

Implications of Central Bank Digital Currencies for Monetary Operations A case study of China's Digital Yuan

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Abstract:

This study aims to analyze the implications of Central Bank Digital Currencies (CBDCs) on monetary operations, with a particular emphasis on China's Digital Yuan (e-CNY). The research employs a qualitative case study approach, drawing on recent data from the People's Bank of China (PBOC) and expert insights. The objective is to assess how the e-CNY affects monetary policy tools, liquidity management, and the broader financial ecosystem. Findings indicate that while the adoption of e-CNY remains modest, it has enhanced domestic transaction efficiency and financial inclusion. Moreover, its design features—such as holding limits and tiered interest—have mitigated risks to monetary stability. The study concludes that the e-CNY presents both strategic advantages and challenges, particularly in terms of global monetary competition and regulatory oversight. These insights highlight the urgency for other central banks to accelerate their CBDC development to maintain monetary sovereignty and global relevance.

Keywords: Central Bank Digital Currencies; monetary operations; The e-CNY.

المستخلص:

تهدف هذه الدراسة إلى تحليل الآثار المترتبة على العملات الرقمية للبنوك المركزية (CBDCs) على العمليات النقدية، مع تركيز خاص على اليوان الرقمي الصيني (e-CNY). اعتمدت الدراسة على منهج دراسة الحالة النوعية، من خلال تحليل بيانات حديثة صادرة عن بنك الشعب الصيني (PBOC) وآراء خبراء في السياسة النقدية. يتمثل الهدف في تقييم تأثير اليوان الرقمي على أدوات السياسة النقدية، إدارة السيولة، والنظام المالي الأوسع. وقد أظهرت النتائج أن تبني اليوان الرقمي لا يزال محدودًا، لكنه أسهم في تحسين كفاءة المعاملات المحلية وتعزيز الشمول المالي. كما أن خصائص تصميمه — مثل حدود الحياة ونظام الفوائد المتدرجة — ساعدت في تقليل المخاطر على الاستقرار النقدي. وتخلص الدراسة إلى أن اليوان الرقمي يقدم مزايا استراتيجية وتحديات في الوقت نفسه، خاصة من حيث التنافس النقدي العالمي والرقابة التنظيمية. وتؤكد هذه النتائج على ضرورة تسريع الدول الأخرى لتطوير عملاتها الرقمية لضمان السيادة النقدية والمكانة في النظام المالي العالمي المتطور.

الكلمات المفتاحية: العملات الرقمية للبنوك المركزية؛ العمليات النقدية؛ اليوان الرقمي (e-CNY).

Jel Classification Codes: E42, E52, E42.

1. INTRODUCTION

One revolutionary development in the global financial system is the rise of Central Bank Digital Currencies (CBDCs). In contrast to conventional fiat currencies, CBDCs combine the efficiency and creativity of digital payment systems with the stability of money issued by a central bank. This breakthrough is important because it adds a new dimension to global financial institutions and monetary policy.

For the majority of central banks, maintaining the internal or external value of the native currency is the primary means of achieving price stability through monetary policy. In this regard, the implementation of CBDCs may improve central banks' capacity to keep an eye on and manage monetary flows, which would strengthen their capacity to maintain economic stability.

China's Digital Yuan (e-CNY), which has attracted a lot of attention because of its potential to affect both the local and international financial systems, is a prime example of an advanced CBDC effort. The People's Bank of China (PBOC) took six years to build the e-CNY after a 2021 crackdown on private cryptocurrency mining and trading. By providing a government-backed substitute for decentralized cryptocurrencies, this project highlights China's strategy to dominate the digital currency market.

This study is significant because it explores the implications of CBDCs for monetary policy, financial stability, and the international monetary system. By examining China's experience with the e-CNY, the study offers valuable insights that can serve as a framework for other countries considering similar initiatives. In doing so, it provides a deeper understanding of the potential benefits and challenges that CBDCs present to both individual nations and the global economy.

Study Problematic

Any topic has a problematic aims to answer, so we ask a principal question which is **How does the introduction of Central Bank Digital Currencies, specifically China's Digital Yuan, impact the efficiency and effectiveness of monetary operations?**

This question contains some Secondary questions:

- What is Central Bank Digital Currencies?
- What are the types of monetary operations?
- What is the impact of Central Bank Digital Currencies (CBDCs) on monetary operations?

