Research on the Impact of Central Bank digital Currency Issuance on Macroeconomics

Han Lu[1], Kaifeng Shen[2], Baodie Zeng [3,*]

[1] School of Economics, Nanjing Audit University, 211815, Nanjing, China
[2] NUIST Reading Academy, Nanjing University of Information Science and Technology, 210044, Nanjing, China
[3] Insurance Academy, University of International Business and Economics, 100105, Beijing, China
202330004@uibe.edu.cn

Abstract. With the development of digital technology, central bank digital currency (CBDC) has gradually become a key force in the global financial system. This paper reviews the multi-dimensional macroeconomic impacts of digital currencies, particularly CBDCS, including impacts on financial stability, commercial banking business models, user privacy, and payment systems. Through systematic literature review and analysis, this paper summarizes the models and methods used in different studies, such as structural equation model, dynamic stochastic general equilibrium model, event study method, etc., and discusses the research conclusions and viewpoints of different scholars in these fields. Research has shown that CBDC can both improve the stability and efficiency of the financial system and trigger new systemic risks. Its impact depends on the mode of implementation and the economic environment, and future studies should further explore its economic effects and long-term impact on social equity and the international financial order. The review of this paper provides a valuable reference for the academic community and policy makers.

Keywords: Central Bank digital currency (CBDC), Financial stability, Monetary policy transmission mechanism, Systemic risk.

1 Introduction

With the rapid development of digital technology, CBDC has gradually become an important force in the global financial system. The emergence of Bitcoin in 2009 as the first decentralized digital currency marked a revolutionary change in the way financial transactions and payments were made. Since then, various digital currencies such as Ethereum and Ripple have emerged in an endless stream, and many countries have also begun to explore and pilot the issuance of central bank digital currencies (CBDC). The widespread application of CBDC has not only changed the payment habits of individuals and enterprises, but also had a profound impact on the global macro economy.

J. Lu (ed.), *Proceedings of the International Workshop on Navigating the Digital Business Frontier for Sustainable Financial Innovation (ICDEBA 2024)*, Advances in Economics, Business and Management Research 315,
https://doi.org/10.2991/978-94-6463-652-9_83

The current research on the impact of CBDC on macro-economy mainly focuses on the following directions. First, a number of studies have explored the challenges of CBDCS to central bank monetary policy, in particular the impact they may have on key macroeconomic indicators such as money supply and inflation. Second, the anonymous and decentralized nature of CBDCS poses a new threat to the risk structure of financial markets, an issue that has attracted considerable attention in financial stability research. Third, the potential of CBDC in cross-border payments and international trade is also an important topic in the academic community, and its impact on the global capital flow and financial market pattern deserves in-depth discussion. Although the existing research has achieved a wealth of results, there are still many unanswered questions about the economic efficiency of CBDC, its impact on the traditional financial system, and its long-term impact on the international economy.

Based on the discussions of many scholars and considering that there are few relevant reviews on the impact of CBDC on the macro economy, this paper will take "the impact of central bank digital currency on the macro economy" as the theme, summarize previous research results and existing problems at the present stage, and further discuss the impact of CBDC on economic efficiency, so as to provide a more comprehensive perspective for future research of scholars. In the specific research process, the main viewpoints and research results of the academic and policy circles on the impact of CBDC will be summarized by combing and analyzing the existing literature. At the same time, the shortcomings of the current research and the future research direction are discussed, so as to provide a reference for further research on the impact of CBDC on the macro economy.

2 The Impact of CBDC on Financial Stability

The impact of the issuance and circulation of CBDC on financial stability has attracted much attention in recent years. Xiao Li et al. 's study used structural equation model (SEM) to analyze the possible systemic risks caused by the introduction of CBDC. They found that the widespread use of CBDC could lead to the loss of bank deposits, thereby increasing liquidity pressure and thus negatively impacting the stability of the financial system [1]. This finding is supported by a study by Lin Xinyu et al. using a dynamic stochastic general equilibrium model (DSGE). By simulating different economic shock scenarios, they proved that in the absence of proper supervision, the launch of CBDC may amplify the volatility of financial markets [2]. On the contrary, Ying Li et al. 's research points out that CBDC can help improve the transparency and controllability of the financial system under specific conditions, thereby enhancing financial stability by analyzing existing policy experiment data [3]. They used panel data analysis to examine the effects of CBDC pilots in different countries. Finally, it is concluded that if the government can effectively control the issuance and circulation speed of CBDC, it will play a key role in reducing systemic risk. In addition, Hiep Ngoc Luu et al. adopted the event study method to analyze the financial market reaction after CBDC pilot in some countries, and found that although market volatility increased in the short term, CBDC could help stabilize inflation expectations and reduce uncertainty in the financial market in the long run [4]. The diversity of these approaches and the complementarity of their conclusions suggest that the impact of CBDC on financial stability depends to a large extent on the specific implementation mode and the economic environment. Therefore, CBDC will have multiple impacts on financial stability through a variety of complex paths, and trigger various chain reactions, bringing different potential risks and opportunities.

