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EVALUATING THE CHALLENGES AND RISKS OF CBDCS IN CROSS-BORDER FINANCE: REGULATORY GAPS, CYBERSECURITY THREATS, AND MONETARY SOVEREIGNTY CONCERNS

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ABSTRACT

Central Bank Digital Currencies are emerging as a transformative force in the global financial landscape. As digital alternatives to traditional fiat currencies, CBDCs offer enhanced payment efficiency, improved financial inclusion, and strengthened monetary policy implementation. Countries worldwide are actively exploring or piloting CBDCs to modernize payment systems, reduce dependency on physical cash, and counter the influence of private cryptocurrencies. However, the adoption of CBDCs also raises concerns regarding financial stability, cybersecurity, and data privacy. This article explores the impact of CBDCs on global financial systems, examining their benefits, challenges, and potential role in reshaping monetary policy, banking structures, and international transactions.

Keywords: Digital Payments, Monetary Policy, Financial Inclusion, Cryptocurrencies, Financial Stability, FinTech.

I. INTRODUCTION

Central bank digital currencies (CBDCs) have emerged as a significant priority for numerous nations in recent years, particularly in reaction to advancements in financial technology and the growing use of cryptocurrencies. "A Central Bank Digital Currency (CBDC) is a digital representation of fiat currency issued by a central bank, designed to enhance payment efficiency, broaden financial inclusion, and preserve monetary control in the face of competition from digital assets." Numerous countries have spearheaded the development of Central Bank Digital Currencies (CBDCs), including China with its e-CNY, which has

undergone trials in major cities, and Nigeria, which introduced eNaira as Africa's inaugural CBDC. Furthermore, The Bahamas is the inaugural nation globally to introduce a Central Bank Digital Currency (CBDC), the Sand Dollar, in 2020, with the objective of enhancing financial accessibility within its island territory. Conversely, nations like the European Union and the United States remain in the research phase, with the European Central Bank (ECB) advancing a digital euro and the Federal Reserve examining the feasibility of a digital dollar. The objectives for the development of CBDCs encompass a spectrum, from diminishing dependence on cash to preserving monetary sovereignty within an increasingly computerized global financial system.

In emerging nations, central bank digital currencies present a significant potential to tackle numerous economic and financial difficulties that have impeded growth. A primary advantage of CBDCs is the enhancement of financial inclusion. A significant section of the population in numerous developing nations remains without access to conventional financial services. Central banks can offer cost-effective and accessible digital payment systems through CBDCs, even for individuals in rural regions. Nigeria introduced eNaira in 2021 with the primary objective of enhancing financial accessibility for its populace.

II. THE PURPOSE OF CBDC

Numerous justifications exist for the adoption of CBDC, including the enhancement of financial integration, the improvement of transaction efficiency and security, and the reduction of cross-border payment costs. In nations with inadequate financial infrastructure, the benefits of CBDC will be more pronounced. The introduction of CBDC will mitigate or maybe eradicate the systemic inefficiencies that obstruct the present market and worldwide expansion. For nations significantly impacted by domestic inflation and foreign sanctions, the creation of Central Bank Digital Currency (CBDC) presents a viable option.

In both wealthy and emerging nations plagued by counterfeiting, Central Bank Digital Currency (CBDC) presents a superior alternative, as it diminishes the expenses associated with the issuance, circulation, and oversight of physical currency. Nevertheless, the eWallet is susceptible to counterfeiting; yet, it is more easily traceable due to technological advancements. Furthermore, the emergence of CBDC may expedite the shift towards a multi-

polar reserve currency, serving as a strategic response to the prevailing asset price inflation resulting from worldwide competitive quantitative easing policies. The implementation of digital currency may enable the central bank to more precisely monitor the money supply, including its structure, velocity, multiplier, and distribution across time and space, thereby enhancing the efficacy of monetary policy operations. A CBDC also mitigates the widespread acceptance of privately created digital currencies, as it is endorsed by reputable governments and relies on domestic accounts. Alternative digital currencies, such as private stablecoins (e.g., Libra, now known as Diem), present dangers to monetary policy and raise concerns around data privacy and the potential misuse of personal information due to regulatory challenges. A significant benefit of CBDC is its inclusivity.