Research hypotheses : We formulate the following research hypotheses to guide our analysis:

- **Hypothesis 01:** Central Bank Digital Currencies (CBDCs) redefine the concept of money by integrating the characteristics of traditional currency with technological innovation, thereby enhancing the central bank's role in the monetary system.
- **Hypothesis 02:** Monetary operations include a range of central bank activities—such as reserve management, liquidity control, and short-term interest rate targeting—which serve as key tools for implementing monetary policy.
- **Hypothesis 03:** The introduction of CBDCs affects monetary operations by altering the monetary base, reducing commercial bank deposits, and influencing the central bank's ability to manage liquidity and control interest rates.

Importance of the study

This research seeks to address these questions by examining the case of the Digital Yuan, providing insights into its role as a pioneering CBDC and its implications for global monetary policy and operations.

Objectives of the study

Researcher aims through this paper to:

- Learn the basics of central bank digital currencies.
- analyze the role of CBDCs in modernizing monetary operations and enhancing payment systems.
- evaluate the specific features and implementation strategies of China's Digital Yuan.

Structure of the study

The study is structured as follows:

- 1- Overview of Central Bank Digital Currencies and Their Key Features.
- 2- Key Components of Monetary Operations.
- 3- Implications of CBDCs for monetary operations.
- 4- Analysis of the Digital Yuan: Development, features, and implementation.

2. Overview of Central Bank Digital Currencies and Their Key Features.

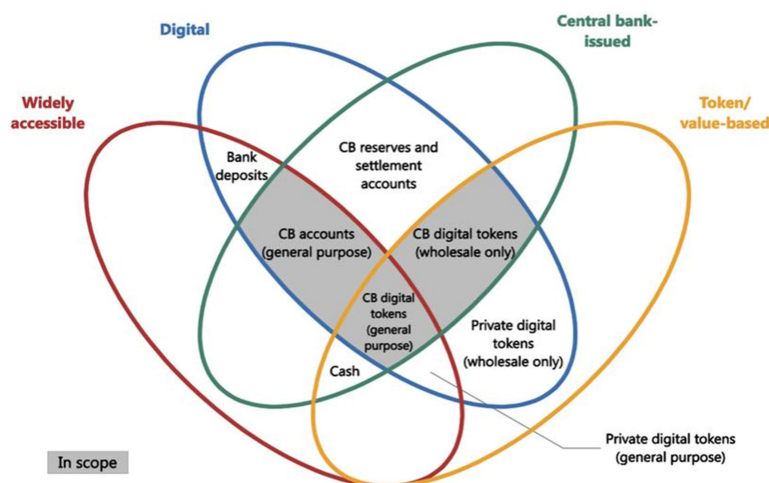
Central Bank Digital Currencies (CBDCs) represent a new form of money issued by central banks in digital format. Designed to complement physical cash, CBDCs aim to enhance payment efficiency, promote financial inclusion, and strengthen monetary policy tools. This section provides an overview of CBDCs and highlights their key features, including security, accessibility, and programmability.

2.1 The Definition of Central Bank Digital Currencies

A Central Bank Digital Currency (CBDC) is a type of digital currency issued and regulated by a nation's central bank. It differs from cryptocurrencies in that it is centrally controlled and governed by the country's monetary authority. While cryptocurrencies are typically decentralized, with no central issuing body and often use blockchain technology to record transactions, CBDCs are fully backed and managed by the central bank. They can also leverage cryptographic security measures to prevent fraud and counterfeiting. In contrast to decentralized currencies, CBDCs allow for centralized control over the issuance of new units and their circulation in the economy (Khalili, 2019, p. 204).

Similar to traditional fiat currencies, CBDCs are designed to facilitate fast, secure, and dependable transactions. According to a 2021 study by the Bank for International Settlements (BIS), 86% of central banks worldwide are exploring the potential of CBDCs, with 60% already in the experimental stages and 14% having launched pilot projects. Additionally, a report by PwC highlights that more than 60 central banks have been researching different types of CBDCs since 2014. (Amalou Hallil, Doudene, 2024, p. 80).

CBDCs are described as "novel forms of central bank money, distinct from traditional physical cash or reserve/settlement accounts." The concept also introduces the "money flower" framework, which classifies various forms of money according to four key characteristics: the issuer (whether it's a central bank or a private entity), the format (digital or physical), the accessibility (general or restricted), and the underlying technology (token-based or account-based). (Rupino Cunha, Melo, 2021, p. 07).

Fig.1. The money flower: a taxonomy of money

Source: Paulo Rupino Cunha, Paulo Melo, others, 2021, p 07.

