
COULD THE “DRAGON” NOW FLY BEYOND BORDERS?
CONTEXTUALIZING REGULATORY ASPECTS AND RISKS
FOR CHINA’S CBDC CROSS-BORDER USE

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Abstract

Current literature on central bank digital currencies (CBDCs) generally focuses on the regulatory issues in a domestic context. However, the expected international trial of Chinese CBDCs, issued by the world’s second-largest economy, undoubtedly deepens relevant regulatory concerns, which requires trenchant scholastic reviews. This paper aims to address three regulatory considerations relating to the cross-border use of CBDCs: (1) the anti-money laundering concern when financial authorities experiment CBDCs across multi-jurisdictions; (2) the Retail CBDC liquidity risks identification; and (3) the capital flow-in and settlements through future Wholesale CBDC. It attempts to point out the basic prerequisites and most significant risks, when China’s CBDCs flow beyond its borders. The paper posits China’s CBDCs, including both retail and wholesale scenarios, as a sample to present key legislative and regulatory challenges for global central banks and financial regulators. It intends to make a series of policy recommendations to facilitate the circulation of China’s CBDCs in international financial markets and to achieve the RMB Internationalization, such as constructing effective regulatory cooperation, conforming to bilateral currency transferring agreements, enforcing macro-prudential regulations, and revising the framework of settlement rules.

I. INTRODUCTION

Nowadays, most countries in the digital era have witnessed the co-existence of privately-issued and government-issued money that operate competitively with each other in national and international financial systems. In 2008, the very first blockchain-based cryptocurrency – Bitcoin – was invented by Satoshi Nakamoto who published an online paper promoting a new form of electronic cash that users can send to each other without going through financial intermediaries like banks.¹ Since then, the recent decade has seen the explosive growth of cryptoassets issued by private entities including tech start-ups, investment funds, and other financial institutions. As of February 2022, there was a total of

¹ Satoshi Nakamoto, *A Peer-to-Peer Electronic Cash System*, MICRO STRATEGY (Oct. 31, 2008), <https://www.microstrategy.com/en/bitcoin/documents/bitcoin-a-peer-to-peer-electronic-cash-system> (last visited Dec. 26, 2022).

10,397 digital coins being traded globally.² Compared with traditional banknotes and coins, cryptocurrencies have certain advantages like decentralisation, cost-effective transaction, and anonymity.³ However, cryptocurrencies are also known for extreme price volatility, making them a less desirable alternative to banknotes as being a medium of exchange, a unit of account, and a storage of value.⁴ Accordingly, stablecoins, such as Tether (USDT) and Facebook-backed Diem, have been created to address the problem of price instability as their value is pegged to mainstream currencies, commodities, or financial instruments.⁵ Nonetheless, the lack of official backing for most cryptocurrencies and stablecoins means that they are less likely to become a mainstream form of money or legal tender.⁶ In practice, their primary use is for investors, speculators, and traders to bet on their short-term increase or decrease of value.

Meanwhile, central banks and financial authorities across the world have been devising or testing their own versions of digital currencies, namely the central bank digital currencies (CBDCs) or sovereign digital money, so as to maintain their supreme status and influence in the economy. Some well-known CBDC pilot projects include the European Central Bank (ECB)'s digital euro, the People's Bank of China (PBOC)'s digital yuan, and more recently, the US Federal Reserve's digital dollar.⁷ According to the Bank for International Settlements (BIS), 86% of 65 surveyed central banks have been engaging in some forms of CBDC work, with 60% of them having progressed from conceptual research to experiments or proofs-of-concepts and 14% moving forward to development and pilot arrangements.⁸ CBDCs offer certain benefits that are typically found in any central bank-issued money, such as settlement finality, liquidity, integrity, and public trust. Contrary to decentralised cryptocurrencies, CBDCs will be governed by a centralised system similar to that for

² Number of cryptocurrencies worldwide from 2013 to February 2022, STATISTA, <https://www.statista.com/statistics/863917/number-crypto-coins-tokens/> (last visited June 1, 2022).

³ Lerong Lu, *Bitcoin: Speculative Bubble, Financial Risk and Regulatory Response*, 33 BUTTERWORTHS JOURNAL OF INTERNATIONAL BANKING AND FINANCIAL LAW 178, 178-82 (2018).

⁴ Most economists agree that money has to fulfil three basic functions as a medium of exchange, a unit of account, and a store of value. See Paul Davidson, *Money and the Real World*, 82 THE ECONOMIC JOURNAL 101, 101-15 (1972).

⁵ Gary B. Gorton and Jeffery Zhang, *Taming Wildcat Stablecoins*, forthcoming at 90 UNIVERSITY OF CHICAGO LAW REV. (Sep. 30, 2021), <https://ssrn.com/abstract=3888752> (last visited Dec. 26, 2022).

⁶ Legal tender has a narrow technical meaning: if you offer to fully pay off a debt to someone in legal tender, they can't sue you for failing to repay. See Bank of England, *What is legal tender?*, <https://www.bankofengland.co.uk/knowledgebank/what-is-legal-tender> (last updated Jan. 30, 2020).

⁷ European Central Bank (hereinafter referred to as ECB), *A digital euro*, https://www.ecb.europa.eu/paym/digital_euro/html/index.en.html (last visited Dec. 26, 2022); People's Bank of China (hereinafter referred to as PBOC), *The White Paper on the Research and Development of China's Digital Yuan* (July 16, 2021), <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4293590/2021071614200022055.pdf> (last visited Dec. 26, 2022); and The US Federal Reserve, *Federal Reserve Board Releases Discussion Paper That Examines Pros And Cons Of A Potential U.S. Central Bank Digital Currency* (Jan. 20, 2022), <https://www.federalreserve.gov/newsevents/pressreleases/other20220120a.htm> (last visited Dec. 26, 2022).

⁸ Codruta Boar, Henry Holden, and Amber Wadsworth, *Impending Arrival - a Sequel to the Survey on Central Bank Digital Currency*, 107 BIS PAPERS (Jan. 2020), <https://www.bis.org/publ/bppdf/bispap107.pdf>, (last visited Dec. 26, 2022).

conventional banknotes, so all transaction records and data could be accessed by financial authorities. CBDCs also contribute to the effective making of monetary policies as an interest leverage tool, and could even be charged with extra regulatory functions in relation to anti-money laundering (AML) and combating the financing of terrorism (CFT).

In the 21st century, the world is expected to observe the concurrence of both private and public digital money, which presents various technical solutions and regulatory challenges. The currency competition between popular private global currencies (e.g., Bitcoin, Ethereum, and USDT) and public global currencies (i.e., CBDCs) is likely to last for a long time. The initiators of most digital currencies claim their products to be more advanced and cost-effective, thanks to the use of latest technologies underpinning a safer and efficient payment system. Therefore, most central banks are facing open questions like: which form of digital currency will be the optimal choice for our economies and financial markets in the future? Could cryptocurrencies or CBDCs make monetary and payment systems more robust and resilient? Could digital money push forward the boundaries of money's traditional utility and value landscape?⁹ In most cases, the answers are likely to be CBDCs which seem to be a more viable option for the future world, due to their advanced regulatory functions, stable value, official endorsement, and consequently, the wider acceptability.

Considering the rising popularity of sovereign digital currencies in the context of currency competition, one way for central banks to boost the further growth and mass application of CBDCs is expanding the cross-border usability. It is of particular important for emerging economies, like China, which have a national goal of achieving currency internationalization.¹⁰ According to the Financial Stability Board (FSB), there is a consensus among major economies, such as the G20, to enhance cross-border payments.¹¹ Providing faster, cheaper, and more transparent and inclusive cross-border payment services would be beneficial for citizens, businesses, and national economies. As the Bank for International Settlements (BIS) noted, the Covid-19 pandemic made global policymakers rethink the significance of optimizing global payment and settlement systems, leading some countries to further explore the possibility of

⁹ The utility and value landscape of money means that they could be measured and used in different ways in our economy. For example, M1 as the narrow money includes banknotes and coins in circulation and other cash equivalents. M2 includes M1 plus those short-term time deposits in commercial banks and some money market funds. M3 includes M2 plus certain long-term deposits. See Stephen M. Miller, *Monetary Dynamics: An Application of Cointegration and Error-Correction Modeling*, 23 JOURNAL OF MONEY, CREDIT AND BANKING 139, 139-54 (1991).

