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THE IMPACT OF CENTRAL BANK DIGITAL CURRENCIES ON MONETARY POLICY AND FINANCIAL STABILITY

DAMPAK CENTRAL BANK DIGITAL CURRENCIES TERHADAP KEBIJAKAN MONETER DAN STABILITAS KEUANGAN

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ABSTRACT
The development of Central Bank Digital Currencies (CBDCs) has become a major focus in efforts to transform the global financial system. On the one hand, CBDC is expected to be able to encourage the expansion of financial access (financial inclusion), but on the other hand, its presence has the potential to pose risks to financial system stability (financial stability). This research aims to explore and analyze the trade-off between financial inclusion and financial stability in the context of CBDC implementation. Using a Systematic Literature Review (SLR) approach, this research examines 58 selected articles published in the 2020-2024 period, originating from reputable databases such as Scopus, Web of Science, and Springer. The research results found that there were two main dimensions of trade-off, namely the benefits of expanding financial access and potential risks to financial stability. These findings were interpreted further in the development CBDC Trade-off Model which theoretically provides a new conceptual framework in understanding the policy implications of CBDC. Practically, this model can be used as a reference for regulators and monetary authorities in designing a CBDC implementation strategy that is balanced between encouraging financial inclusion and maintaining financial system stability. This research also recommends further empirical-based studies to test the validity of the model in the context of developing and developed countries.
Keywords: CBDC, Financial Inclusion, Financial Stability, CBDC Trade-off, Systematic Literature Review

ABSTRAK
Perkembangan Central Bank Digital Currencies (CBDCs) telah menjadi fokus utama dalam upaya transformasi sistem keuangan global. Di satu sisi, CBDC diharapkan mampu mendorong perluasan akses keuangan (financial inclusion), namun di sisi lain kehadirannya berpotensi menimbulkan risiko terhadap stabilitas sistem keuangan (financial stability). Penelitian ini bertujuan untuk mengeksplorasi dan menganalisis trade-off antara financial inclusion dan financial stability dalam konteks implementasi CBDC. Dengan menggunakan pendekatan Systematic Literature Review (SLR), penelitian ini mengkaji 58 artikel terpilih yang dipublikasikan pada rentang tahun 2020-2024, berasal dari database bereputasi seperti Scopus, Web of Science, dan Springer. Hasil penelitian menemukan adanya dua dimensi utama trade-off, yaitu manfaat perluasan akses keuangan dan potensi risiko terhadap stabilitas keuangan. Temuan ini diinterpretasikan lebih lanjut dalam pengembangan CBDC Trade-off Model yang secara teoritis memberikan kerangka konseptual baru dalam memahami implikasi kebijakan CBDC. Secara praktis, model ini dapat digunakan sebagai referensi bagi regulator dan otoritas moneter dalam merancang strategi implementasi CBDC yang seimbang antara mendorong inklusi keuangan dan menjaga stabilitas sistem keuangan. Penelitian ini juga merekomendasikan studi lanjutan berbasis empiris untuk menguji validitas model pada konteks negara berkembang maupun maju.
Kata Kunci: CBDC, Inklusi Keuangan, Stabilitas Keuangan,Trade-off CBDC, Systematic Literature Review

1. INTRODUCTION

The emergence and development of Central Bank Digital Currencies (CBDCs) have been significant in reshaping the global financial landscape. With over 130 countries investigating or implementing CBDC solutions, which collectively account for approximately 98% of the world's GDP, it becomes evident that these digital currencies are viewed as critical tools for enhancing

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monetary control and responding to modern economic challenges (Kshetri, 2021; . The strategic movement towards CBDCs responds to evolving consumer behaviors, particularly the increasing reliance on digital and private cryptocurrencies, and the necessity for central banks to maintain effective monetary policy in this new digital context (Kshetri, 2021; (Ozili, 2022; .