2.2 Characteristics of CBDCs

CBDCs stand out from other types of currency due to several important differences. Their defining characteristics include: (KHATOUI, 2024, p. 179)

2.2.1 Centralized Issuance and Regulation

CBDCs are solely issued and regulated by the central bank, which positions them as an official payment method recognized by both governments and financial authorities. This centralized control ensures their legitimacy, fosters public trust, and encourages their adoption in both commercial and financial transactions.

2.2.2 Digital Form of Currency

A CBDC represents a new type of money that exists only in digital or fully electronic form. This means it circulates exclusively online, without the need for physical paper or coins. It is processed, stored, and exchanged through computer systems and digital networks. CBDCs are widely accessible digital versions of a country's central bank-issued currency.

2.2.3 Tied to the Value of Official Currency

The value of a CBDC is directly linked to the nation's fiat currency, ensuring that the digital currency's purchasing power remains stable. This connection reinforces confidence in both the national financial system and the digital currency as a reliable and steady form of payment.

2.2.4 Transparency and Traceability

The ability to track and monitor every financial transaction involving CBDCs provides transparency. This allows central banks and regulatory authorities to closely observe the movement of money within the financial system, ensure compliance with financial laws, enhance trust in the system, and foster the adoption of digital technology in payments and financial transfers.

2.2.5 Programmability

CBDCs are highly flexible and can be programmed to adjust and align with specific policy goals. Central banks can use artificial intelligence and smart contracts to implement various rules and regulations. Additionally, CBDCs can be designed with restrictions, such as limiting or prohibiting their use outside the country of issue.

2-3 Strategic Management of CBDC Development by Central Banks

The chapter presents the **5P methodology**, designed to guide central banks through the process of

exploring and developing Central Bank Digital Currencies (CBDCs) from initial research to potential launch. This methodology encourages progressive decision-making, promotes innovation, and effectively manages risks by leveraging best practices from various industries and drawing on experiences from different regions. The 5P methodology includes five key phases: The Preparation Phase, which involves researching trends, setting goals, defining success criteria, evaluating feasibility, assessing capacity, and analyzing risks, serves as the foundational step. The Proof-of-Concept Phase follows, where small-scale empirical tests and validation activities are conducted, usually in a lab environment, to gather insights into potential CBDC designs. The Prototype Phase focuses on the development or acquisition of required technologies and the selection of suitable partners. In the Pilot Phase, a near-final version of the CBDC is tested in real-world conditions to assess its functionality. Finally, the Production Phase involves the official launch of the CBDC, making it available for use in public and commercial transactions. (Herve , Ashley, other, 2023, p. 05).

2.4 The Five Phases of CBDC Project Management

The implementation of a Central Bank Digital Currency (CBDC) follows a structured process divided into five distinct phases, each focusing on specific tasks, challenges, and questions to ensure a comprehensive development and deployment approach.

2.4.1 Preparation

The first phase involves examining emerging trends, evaluating technological advancements, and considering their potential impacts. Key questions include:

- What are the advantages and limitations of emerging technologies?
- How do these technologies operate, and what trade-offs exist in CBDC infrastructure?
- What risks are associated with these technologies?
- What resources and capacities are needed for each phase?
- What impact could this have on governments and businesses?

2.4.2 Concept Validation

This stage tests hypotheses and core features of the CBDC in controlled environments. Relevant questions include:

- Which assumptions need to be validated or refuted?
- How can various design elements and infrastructure components be effectively tested?
- Which technologies best fulfill the project's requirements?

2.4.3 Prototyping

The prototyping phase involves building the foundational structure of the CBDC and its ecosystem. Key questions to address include:

- How can the CBDC technology stack and its core components be integrated seamlessly?
- What workforce, expertise, and operational processes are required to oversee and maintain the CBDC system?

2.4.4 Pilot Testing

Pilot testing evaluates the CBDC in real-world conditions using actual data and engaging stakeholders. Critical considerations include:

- Does the CBDC system perform as expected under real-world conditions?
- How can risks be effectively identified and mitigated?
- What are the best practices for ensuring the system's maintenance?
- Were the initial assumptions regarding adoption and implementation accurate?

2.4.5 Product Deployment

In the final phase, the CBDC is officially launched and integrated into the financial system. Key questions include:

- Are risk management strategies and adoption plans being effectively executed?
- How can ongoing monitoring, testing, and integration of new industry developments enhance the CBDC?
- What measures can ensure the security and stability of the operational system?