3 The Impact of CBDC on Commercial Banks

From the perspective of commercial banks, the emergence of CBDC is both a challenge and an opportunity. Brandon Joel Tan et al. adopted the game theory model to explore the impact of CBDC on the traditional business model of commercial banks. Th e analysis shows that with the widespread adoption of CBDC, the intermediary function of commercial banks may be weakened, especially in the deposit and payment business. This shift may lead to a decline in banks' profit margins, forcing them to adjust and transform in terms of interest rates, service innovation and risk management [5]. Banks can cope with the competitive pressure brought by CBDC by strengthening cooperation with technology companies and developing new financial products and services, so as to maintain market share in the new environment [6]. In other words, CBDC not only impacts the business model of traditional commercial banks, but also provides commercial banks with the opportunity to explore new business models. Zhao Heng et al. analyzed how banks in some pilot countries use CBDC to develop cross-border payment and small loan businesses through case studies. Specifically, the introduction of CBDC will greatly improve the efficiency of cross-border payment and significantly reduce the cost, thus promoting the international development of banking business [7]. Banks can enhance their competitiveness through digital transformation, promoting the upgrading of payment systems and developing financial products based on blockchain technology [8].

4 The Impact of CBDC on Traditional Monetary Policy

The impact of CBDC on the effectiveness of traditional monetary policy cannot be ignored either. Dejun Li et al. analyzed the impact of CBDC on the transmission mechanism of monetary policy through econometric models and found that the existence of CBDC may change the effectiveness of traditional monetary policy tools, especially in the aspects of interest rate transmission and money supply. CBDC can improve the precision of monetary policy, but it may also bring new policy challenges, especially the need for more flexible policy tools in response to fluctuations in the economic cycle [9].Similarly, Jafar El Armali et al. used the VAR model to analyze the impact of CBDC on the price level and employment rate, the results suggest that the introduction of CBDC may affect price levels and employment by altering the public's preference for money and the risk of liquidity traps [10].The widespread use of CBDC may lead to an increase in deflationary pressure, especially during the economic downturn, and the central bank needs to pay more attention to the management and control of money supply. In addition, CBDC may have a negative impact on traditional bank credit creation mechanisms, thereby inhibiting economic growth, a point that has received extensive attention in current research.

5 The Impact of CBDC on User Privacy

User privacy security is directly related to the anonymity of CBDC, and transaction anonymity can be divided into completely non-anonymous, semi-anonymous and completely anonymous from weak to strong. Wu and others say that in the informal economy, cash acts as an anonymous currency that cannot be tracked by the government through paper money, allowing companies to avoid paying income tax. In the case of CBDC, most consumption is recorded and traceable, greatly reducing the pressure on public authorities, which is why China encourages the use of CBDC. Although a few countries have adopted specific tax policies for CBDCS to combat tax evasion, in developing countries and enterprises, more paper money is still used. Not only that, even in more developed countries and businesses, there are still many members of the public who prefer to use cash, especially vulnerable groups, who find it easier to pay in cash [11].

Although CBDC can effectively solve problems such as tax evasion, how to ensure payment privacy is a special concern of many members of the public and a controversial topic in today's academic circles. Ozley and others argue that some consumers are worried about losing their privacy with digital payments, and vendors are worried about central banks having their sensitive data, so they are resistant to CBDCS.A survey of the eurozone between October 12, 2020 and January 1, 2021 showed that 43 percent of people believe that privacy is a key CBDC issue, and 18 percent believe that privacy is a CBDC security issue [12].