Countries such as China with its digital Yuan (e-CNY), the Bahamas with its Sand Dollar, and Nigeria through its e-Naira exemplify early adopters of CBDCs, each motivated by objectives including financial inclusion, payment efficiency, and reduced transaction costs (Ozili, 2023)Cheng, 2022). This urgency for financial inclusion is particularly crucial, as CBDCs have the potential to provide services to unbanked populations that traditional banking systems often neglect (Tercero-Lucas, 2023). For instance, the e-Naira is designed to enhance access to financial services in Nigeria, offering benefits such as seamless payments and low-cost financial products (Ozili, 2023).

However, the implementation and expansion of CBDCs are not without challenges. One of the principal concerns is financial stability, primarily the risk of bank disintermediation and potential liquidity crises, as users might prefer holding CBDCs over traditional bank deposits (Bindseil, 2020; Andolfatto, 2020). The introduction of CBDCs can fundamentally alter the bank-customer relationship and may contribute to systemic risks, particularly during crises when digital bank runs become conceivable (Viñuela et al., 2020). For instance, if a large proportion of depositors withdraw their funds in favor of CBDCs, the resulting liquidity issues could cripple traditional banking operations (Viñuela et al., 2020).

It is also essential to consider the regulatory and design frameworks surrounding CBDCs. Successful implementation necessitates not just technological innovation but also comprehensive stakeholder involvement, ensuring that risks are mitigated through sound governance practices (Ozili, 2022; Tang, 2023). The careful design of CBDCs can help balance the dual goals of enhancing financial inclusion while safeguarding the financial system's stability. Comprehensive strategies need to be developed to ensure that these digital currencies fulfill their promise without exacerbating existing vulnerabilities or creating new risks (Ozili, 2022; Ceylan, 2024). In summary, the dual-edged nature of CBDCs presents a compelling area for research, emphasizing the need to navigate the trade-offs between fostering financial inclusion and maintaining financial stability. As countries increasingly move towards digital currencies, understanding these dynamics will be critical for the future of global finance.

Although the literature related to CBDC has grown significantly in recent years, research that specifically and comprehensively analyzes the trade-off between financial inclusion and financial stability in the context of CBDC implementation is still very limited. The majority of previous studies tend to focus partially on one aspect only, either on the potential of CBDCs in encouraging financial inclusion (Auer & Bohme, 2020; Barontini & Holden, 2019) or on risks to financial system stability (Fernandez-Villaverde et al., 2021; Bindseil, 2020). The results of the literature review show that studies that integrate these two perspectives in one analytical framework are still rare. This creates an important gap in the literature (research gap), especially regarding how CBDC design and implementation policies can mitigate financial stability risks without hampering financial inclusion goals.

Furthermore, the limited number of empirical studies based on real cases from countries that have implemented CBDC is also an obstacle in understanding these trade-offs contextually and applicable. Therefore, it is hoped that this research will be able to fill this gap by providing an integrative literature synthesis, based on the Systematic Literature Review (SLR) approach.

Based on the background and identification of research gaps above, the research questions (RQ) in this study are formulated as follows:

- **RQ1: What are the trade-offs between financial inclusion and financial stability in the implementation of CBDCs?**

- **RQ2: How does CBDC promote financial inclusion in unbanked populations?**
- **RQ3: What are the systemic risks arising from mass CBDC adoption?**

The formulation of these research questions is not only relevant to the needs of developing the latest literature, but also has practical relevance for monetary authorities and regulators in designing CBDC policies that balance the goals of inclusion and stability. This research has two main contributions, both theoretical and practical, which are expected to provide added value in the development of science and public policy related to CBDC. This study offers an integration of literature between financial inclusion and financial stability in one CBDC-based analytical framework. This is an important novelty because so far previous studies have tended to be fragmentary and do not link these two aspects directly in one conceptual model. Apart from theoretical contributions, this research also provides practical implications in the form of strategic recommendations for policy makers and central banks regarding optimal CBDC design. These recommendations cover aspects of CBDC design (for example: retail vs wholesale CBDC), systemic risk control mechanisms, setting ownership limits, as well as public education strategies in order to expand financial inclusion without compromising financial system stability. Thus, it is hoped that this research can become an important reference for academics, practitioners and regulators in responding to the challenges and opportunities of implementing CBDC in a more balanced and sustainable manner.