This step-by-step approach provides a thorough framework for the effective implementation and management of a CBDC. Each phase tackles essential technical, operational, and strategic elements required to build a strong and functional digital currency system.

3. Key Components of Monetary Operations

The objective of monetary operations is to achieve stability in both the foreign exchange and money markets concurrently. This can be accomplished through both traditional methods and Sharia-compliant approaches. To maintain monetary stability, these operations aim to keep the rupiah exchange rate aligned with its fundamental value, while managing interest rates in the Overnight Interbank Money Market (PUAB O/N) to hover around the policy rate, which is the BI 7-Day Reverse Repo Rate (BI7-DRR). The primary operational goal of monetary policy is to regulate the PUAB O/N interest rate. Additionally, monetary operations are conducted through interventions or other foreign currency transactions in the foreign exchange market to ensure the exchange rate remains consistent with its underlying value. The two main tools for these operations are Open Market Operations (OMO) and Standing Facilities (SF). (Bank Indonesia, 2024).

3.1 Open Market Operations

A key tool the Federal Reserve employs to implement monetary policy is open market operations (OMOs), which involve the buying and selling of assets in the open market by the central bank. (the Federal Reserve System, 2024).

3.2 Standing Facilities

Standing facilities are monetary policy tools that enable the central bank to provide or absorb overnight liquidity in the banking sector. Counterparties can access these facilities on their own initiative. There are two types of standing facilities, each operating in opposite directions: (Banco Deespana Eurosistema, 2024)

- Banks can access overnight cash from national central banks through the marginal lending facility, which is offered at an interest rate determined by the central bank. While the amount of money that banks can request is unlimited, they must provide sufficient collateral in return. In theory, a bank would not borrow from the central bank if it could obtain cheaper funding from the interbank market (provided it has adequate collateral). As a result, a single marginal lending rate is set for the entire region, acting as the ceiling for the overnight market interest rate.
- Through the deposit facility, banks can place overnight deposits with the national central banks, earning interest at the deposit facility rate (DFR), which is set by the central bank. Banks are less inclined to deposit funds at the central bank if this rate is negative. These deposits usually have no restrictions or limitations. The deposit facility rate typically sets the floor for the overnight market interest rate across the region, thereby influencing short-term money market prices.

4. Implications of CBDCs for monetary operations

The introduction of Central Bank Digital Currencies (CBDCs) presents new challenges and opportunities for monetary operations. As CBDCs alter the composition of money and influence

liquidity, central banks must reconsider traditional tools for managing reserves and short-term interest rates. This section explores the potential effects of CBDCs on core monetary functions.

4.1 Monetary Operations in the Context of CBDCs

With the emergence of Central Bank Digital Currencies (CBDCs), the scope of monetary operations could extend to encompass the digital management of money. Central banks may utilize CBDCs to: (Sebastian I, Kyungmin K, others, 2022, p. 05)

4.1.1 Direct Control over the Money Supply

Because CBDCs are digital, central banks could implement policies with greater precision and control, allowing them to manage the money supply and liquidity more effectively.

4.1.2 Improved Payment Systems

CBDCs could enhance the efficiency and security of payment systems, which, in turn, could have a broader impact on general monetary policy operations.

