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THE IMPACT AND INFLUENCE OF DIGITAL CURRENCIES ON THE TRADITIONAL FINANCIAL SYSTEM: OPPORTUNITIES, CHALLENGES AND TRANSFORMATION

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Abstract: Digital currency, as an emerging financial instrument, is having a profound impact on the traditional financial system. This paper explores the transformative role of digital currencies on the global financial system by analysing the types of digital currencies, their technological foundations and their impact on the areas of money supply, banking, payment systems and capital markets. First, digital currencies have improved payment efficiency and financial inclusion, especially central bank digital currencies (CBDC) and decentralized finance (DeFi) have driven innovation in payment systems and cross-border payments. Second, the popularity of digital currencies also poses regulatory and compliance challenges, particularly in terms of monetary policy, financial stability, and cross-border regulation. Finally, the paper highlights the potential of digital currencies to drive financial services inclusion and market innovation, particularly in the area of decentralised finance. Nonetheless, issues of technical security, market risk and legal compliance still need to bead dressed. In the future, the development of digital currencies will depend on technological advances and regulatory harmonization on a global scale.
Keywords: Digital currency; Central bank digital currency (CBDC); Decentralised finance (DeFi); Cross-border payment

1 INTRODUCTION

Over the past decades, digital currencies have evolved from an emerging technological innovation to a force to be reckoned with in the global financial arena. Especially in recent years, with the rise of cryptocurrencies such as Bitcoin and the promotion of the experimentation and landing of central bank digital currencies (CBDC) by central banks, the concept and application of digital currencies have transcended the technological realm and have become an important variable affecting the traditional financial system[1-2]. Digital currencies not only represent a new payment method, but also challenge, to some extent, the definition of traditional money, the implementation mechanism of monetary policy, and the role of financial intermediaries. Its potential impact and changes to the financial system have become the focus of attention of financial academics, policy makers and financial market participants around the world.

The purpose of this paper is to explore the impact and influence of digital currencies on the traditional financial system, in particular, to analyse the three aspects of opportunities, challenges and transformation. Firstly, the paper will review the basic concepts, types and technical basis of digital currencies to help readers understand the characteristics of this emerging financial instrument. Then, this paper will focus on analysing the impact of digital currencies on the traditional financial system, exploring its role in money supply, banking, capital market and financial stability. Subsequently, the paper will discuss the policy and regulatory challenges posed by digital currencies, particularly in terms of monetary policy, financial regulation, and compliance. Finally, the article will explore the potential of digital currencies to drive transformation of the financial system, particularly in the areas of decentralized finance (DeFi), payment system innovation and cross-border payments.

With the rapid development of digital currencies, their impact and influence on the traditional financial system is not only an object of academic research, but also a core issue in policy making and financial practice. Therefore, the research in this paper is not only of academic significance, but also of extensive practical value, providing theoretical support and policy recommendations for understanding and responding to the transformative challenges posed by digital currencies.

2 OVERVIEW AND CLASSIFICATION OF DIGITAL CURRENCY

2.1 Definition of Digital Currency

Digital currency is a form of currency that exists in digital form, and its value relies on cryptography, distributed ledger or centralised credit system to ensure that it can realise the digital transfer of value and settlement. From the technical point of view, digital currency breaks through the physical form of traditional physical currency (such as banknotes and coins), and completes the circulation in the network through binary data, which is the product of the deep integration of information technology and financial industry.

In academic research, the definition of digital currency needs to be defined in terms of technical basis and core features. From the technical basis, most digital currencies rely on cryptography to ensure the security and anonymity of

transactions[3]. At the same time, they use distributed ledger technology to achieve decentralized transaction recording and verification, which makes them tamper-proof and traceable. The core features are reflected in three aspects: first, the digital carrier, completely detached from the physical form, relying on electronic equipment for storage and transactions; second, the value of the anchor mechanism, part of the digital currency and the legal tender pegged, part of the market through the supply and demand to form the price; third, the circulation of the inter-temporal space and time, can be realised in a global network environment for instantaneous transfer of funds, not subject to traditional financial institutions business hours or geographical restrictions[4-5].