2. METHODS

2.1. Research Design

This research uses a Systematic Literature Review (SLR) approach as the main method to collect, evaluate, and synthesize findings from previous studies related to the implementation of the Central Bank Digital Currency (CBDC), financial inclusion, and financial stability. The SLR approach was chosen because it is able to provide systematic, transparent and structured knowledge mapping, thereby enabling researchers to identify important patterns, research gaps, as well as produce more comprehensive theoretical and practical insights. SLR is also relevant to respond to the complexity of the trade-off phenomenon between financial inclusion and financial stability, which so far has been scattered in separate studies and has not been fully integrated.

2.2. Source of Data

The data sources in this research come from reputable international journal databases, namely Scopus, Web of Science, and Springer. These three databases were chosen because they have broad academic literature coverage, are of high quality, and are relevant to the research topic. Apart from that, the selection of this database also aims to ensure that the articles studied have passed a strict peer-review process, thereby increasing the validity and credibility of research results.

2.3. Inclusion and Exclusion Criteria

To ensure the relevance and focus of the literature reviewed, this study established the following inclusion and exclusion criteria:

Inclusion Criteria:

- Articles published over a period of time 2020 to 2024, in order to capture the latest dynamics of CBDC development. The selection of articles from 2020 to 2024 in this research is based on relevance and the latest developments related to CBDC. Since 2020, the issue of CBDC has increased significantly in line with the acceleration of global financial digitalization and the start of various CBDC pilot projects in many countries. This period also represents an important transition from theoretical studies

to more applied and empirical studies, making it very relevant to analyze in the context of the trade-off between financial inclusion and financial stability.
- Studies that explicitly discuss CBDC issues, financial inclusion, and/or financial stability.
- Empirical and conceptual based studies that are relevant to banking, monetary and public policy contexts.

Exclusion Criteria:
- Studies that are not directly related to CBDCs or only discuss cryptocurrencies without monetary policy context.
- Articles in languages other than English.
- Studies are in the form of working papers or opinions that do not go through a peer-review process.

2.4. Search Strategy

The search strategy was carried out systematically using a combination of main keywords and Boolean operators (AND, OR) to optimize the search for relevant literature. The keywords used include:
- “Central Bank Digital Currency” OR “CBDC”
- “Financial Inclusion”
- “Financial Stability”
- “Systemic Risk”
- “Digital Currency”

The combination of keywords is used flexibly to adapt to the features of each database, so that literature is obtained that is specific but still covers a variety of relevant perspectives.

3. RESULTS

3.1. Prism Diagram

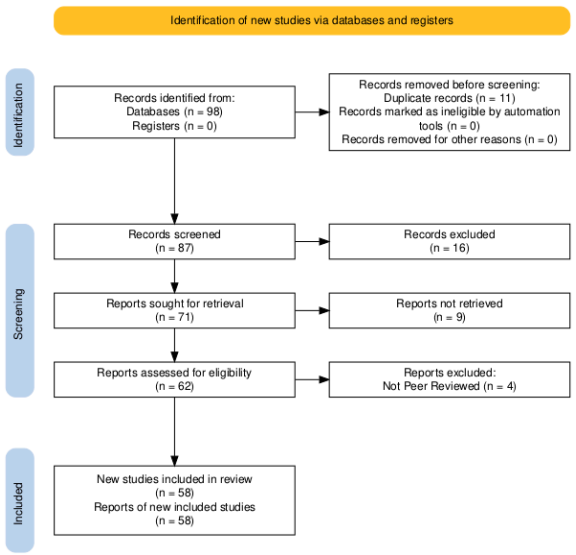

Figure 1. Prisma Diagram
Source: Processed Data, 2025

The process of identifying and selecting articles in this research followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) pathway. At the

identification stage, 98 articles were found through a database search process, without any additions from other registers. However, before the screening process, 11 articles were deleted because they were duplicates, so only 87 articles entered the screening stage.