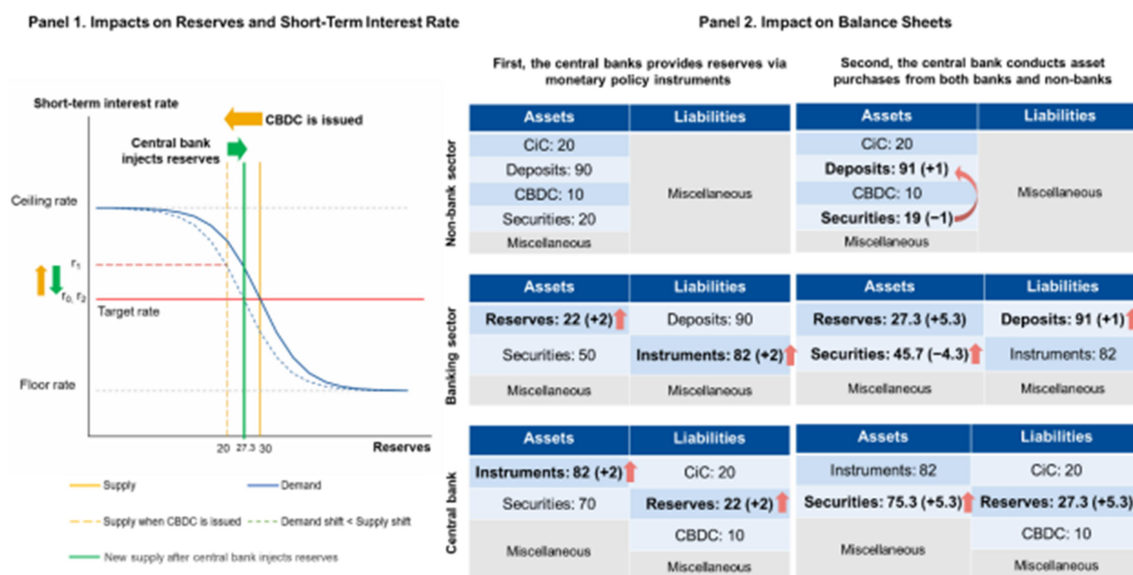
4.1.3 Boost Financial Inclusion

By promoting easier access to banking services, CBDCs could help central banks foster financial inclusion, potentially influencing both monetary stability and economic activity.

4.2 Implications for the banking

Banks play a crucial role in the modern financial system due to their ability to create liquidity through maturity transformation. This process involves funding long-term, illiquid assets with short-term, liquid liabilities, such as accepting deposits. By doing so, banks generate inside money, which acts as both a reliable store of value and a means of payment. Banks leverage their expertise to assess, manage, and support borrowers, while providing funding to various economic agents through loans. Their combined lending and deposit-taking activities give banks a natural edge over other financial institutions, enabling them to provide liquidity, protect businesses and households from both idiosyncratic and systemic liquidity shocks, and stimulate economic growth through the synergies created by these activities.(Sebastian I, Kyungmin K, others, 2022, p. 05).

Fig.2.Reserves and Balance Sheet Impacts when the Central Bank Provides Additional Reserves through Monetary Policy Instruments and Asset Purchases



Source:IMF staff calculations, 2022.

Note: CBDC = central bank digital currency; CiC = currency in circulation.

A modeled example of the central bank's market interventions to counteract upward pressure on short-term interest rates is shown in Figure 2. The process begins with Scenario 2 in the figure, where the supply and demand for reserves shift left, and the reserve balance is set at 20 units. In this situation, the central bank responds by supplying additional reserves through asset purchases and market instruments. As indicated in the first column of the balance sheets, the central bank initially adds two units of reserves to the banking system through Open Market Operations (OMOs) or Standing Facilities (SFs). Subsequently, the central bank buys securities from both banks and nonbanks. It can either purchase assets directly from the banking sector and pay with central bank reserves, or it can buy from the nonbanking sector, paying with bank deposits. As shown in Panel 2 of Figure 2, the central bank continues to supply reserves until the total reaches 27.3 units, and short-term interest rates return to the target level. This occurs as deposits increase to 91, and the reserve requirement ratio is maintained at 0.3. Following these operations, Panel 1 of Figure 2 demonstrates how the central bank's actions influence short-term interest rates. (Tansaya K, André R, others, 2024, p. 13).

5. Analysis of the Digital Yuan: Development, features, and implementation

Given the increasing adoption of digital payments in an already largely cashless society, along with the Chinese government's strong commitment to advancing this initiative, it is highly likely that China will be the first country to launch a Central Bank Digital Currency (CBDC).

5.1 Definition

The People's Bank of China (PBOC) provides digital currency directly to individuals through the digital yuan, which serves as China's version of a Central Bank Digital Currency (CBDC). Unlike a wholesale CBDC designed for banks and financial institutions, the digital yuan is a retail CBDC intended for everyday transactions. Its main goal is to replace cash within China's economy. The digital yuan is pegged 1:1 with the traditional yuan and does not accrue interest. (Boxuan, 2024, p. 02).

5.2 Development History

In 2014, the People's Bank of China (PBOC) began researching digital currency as part of its broader strategy for economic development. Early research focused on the technical foundations, operational model, and legal framework of digital currency.