2.2 Types of Digital Currency

2.2.1 Central Bank Digital Currency (CBDC)

Central Bank Digital Currency (CBDC) is a digitised legal tender issued by the central bank, with the same legal status and unlimited legal tender as banknotes and coins, with the core features of centralised issuance and legal credit endorsement, and the issuance mechanism articulating the traditional monetary policy framework, aiming to supplement or replace the circulation of cash and enhance payment efficiency.

The technology path is divided into "account-based" and "token-based" categories: the former is similar to the traditional bank account system, where transactions are completed through identity authentication; the latter draws on the design of cryptocurrencies, with digital signatures to verify ownership and support offline transactions (e.g., China's digital RMB). At present, China's digital RMB and Sweden's electronic krona (e-krona) have entered the pilot stage, with application scenarios covering retail payments, government subsidy disbursement, and cross- border settlement.

2.2.2 Cryptocurrency

Cryptocurrencies are decentralized digital currencies based on blockchain technology, relying on cryptographic algorithms to guarantee transaction security and anonymity, with transaction records permanently stored in the blockchain, and not relying on centralised financial institutions or government regulation. 2008 saw the introduction of Bitcoin by the pseudonym Satoshi Nakamoto, which was launched in 2009, and has become the first and best known cryptocurrency. Since then, Ethereum, XRP and Litecoin have emerged, each using different technologies and algorithms. For example, Ether is not only a cryptocurrency, but also supports smart contracts and decentralized applications (DApps). These currencies operate through a decentralized network, eliminating the need for intermediaries, making transactions faster and cheaper.

The cryptocurrency market has a high degree of volatility, which is regarded as both an "emerging asset" and poses a financial stability risk, and has become a global regulatory focal point due to the lack of regulation and vulnerability to use in money laundering, terrorist financing and other illegal activities.

2.2.3 Stablecoin

Stablecoins aim to reduce the volatility of the cryptocurrency market, with values usually linked to a single fiat currency (e.g., the U.S. dollar, the euro) or a basket of commodities (e.g., gold) at a relatively stable price, which solves the problem of high volatility of cryptocurrencies, and makes them more suitable for payments and daily transactions.

Tether (USDT) and USD Coin (USDC) are representative projects that maintain exchange ratios with fiat currencies through different mechanisms, e.g.,

Tether is always equal to US$1. With the rise of decentralized finance (DeFi), stablecoins are widely used in cross-border payment, lending and derivatives markets.

2.3 The Technical Basis of Digital Currencies

The core technical foundation of digital currency includes blockchain technology, cryptography, consensus mechanism and smart contracts. Blockchain, as a decentralized distributed ledger, guarantees security and trustworthiness by virtue of tamper-proof data storage and transparent transaction records; cryptography ensures the privacy and integrity of transactions through public key encryption, hash algorithms and digital signatures to support security verification in a decentralized network; consensus mechanisms such as Proof of Work (PoW) and Proof of Stake (PoS), which are the protocols reached by nodes of the blockchain to guarantee the validity of transactions and network security; smart contracts support the automatic execution of contractual agreements without intermediaries to promote decentralised finance (DeFi) and other financial innovations. Together, these technologies ensure the validity of transactions and the security of the network, forming an efficient and reliable transaction system that accelerates the digitalization and decentralization of financial services [4].

3 THE IMPACT OF DIGITAL CURRENCY ON THE TRADITIONAL FINANCIAL SYSTEM

The emergence of digital currencies has not only changed the traditional means of payment and transaction methods, but also had a far-reaching impact on the multifaceted structure and function of the traditional financial system. Specifically, digital currencies have had a significant impact on a number of areas, including money supply, banking, payment systems, capital markets, and financial stability. The following will explore in detail the impact of digital money on the traditional financial system from these perspectives.