Furthermore, at the screening stage, 87 articles were reviewed further, and 16 articles were excluded because they were not relevant to the research topic. Of the remaining 71 articles, a search process was carried out to obtain the full text, but 9 articles could not be accessed.

At the eligibility assessment stage, 62 articles were examined in more depth. Of these, 4 articles were excluded because they did not meet peer-reviewed standards. Thus, a total of 58 articles were declared appropriate and relevant, and were finally included in the systematic analysis and synthesis of this research.

3.2. Article Distribution

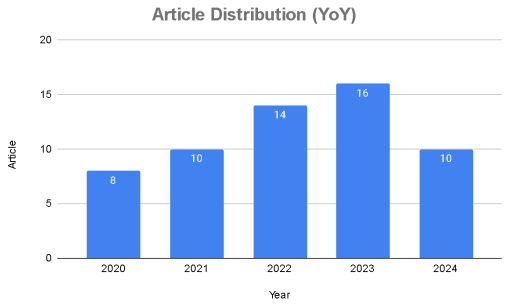

Figure 2. Article Distribution (2020 - 2024)
Source: Processed Data, 2025

The distribution of articles based on year of publication shows that the majority of articles used in this research come from the period 2022 to 2023. This reflects the high level of attention and developments in the latest literature regarding the issue. financial inclusion And financial stability, especially in the context of developments in financial technology and Central Bank Digital Currency (CBDC) policies. The choice of the 2020-2024 time frame is based on the consideration that the issue of trade-offs between financial inclusion and financial stability has begun to receive serious attention in academic literature in the last five years, along with the increasing adoption of digital technology in the financial sector.

3.3. Journal Distribution

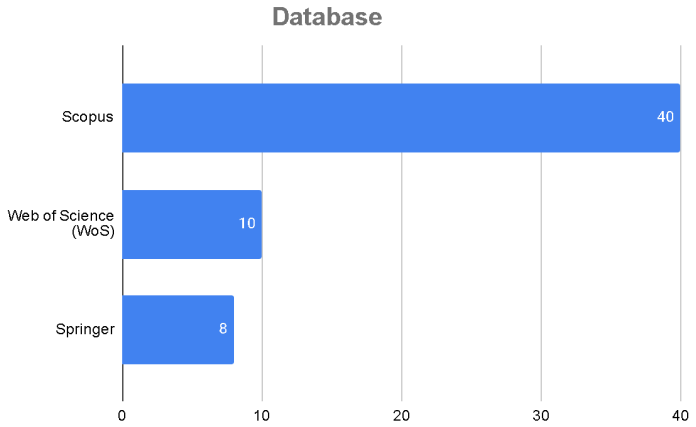

Figure 3. Journal Distribution
Source: Processed Data, 2025

Based on the results of reference source classification, the majority of articles used in this research came from journals of international reputation indexed by Scopus, with a proportion of 68.97%. Furthermore, 17.24% came from journals indexed by Web of Science (WoS), while the other 13.79% came from Springer, in the form of journal articles, book chapters, or scientific proceedings. This shows that the references used have met the standards of credibility and relevance in supporting the validity of the research.