This initial phase laid a strong groundwork for the future development of Central Bank Digital Currency (CBDC). To further this goal, the PBOC established the Digital Currency Research Institute earlier this year, aiming to enhance the operational mechanisms of the digital currency technology platform. Under the PBOC's guidance, the China Banking Association organized a series of meetings with commercial banks to discuss and explore potential pilot projects for digital money. Significant progress in digital currency research was made by the PBOC between 2017 and 2018. Reports indicate that the core features of the digital currency were developed, and testing began. In response to domestic needs, the central bank gradually established a system for issuing and operating the digital currency. In the second half of 2019, the PBOC announced that it would accelerate its CBDC research and development. By 2020, small-scale pilot testing began in cities like Shenzhen and Suzhou, focusing on consumer payments and diverse applications such as wage payments and public transit. These pilot programs have raised public awareness of CBDCs and demonstrated their practical use in everyday scenarios. (Boxuan, 2024, p. 02).

The People's Bank of China intends to expand the scope of the Digital Currency Electronic Payment (DCEP) pilot significantly by 2021 and 2022, targeting a broader user base and exploring additional areas and use cases. DCEP made notable strides in its global outreach during

the Beijing Winter Olympics, where it was tested by international media and athletes, marking a key step in its international promotion.

Fig.3.Application scenarios of China's central bank digital currency



Source :Boxuan Li, 2024, p 02.

5.3 Implications of a digital currency for China

DCEP could offer several advantages to China, especially if it is launched early. Beijing's strong push for this initiative is likely driven by these benefits. Overall, DCEP could enhance the efficiency of financial transactions, reduce friction in bank transfers, and lower the costs associated with printing coins and paper money. The government's promotion of DCEP also responds to the growing decline in the use of cash in Chinese society, where people are highly accustomed to using their smartphones for various types of transactions, regardless of size. China, with the highest mobile payment adoption rate globally, sees over 80% of smartphone users making payments via their devices. Private payment services like Alipay and WeChat Pay have become dominant and systemically important in China. By introducing DCEP, the government aims to regain some control over the digital payment landscape, shifting power away from these private companies. This could enhance financial stability, improve regulatory oversight, and reduce the influence these firms have on the future development of digital payments. (Nicola , Fabrizio, 2021, p. 150).

The global acceptance of digital currencies as a valid payment method is vital for the success of the digital yuan. Encouraging the use of e-CNY among foreign users presents a challenge, as it would involve operating as a payment provider in foreign markets. This, in turn, would require obtaining licenses and complying with various local regulations in those jurisdictions. (Nicola , Fabrizio, 2021, p. 150).

5.4 The evolution of the digital yuan

China faces significant challenges in encouraging the domestic use of e-CNY, despite ongoing progress in its digital currency implementation. The adoption rate of e-CNY for retail payments remains uncertain. By the end of 2021, there were reportedly over 261 million e-CNY wallets, with transactions totaling RMB 87.5 billion, which averages out to about RMB 335 per wallet. However, in 2020, Alipay processed an average of 10 trillion yuan in monthly transactions. As the e-CNY is still in the experimental phase, it may struggle to outpace private-sector alternatives without substantial government intervention. In practice, the government may find it difficult to replicate the success of major platforms that combine digital payments with other online services such as social networking (WeChat), ride-hailing (Go-Jek), telecommunications, and e-commerce

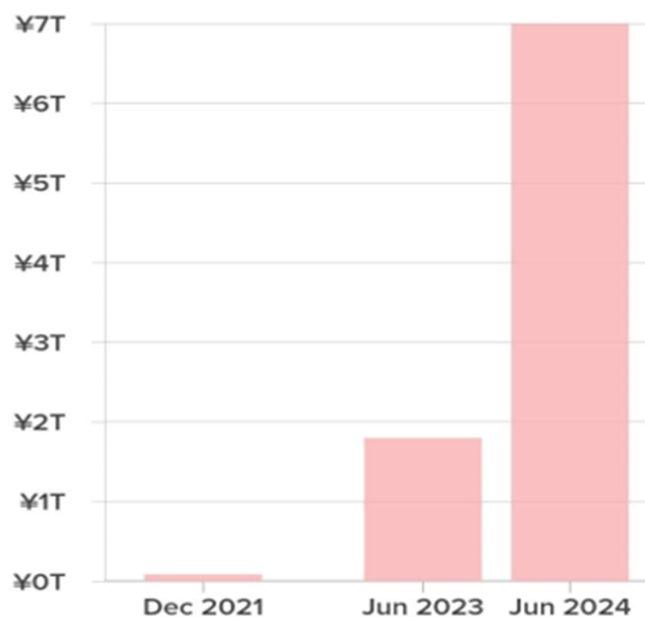
(Alibaba/Alipay). (Sarah C, 2023, p. 156).