3.1 Money Supply and Circulation

The money supply is a crucial part of the traditional financial system and is usually controlled by national central banks through fiat currencies. However, the emergence of digital currencies, in particular Central Bank Digital Currency (CBDC) , has the potential to redefine the mechanism of money supply and circulation. Unlike traditional currencies that rely on physical notes and coins, CBDC, as an electronic form of legal tender, not only offers advantages in terms of speed of circulation and ease of payment, but also enables more precise regulation of money supply through more efficient management tools.

In addition, the emergence of digital currencies may also affect the transmission mechanism of monetary policy. Monetary policy implemented by the central bank through the CBDC will no longer rely on the transmission of commercial bank intermediaries, but can directly affect the payment behaviour of individuals and enterprises, thus potentially improving the effectiveness of monetary policy. For example, the programmability of digital currencies may enable the CBDC to implement more refined monetary policy, such as directly regulating the amount of money in circulation in a particular industry or region[7].

3.2 Banking and Financial Institutions

In the traditional financial system, banks play a crucial role, providing basic services such as savings, loans and payments. However, the popularity of digital currencies, especially central bank digital currencies (CBDC) and cryptocurrencies, may pose a significant impact on the core business of commercial banks. On the one hand, the ease of payment and transparency of digital currencies may prompt some customers to transfer their deposits to digital currencies as the preferred payment instrument for individuals and businesses. On the other hand, the decentralized nature of digital currencies may undermine the role of banks as financial intermediaries, particularly in their core functions of payment settlement and funds movement.

Nonetheless, the rise of digital currencies also presents an opportunity for banks to innovate. Commercial banks can develop financial products and services related to digital currencies and drive the digital transformation of their business through technological cooperation and innovation. The integration of financial technology (Fintech) with the banking industry will be a key direction for future development. Banks can make use of emerging technologies such as blockchain to optimise payment, clearing and transaction systems, thereby reducing costs and improving operational efficiency[8].

3.3 Payment systems and cross-border payments

Innovation in payment systems is one of the most intuitive impacts of digital currencies. Traditional payment systems typically rely on third-party intermediaries (e.g., banks or payment companies) and often face higher costs and slower settlements in cross-border payments. Digital currencies, particularly CBDCs and cryptocurrencies, can provide faster and lower-cost payment solutions through decentralized technology. The implementation of CBDCs can make cross-border payments more efficient as it avoids the need for multiple layers of intermediaries and complex foreign exchange conversion processes, and dramatically improves the timeliness of settlements.

3.4 Capital Market Impact

The impact of digital currencies on the capital market is multifaceted. Firstly, as an emerging asset class, cryptocurrencies have attracted the participation of a large number of investors, leading to changes in the structure of risky assets in the capital market. The high volatility and decentralized nature of cryptocurrencies such as Bitcoin and Ether have made them popular targets for speculative investment, and while this feature has increased the risk in the market in the short term, it has also brought unprecedented return opportunities for investors.

Second, the combination of digital currencies and blockchain technology promotes innovation in the capital market. Blockchain technology not only improves the transparency and traceability of assets, but also automates trading through smart contracts, reducing the risk of market manipulation. New financial products and market forms such as digital asset securitisation and decentralized finance (DeFi) are also emerging under the impetus of digital currencies, changing the landscape of traditional capital markets[6].

4 CHALLENGES OF DIGITAL CURRENCY TO FINANCIAL POLICY AND REGULATION

With the rise of digital currencies, especially the popularity of central bank digital currencies (CBDC) and cryptocurrencies, the regulatory framework of the global financial system is facing unprecedented challenges. The decentralized nature of digital currencies, global cross-border liquidity and deep integration with the traditional financial system make it difficult for the existing financial regulatory regime to adapt to this emerging field. In response to these challenges, policymakers and regulators need to revisit and adapt existing policy tools and regulatory mechanisms to ensure the stability and transparency of the financial system.