6 The Impact of CBDC on Payment Systems

CBDC has many positive effects on the payment system. Zou Wenbo said CBDC has broadened the scope of payment and funds are more easily distributed to users in many poor areas, enabling them to enjoy more financial services. In addition, CBDC is rich in payment methods. During the COVID-19 epidemic, many people are more willing to use CBDC because they are worried that paying with paper money will increase the risk of infection. Moreover, paper money poses risks to the public such as storage, storage and transportation, as well as inconvenient change and portability. In contrast, CBDC is more in line with modern people's goal of paying attention to efficiency, and the public can make efficient payment through simple methods such as scanning code payment, face recognition, palm touch recognition, and small amount of secret free [13]. Lin Xinyu said that CBDC can promote social equity, and traditional payment methods, due to the cumbersome payment process and high payment cost, have a high threshold for many financial services, excluding many small and medium-sized enterprises and individuals. CBDC can effectively solve these problems and promote social equity [2]. At the same time, CBDC is also expected to make up for the legal and conversion issues between different countries involved in cross-border payments. Although CBDC has many positive effects on the payment system, it also faces many challenges. In China, many people are more inclined to use payment methods such as Alipay and Wechat Pay, and 96% of small sales in China are through Alipay or Wechat Pay. Compared with Alipay and Wechat Pay, CBDC has little difference in the daily life of most of the public. How to attract more users to use CBDC is a problem that needs to be solved.

7 Conclusion

To sum up, the macroeconomic impact of CBDC on a global scale has triggered extensive and in-depth research. Based on a systematic review of the existing literature, this paper summarizes the impacts of CBDC on financial stability, business models of commercial banks, user privacy and payment systems. This research shows that the introduction of CBDC may not only bring about the improvement of the stability and efficiency of the financial system, but also trigger new systemic risks and challenges. In general, CBDC may enhance the precision of monetary policy and the transparency of financial transactions under appropriate supervision, but it may also exacerbate market volatility under poor supervision, weaken the intermediary function of traditional banks, and have a profound impact on the global financial market pattern.

The results of this study have implications for the academic community and policy makers. On the basis of existing studies, the academic community can further explore the economic effects of CBDC and its differentiated impact on different economies, while policy makers need to comprehensively evaluate its potential risks and benefits when implementing CBDC, and formulate corresponding regulatory framework to maximize the positive role of CBDC. Looking ahead, as CBDC applications continue to evolve, their impact on the macro economy will become more complex and far-reaching. Future research should pay more attention to the comparative analysis among different economies and the specific implementation effects of CBDC in different economic environments. In addition, the long-term impact of CBDC on social equity, the restructuring of the international financial order, and the digital economic ecosystem remains an important topic worthy of in-depth discussion. These studies will provide more comprehensive and systematic theoretical support for the development and regulation of global CBDC.

Author Contributions

All the authors contributed equally, and their names were listed in alphabetical order.

References

1. Li X.: A Study of the Impact of Central Bank Digital Currency on the Financing Constraints of Small and Medium-sized Enterprises. Academic Journal of Business & Management **5** (26), 184-189 (2023).
2. Lin X.Y.: A summary of the research on the influence of central bank digital currency on the financial system. Academic Journal of Business & Management **6** (6), 31-35 (2024).
3. Li Y.: Central Bank Digital Currency and Commercial Bank Soundness, Academic Journal of Business & Management **5** (26), 179-183 (2023).
4. Hiep Ngoc Luu, Canh Phuc Nguyen, Muhammad Ali Nasir.: Implications of central bank digital currency for financial stability: Evidence from the global banking sector, Journal of International Financial Markets, Institutions & Money, (2024)
5. Brandon Joel Tan.: Central bank digital currency and financial inclusion, Journal of Macroeconomics, **81** (2024), 103620 (2024)
6. Dai M. W.: Study of the Macroeconomic Effect of Central Bank Digital Currency, Zhongnan University of Economics and Law, (2020).
7. Zhao H., Lian F., Zhou Y.: Research on the Macroeconomic Impact and Welfare Effects of Legal Digital Currency, Financial Economics Research **1**, 2097-1346 (2023).
8. Yang W.: Research on the Impact of Legal Digital Currency on Monetary Policy Transmission Mechanism——Based on the Perspective of Monetary Policy Credit Channel, Xihua University, (2023)
9. Li D.J., Huang J. B., Wang L.C.: The Impact of Digital Currency on the Financial System: Universal Decentralized Digital Currency, Is It Possible?, Journal of Economics and Public Finance **5** (2), (2019).
10. Jafar El Armali.: Central bank digital currency and fiscal policy in a Diamond-Dybvig Model, Journal of Government and Economics **12,** 100089 (2023)
11. Eun Young Oh, Zhang S.N.: Informal economy and central bank digital currency, Shuonan Zhang, Economic Inquiry **60** (4), (2022)
12. Peterson K. Ozili, Sergio Luis Náñez Alonso.: Central bank digital currency adoption challenges, solutions and a sentiment analysis, Journal of Central Banking Theory and Practice 1, 133-165 (2024)
13. Zou W. B.: Research on the Economic Impact of Central Bank Digital Currency, International Journal of Social Science and Education Research **7** (6), (2024)