3.4. Distribution Research Country

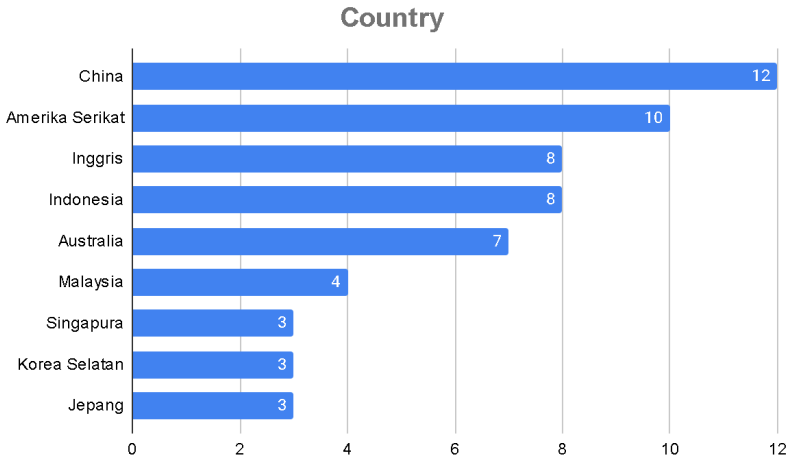

Figure 4. Distribution of Research Countries
Source: Processed data, 2025

Figure 4 illustrates the distribution of countries from which the reviewed research articles on Central Bank Digital Currencies (CBDCs) originated. Based on the identification of 58 selected articles, China emerges as the leading country in terms of the number of publications, with a total of 12 studies. This reflects China's position as a global frontrunner in the development and implementation of CBDCs.

The United States follows with 10 publications, followed by the United Kingdom (8 publications), Indonesia (6 publications), and Australia (5 publications). Other contributing countries include Malaysia (4 publications), Singapore (3 publications), South Korea (3 publications), and Japan (2 publications).

This distribution indicates that CBDC research is not only a focus in developed countries but also in emerging economies, particularly in the Asia region. It highlights a global concern over the implications and challenges of CBDCs, especially in relation to financial inclusion and financial stability.

3.5. Previous Research Methods

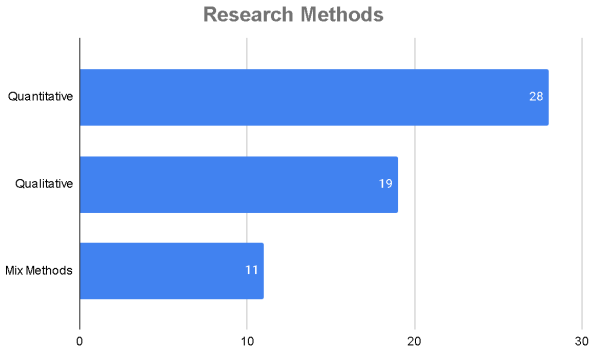

Figure 5. Previous Research Methods
Source: Processed Data, 2025

Based on the 58 articles analyzed, the majority of previous studies used this approach quantitative (48.3%) through survey methods, statistical analysis, and econometric models. Next, approach qualitative (32.8%) is also quite dominant, generally using case studies, content analysis and in-depth interviews. Meanwhile, use of mix methods (18.9%) was found in studies that combined quantitative and qualitative analysis to enrich research findings. These findings show that research on CBDC is still dominated by quantitative data-based studies, but the use of mixed methods is starting to grow to gain more comprehensive insights.

3.6. Identified Trade-offs between Financial Inclusion and Financial Stability

The results of the systematic study in this research succeeded in identifying a fundamental trade-off between the aim of encouraging financial inclusion and potential threats to financial stability in the implementation of the Central Bank Digital Currency (CBDC). In general, CBDC offers a number of significant benefits in expanding financial access for unbanked and underbanked groups. However, on the other hand, massive adoption of CBDC also has the potential to give rise to various systemic risks that could shake the traditional banking structure and the stability of the financial system as a whole.

Table 1. Main Dimensions of Trade Off

Financial Inclusion Benefit	Financial Stability Risk
Wider financial access	Risk of massive withdrawal (bank run)
Low transaction fees	Dependence on digital infrastructure
Transaction transparency	Privacy threats & potential data misuse

Source: Processed Data, 2025

The findings of this research show that the implementation of Central Bank Digital Currencies (CBDCs) presents two main consequences that need to be carefully considered by monetary authorities, namely the benefits of increasing financial inclusion on the one hand, and potential risks to financial stability on the other hand. This trade-off is reflected in several key dimensions that are interrelated and have the potential to give rise to policy dilemmas.