4.1 Adaptation of Monetary Policy

The introduction of CBDCs may reconfigure the monetary policy transmission mechanism. Under the traditional model, the central bank regulates the money supply through the intermediation of commercial banks, while the popularity of

CBDC allows the central bank to provide e-money directly to the public, bypassing the commercial banking system, which may trigger the loss of bank deposits and weaken its credit creation function.
The programmability of digital currencies expands the space for monetary policy operations. The central bank can regulate the flow of funds to specific industries or regions through technical means, such as relying on smart contracts to regulate the supply of funds to specific economic sectors, which breaks through the operational boundaries of traditional monetary policy. How to effectively integrate such new tools with the existing policy framework and ensure their effectiveness has become a core issue for central banks.
At the same time, CBDCs may also enhance the precision of policy transmission. By issuing money directly to the public, central banks can more directly influence the behaviour of microeconomic agents, for example, by implementing precise interest rate regulation or targeted monetary stimulus.

4.2 Challenges to Financial Stability

The rise of cryptocurrencies poses a systemic challenge to financial stability. Their markets are highly volatile and subject to manipulation risks: sharp price fluctuations in bitcoin, ethereum, etc. not only affect investors' balance sheets, but may also impact financial institutions holding related assets, triggering a chain reaction of sell-offs and systemic risks.
The decentralized nature of digital currencies (especially in the field of decentralized finance (DeFi)) increases the difficulty of regulation, leading to an increase in the risk of illicit financial flows, money laundering and other financial crimes. Asset management and transparency of stable coins are also critical, if the reserve assets are not properly operated, its price collapse may trigger a chain reaction in the financial market, so the regulation of stable coins has become the core link to maintain market stability.

4.3 Complexity of Cross-Border Regulation and Coordination

The cross-border and decentralized nature of digital currencies puts global regulation in a difficult position. While traditional regulation relies on country- specific frameworks, the global nature of digital currencies makes it difficult for them to be controlled by a single jurisdiction, leading to a divergence of regulatory attitudes among countries (from a total ban to leniency and inclusiveness).
The lack of regulatory harmonisation has led to multiple problems: regulatory arbitrage has been highlighted, with market players tending to operate in regulatory pockets; and inconsistencies in international standards have led to legal and tax differences in cross-border transactions, increasing trade and investment uncertainty.
The Bank for International Settlements (BIS), the Financial Stability Board (FSB) and others are promoting global regulatory harmonisation, with the aim of establishing a unified framework to safeguard transaction transparency and prevent capital flow risks. This requires countries to strengthen cooperation and information sharing, and gradually achieve harmonisation of regulatory standards.

4.4 Future Development of Regulatory Framework

Global regulators need to accelerate the construction of a regulatory framework for digital currencies, which not only covers traditional financial regulatory elements, but also incorporates technological regulatory dimensions (e.g. blockchain compliance, smart contract standards, cross-chain technology transparency, etc.), and seeks to strike a balance between security, privacy protection and technological innovation, so as to avoid impacting market stability.
International coordination is a key direction for framework construction. As applications deepen, regulatory reforms in areas such as cross-border payments, stable coins, and CBDCs need to rely on global institutions to advance. Global regulatory integration can reduce market uncertainty and enhance the resilience of the financial system.
At the same time, the framework needs to be dynamically adaptable to cope with technological changes, and safeguard the vitality of market innovation while preventing and controlling systemic risks.

5 THE ROLE OF DIGITAL CURRENCIES IN THE TRANSFORMATION OF THE FINANCIAL SYSTEM

5.1 Enhancement of Financial Inclusion

The popularisation of digital currencies has injected a strong impetus to financial inclusion, especially in developing countries and areas with weak traditional financial coverage, breaking down service barriers and expanding the scope of participation in the global financial system.
CBDC and cryptocurrencies provide new access to the unbanked. In many underdeveloped areas of developing countries, a large number of people have difficulty in accessing traditional banking services, and with the help of smartphones and the Internet, users can directly access digital currency platforms to carry out payment, savings, lending and other activities, which will significantly increase the penetration rate of financial services. India, Kenya and other countries have gradually improved financial access in poor areas through digital currency and payment technology.
In addition, the decentralized nature of digital currencies breaks through the limitations of traditional banking networks, further reducing intermediation costs and enabling financial services to reach more remote users. This enhanced inclusiveness is important for promoting global economic growth and narrowing the gap between the rich and the poor.