¹⁰ For the topic of the internationalization of Renminbi, see *2021 Report on RMB Internationalization*, PEOPLE'S BANK OF CHINA (Sep. 18, 2021), <http://www.pbc.gov.cn/goutongjiaoliu/113456/113469/4344602/2021091814193942128.pdf> (last visited Dec. 26, 2022).

¹¹ Financial Stability Board, *Enhancing Cross-border Payments: Stage 3 roadmap* (Oct. 13, 2020), <https://www.fsb.org/wp-content/uploads/P131020-1.pdf> (last visited Dec. 26, 2022).

developing cross-border central bank digital currencies (CBDCs).¹² Mr. He Dong, from the International Monetary Fund (IMF), suggested that, “CBDCs would not qualitatively change the economic force that lead to the international use of currencies, but they could enhance the incentives behind currency substitution and currency internationalization.”¹³ Clearly, facilitating the cross-border use of CBDCs is beneficial for the global economy, as it contributes to higher efficiency in international payment and settlement systems and is likely to enhance multilateral economic cooperation in neighboring countries and beyond. However, the potential financial risks and regulatory challenges should not be underestimated.

For China, accelerating the cross-border use of CBDCs is critical to realizing the country’s long-term national strategy of the internationalization of RMB to compete with other major currencies in international payments. In response, China has sped up its own CBDC experiment – the digital yuan or digital renminbi (RMB) – by joining the “Multiple CBDC (m-CBDC) Bridge” project, whose other members are the Hong Kong Monetary Authority and the central banks of Thailand and the UAE.¹⁴ The PBOC has legally defined retail-CBDCs (Digital Currency Electronic Payments or DCEP) as digital “fiat money,” meaning it is currently incapable of being freely exchanged beyond the country’s borders, which may severely restrict DCEP’s acceptance and application at both domestic and international level. This issue is of particular importance for China’s policy-makers, as the country has been actively promoting the use of retail-CBDCs on a large scale within its borders. Accordingly, exploring the cross-border use of CBDCs has become an urgent task for the PBOC. China, as the world’s second largest economy, should be cautious if and when it experiments with cross-border CBDCs and needs to carefully consider regulatory challenges like financial stability and regulatory compatibility.

When we review the current research papers on China’s CBDCs, we find that most of existing literature focus on the domestic design, use, and innovation of CBDCs.¹⁵ Major research outcomes in the field of CBDCs have mostly been published by the national central banks, international institutions, and related enterprises in the industry, as they would have more access to official data and information compared with legal scholars and researchers working in an university environment. However, the research topic of “cross-border use

¹² Bank for International Settlements (hereinafter referred to as BIS), *Central bank digital currencies for cross-border payments: Report to the G20*, (July 2021), <https://www.bis.org/publ/othp38.pdf> (last visited Dec. 26, 2022).

¹³ Dong He, *Digitalization of Cross-border Payments*, 14 CHINA ECONOMIC JOURNAL 26, 26-38 (2021).

¹⁴ BIS, *Multiple CBDC (mCBDC) Bridge* (Nov. 14, 2022), https://www.bis.org/about/bisih/topics/cbdc/mcbdc_bridge.htm (last visited Dec. 26, 2022).

¹⁵ For example, see Wei Shen and Hou Liyang, *China’s Central Bank Digital Currency and Its Impacts on Monetary Policy and Payment Competition: Game Changer or Regulatory Toolkit?*, 41 COMPUTER LAW AND SECURITY REV. 105577 (2021); and Lerong Lu and Hang Chen, *Digital Yuan: The Practice and Regulation of China’s Central Bank Digital Currency*, 36 BUTTERWORTHS JOURNAL OF INTERNATIONAL BANKING AND FINANCIAL LAW 601, 601-03 (2021).

(payment) of CBDCs” has gained more popularity since 2020.¹⁶ Some scholars have attempted to roughly picture the basic regulatory frameworks for the cross-border use of CBDCs in China,¹⁷ but without further assessing the detailed risks and regulatory solutions.¹⁸ Neither did they discuss this topic with reference to international standards and regulations.

Against this background, the paper aims to explore and critically analyze the regulatory aspects and risks relating to the cross-border use of China’s CBDCs, which will be discussed in the context of international financial systems and relevant regulatory frameworks. It endeavors to better understand the feasible mechanism and possible cooperation among three areas of regulatory practices with a forward-looking perspective: anti-money laundering enforcement (Part II), global trading retail use (Part III), and wholesale use in capital markets for qualified foreign investors (Part IV). The settle of these issues requires bilateral, multilateral, and even international efforts by sovereign states, so this paper will provide a roadmap for future academic debates and policy-making processes. In Part V, it draws a conclusion by making suggestions for the future research of cross-border use of CBDCs. It advocates that regulatory risks arising from CBDCs’ cross-border use could only be addressed and mitigated by a compatible design and multilateral coordination.

II. TRACKING MONEY FLOW: HOW CBDCs ASSIST ANTI-MONEY LAUNDERING ACROSS MULTI-JURISDICTIONS?

The cross-border circulation of money could result from either the ordinary course of international business transactions or other illegal activities such as money laundering. In principle, complying with the anti-money laundering (AML) or combating the financing of terrorism (CFT) regulations shall be a prerequisite for any countries that intend to promote the cross-border use of their CBDCs in international financial markets. In China’s case, the key AML compliance issues regarding the cross-border use of CBDCs can be summarized in two aspects.

Firstly, the cross-border use of CBDCs shall be in line with the existing AML law in China and international conventions. Although meeting AML or CFT requirements is less likely to be a core regulatory objective and will not be the primary motivation for any countries to issue CBDCs, central banks are

¹⁶ Raphael Auer *et al.*, *CBDCs beyond borders: results from a survey of central banks*, 116 BIS PAPERS (June 2021), <https://www.bis.org/publ/bppdf/bispap116.pdf> (last visited Dec. 26, 2022).

¹⁷ See Bu Xuemin, *On the Challenges and Institutional Construction of Central Bank Digital Currencies’ Cross-Border Flow*, 29 *PACIFIC JOURNAL* 25, 25-38 (2021); Meng Yuqun, *Legal Issues and Regulations on Constructions of Cross Border Payment with Central Bank Digital Currency*, 4 *ZHENG FA LUN CONG* 36, 36 (2021).

¹⁸ It should be noted that some scholars have tried to analyze the regulatory risks and propose solutions, considering cross-border spillover effects of the domestic CBDC, and focusing on the foreign sovereign state’s monetary stability and capital control measures. See C.Y. Tsang and P.K. Chen, *Policy Responses to Cross-border Central Bank Digital Currencies—Assessing the Transborder Effects of Digital Yuan* (Aug. 8, 2021), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3891208 (last visited Dec. 26, 2022).

expected to design CBDCs in a manner that their operation will conform to such requirements (along with other regulatory expectations and disclosure laws).¹⁹ This requires central banks and financial regulators, when experimenting CBDCs domestically and internationally, to incorporate the compulsory requirements under current AML frameworks into CBDCs' payment and settlement process. The ex-ante approach would be the most effective and economical regulatory strategy before authorities widely rolling out their CBDC pilot schemes.

Secondly, promoting the cross-border use of CBDCs is progressively conducive to the enforcement of Chinese AML law at both domestic and international level. Based on our empirical research that collected AML data from ten mainstream jurisdictions (see Table 1), "identity" is found to be the most common factor for triggering influential AML enforcement cases which often lead to a fine of over US\$100,000 (including one case from Netherlands that involves a penalty of over US\$500 million). As shown in Table 1, failures to conduct customer due diligence (CDD) or identify account ownership have been the common reason accounting for the hefty fines imposed on financial institutions and other corporations. This suggests that anti-money laundering investigations are primarily focused on the verification of clients' identities and accounts, before the law enforcers starting to assess the source and flow of funds, business relationships and suspicious transactions, and to prepare relevant reports and evidence for the AML regulatory authorities.