CBDC enables payment transactions via eWallets without requiring identities, accounts, or an Internet connection. CBDC, in conjunction with other technologies, empowers and facilitates access to financial services for the underserved, unbanked populations in rural areas, and developing nations. The use of CBDC enables the fractionalization of diverse assets, durable goods, and animals. Fractionalization enhances liquidity and asset affordability. Tokenization can monitor home services, livestock trades, and numerous other unrecorded and unreported activities, while also facilitating extra financing and business options. Non-Fungible Tokens (NFTs) facilitate the tracking of unique and non-interchangeable products or services, and they can now be fractionalized and controlled by several individuals. This text outlines intriguing concepts in Decentralized Finance that can be utilized with Central Bank Digital Currencies (CBDC) and Smart Contracts, which are computer programs or transaction protocols designed to execute automatically, regulate, or document legally significant events and actions in accordance with the stipulations of a contract or agreement. The substantial improvement in inclusivity allows CBDC to assist countries in measuring economic activities with more precision and accuracy. The technologies integrated into CBDC provide a more precise depiction of economic activity presently omitted from national accounts figures.

III. GLOBAL REGULATORY AND COORDINATION DEVELOPMENT OF CBDCS

Despite the proactive promotion of international coordination for Central Bank Digital Currencies (CBDC) by the Bank for International Settlements, the International Monetary Fund, and other global institutions since 2016, and their proposal for an inclusive and

interconnected CBDC sharing platform, the majority of central banks have yet to respond. Current research, development, and regulatory frameworks for CBDC remain fragmented and dispersed, lacking a foundational consensus, thereby complicating the establishment of an international financial infrastructure for CBDC and exacerbating the risks associated with the "decentralization" of global CBDC governance. The governance of global CBDCs is threatened by "decentralisation," while "data silos" and regulatory fragmentation will undermine the stability of the international monetary system.

The global CBDC ecosystem is at risk of fragmentation as numerous central banks create their own digital currencies with varying technology, standards, and protocols. International discord implies that central bank digital currencies will lack complete interconnectivity. Recent research indicates that the Monetary Economics Department of the BIS has been undertaking annual CBDC studies with monetary authorities in major nations globally since 2019, and its reports demonstrate an increasing number of central banks exhibiting favorable attitudes towards CBDC. The findings of the 2020 research indicate that approximately 80 percent of the 66 central banks involved are active in CBDC research and development, reflecting a 10 percentage point rise from the prior year. The proportion of central banks intending to launch generic CBDCs in the short and medium term is 10% and 20%, respectively, both of which have risen by one percentage point from the prior year. The third study report published in 2021 indicates that 86% of the 65 surveyed central banks are investigating the advantages and disadvantages of CBDCs; the proportion of central banks likely to issue generic CBDCs in the near and medium term remains consistent with the previous year. The proportion of central banks possessing CBDCs remained unchanged from the prior year; however, an increased number of central banks demonstrated a greater propensity to issue CBDCs in the short- and medium-term, and a larger number progressed to the proof-of-concept or pilot phase of CBDC development. The fourth research report published in 2022 examined 81 central banks, revealing that the proportion of central banks actively involved in Central Bank Digital Currencies (CBDCs) rose to 90 percent, as did the percentage of those entering the development and pilot phases of CBDCs. The percentage of central banks in the development and pilot phase has increased to 26 percent, up from 14 percent the prior year.

Since 2020, the BIS has initiated CBDC collaboration projects with prominent nations to develop CBDC standards. In January 2020, six G7 central banks, excluding the Federal Reserve, declared their intention to collaborate on digital currency research by establishing a CBDC research group with the BIS. This group aims to investigate potential CBDC

application scenarios within their jurisdictions and to exchange knowledge and expertise on technical CBDC matters. In October 2020, the BIS declared the formation of a CBDC research group to investigate potential applications of CBDCs within their jurisdictions and to exchange knowledge and expertise on technical CBDC matters. In October 2020, the BIS and the central banks of the G7 nations collaboratively published a report on the initial phase of cooperation, examining the motivations, benefits, opportunities, and challenges associated with CBDCs. "Based on this analysis, they proposed fundamental principles and essential characteristics for CBDC issuance and detailed pertinent technical options." The study said that participants underscored the necessity of considering interoperability of cross-border payments during the first phase of CBDC development and emphasized their willingness to engage on this matter.