First, the advent of Central Bank Digital Currency (CBDC) presents significant opportunities for enhancing financial inclusion, especially for historically underserved

populations, such as the unbanked and underbanked. CBDCs have the potential to expand access to essential financial services, including payment systems, savings, and transactions, for individuals who do not possess traditional bank accounts. According to Banet and Lebeau, the mechanisms of CBDC can facilitate financial inclusion, particularly in emerging markets where access to transaction accounts is limited and has a robust connection to poverty alleviation (Banet & Lebeau, 2022). Furthermore, Ozili emphasizes that CBDCs can serve as a digital tool that increases financial inclusion by digitizing value chains and improving accessibility to formal financial services, thereby contributing to the digital economy (Ozili, 2021; Ozili, 2022).

However, the broader adoption of CBDCs simultaneously introduces risks, particularly concerning the stability of the financial system. The potential for mass withdrawals from traditional banks, as individuals might prefer holding their savings in CBDCs, raises concerns about disintermediation. Bindseil discusses the cyclical and structural risks posed by CBDC, noting how their adoption might precipitate significant shifts in banking practices and challenges to the intermediation role of financial institutions (Bindseil, 2020). Moreover, Ozili points out that while CBDCs like Nigeria's eNaira could greatly improve financial inclusion, a lack of public confidence due to potential volatility could undermine the goal of broader access (Pratiwi, 2024; Ozili, 2023). This apprehension is echoed in the literature, which recognizes that the balance between enhancing financial access and maintaining financial stability is intricate and fraught with challenges (Kim et al., 2022; (Ozili, 2022; .

The design and implementation of CBDCs will play a crucial role in determining their impact on financial stability. As outlined by Agur et al., the introduction of CBDCs could either enhance economic welfare by increasing competition among financial institutions or lead to a contraction in bank credit if not managed properly (Agur et al., 2022). Furthermore, the potential effects of CBDC on deposit bases and lending practices are significant concerns for central banks. Kiff et al. provide a structured framework for understanding these impacts, emphasizing the importance of comprehensive risk assessment and regulatory consideration in CBDC discussions (Kiff et al., 2020). Consequently, if not designed appropriately, CBDCs could inadvertently lead to weakened financial intermediation, reduced lending capacities, and overall economic instability (Ozili, 2022; Ozili, 2023). In summary, while CBDCs offer promising avenues for improving financial inclusion, careful consideration of their design and implementation is necessary to mitigate risks associated with financial system stability. The duality of potential benefits and inherent risks underscores the complexity of integrating CBDC into existing financial frameworks.

Second, Central Bank Digital Currencies (CBDCs) have transformative potential for reducing transaction costs, particularly in cross-border payments and remittance services. Empirical evidence indicates that CBDCs can lower transaction costs compared to traditional banking services, enhancing the efficiency of financial transactions. This economic efficiency arises from the electronic nature of CBDCs, which eliminates costs associated with processing cash and can streamline existing payment systems (Guley & Koldovskyi, 2023; , Erwanti & Prasetyani, 2023). The Bank for International Settlements (BIS) emphasizes that the efficiency of various CBDC arrangements largely depends on factors such as the technologies employed and the operational costs of issuing and maintaining these currencies (Sood & Singh, 2024). The implications for financial inclusion associated with CBDCs are significant, especially in emerging markets where access to financial services is limited. By digitizing financial interactions, CBDCs can improve access to financial services for unbanked populations, thus contributing to broader economic uplift (Banet & Lebeau, 2022; , (Ozili, 2022), Roosebeke & Defina, 2023). Research highlights that CBDCs could expand access to digital financial services, which is particularly critical in regions lacking traditional banking infrastructure (Ozili, 2021; . These developments are timely as global digitalization accelerates, reflecting a shift towards more inclusive financial ecosystems (Syarifuddin, 2024). However, the reliance on robust digital technology infrastructure for CBDCs introduces a set of risks, particularly in regions with

underdeveloped technological capabilities. The effectiveness of a CBDC is heavily influenced by the underlying technological support systems—such as reliable internet access, secure digital payment platforms, and user-friendly mobile devices (Ozili, 2021; , Kiff et al., 2020).