TABLE 1: SELECTED EXAMPLES OF GLOBAL ANTI-MONEY LAUNDERING ENFORCEMENT CASES (2021)²⁰

	Jurisdictions	Regulators	Correspondents	Regulatory Findings and Decisions
1	United States	NFA	OANDA corporation	Violations of AML Procedures and Internal Controls (Rules 2-9(c) and 2-36(e))
2	South Africa	SARB (Central Bank)	Deutsche Bank-AG	Violations of Customer Due Diligence (21 to 24 of the FIC Act)
3	India	RBI (Central Bank)	Bihar Awami Co-operative Bank Ltd.	Violations of Customer Due Diligence (Section 46 (4) and Section 56 of

¹⁹ BIS, Central bank digital currencies: foundational principles and core features (2020), <https://www.bis.org/publ/othp33.pdf> (last visited Dec. 26, 2022).

²⁰ The table has been compiled by the authors.

				AACS
4	Singapore	MAS	Bank J. Safra Sarasin Ltd	Failure to establish Internal process, monitor wealth sources of Customers and business relationship
5	Netherlands	NPPS	ABN AMRO Bank	Failure to assign risk classification, identify account and monitor money flow
6	United Kingdom	HMRC	Neelam Amand MSB	Failure to notify changes/correct inaccuracies (Violation of Regulation 57)
7	United Arab Emirates	CBUAE	an exchange house (with the name not specified)	Weak AML Compliance framework (Violation of Article 14 of the Federal Decree Law No. 20 2018)
8	Canada	FINTRAC	C&Z Holdings Ltd	Failure to submit, assess, notify and develop relevant information
9	Norway	Finanstilsynet	DNB BANK ASA	Failure to establish Internal process, monitor wealth sources of Customers and business relationship
10	Cayman	CIMA	Intertrust Corporate Services (Cayman) Ltd	Failure to do Customer due diligence, obtain evidence, identify, and monitor. (Violations of 42A and 42B of Monetary Authority Act 2020 and AMLRs)

A. Technical Anonymity and Legal Compatibility

Considering that the anonymity design will be a common feature for most CBDCs, when central banks launch sovereign digital money for the cross-border use, balancing the AML compliance requirements with the protection of personal data privacy across multiple jurisdictions would be a common concern that merits regulatory attention and multi-party coordination.

However, as for individual jurisdictions that have distinctive economic, political and legal environments, the regulatory tasks of balancing the aforementioned two goals might vary in terms of mitigating the gaps or improving the compatibility of their existing legislative frameworks. For example, in the European Union (EU), the “proportionality test” is a requirement for member states to ensure that the regulatory power given to any governments under a particular law does not unduly restrict other fundamental rights under Article 52(1) of the Charter of Fundamental Rights in the European Union.²¹ Besides, the AML transaction monitoring process could be referred to and evaluated by the Court of Justice of the European Union (CJEU) for further justification on whether a case requiring banks to implement detection and report suspicious activities of their customers is compliant with the Article 23 of the General Data Protection Regulation (GDPR) interpreted in light of Article 52(1) of the Charter.²² In contrast, Hong Kong regulators hold a view that personal data is exempt from data protection rules where such data will be used for the prevention and detection of crimes.²³ As for Mainland China, data security and privacy has been a new topic of academic and policy discussion in recent years. The first Chinese data privacy law called “Personal Information Protection Law (PIPL)” was passed by China’s National People’s Congress in August 2021, which lays out for the first time a comprehensive set of rules about data collection in the country and ends the once freewheeling environment of data breach. Although no clauses have been specifically made for connecting the AML compliance issue with personal data collection, the Article 34 of PIPL requires that administrative officials and regulators shall collect personal information within the range and level not exceeding necessary limitation.²⁴

Based on the aforementioned legislations, it could be summarized that different legal regimes and patterns, with the objective to strike a delicate balance between AML and data protection laws, could be categorized into two models:

²¹ See Harbo Tor-Inge, *The Function of the Proportionality Principle in the EU law*, 16 EUROPEAN LAW JOURNAL 158, 158-185 (2010); Wolf Sauter, *Proportionality in EU Law: A Balancing Act?*, 15 CAMBRIDGE YEARBOOK OF EUROPEAN LEGAL STUDIES 439, 439 (2013).

²² Astrid Bertrand, Winston Maxwell, and Xavier Vamparys, *Do AI-Based Anti-Money Laundering (AML) Systems Violate European Fundamental Rights?*, 11 INTERNATIONAL DATA PRIVACY LAW 276, 276-93 (2021).

²³ The Personal Data (Privacy) Ordinance, 486 Hong Kong E-legislation §58 (1) (2012), https://www.e-legislation.gov.hk/hk/cap486/en?INDEX_CS=N&xpid=ID_1438403263424_003 (Dec. 26, 2022 last visited).

²⁴ Geren Xinxi Baohu Fa (个人信息保护法) [Personal Information Protection Law (hereinafter referred to as PIPL)], (promulgated by the Standing Comm. Nat’l People’s Cong., Aug. 20, 2021, effective Nov. 1, 2021), art. 34 (Chinalawinfo).

1) the EU Model, where the domestic regulatory enforcement would be referred to and measured by the European court system for the revaluation of balancing interests on both sides,²⁵ and 2) the China Model (including Hong Kong SAR), which seems to highlight the priority of detecting potential money-laundering activities, and meanwhile it takes account of the necessary protection of personal data during the process of investigation. It is worth mentioning that one major distinction between the Chinese and EU models reveals that the current financial judicial system in China does not lead or shape regulatory attitudes. Instead, the court decisions relating to financial disputes usually follow the regulatory policies and decisions implemented by financial regulators,²⁶ which suggests that Chinese financial regulators have more power in maintaining financial stability and financial order, compared with their European counterpart. Accordingly, as one of the financial authorities, the Chinese central bank is likely to prioritize the compliance of AML regulations over other regulatory goals when issuing CBDCs, for the sake of safeguarding financial stability and security.

It is suggested that establishing a token-based CBDC system with full anonymity tends to be a risky attempt and would not be welcomed by Chinese regulators in the future.²⁷ As for the EU member states, since the protection of data privacy as a fundamental human right will need to be firstly satisfied, the results of enforcing AML laws might be subject to extra judicial reviews in the future. Therefore, in order to balance the basic right of individuals with the public interest²⁸ and to reduce the compliance costs when enforcement results will be denied or reconfirmed by the European Court of Justice (ECJ),²⁹ the EU member states are likely to adopt the anonymity mechanism when designing their CBDCs in the first place and then to gradually improve the design features for containing AML risks. The research project of European Central Bank (ECB) on CBDCs' anonymity has further supported this view.³⁰ However, the

²⁵ Sara De Vido, *Anti-Money Laundering Measures Versus European Union Fundamental Freedoms and Human Rights in the Recent Jurisprudence of the European Court of Human Rights and the European Court of Justice*, 16 GERMAN LAW JOURNAL 1271, 1271-92 (2015).

²⁶ Liu Zhiwei, *A Reflection on Mixed Operation Provisos in the Financial Law*, 41 CHINESE JOURNAL OF LAW 93, 93-114 (2019); Lei Jiping, *New Asset Management Regulations: The Impact of financial Supervision on Judicial Decisions of Asset Management Disputes*, KING & WOOD MALLESONS (2018), <https://www.kwm.com/zh/cn/knowledge/insights/the-trend-of-judicial-supervision-20180628> (last visited Dec. 26, 2022).

²⁷ See Mu Changchun, *Reflection on Controlled Anonymity CBDC*, SINA (Mar. 25, 2021), <http://finance.sina.com.cn/zl/china/2021-03-25/zl-ikknsck1349458.shtml> (last visited Dec. 26, 2022).

²⁸ AML could be regarded as an objective of "general interest" which is the opinion of Advocate General Maduro at para. 78, *Ordre des barreaux francophones et germanophone and Others v Conseil des ministres*, EU Case C-305/05, Judgment of the Court (Grand Chamber) of 26 June 2007.

²⁹ *Jyske Bank Gibraltar Ltd v Administración del Estado*, EU Case C-212/11.

³⁰ The "anonymity vouchers" is a new concept introduced by the ECB to create flexibility for users who want to transfer CBDC without revealing information to the AML authority if they have enough vouchers to spend (a ratio of one voucher per CBDC unit transferred). See ECB, *Exploring anonymity in central bank*

various and divergent designs of CBDCs' anonymity rules made by central banks in different countries are likely to restrict the feasibility and compatibility of CBDCs' cross-border use, which presents a major challenge for the regulation and compliance of CBDCs' cross-border payment activities.