IV. METHODOLOGY ADOPTED

This study adopts a qualitative research approach, analyzing case studies of CBDC implementations in different countries. Data is collected from central bank reports, government white papers, and academic research articles. A comparative analysis is conducted to evaluate the economic, security, and policy implications of CBDCs, focusing on their impact on banking structures, monetary policy effectiveness, and financial stability.

V. FINDINGS AND DISCUSSION

The study reveals several key insights regarding the impact of CBDCs on global financial systems:

[1]. Enhanced Payment Efficiency: CBDCs facilitate real-time digital transactions, reducing settlement times and lowering transaction costs in domestic and cross-border payments.

[2]. Financial Inclusion: By providing a secure and accessible digital currency, CBDCs can bridge the financial inclusion gap, particularly in regions with low banking penetration.

[3]. Improved Monetary Policy Implementation: CBDCs allow central banks to deploy direct monetary interventions, such as digital stimulus payments and programmable interest rates, without reliance on commercial banks.

[4]. Potential Bank Disintermediation: Widespread CBDC adoption may reduce commercial bank deposits, affecting lending capacity and financial stability unless appropriate measures are implemented.

[5]. Cybersecurity Risks: Digital currencies are vulnerable to cyber threats, requiring advanced security protocols to prevent hacking, fraud, and data breaches.

[6]. Regulatory and Privacy Concerns: The centralized nature of CBDCs raises concerns about government oversight and data privacy, necessitating robust legal frameworks to protect financial autonomy.

[7]. Geopolitical and Economic Implications: CBDCs may reshape global financial power dynamics, particularly as major economies explore digital currency solutions to reduce reliance on the U.S. dollar in international trade.

CBDCs represent a major shift in monetary systems, offering numerous benefits while posing significant challenges. One of the most compelling advantages of CBDCs is their potential to streamline financial transactions by eliminating intermediaries, reducing transaction costs, and facilitating real-time settlements. This efficiency could greatly enhance global trade and economic activity, particularly in cross-border payments, where traditional banking systems are often slow and expensive.

CBDCs also present an opportunity to enhance financial inclusion, particularly in countries with limited banking infrastructure. By providing digital wallets that do not require traditional bank accounts, central banks can enable unbanked populations to participate in digital finance, promoting economic growth and reducing financial inequality. Moreover, CBDCs offer central banks a powerful tool for implementing monetary policies more effectively. Unlike traditional cash-based policies, CBDCs allow for programmable monetary mechanisms, such as automatic stimulus disbursements and direct interest rate adjustments, improving economic responsiveness. However, the widespread adoption of CBDCs also presents risks that must be carefully managed. A major concern is the potential for bank disintermediation, where consumers and businesses shift deposits from

commercial banks to CBDC accounts, reducing banks' ability to lend and impacting credit markets. To mitigate this risk, central banks may need to implement deposit limits, tiered interest rates, or hybrid CBDC models that maintain the role of commercial banks in financial intermediation.

Cybersecurity risks are another critical issue, as CBDCs become prime targets for cybercriminals. Ensuring the security of CBDC transactions requires advanced encryption, multi-layered authentication, and real-time fraud detection systems. Additionally, privacy concerns must be addressed to prevent excessive government surveillance of financial transactions. Policymakers must strike a balance between regulatory oversight and individual financial privacy, ensuring that CBDCs do not become tools for financial repression or mass surveillance. On a global scale, CBDCs could reshape the international financial order. Countries such as China are actively developing digital currencies that could challenge the dominance of the U.S. dollar in global trade. The introduction of CBDCs in multiple economies could lead to new economic alliances and payment networks, reducing dependency on traditional international financial institutions and increasing monetary sovereignty.

VI. SUGGESTIONS FOR THE FUTURE DEVELOPMENT OF CBDC

The advancement of globalized CBDC applications must be incorporated into the international regulatory framework. Global central banks have collaborated on the research and development of Central Bank Digital Currencies (CBDCs) and established medium- and long-term development strategies. "However, many of these initiatives remain in exploratory and pilot phases, indicating a heightened concern among global central banks regarding the long-term implications and potential of CBDCs. The ongoing pilot initiatives of global central banks regarding Central Bank Digital Currencies (CBDCs) primarily emphasize retail and wholesale types. The technical implementation of wholesale CBDCs has been effectively showcased in various multilateral central banks' research and development projects. However, for broader applications in cross-border payments or financial markets in the future, the regulatory challenges associated with cross-border CBDCs must be addressed. Due to significant disparities among nations regarding legal systems, financial regulatory frameworks, and economic environments, international regulatory challenges are inherently present. In this context, it is imperative for all stakeholders to diligently pursue the enhancement of multilateral cooperation on Central Bank Digital Currencies (CBDC).