5.2 Cross-border Payments and Global Financial Integration

CBDC can be designed as a cross-border payment tool to realise direct fund transfers between countries and regions, reducing intermediation costs and foreign exchange risks. For example, the People's Bank of China is promoting digital RMB cross-border payment pilots, and plans to improve efficiency through co-operation with central banks in other countries. Through the interconnection of CBDC systems in various countries, it is expected to break the dollar-dominated global payment system and promote the balanced development of multi-currency payment and settlement methods.

At the same time, the cross-border payment capability of digital currencies simplifies the international trade and investment process and reduces market uncertainty in terms of capital flows and exchange rate fluctuations. With the improvement of the relevant systems in the future, the process of global financial integration will be further accelerated.

5.3 The Rise of Decentralized Finance (DeFi)

Decentralized finance (DeFi) is the core area of digital currency-driven financial innovation. It relies on blockchain technology to build a financial ecosystem without traditional intermediaries, supporting users to carry out lending, trading and other activities on a decentralized platform, with the core advantages of disintermediation, high transparency and operational flexibility, which has great potential to enhance service accessibility and reduce financial costs.

The DeFi platform allows individuals and organisations to lend, pay and trade directly without the need for intermediaries such as banks. For example, users can automate loan agreements through smart contracts, freeing them from reliance on traditional financial institutions. This disintermediation not only improves market efficiency, but also provides low-cost financial services to investors and borrowers around the world.

However, the development of DeFi is also accompanied by new risks, especially in terms of liquidity, compliance and smart contract security. Its decentralized nature makes it difficult to regulate, and smart contract loopholes may be exploited by attackers to cause capital loss. Therefore, balancing innovation with risk prevention and control is key to its development.

6 CHALLENGES AND RISKS FACING DIGITAL CURRENCY

While the rapid development of digital currencies brings opportunities for innovation, it also triggers challenges and risks in multiple areas such as technology, regulation and market, involving key areas such as financial stability, privacy protection and cross-border regulation. Effectively identifying and addressing these risks is a prerequisite for their healthy integration into the global financial system.

6.1 Technical Risks and Security Issues

Blockchain and cryptographic algorithms, as the core technology of digital currencies, have security risks despite their decentralized and tamper-proof characteristics. The blockchain network may encounter distributed denial-of-service attacks; encryption algorithms, if breached or technological loopholes exist, may trigger large-scale capital theft or data leakage, impacting the financial market. In addition, digital currency storage and trading platforms often become the target of hackers, and in recent years, a number of exchange data leakage and capital theft incidents have led to huge losses for investors, so improving technical security has become an urgent issue.

6.2 Legal and Compliance Risks

It is a challenge to establish a unified and effective legal and regulatory framework for digital currencies globally, and there are large differences in attitudes and policies among countries, leading to legal uncertainty in cross-border transactions. The anonymity and decentralized nature of digital currencies are vulnerable to being used for money laundering, terrorist financing and other illegal activities, which are difficult to be covered by the existing anti-money laundering and anti-terrorist financing frameworks, and relevant regulations are lacking. The lack of uniformity in regulatory standards and legal frameworks increases the legal risks and compliance costs for market participants, and achieving regulatory compliance is key to stabilising the market and protecting investors.

6.3 Market Risk and Volatility

The cryptocurrency market is notably characterised by high volatility, with dramatic price fluctuations in Bitcoin, Ether and other currencies, posing greater market risks to investors, especially retail investors, whose fluctuations are subject to multiple influences such as speculative behaviours, technological factors, regulatory policies, and market sentiments, which may give rise to asset bubbles and increase financial systemic risks. At the same time, the limited depth and liquidity of the market is prone to market manipulation, price manipulation and false trading, and speculation also attracts short-term capital to move in and out of the market quickly, exacerbating market instability.