B. The Myth of "Efficient Traceability" in the Cross-Border Context

The Chinese authorities believe that the adoption of CBDCs will make it easier to track money flow within the country, which therefore improves the effectiveness and efficiency of enforcing AML laws.³¹ As discussed, such regulatory objective could be better achieved when central banks incorporate AML functions into their design of the prototype of CBDCs. Nonetheless, is this assumption still relevant in the CBDCs' cross-border payment scenario?³² This section will continue to examine the AML issue in the cross-border context.

At present, cross-border money laundering activities involving the use of fiat CBDCs only constitute a small proportion of all money laundering crimes. In this sense, it is less likely to improve overall efficiency of the current AML regulatory regime by simply strengthening the AML feature of CBDCs. In any digital economies, using fiat CBDCs has been one of multiple private or public payment methods for consumers who are supposed to freely choose any payment methods as they want.³³ Moreover, the onerous AML requirements might even discourage the cross-border use of CBDCs in global trade and financial activities, as there exist other alternatives for individuals and corporations to exchange funds across countries. Aside from traditional currency exchange venues, money can flow beyond borders through the use of private cryptocurrencies, which is increasingly popular. In some cases, the application scenarios for fiat CBDCs are even more restricted than that for private cryptocurrencies.

digital currencies, (Dec. 2019), <https://www.ecb.europa.eu/paym/intro/publications/pdf/ecb.mipinfo-cus191217.en.pdf> (last visited Dec. 26, 2022).

³¹ According to the former president of the Bank of China, CBDCs are expected to support PRC government and regulators for their AML enforcement. See Li Lihui, *What changes would CBDC bring in?*, THE DEVELOPMENT RESEARCH CENTER OF THE STATE COUNCIL (CHINA) (Apr. 7, 2021), <https://www.chinathinktank.org.cn/content/detail?id=e0sh5z61>; Under China's indirect CBDC design, deputy governor Fan Yifei put forward thoughts that CBDC would "allow the central bank to keep track of necessary data to implement prudent regulation and crack down on money laundering and other criminal offences, as well as easing the workload for commercial banks." See Fan Yifei, *Some thoughts on CBDC operations in China*, CENTRAL BANKING (Apr. 1, 2020), <https://www.centralbanking.com/fintech/cbdc/7511376/some-thoughts-on-cbdc-operations-in-china> (last visited Dec. 26, 2022).

³² Contrary to the view of Chinese regulator, the former CIA analyst makes arguments from opposing perspective that CBDC would do threat to AML operation and enforcement because of cross-border currency exchanges being largely eased. See Yaya J. Fanusie, *Central Bank Digital Currencies: The Threat From Money Launderers and How to Stop Them*, LAWFARE BLOG (Dec. 14, 2020), <https://www.lawfare-blog.com/central-bank-digital-currencies-threat-money-launderers-and-how-stop-them> (last visited Dec. 26, 2022).

³³ See PBOC, *Progress of Research & Development of E-CNY in China* (July 2021), <http://www.pbc.gov.cn/en/3688110/3688172/4157443/4293696/2021071614584691871.pdf> (last visited Dec. 26, 2022); Wei Shen and Liyang Hou, *China's Central Bank Digital Currency and Its Impacts on Monetary Policy and Payment Competition: Game Changer or Regulatory Toolkit?*, 41 COMPUTER LAW AND SECURITY REV. 105577 (2021).

For instance, most stablecoins can be exchanged as financial securities (such as shares and bonds) and used as alternative payment methods, but whether CBDCs can be used as securities and payment methods for decentralized finance (DeFi) transactions, such as green bond tokenization project, is still under experiment.³⁴ Therefore, so as to promote the wider use of CBDCs in the cross-border context and maintain their competitive edges over private cryptocurrencies, regulatory authorities might need to make a compromise on extra regulatory features that are less wanted by global consumers and investors.

According to a study by the Economist Intelligence Unit,³⁵ a majority of respondents (59%) agreed that the establishment of digital currencies by central banks would fuel more extensive demand for crypto assets. This has forced regulators to spend more resources, time, and money on fulfilling relevant AML tasks to achieve their policy objectives. For instance, the US Federal Reserve Board (FRB) and Financial Crimes Enforcement Network (FinCEN) have made explicit regulatory rules to supervise transactions involving convertible virtual currencies (CVCs) such as Bitcoins, and the EU is also tightening their grip on cross-border money flow (such as the EU 5th Anti-Money Laundering Directive). But for China, the trading of cryptocurrencies has been strictly banned in the country, which is seemingly an “one-size-fits-all” regulatory strategy.³⁶ According to the international standards made by the Financial Action Task Force (FATF),³⁷ the cross-border AML cooperation shall be carried out based on the information sharing and collaborative making of laws, but Chinese authorities do not allow the legalization of virtual currency trading platforms. Therefore, the pressure brought by the existing currency competition might become a source of risk for China’s cross-border AML cooperation as well as a main reason for a reduction in effectiveness of the existing AML framework.

Moreover, it should be noted that the CBDC function of AML multilateral cooperation is affected and restrained by comprehensive factors, which might cause uncertainty on the regime’s stability and efficiency. In essence, the AML multilateral cooperation can be regarded as a sophisticated regulatory activity

³⁴ Paul Muir, HK, *Singapore to help advance CBDC development*, ASIA TIMES (Jan. 23, 2021), available at <https://asiatimes.com/2021/01/hk-singapore-to-help-advance-cbdc-development/> (last visited Dec. 26, 2022).

³⁵ *Digitality 2021: Digital Currency from Fear to Inflection*, THE ECONOMIST (May. 2021), <https://digitalcurrency.economist.com/wp-content/uploads/2021/05/Digitality-Crypto-EIU-Final2-1.pdf> (last visited Dec. 26, 2022).

³⁶ Guanyu Fangfan Bitebi de Tongzhi (关于防范比特币风险的通知) [Announcement of Preventing Risks of Bitcoin” by People’s Bank of China] (promulgated by Ministry of Industry and Information Technology, China’s Banking Regulatory Commission, and Other Departments, China, Dec. 3, 2013, effective on Dec. 3, 2013); Gongshang Zongju deng Qibumen Guanyu Fangfan Daibi de Gonggao (工商总局等七部门关于防范代币发行融资风险的公告) [Announcement of Preventing the Financing Risks of Initial Coin Offerings] (promulgated by People’s Bank of China, the Office of the Central Leading Group for Cyberspace Affairs, the Ministry of Industry and Information Technology etc., Sept. 4, 2017, effective on Sept. 4, 2017).

³⁷ Financial Action Task Force (FATF), *Consolidated FATF Standards on Information Sharing* R.37, <https://www.fatf-gafi.org/media/fatf/documents/recommendations/pdfs/consolidated-fatf-standards-information-sharing.pdf> (last updated Nov. 2017).

involving different parties from capital markets, the sale of goods, customs, and tax. All factors should be considered by the CBDC design team at the early stage of research and development. Therefore, the CBDC's cross-border AML function is highly reliant on the geopolitical consensus, a similar level of economic development, as well as the effective collaboration among global policy-makers and financial authorities. Accordingly, some points shall be well considered for the design of CBDCs for cross-border payments: 1) China, along with other countries, shall further clarify whether central banks or commercial banks will undertake the primary AML duties; 2) In order to best exercise CBDCs' cross-border AML function, China needs to carry out pilot CBDC collaborative experiments with countries which it traditionally has a close economic tie in the areas of international commerce and capital markets, such as countries in East and Southeast Asia, the UK, the US, and Australia; and 3) China, for its own sake, shall value the strategic location, legal, and regulatory environments of Hong Kong SAR which is a common law jurisdiction. Hong Kong's legal system is similar to that of other leading international financial centers such as New York and London, leading to its competitive advantages in the areas of compliance environment and regulatory compatibility.

