely adjust the problems exposed in the sandbox to prevent hidden risks.

There are many contradictions between China's pilot of e-CNY and legislation, and the law often lags behind relevant practices. For example, the current pilot of e-CNY may conflict with China's Personal Information Protection Law (PIPL). According to PIPL, anonymized personal information cannot be identified and cannot be recovered after anonymization processing. However, in the pilot of e-CNY, user information can still be traced when investigating and punishing regulatory activities such as money laundering (Cheng, 2022). This is equivalent to preserving the possibility of "de anonymization" at the technical level, which conflicts with legal provisions and requires further clarification and regulation by relevant laws. Therefore, the newly added or improved clauses in PIPL can be piloted and implemented in the regulatory "sandbox". Through investigation and evaluation, eligible economic zones such as free trade zones and free trade ports can be used as a "sandbox" for control group experiments.

4.1.2 Supervision Through the Use of Big Data and Other Technological Means

Establish a big data center, utilize distributed ledgers to obtain timely, analyze, and monitor the transaction status of e-CNY, discover abnormal and suspicious transactions, and extract and preserve evidence (Bu & Ma, 2022). Regulatory technology should also be

applied, such as China's e-CNY pilot using a "controllable anonymity" mechanism. Its technology achieves intelligent separation of user identity and transaction information in the transaction verification process through layered encryption and permission control. According to the value of user transactions, accessing their personal information is classified into different levels, with small transactions being anonymous and large transactions being traceable. Small scale anonymity means that in retail transactions, only the ownership of the wallet needs to be verified rather than the user's identity, while in large scale transactions, information is traced according to legal and regulatory rules. PBOC describes this controllable anonymous connection between a user's bank account and their electronic RMB wallet as a 'loosely coupled account link' (Cheng, 2022). This not only meets the privacy needs of daily payments but also ensures effective public supervision such as anti-money laundering. Regulatory agencies need to improve their regulatory level through regulatory technology, anticipate potential risks in advance, monitor the market in real-time 24 hours a day, maintain long-term tracking of issues, and strengthen collaboration and cooperation among various departments. At the same time, it is necessary to improve the ability to analyze and control risks, so that regulatory work can discover problems faster and solve them more effectively.

By utilizing technological means for supervision, it is possible to comprehensively and effectively regulate cross-border payments of e-CNY. Under the application of big data, achieve full coverage and round the clock supervision, and reduce the probability of oversight.

4.2 International Level

4.2.1 International Consensus on Regulatory Rule Design-"The Belt and Road" Regional Demonstration

The current situation poses challenges to the standardized development of e-CNY cross-border payment business. Given that it is still difficult to reach a global and large-scale international consensus, and based on the international situation, some countries refuse to cooperate, China can establish an international coordinated regulatory mechanism starting from the "the Belt and Road". As cross-border payment involves two-way flow of funds, PBOC and other regulatory authorities need to establish cooperation alliances with regulatory authorities in various countries. By signing bilateral

treaties, multilateral treaties and other forms, the dispute resolution mechanism for cross-border circulation of e-CNY and the allocation of powers and responsibilities for supervision in various countries should be clarified, so as to form unified international regulatory norms and international customs. Through information sharing and joint law enforcement, they should jointly crack down on illegal and criminal activities such as money laundering through cross-border payment channels and effectively build a defense line for financial security.

Starting from the "the Belt and Road", we should start from a small scale to reach an international consensus on the "the Belt and Road" and then expand our influence to escort the internationalization of e-CNY. Through this gradual breakthrough strategy, e-CNY is expected to establish a regional cross-border payment main channel, providing a Chinese solution for reconstructing the international monetary order.

4.2.2 Improve International Regulatory Agencies for Digital Currencies

The scale of global digital currency transactions is becoming increasingly large, and the international community urgently needs to establish a unified regulatory framework and improve the international regulatory agencies for digital currencies.

According to the 1965 Washington Convention, member countries of the World Bank (WB) established the International Centre for the Settlement of Investment Disputes (ICSID) to resolve disputes between governments and foreign private investors through mediation or arbitration, promote mutual trust, and encourage international capital flows. Non-governmental investors who have disputes over digital currencies with the host country can apply for ICSID mediation or arbitration (Li & Qu, 2022). In view of this, member countries of the World Bank (WB) can establish an international regulatory body for digital currencies by improving the 1965 Washington Convention. International regulatory agencies for digital currencies have the authority to control global digital currency circulation data and have an obligation to capture data with risks. They can establish multiple functional departments, such as the Digital Currency Technology Group, to maintain the system on a daily basis, solve technical problems in cross-border supervision, and build a global digital currency crime case database; The Digital Currency Crime Supervision Group focuses on anti-money laundering and other work, providing illegal activities

and electronic data evidence to ICSID; The risk control center establishes a five level response mechanism and initiates differentiated disposal plans for different risk levels.

International regulatory agencies for digital currencies can also suggest that countries share successful cases in a timely manner, widely collect experiences from various countries, ensure effective regulation of digital currencies, and ensure accurate implementation of dispute resolution.

5 CONCLUSION

This article analyzes the principles and risks of e-CNY cross-border payment regulation through literature review and case analysis methods and further summarizes how to establish a regulatory system for e-CNY cross-border payments. Specifically, in the regulation of e-CNY cross-border payments, it is necessary to adhere to the balance between personal privacy and public interests, take into account regulatory legal systems and scientific and technological principles, and face risks such as money laundering and personal privacy leakage. We should improve domestic legislation, use big data and other scientific and technological means to regulate, reach international consensus on the design of regulatory rules through the "the Belt and Road" pilot demonstration, and improve national regulatory agencies for digital currencies to ensure the internationalization of e-CNY. Future research can delve into the application boundaries of science and technology such as artificial intelligence in cross-border payment regulation, laying a compliant development path for the internationalization of e-CNY.

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