While the CBDC presents real and potentially significant risks, its benefits for both domestic and international use remain largely speculative. The introduction of retail CBDCs globally could have adverse macroeconomic consequences, such as currency substitution and heightened vulnerability to financial shocks. Given that digital money is not a novel concept and much of the excitement around it has been exaggerated, BIS Managing Director Agustin Carstens believes that CBDCs are not a game-changer and are unlikely to pose competition for reserve currencies or provide a geopolitical advantage to early adopters. (Sarah C, 2023, p. 156).

5.5 The current status of the Digital Yuan in 2024

The Digital Yuan has been introduced in 29 cities, signaling its shift toward full-scale deployment and integration into China's central bank monetary supply system, moving beyond the "pilot" phase suggested by the Chinese government. However, adoption has been slow, with data indicating that the Digital Yuan has yet to gain widespread popularity. While the payment volume of the Digital Yuan has increased since its launch, the total transaction throughput—reported at \$250 billion in the first half of 2023—remains relatively small when compared to China's population and economy, making up only 0.16% of the country's total monetary volume. Nevertheless, this is still a notable increase when compared to the approximately \$14 billion processed during the first two years of the e-CNY's rollout. (Roger H, 2024).

Fig.3.e-CNY transaction volume quadruples since 2023



Source: People's Bank of China, 2024.

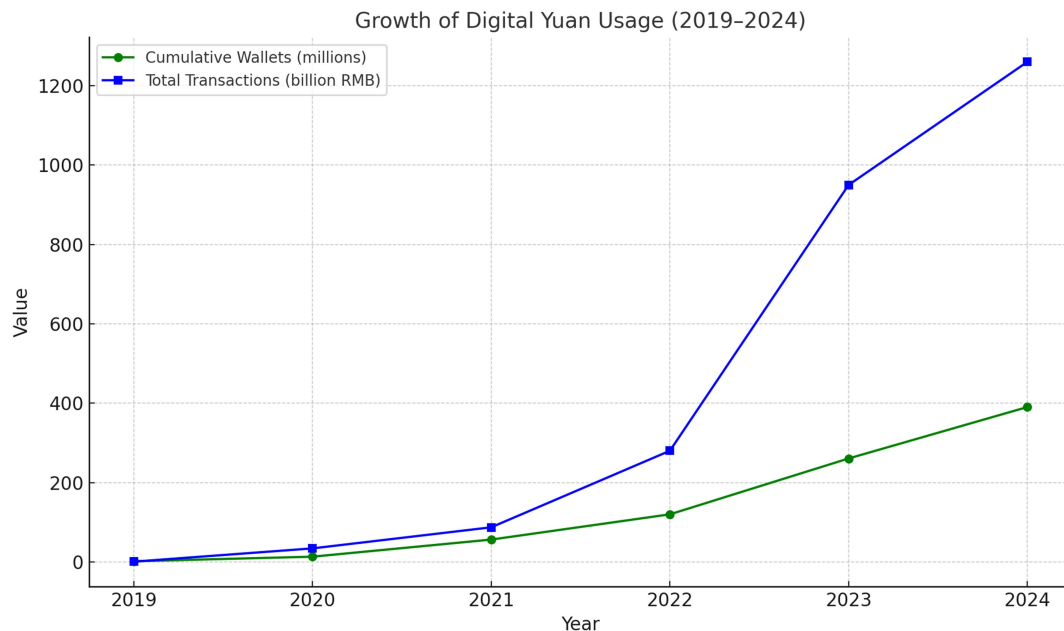
According to the figure, e-CNY (Digital Yuan) transactions saw a remarkable rise, growing from modest levels in December 2021 to ¥2 trillion by June 2023, and reaching ¥7 trillion by June 2024. This significant growth can be attributed to strong government backing, expanded pilot programs, and increasing public acceptance of digital payments. The surge highlights China's success in promoting financial inclusion, reducing reliance on cash, and enhancing payment efficiency. Strategically, this positions China as a leader in the development of central bank digital currencies (CBDCs), potentially accelerating the yuan's internationalization. However, sustained growth will depend on continued public trust and further technological integration.

Table 1: Evolution of e-CNY Pilot Adoption (2019–2024)

Year	No. of Pilot Cities	Cumulative Wallets (millions)	Total Transactions (billion RMB)
2019	4	2.1	1.1
2020	11	13.6	34.5
2021	23	56.7	87.6
2022	28	120.3	280.4
2023	30+	261.0	950.0
2024	30+	390.5	1,260.0

Source: People's Bank of China (2024), BIS Working Paper No. 1071.