III. CHINA'S RETAIL CBDC: MONEY LIQUIDITY AND RISK IDENTIFICATION

China's policy-makers aim to promote the cross-border use of CBDCs and to pursue the goal of renminbi (RMB) globalization in the context of international currency competition. This move is likely to increase the capability of RMB to compete with other major currencies, such as the US Dollar, Euro, British Pound, and Japanese Yen. One of the determining factors, for the successful rolling-out of Chinese CBDCs beyond its borders, lies in the market demand for cross-border mobility arising in global trade in goods and services.³⁸ This section will discuss and analyze the operating mechanism and regulatory issues relating to Retail CBDCs in China that are designed as cash available to the general public as a direct claim on their central bank. Therefore, when retail CBDCs become popular in foreign markets serving as a means for small-and-medium trans-border payment and value storing, it would intensify the flowing frequency between customers' ordinary RMB deposit accounts (interest-bearing) and their DCEP accounts (non-interest bearing), incurring liquidity risks and even challenging the country's financial stability.³⁹

³⁸ The former chairman of the U.S. Federal Reserve, Mr. Alan Greenspan, has mentioned the correlation between the global market competition and the U.S. monetary policy flexibility, showing its impacts on other countries' GDP and central bank balance accounts where U.S. dollars act as world's dominant currency in the post-Bretton Woods era. See The Federal Reserve Board, *Remarks by Chairman Alan Greenspan* (Nov. 2015), <https://www.federalreserve.gov/boarddocs/speeches/2005/20051114/default.html> (last updated Dec.18, 2019).

³⁹ Digital Currency Electronic Payment (DCEP) refers to the digital payment and processing network operated by the PBOC as well as its central bank digital currencies, Chinese yuan (e-CNY). In media and policy papers, Chinese retail-CBDC are commonly known as the DCEP project.

A. Money Flow and Liquidity Spillovers

Retail CBDCs provide convenience for retail consumers using the CBDC payment method that involves a direct claim on central banks.⁴⁰ It is a vital component of a completed CBDC family tree. Clearly, the cross-border flow of Retail CBDC (M0) would affect the circles of flowing money creation, in particular its quantity and frequency, among countries, leading to a higher level of regulatory burden of predicting risks and carrying liquidity⁴¹ for both commercial banks and central banks.

At the early stage of any CBDC pilot schemes, Retail CBDC flowing cross-border is more likely to happen at small or medium amounts. Even though the development of CBDCs is expected to progress rapidly along with the recovery and further growth of international e-commerce activities and global tourism after the Covid-19 pandemic, whether Retail CBDCs could be aptly inserted into the whole economy, especially the large-scale businesses and industries, is still unknown. Therefore, as the medium of seamless and inexpensive cross-border payments, the transactions in use of Retail CBDCs are likely to be requested mainly by end-users like retail consumers and small and medium-sized enterprises (SMEs) for daily business and consumption like small trading, vehicle use, and grocery payment.

In the countries that are supporting the cross-border usability of China's Retail CBDCs (also called "DCEP" or E-CNY)⁴², money liquidity and money creation would be affected bilaterally by both monetary policies in their home countries and China. It is largely due to the most significant features of Retail CBDCs as consumers' direct claims on the balance sheet of central banks when having access to their non-interest DCEP wallets. This may cause extra transactional costs to the commercial banks under a two-tier operation system, when they have to comply with the due diligence rules among the rising risks of money laundering, fake account, and etc.

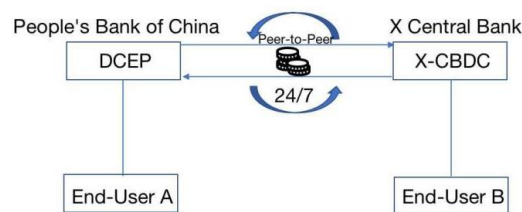
For a better understanding of the Retail CBDC operating mechanism, further clarifications will be provided as follow, as it introduces two potential structures of Retail CBDC operating system. First of all, when DCEPs are exchanged in a foreign country X as shown in Graph 1, one possible pathway for the DCEP cross-border payment is going through "China National Automatic Payment System" (CNAPS). In this scenario, we assume that foreign country X has not yet issued its own Retail CBDCs and only allows overseas RMB business clearing banks to register DCEP wallets for the X country's intended

⁴⁰ Raphael Auer and Rainer Böhme, *The technology of retail central bank digital currency*, BIS QUARTERLY REV. (Mar. 1, 2020), https://www.bis.org/publ/qtrpdf/r_qt2003j.htm (last visited Dec. 26, 2022).

⁴¹ The term "liquidity" has a wide range of meanings in financial theories and practices. The dimensions of liquidity in this paper are highlighted in two ways: the first dimension of liquidity is referred as the availability of credit funding eased from commercial banks to borrowers; secondly, liquidity also means the amount of currency present in a particular market at specifically given point. And both of meanings are mentioned here. See Franco Modigliani, *Liquidity preference and the theory of interest and money*, 12 JOURNAL OF THE ECONOMETRIC SOCIETY 45, 45-88 (1944).

⁴² *Supra* note 33.

Moreover, the facilitation of exchanging bilateral Retail CBDCs is demonstrated in Graph 2, showing the potential impacts by DCEP exchanges through a legally binding swap agreement between two countries. Compared to the operating mechanism explained in Graph 1, the next model of Retail CBDCs is much more convenient and accessible for global users. In this scenario, one of the most significant concerns is about how the foreign exchange rate would be settled for bilateral Retail CBDC payment and settlement activities. Although it is known that DCEP is pegged, by the 1:1 ratio, to RMB domestically, it does not necessarily mean that DCEP would be subject to the same foreign exchange rate as RMB in the offshore markets. Therefore, the value of DCEPs in foreign exchange markets is likely to be determined by the counterparties who will be considering multiple factors such as trading volumes, global acceptance, currency status, etc. Accordingly, we argue that the facilitation mentioned in the Graph 2 had better to be based on a bilateral commercial trading relationship, which will achieve the best effect of internationalizing RMB.⁴⁵ If it had not been backed up by the real volume of commercial transactions and market demands, Retail CBDCs' foreign exchange rate would be exposed to risky market manipulation. For some weak economies, easing the barrier to implementing China's Retail CBDC exchanges, sponsored by the 24/7 peer-to-peer service, would lead to the so-called dual currency system domestically,⁴⁶ which is likely to intensively exacerbate the risk of fiat money substitution. Besides, the arrangement for DCEP settlement operations would be another key issue affecting the financial stability across Asia and the globe.



Graph 2 : Risks of DCEP Currency Swap by Compatible Operation

FIGURE 2. RISKS OF DCEP CURRENCY SWAP BY COMPATIBLE OPERATION

⁴⁵ In China's case, constructing Retail CBDCs collaborations with countries on the "One Belt one Road" initiative would not be better than with countries having frequent small-and-medium scales of money transfer with Chinese. For example, Thailand and Tokyo have accounted for around 30 percent of the total visiting these years. See *Top 10 destinations for Chinese tourists*, CHINA DAILY, Feb. 27, 2019, <https://www.china-daily.com.cn/a/201902/27/WS5c75c041a3106c65c34eb8ce.html>.

⁴⁶ See E.S. Curtis and C.J. Waller, *A search-theoretic model of legal and illegal currency*, 45 JOURNAL OF MONETARY ECONOMICS 155-84 (2000).

B. The Floating RMB Interest Rate Challenging Systemic Stability

As mentioned above, the multiplication of money creation would be limited when the deposit money is largely transferred into DCEPs (M0). Additionally, the RMB interest rate would be subject to increasing floatation which might cause risks to the stability of domestic financial system. The systemic financial stability could be challenged in the following areas.

First of all, the increasing cost of funds in quantity shall be a key factor affecting onshore commercial banks to restructure the floor of bank lending rate and the ceiling of bank deposit rate. As Graph 1 shows, the sum of onshore commercial banks deposits could be intensively decreased when DCEPs are heavily transferred from and exchanged with the deposited money for any cross-border use. In this aspect, onshore commercial banks might have to strongly level up the deposit interest rate to attract sufficient capital inflow. It would expose onshore commercial banks to a risky position of going bankrupt once there was any liquidity mismatch happening in an unexpected way. What is more, facing the extra compliance burden of security requirements for using Retail CBDCs, onshore commercial banks, as a rational economic man, would prefer to convey the additional costs to money borrowers, which will lead to increasing loan rates. Obviously, it would negatively impact the promising development trend of promoting the use of CBDCs for domestic businesses.