Countries with insufficient digital infrastructure may encounter significant challenges in implementing CBDCs effectively, potentially widening the digital divide (Ozili, 2022). Furthermore, concerns about cybersecurity emerge as considerable risks; if adequate safeguards are not integrated, CBDCs could become targets for cyber threats, complicating their role in financial systems (Rahman, 2023). In conclusion, while CBDCs offer the promise of reducing transaction costs and enhancing financial inclusion, careful attention must be given to the technological infrastructure and security risks associated with their implementation. Policymakers must take proactive steps to ensure that these digital currencies are both accessible and secure, thereby realizing their full potential in fostering an inclusive and efficient financial landscape.

Third, the emergence of Central Bank Digital Currencies (CBDCs) presents a distinct opportunity to enhance transaction transparency, allowing monetary authorities to monitor the flow of funds more effectively. This capability facilitates the detection and prevention of money laundering activities, which is a significant concern for regulatory bodies tasked with maintaining the integrity of the financial system. The implementation of specific CBDC regimes could enhance various anti-money laundering (AML) frameworks by establishing comprehensive monitoring systems capable of flagging suspicious transactions in real-time (Dupuis et al., 2021). As Auer et al. note, the design of CBDCs holds the potential to streamline regulatory compliance and bolster the effectiveness of existing financial oversight mechanisms (Auer et al., 2020). However, while transparency aids in mitigating illicit financial activities, it concurrently raises intricate questions around individual privacy. The centralization of transaction data within CBDC systems poses significant risks; unauthorized access to this sensitive information could result in breaches of user privacy rights (Minja et al., 2024). Tronnier's exploration of CBDCs highlights that while some demand exists for anonymity in transactions, balancing this with the need for oversight is a critical challenge, underscoring a potential conflict between transparency and privacy (Tronnier, 2021).

Furthermore, the aspect of user privacy in CBDC design has been less researched, indicating that more work is needed to understand consumer attitudes toward these digital currencies (Fang et al., 2023). The regulatory landscape surrounding CBDCs must also account for evolving methods of money laundering that may arise as criminals adapt to new financial technologies (Dupuis et al., 2021). The centralized nature of data collection in CBDCs could lead to scenarios where advanced techniques may facilitate data misuse, subsequently exacerbating privacy risks (Minja et al., 2024). Importantly, the literature emphasizes the need for innovative responses to circumvent potential financial abuses under a CBDC framework, as outlined by Dupuis and Gleason (Dupuis & Gleason, 2020). Hence, while the integration of CBDCs could significantly enhance transaction oversight and prevent money laundering, careful consideration is necessary to protect individual privacy and prevent data misuse. Collectively, the insights garnered from these various studies elucidate the double-edged sword presented by CBDCs, reflecting both their potential to enhance transaction integrity and the privacy challenges they introduce.

Thus, these three main dimensions show that the design and implementation of a CBDC requires a careful balance between the goal of expanding financial inclusion and the need to maintain financial system stability. Monetary authorities need to formulate comprehensive risk mitigation policies so that the benefits of CBDC can be optimized without causing negative consequences for macroeconomic stability and the integrity of the financial system. CBDC allows individuals who previously did not have access to formal banking services to engage in digital economic activities through digital wallet mechanisms or mobile-based applications. However, this easy access and low costs can also trigger switching behavior from

conventional bank deposits to CBDC, especially in crisis conditions, which increases the risk of disintermediation and liquidity pressure in the banking sector. In addition, the transaction transparency offered by CBDC can increase accountability in the payment system. However, the nature of this transparency also raises concerns about user privacy as well as the potential for misuse or surveillance by authorities.