Fig.4.Growth of digital yuan usage (2019- 2024)



Source: Prepared by the researcher based on Table 1.

The table 01 illustrates the progressive expansion of the Digital Yuan pilot program across Chinese cities from 2019 to 2024. There is a sharp rise in the number of registered digital wallets and transaction volume, highlighting increased public engagement and infrastructure readiness. This growth reflects the Chinese government's strategic commitment to digitizing its monetary system.

5-6 Deepening the Empirical Dimensions of China’s e-CNY Pilot.

As China leads the global race in central bank digital currencies, its e-CNY pilot offers rich empirical insights .This section explores concrete case studies that demonstrate the scale, scope, and innovation of the digital yuan in real-world settings.(People’s Bank of China, 2023)

➤ Institutional Use of e-CNY

The digital yuan was deployed in institutional settings such as government payrolls. In cities like Shenzhen and Suzhou, civil servants received part of their salaries via e-CNY, and payments for public services like transportation and taxes were enabled through digital wallets.

This institutional approach ensured confidence in the currency’s legal stability and technological infrastructure.

➤ Stimulus Distribution through Digital Red Envelopes

China experimented with the distribution of government subsidies using e-CNY. In October 2020, the Shenzhen municipal government distributed 10 million yuan in digital “red envelopes” to over 50,000 residents, allowing them to spend the money at selected merchants.

This initiative served as a real-world test for large-scale retail use and behavioral response to programmable money.

➤ **Cross-border Trial during the 2022 Beijing Olympics**

The Beijing 2022 Winter Olympics served as a unique international testbed for e-CNY. Foreign athletes, staff, and visitors were able to download e-CNY wallets and use the currency for purchases in the Olympic Village and beyond.

This was a significant step towards assessing the potential for cross-border interoperability of China's central bank digital currency.

➤ **Integration with Monetary Policy Tools**

The People's Bank of China has developed programmable features within e-CNY, enabling control over how, when, and where the currency is used. This allows for more targeted stimulus, better liquidity tracking, and an enhanced monetary transmission mechanism.

In regions with limited financial infrastructure, e-CNY also supports financial inclusion objectives.

6. CONCLUSION

In conclusion, the introduction of the Digital Yuan marks a critical development in the evolution of CBDCs and offers significant potential for improving the efficiency and effectiveness of monetary operations.

However, its full implementation raises complex issues that must be carefully managed, particularly concerning privacy, security, and the broader impact on global monetary systems. As China continues to lead the way in CBDC adoption, other countries will likely follow, shaping the future of digital currencies and their role in the global economy.

Hypotheses Testing

Based on our study and analysis of the results, we test the research hypotheses as follows:

- **Hypothesis 1:** It assumes that Central Bank Digital Currencies (CBDCs) redefine the concept of money by integrating characteristics of traditional currency with technological innovation, thereby enhancing the central bank's role in the monetary system. The study shows that the digital yuan clearly combines these features, reflecting a change in the nature and functions of money. **Therefore, we confirm this hypothesis.**
- **Hypothesis 2:** It suggests that monetary operations include key tools such as reserve management, liquidity control, and short-term interest rate targeting used by central banks to implement monetary policy. The results confirm the continued effectiveness of these tools alongside the introduction of the digital yuan, without abandoning traditional mechanisms. **Therefore, we confirm this hypothesis.**
- **Hypothesis 3:** It assumes that the introduction of CBDCs affects monetary operations by altering the monetary base, reducing commercial bank deposits, and influencing the central bank's ability to manage liquidity and interest rates. The study indicates that these effects have been limited so far due to the cautious design policies of the digital yuan. **Accordingly, we partially confirm this hypothesis.**

Key Findings

- CBDCs contribute to redefining the nature of money by combining traditional currency features with digital technology.
- Traditional monetary operations remain effective and adaptable in the presence of CBDCs

like the e-CNY.

- The impact of CBDCs on liquidity and monetary stability is limited so far due to cautious implementation policies.
- The e-CNY experience highlights the importance of thoughtful design in minimizing negative impacts on the financial and monetary system.

7. Glossary:

CBDC Central Bank Digital Currency
IMF International Monetary Fund
OMOs..... Open Market Operations
CiC Currency in Circulation
e-CNY..... Electronic Chinese Yuan
PBOC People's Bank of China
BIS Bank for International Settlements

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