Secondly, onshore commercial banks might need to adjust the interest rates for their loan products, with the aim to balance loss in their reserve accounts. Under China's two-tier structure for CBDC operation, onshore commercial banks shall maintain a 100% reserve ratio at the central bank before having any available holdings of DCEPs.⁴⁷ Different from RMB borrowings, the amount of DCEPs owned by commercial banks would still be stored in the central bank wallet but managed by the commercial banks individually. It means that the commercial banks shall be regarded as the financial intermediaries and they have no ultimate power in controlling such digital money. In other words, the commercial banks lose the opportunity of earning yields through holding a large amount of fiat money. For example, one commercial bank sends a request to transfer 300 RMB from its reserve account to its DCEP account. In response, the central bank would debit (reduce RMB in) the bank's reserves account, and credit (increase RMB in) the DCEP account by 300 units. The immediate outcome is that the commercial bank will lose both 300 RMB of its reserves and 300 RMB of its household deposits, resulting in an unfavorable situation where

⁴⁷ Li Bing, *In future, CBDCs will co-exist with third party payment methods*, SECURITIES TIMES, May 28, 2020, http://epaper.zqrb.cn/html/2020-05/28/content_619831.htm.

the commercial bank is potentially losing double.⁴⁸ Besides, when commercial banks maintain RMB money in their reserve accounts in exchange for DCEPs (non-interest bearing) at the central bank, would interests still be paid by the PBOC? If the answer is no, a potential monetary conflict could arise.⁴⁹ If the answer is yes, the pegged ratio of 1:1 (RMB to DCEP) may be challenged, accumulating risks to financial stability.

Thirdly, another key impact factor on the RMB interest rate is how PBOC would implement monetary policy to manage liquidity risk when facing fluctuating foreign exchange rate to DCEP. As discussed, the RMB interest rate in the future might not be as stable as it is now. If DCEPs' cross-border use would be popular in international financial markets, then the foreign exchange rate converting from CBDC-X1 to DCEP would have a highly valued price, which will further attract more public users to hold and store Chinese CBDCs. Since DCEPs are pegged to RMBs at 1:1 ratio, the foreign market users are likely to switch a large amount of DCEP to RMB, especially when they are qualified to do so or have had their RMB accounts open. A large amount of foreign money transferred into the RMB currency system, through the novel DCEP channel, is likely to leave the domestic economy overheated due to the excessive flow of hot money, waving a significant red flag for the macro-prudential regulator. Accordingly, the PBOC is likely to raise interest rate as a common monetary tool to prevent the economy from encountering overheated inflation. In practice, however, the regular fluctuation of both currency exchange rate and interest rate are influenced by comprehensive factors, presenting either a positive or negative correlation. Such new challenges require domestic commercial banks to closely follow the global trend of financial markets when they anchoring the interest rates and conducting rate-sensitive businesses.

IV. CHINA'S WHOLESALE CBDC: CAPITAL FLOW AND SETTLEMENTS

Distinctive from Retail CBDC that mainly focuses on the areas of household transactions and SME trading, Wholesale CBDC is a digital payment method designed for the settlement of inter-bank money transfers and related wholesale transactions.⁵⁰ Generally speaking, Wholesale CBDC is less known and used by the public as its transactions flow among financial intermediaries only. When policy-makers and researchers are considering RMB globalization through the use of CBDCs, whether Wholesale CBDC, as a way of inter-bank payments and settlements, could be used at a large scale in international capital markets is a key criteria in assessing the maturity of CBDC's cross-border

⁴⁸ In China, the PBOC still provides commercial banks with the interests on required deposit reserve (at rate of 1.62%) and excess deposit reserve (from 0.72% to 0.35% in response to new monetary policy after Covid-19).

⁴⁹ See C. Jia, The effect of ownership on the prudential behavior of banks-The case of China, 33 JOURNAL OF BANKING & FINANCE 77, 77-87 (2009).

⁵⁰ BIS, BIS Annual Economic Report: III. CBDCs: an opportunity for the monetary system (2021), <https://www.bis.org/publ/arpdf/ar2021e3.pdf> (last visited Dec. 26, 2022).

usability. The resilience of Chinese economy to the Global Financial Crisis 2007-08 and the more recent Covid-19 pandemic, coupled with the higher-yielding Chinese assets, have attracted large amounts of overseas capital flooding to China's bond markets with a total amount of 3.3 trillion yuan.⁵¹ In China's bond markets, China Interbank Bond Market (CIBM) accounts for the most value of transactions. Therefore, in this section, analyzing Wholesale CBDC's potential pros and cons as a *de facto* medium of settlement in the interbank bond markets would constitute a necessary part of further exploration of the legal framework of Inter-bank Market Clearing House Co., Ltd. (hereinafter referred to as "Shanghai Clearing House"), a financial intermediary that assumes statutory duties and owns the rights to provide services for qualified foreign investors through centralized registration, custody, clearing, and settlement.

A. Institutional Settlement Rules of Interbank Bond Market

Having multi-accounts opened is the prerequisite for any qualified foreign investors to enter and invest in China's interbank bond markets, as such transactions and settlements will fall under China's macro-prudential regulatory regime. According to the latest regulations in "Provisions on the Administration of Domestic Securities and Futures Investment Funds of Foreign Institutional Investors", the qualified foreign institutional investors (QFII) shall first entrust a domestic custodian (at Tier 2 of Graph 3) to open a special foreign currency account and/or a special RMB deposit account.⁵² If qualified foreign investors choose to invest through Hong Kong "Bond Connect" (Northbound) channel, functioning similarly to the "QFII" one, they shall first open a RMB deposit account to complete money exchanges and settlements in any approved settlement banks according to the Article 11 of "Interim Measures for the Administration of Mutual Bond Market Access between Hong Kong SAR and Mainland China".⁵³ Once foreign investors open their RMB deposit account, they will need to open a fund money settlement account at Shanghai Clearing Exchange under the Article 3 of "Operating Guidelines for Networking and Account Opening by Foreign Institutional Investors in the Interbank Market".⁵⁴

⁵¹ *China's Epic Battle with Capital Flows is More Intense than Ever*, THE BLOOMBERG, Apr. 6, 2021, <https://www.bloomberg.com/news/articles/2021-04-06/china-s-epic-battle-with-capital-flows-is-more-intense-than-ever> (last visited Dec. 26, 2022).

⁵² Jingwai Jigou Touzizhe Jingnei Zhengquan Qihuo Touzi Zijin Guanli Guiding (境外机构投资者境内证券期货投资资金管理规定) [Provisions on the Administration of Domestic Securities and Futures Investment Funds of Foreign Institutional Investors] (promulgated by the People's Bank of China and the State Administration of Foreign Exchange, May 7, 2020, effective on June 6, 2020), art. 7 and 9 (Chinalawinfo).

⁵³ Neidi yu Xianggang Zhaiquan Shichang Hulanhutong Hezuo Guanli Banfa (内地与香港债券市场互联互通合作管理暂行办法) [Interim Measures for the Administration of Mutual Bond Market Access between Hong Kong SAR and Mainland China] (promulgated by the People's Bank of China, June 21, 2017, effective on June 21, 2017) (Chinalawinfo).

⁵⁴ Jingwai Jigou Touzizhe Jinru Yinhangjian Shichang Lianwang he Kaihu Caozuo Zhiyin (境外机构投资者进入银行间市场联网和开户操作指引) [Operating Guidelines for Networking and Account Opening

Multi-accounts are linked under the schemes of multi-tier agents. According to the Article 62 of “Announcement of the Shanghai Clearing House on Operating Rules and Procedures for the Registration, Custody, Clearing and Settlement of Interbank Bond Market”,⁵⁵ investors shall entrust custodians (at Tier 2) to handle clearings and settlements of bond transactions through Shanghai Clearing House in counterparty clearing methods. In this process, the custodian (at Tier2) shall entrust and authorize Shanghai Clearing House to directly debit or credit the designated fund money settlement account, according to the “Operating Guidelines for the Settlement of Bond Transactions”.⁵⁶ On that basis, Shanghai Clearing House becomes the main custodian (at Tier 1), with the rights to intervene in any transactions and to inherit all rights and duties of money settlements for counterparties.⁵⁷

During the settlement process for qualified foreign investors, Shanghai Clearing House will be acting as a specially authorized participant to send instant transferring requests to Central Bank High Value Payment System (HVPS) for QFII onshore settlements. In the “Bond Connect” (Northbound) channel between Hong Kong and mainland China, Shanghai Clearing House (SHCH) plays the role as a direct participant in Cross-border Interbank Payment System (CIPS), initiating and processing the DvP settlements through the link between CIPS and SHCH for foreign investors. After settlements are completed onshore, the amount of capital money will flow back to the special account(s)—a special foreign currency account and/or a special RMB deposit account—and then the exchanged currency will flow back to the account offshore.

by Foreign Institutional Investors in the Interbank Market] (promulgated by the China Central Depository & Clearing Co., Ltd., May 27, 2016, effective on May 27, 2016) (Chinalawinfo).