6.4 Cross-border Regulation and Privacy Protection

Although the cross-border liquidity of digital currencies is an advantage, it makes cross-border regulation more complicated, and it is difficult for the existing framework to adapt to its transaction model that does not rely on a single country's central bank or financial institution, and the use of stable coins may have a greater impact on the international payment and foreign exchange markets, which the existing system fails to effectively address. In addition, privacy protection has raised widespread concerns, and the anonymity of cryptocurrencies facilitates illegal activities while protecting users' privacy. Balancing privacy protection and regulatory compliance, and ensuring security and traceability, is key to developing a reasonable regulatory framework.

7 CONCLUSION

This paper comprehensively examined the impact of digital currencies on the traditional financial system, focusing on opportunities, challenges, and transformational pathways. By analyzing the structural characteristics and application scenarios of central bank digital currencies (CBDCs), cryptocurrencies, and decentralized finance (DeFi), the study identified how digital currencies have significantly enhanced payment efficiency, broadened financial inclusion, and driven technological innovation within the financial sector. Furthermore, the paper discussed how digital currencies are reshaping core functions such as money supply management, banking intermediation, capital market dynamics, and cross-border transactions.

However, digital currencies still face many challenges in the process of large-scale promotion and application, including technical security risks, insufficient international regulatory coordination, and high market volatility. Moreover, there is a significant tension between the decentralized nature of digital assets and the practical requirements for regulatory compliance, which hinders the transparency, stability, and standardized development of the digital currency ecosystem.

In the future, digital currencies will occupy a more important position in the global payment system. The promotion of central bank digital currencies (CBDC) will promote the digitization of fiat currencies and enhance payment efficiency and transparency. Central banks in several countries, such as China, Europe and the United States, are actively researching and piloting CBDC, which is expected to become part of the financial system in the next few years and promote the integration of global financial markets.

It is necessary for all countries to enhance international cooperation in the regulation of digital currencies, improve the legal adaptability of existing monetary and financial systems to emerging technologies, and accelerate the construction of new digital infrastructure that is secure, programmable and interoperable. Subsequent research should also focus on the long-term impact of digital currencies on financial governance, the transmission of monetary policy, and global financial integration. Only by promoting innovation while strengthening risk prevention and control can digital currency truly become an important cornerstone of the future financial system.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

REFERENCES

[1] Dong Zhazhuang. Digital Currency, Financial Security and Global Financial Governance. Journal of Foreign Affairs College, 2022, 39(04): 133-154+8.

[2] Hao Yi, Wang Bin. How Legal Tender Digital Currency Affects the Traditional Financial System. China Foreign Exchange, 2020, (21): 22-23.

[3] Yu Pinxian. Research on Legal Issues of Cryptocurrency Regulation. Wuhan University, 2020. DOI: 10.27379/d.cnki.gwhdu.2020.002128.

[4] Shanghai New Financial Research Institute Group, Zhong Wei, Song Jing. Digital Currency and the Rise of Financial Technology Regulation. New Financial Review, 2017, (06): 1-26.

[5] Jiao Jinpu, Sun Tianqi, Huang Tingting, et al. Digital Currency and the Development of Inclusive Finance: Theoretical Framework, International Practices, and Regulatory System. Financial Regulation Research, 2015, (07): 19-35. DOI: 10.13490/j.cnki.frr.2015.07.002.

[6] Bouis R, Gelos G M, Nakamura F, et al. Central Bank Digital Currencies and Financial Stability: Balance Sheet Analysis and Policy Choices. IMF Working Papers, 2024, 2024(226). DOI: 10.5089/9798400290794.001.

[7] Xu X. Study on the Impact of Digital Currency on the Traditional Financial System. Modern Economics & Management Forum, 2024, 5(6): 1128-1130. DOI: 10.32629/memf.v5i6.3346.

[8] Shi Y. A Study of the Challenges of Digital Currencies to the Traditional Financial System and Their Implications for Economic Policy. Applied Mathematics and Nonlinear Sciences, 2024, 9(1): 1-18.

[9] Jaemin S, Doojin R, Robert I Webb. Central bank digital currency: Payment choices and commercial bank profitability. International Review of Financial Analysis, 2023, 90. DOI: https://doi.org/10.1016/j.irfa.2023.102874.