Authoritative international organizations, including the International Monetary Fund, the World Bank, the Bank for International Settlements, the Financial Stability Board, and the Basel Committee on Banking Supervision, should fortify their regulatory dialogue with global central banks, examine the potential ramifications of CBDC on the traditional international monetary system, the international payment network, the financial market, and the banking sector, and promptly amend CBDC regulations in accordance with the evolving landscape of CBDC. They ought to promptly revise and update international regulatory frameworks in accordance with the evolving trends of CBDC, and contemplate the establishment of a feasible and compatible international standard for CBDC. Additionally, they should furnish technical and network support for global central banks regarding CBDC, and foster a consensus on CBDC regulation among these institutions to preemptively address and mitigate the risks associated with CBDC decentralization.

Secondly, there is a pursuit of international collaboration on CBDCs grounded in security and stability. The current state of global multilateral CBDC cooperation indicates that existing transnational (regional) initiatives remain nascent. A limited number of projects, such as the Multilateral Central Banks Digital Currency Bridge Project (mBridge) initiated by China's Hong Kong Monetary Authority and four other entities, along with the Helvetia Project launched by the Swiss Central Bank, have achieved some advancement; however, they are still in the preliminary phase of commercial application and require further testing across various scenarios and domains. Future participation of additional international organizations and central bank divisions in CBDC multilateral cooperation is anticipated, emphasizing two critical considerations: the technical security of CBDC multilateral cooperation and the issue of stability. The present joint test primarily targets the consumer sector, with a minor component pertaining to commercial banks. As CBDC technology advances, its use is anticipated to broaden to encompass the banking system, financial markets, and further domains. In contrast to the established payment and settlement systems of the past, CBDC will encounter a more intricate network landscape, necessitating the immediate development of a safe and stable cross-border payment or transaction framework for CBDC. The necessity of evaluating the incorporation of advanced technologies, such as quantum settlement and artificial intelligence, in the future requires further investigation and experimentation. It is anticipated that international organizations, including the BIS and the Society for Worldwide Interbank Financial Telecommunication, will expedite the demonstration and testing efforts concerning the multilateral and cross-border implementation of CBDC.

We must expedite collaboration in advancing the development of the CBDC international financial infrastructure. The frequent use of the CBDC system by Europe and the United States to arbitrarily extend sanctions has undermined the neutrality of the international financial infrastructure, jeopardizing the financial security of sovereign nations and raising apprehensions regarding the autonomy of this infrastructure. The future cross-regional and international implementation of CBDC necessitates a financial infrastructure with international credibility that adheres to the fundamental principles of inclusiveness and neutrality; however, it remains to be determined whether it should be developed independently or be compatible with existing financial infrastructures. In October 2022, the Society for Worldwide Interbank "Financial Telecommunication announced a successful study involving 14 central and commercial banks globally, demonstrating the seamless integration of CBDCs with current financial infrastructure systems." Establishing an international financial infrastructure centered on CBDC necessitates collaboration among international institutions, central banks, commercial banks, and enterprises to advance current cross-border payment schemes and CBDC platforms, while integrating with existing international payment systems; however, maintaining the autonomy of the international financial infrastructure is paramount.

VII. CONCLUSION

CBDCs have the potential to revolutionize global financial systems, offering enhanced transaction efficiency, greater financial inclusion, and improved monetary policy implementation. However, the adoption of CBDCs must be carefully managed to address risks related to banking stability, cybersecurity, and data privacy. Central banks must adopt a balanced approach that ensures financial security while maintaining consumer trust and privacy. As CBDC initiatives continue to gain traction, their successful implementation will depend on robust regulatory frameworks, international cooperation, and technological advancements. If properly designed and implemented, CBDCs could become a cornerstone of the future financial ecosystem, transforming the way money is created, distributed, and used in the digital age.

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