⁵⁵ Yinhangjian Shichang Qingsuansuo Gufen Youxian Gongsi Zhaiquan Dengji Tuoguan Qingsuan Jiesuan Yewu Guize (银行间市场清算所股份有限公司债券登记托管、清算结算业务规则) [Announcement of the Shanghai Clearing House on Operating Rules and Procedures for the Registration, Custody, Clearing and Settlement of Interbank Bond Market] (promulgated by Shanghai Clearing House Oct. 11, 2014, effective on Oct. 11, 2014) (Chinalawinfo).

⁵⁶ Zhaiquan Jiaoyi Jiesuan Yewu Caozuo Zhina (债券交易结算业务操作指南) [Operating Guidelines for the Settlement of Bond Transactions] (promulgated by Shanghai Clearing House, revised on Jan. 22, 2018) (Chinalawinfo).

⁵⁷ Yinhangjian Shichang Qingsuansuo Gufen Youxian Gongsi Jizhong Qingsuan Yewu Zhinan (银行间市场清算所股份有限公司集中清算业务指南) [Manual of the Centralized Clearing Business in the Interbank Market] (promulgated by Shanghai Clearing House, July 2022), <https://www.shclearing.com.cn/cpyy/ywzn/202111/P020220725387226575862.pdf> (Dec. 26, 2022 last visited).

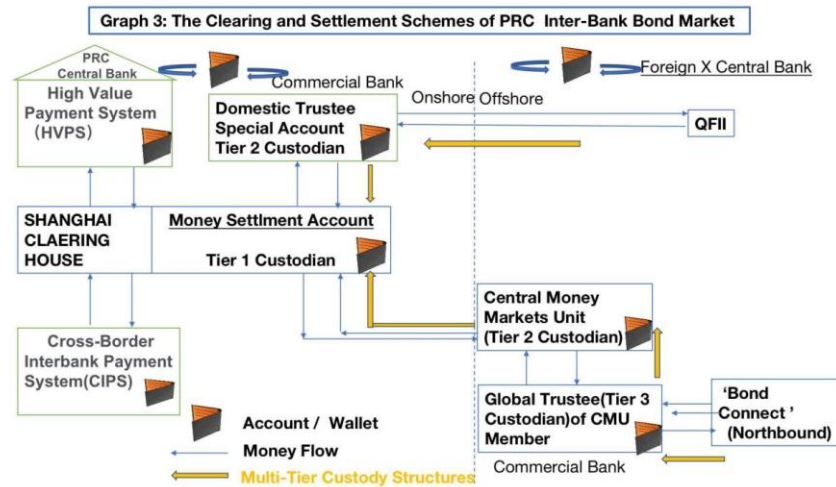


FIGURE 3. THE CLEARING AND SETTLEMENT SCHEMES OF PRC INTER-BANK BOND MARKET

B. Advantages of Wholesale CBDC: The Enhanced Efficiency

If Wholesale CBDC could be applied in the financial institutional settlement system, it is highly likely to improve the efficiency of peer-to-peer (P2P) fund money settlements and to reduce the transaction costs under multiple accounts and multi-tiers of clearing structures. As discussed, the settlement process of the interbank bond markets for foreign investors' transactions is to enter the HVPS/CIPS of multi-accounts and tiers structure, but Wholesale CBDC could complete the process in a P2P transaction model.⁵⁸ For instance, the Wholesale CBDC projects, such as Project Ubin (Singapore), Jasper (Canada), Stella (Europe and Japan), and LionRock (Hong Kong), have tested mainstream blockchain platforms in a comprehensive manner.

P2P settlement model could change the current framework of interbank bond market to benefit the qualified foreign investors. The P2P transaction design of central bank digital currencies determines that CBDC and its wallet are independently operated without the need to be strongly tied to a specific commercial bank account. In this sense, foreign investors could save significant transaction costs both onshore and offshore. Besides, Wholesale CBDC also means that the relevant parties of money transfer can choose not to rely on (or just partly rely on) the intermediate third-party financial institutions or their accounts offered. If this is the case, foreign investors would only need to tackle money issues with foreign X central bank. And when Wholesale CBDC serves

⁵⁸ Central Banks and Distributed Ledger Technology: How are Central Banks Exploring Blockchain Today?, WORLD ECONOMIC FORUM (Mar. 2019), http://www3.weforum.org/docs/WEF_Central_Bank_Activity_in_Blockchain_DLT.pdf (last visited Dec. 26, 2022).

as the settlement medium in the interbank bond markets, the PBOC could take advantage of the new monetary tool embedded with regulatory functions which allows it to directly supervise money flow across sectors. Therefore, it may require financial authorities in China to adjust or restructure its cross-border settlement patterns and the relationship among correspondent banks, clearing banks, and bilateral central banks. Even though the PBOC remains the multi-tier structure for its sovereign digital money, Wholesale CBDC could still connect and calculate money flowing through HVPS/CIPS, Shanghai Clearing House, and trustee custodians both onshore and offshore (Hong Kong “Bond Connect”), which is likely to advance the efficiency of capital market AML enforcement activities.

C. *Uncertainties of Wholesale CBDC Among Multi-Participants*

However, the introduction of Wholesale CBDCs for international bond investors is likely to bring uncertain changes to the current legal and regulatory structures surrounding the settlement system and infrastructure in China’s interbank bond markets. At present, there are three potentially possible models of cross-border payment settlement available for Wholesale CBDC use.⁵⁹ The potential use of Wholesale CBDC under these three models shows significant differences in the following areas: whether money is exchanged directly through central bank infrastructure (CBDC-Interlink-System); whether payment settlements rely on a compatible operator supported by both private and public sectors (Domestically Compatible-CBDC-System)⁶⁰; and whether to form bilateral agreements on corridor operating network (Single-mCBDCs-System).⁶¹ This section will examine the three models respectively.

1. Model 1: Wholesale CBDC-Interlink-System. If China adopts the Model of Wholesale CBDC-Interlink-System in its interbank bond market, the current QFIIs may no longer need to entrust commercial banks or other third-party financial institutions in China to open a special fund money account. Then, it is possible for them to directly open an X-Wholesale CBDC account with the foreign central bank. The foreign central bank will have to entrust the Shanghai Clearing House in China and the central bank of China to conduct real-time clearing and settlements through the Model of CBDC-Interlink-System. From the agency’s cost-saving perspective, it is likely to simplify the settlement

⁵⁹ *Supra* note 12.

⁶⁰ In fact, Wholesale CBDC can also be directly allocated to end users, simply by extending account access to additional participants. See Rodney Garratt et al., *Segregated Balance Accounts*, Federal Reserve Bank of New York Staff Reports (Aug. 2015).

⁶¹ This is how project Inthanon-LionRock, the CBDC Cross-border Project initiated by Thailand and Hong Kong, is being tested now. See Hong Kong Monetary Authority, *Inthanon-LionRock Leveraging Distributed Ledger Technology to Increase Efficiency in Cross-Border Payments*, https://www.hkma.gov.hk/media/eng/doc/key-functions/financial-infrastructure/Report_on_Project_Inthanon-LionRock.pdf (last visited Dec. 26, 2022). Some researcher also called this multi-CBDCs model as “Liquidity Swap Lines”. See George Calle and Daniel Eidan, *Central Bank Digital Currency: an innovation in payments*, R3 (Apr. 2020), https://www.r3.com/wp-content/uploads/2020/04/r3_CBDC_report.pdf (last visited Dec. 26, 2022).

process in a legal manner, and to reduce the compliance costs and litigation risks for foreign investors. However, considering the benefits of China's onshore commercial banks, it may negatively impact their incomes as being the advisory agent, business trustee, and account custodian in traditional currency transactions.

2. Model 2: Domestically Compatible-Wholesale CBDC-System. If China decides to take the Model of Domestically Compatible-Wholesale CBDC-System in its interbank bond market, then PBOC might need to insert the function of CBDC Wallet into private sector operators, like commercial banks, similar to the two-tier structure of Retail CBDC which is under testing now. In this case, it remains a critical question for authorities to define the legal relationship between the PBOC and other financial institutions both onshore and offshore. According to the "Operating Guidelines for the Settlement of Bond Transactions", shall Shanghai Clearing House still be in charge of the CBDC wallet and directly debit or credit the wallet for the central bank(s) and/or foreign institutional investors? Who shall be legally regarded as the end-users of Wholesale CBDC—financial institutions or foreign institutional investors? Depending on different answers to the aforementioned questions, it is imperative for authorities to reallocate the duties and liabilities among various parties during the settlement process in case of any defaults happening. All these issues should be carefully considered and clarified by Chinese regulators in making the new legal framework for the Model of Domestically Compatible-Wholesale CBDC-System.

3. Model 3: Single-mCBDCs-System. If China intends to take the Model of Single-mCBDCs-System in its interbank bond market, then various types of CBDCs from participating countries could maintain their independent design features and special characteristics. But in this scenario, the parties involved need to establish a stable and sustainable cooperation mechanism and to conclude a legal contract if possible, to avoid regulatory uncertainty and vacuum. Some important points need to be reviewed by authorities, including: a) whether Retail CBDC could be exchanged mutually within the network, and if so, shall the parties form a "dual-legal" framework separate or integrate Wholesale CBDCs with Retail CBDCs?; b) the underlying goal of maintaining financial stability shall be considered in all participating countries and regions as a whole; c) the legal claims to central banks and financial data privacy concerns shall be included to outline escalation and remediation protocols for such claims and issues; and d) the duration, amounts, pricing, exchange rates, collateral conditions, and possible initial limits for any Wholesale CBDC transactions.

V. CONCLUSION

In this paper, the cross-border use of China's CBDCs is found to be functionally feasible and beneficial but it is likely to trigger extra financial risks and regulatory challenges in several aspects. When China's CBDCs are soon to be distributed, stored, transferred, and exchanged beyond its borders, it requires

joint efforts to improve the existing regulatory regimes at national, regional, and international level as well as the cross-border cooperation in areas such as the sovereign states' monetary systems, macro-prudential policies, institutional infrastructure, legal mandates, and technically compatible designs across borders. This calls for the collaboration of global financial authorities and international organizations to address the discrepancies in each issuing country's technological standards and regulatory frameworks. This paper, accordingly, has provided a comprehensive and in-depth examination of three major regulatory concerns regarding the cross-border use of Chinese CBDCs, which merits attention from the People's Bank of China and financial authorities in other countries that intend to experiment CBDCs.

First of all, central banks and financial regulators have to reconciling regulatory conflicts between enforcing anti-money laundering (AML) regimes and data protection law. Failures to identify account ownership or to perform customer due diligence are the most common reasons accounting for AML fines imposed on financial institutions. Considering the anonymous design of CBDCs, how to balance the AML compliance task with the protection of personal data and privacy will be a major concern for Chinese financial regulators when dealing with the cross-border use of CBDCs. The solution lies in the multi-party coordination as relevant transactions denominated in digital yuan will involve regulatory scrutiny and law enforcement across several jurisdictions. For example, Chinese law has not yet recognised personal data protection as a fundamental human right, but in contrast, the European Union has endorsed this in the EU Charter of Fundamental Rights. Thus, the permitted range of data collection and usage isn't the same for regulators from China and the EU. Accordingly, controlled anonymity is likely to be a future mainstream design for China's CBDCs, whilst anonymity vouchers have been newly introduced by the European Central Bank.

Secondly, this paper has assessed the use of Retail CBDC in foreign markets and relevant regulatory issues in relation to financial stability, liquidity spillovers, balance-sheet reorganization, and floating interest rates. If and when retail-CBDCs become popular in foreign markets as the equivalent of publicly available cash, this will increase the circulation speed of RMB currencies in general and will lead to the rapid fluctuation of interest rates for RMB-denominated deposits and financial products, which might affect financial stability. Under the two-tier distribution model of Chinese retail-CBDCs (commonly referred to as DCEP), domestic commercial banks and offshore RMB business clearing banks are exposed to the liquidity risk caused by frequent fund movements between customers' ordinary RMB deposit accounts (interest-bearing) and their DCEP accounts (non-interest bearing). In response, both onshore and offshore commercial banks are likely to reorganize their balance sheets by partly switching long-term RMB assets into short ones. Moreover, the cross-border payment convenience of Chinese CBDCs, coupled with the price stability of RMB, might expose certain developing countries with immature financial systems to the threat of currency substitution. Finally, in the event

of an overheated domestic economy caused by a large inflow of foreign money via DCEP, the PBOC is likely to raise interest rates to curb the consequent inflation. In practice, however, the regular fluctuation of currency exchange rates and interest rates is determined by multiple factors that are either positively or negatively correlated with each other, which further complicates the problem. Such challenges require domestic commercial banks to closely watch the global inflow and outflow of Chinese CBDCs when they are setting interest rates for their savings products and rate-sensitive businesses.

Thirdly, this paper has analyzed the Wholesale CBDC scenarios and made suggestions for revising international settlement rules. Unlike retail-CBDCs, wholesale-CBDCs generally flow through financial intermediaries, which impacts the institutional settlement framework. The inter-bank bond market accounts for 80% of the bond trading volume in China, and its settlement and clearing scheme for qualified foreign investors is made up of multiple accounts and a tier structure. The PBOC, the Market Clearing House Co., Ltd. (Shanghai Clearing House), and commercial banks have collectively been granted statutory rights and duties to provide services of centralized registration, custody, clearing, and settlement. Technically speaking, if and when wholesale-CBDCs are used in financial markets in the future, this will allow foreign investors to complete the settlement process by bypassing any third parties, as they will have a direct claim on the PBOC. The peer-to-peer mechanism of CBDC settlement and clearing is likely to reduce transaction costs for foreign investors, but it may also weaken the status of financial intermediaries, especially traditional commercial banks. Considering the need to protect financial stability, the PBOC is expected to maintain the role of Shanghai Clearing House as the central counterparty and might even embed wholesale-CBDCs into the existing Clearing House system.

In summary, this paper sheds light on the financial risks and regulatory options for the cross-border use of CBDCs, providing useful suggestions for central banks and policy-makers across the globe. Any central banks issuing CBDCs for cross-border use shall carefully consider its impacts at home and abroad. As the globalization of economic activities deepens, further surveys, quantitative analysis, and tests with a broader horizon will be needed for the rolling out of CBDCs. The convenient and inexpensive access to other countries' digital currencies for remittance, travel, and trade is expected to deeply link and integrate each country's financial systems, affecting their making of monetary policies and regulatory strategies. Therefore, in order to improve CBDC's interoperability, it is necessary for monetary authorities to take not only the design of other countries' CBDCs but also the evolving international financial infrastructure as a whole into consideration. Obviously, a positive way for central banks to confront the pressure from the rising use of private global currencies, such as Bitcoin and USDT, is to promote the effective use of sovereign digital currencies beyond borders. In the future, any compatible CBDC cross-border systems would be an organic part of the new international financial infrastructure, underpinning the long-term growth of the global economy.

Although this initiative is technically possible for now, it would not easily become a global consensus due to the rising ideological differences and geo-political tensions.

Finally, it is not possible for the paper to exhaustively discuss all the potential risks and regulatory aspects for the cross-border use of CBDCs, which suggests its limitation. In practice, there are other legal and regulatory issues worthy of further exploration, beyond the scope of this paper, due to the limitation of research materials or the immaturity of institutional developments. In this paper, we have attempted to provide a roadmap for any researchers to explore the topic of cross-border use of CBDCs, and the following issues might be of particular interest to economists and legal scholars for further consideration: (a) the legal framework chosen to balance AML and users' privacy (See Part II); (b) regulatory interoperability between existing and new infrastructures (See Part IV); (c) macro-prudential regulations on the access to and liquidity control of CBDC flowing (See Part III and IV); and (d) regulatory arrangements on separation and compatibility between the Wholesale and Retail CBDC (See Part IV).