3.7. CBDC and Financial Inclusion

Central Bank Digital Currencies (CBDCs) emerge as a pivotal tool in promoting financial inclusion, particularly for unbanked and underbanked populations globally. One of the primary mechanisms through which CBDCs drive financial inclusion is by leveraging digital technologies such as mobile banking and digital wallets. These technologies enable individuals without traditional bank accounts to access digital money issued directly by central banks, effectively bypassing the need for a physical banking infrastructure (Banet & Lebeau, 2022; (Tan, 2023; Svoboda, 2024). Consequently, CBDCs can empower millions of people by offering them easier access to financial services that they previously could not obtain due to geographical and infrastructural barriers (Gigauri et al., 2023). Moreover, CBDCs can significantly reduce transaction costs associated with domestic and cross-border payments, which is especially crucial for vulnerable groups and rural communities where high transaction fees can hinder economic activities and limit access to essential services (Onumoh et al., 2023; (Olabiyi & Adedokun, 2023; . Studies have indicated that lowering such costs allows these populations to engage more fully in the economy, thereby enhancing their overall welfare and fostering economic growth (Tan, 2023; Ozili, 2023).

Furthermore, the scope of CBDCs extends beyond merely facilitating transactions. They can incorporate features designed to function offline, thus allowing financial access in areas with limited or unreliable internet connectivity—an issue that remains particularly problematic in developing countries (- & Bhargava, 2024; Attarde et al., 2024). This capability enhances the accessibility and usability of financial services among marginalized communities. Digital currencies can thus serve not only as a means of payment but as a bridge to broader economic participation, addressing historical inequities tied to physical banking structures (Ceylan, 2024; "FROM BITS TO BUCKS: UNLEASHING THE POWER OF DIGITAL FINANCE", 2023). In addition to providing infrastructure to support unbanked populations, various studies have highlighted that the design and implementation of CBDCs must prioritize user-friendliness and accessibility to positively impact financial inclusion (Shah, 2016). For example, tailored digital wallets can be instrumental in ensuring that underserved populations have viable access to CBDC features (Dávid & Afadzinu, 2024). Collectively, these attributes position CBDCs as a transformative force in advancing financial inclusion, playing a crucial role in efforts to improve economic conditions for the unbanked and underbanked (Olabiyi & Adedokun, 2023; Scollan & Darling, 2023; Mainetti et al., 2023).

3.8. Systemic Risks from CBDC Adoption

The adoption of Central Bank Digital Currencies (CBDC) introduces several systemic risks that warrant careful examination. These risks primarily include bank disintermediation, potential bank runs, and cybersecurity concerns, which collectively threaten the stability of the financial system.

1. **Bank Disintermediation Risk**

The use of CBDC poses a significant risk of disintermediation for commercial banks. When individuals opt for CBDCs over traditional bank deposits, banks may face reduced funds for lending, which could impede their primary intermediation role in the economy. Literature highlights that CBDCs could cause a crowding out of bank deposits, leading to increased funding costs for banks and potentially diminishing their ability to lend effectively (Shapoval, 2020; , Kim et al., 2022; , KIM & Kwon, 2022). Consequently, this siphoning of funds from banks

may destabilize their operations and reduce overall credit supply, particularly in times of financial stress where trust in traditional banking is already wavering (Hoffmann et al., 2023; , ACAR & Kaya, 2024).

2. Potential for Bank Runs

The speed and efficiency with which individuals can convert bank deposits into CBDCs could amplify the risk of bank runs during crises. If a significant portion of depositors perceives that their banks are under threat, the swift transition to CBDCs can accelerate withdrawals, creating a liquidity crisis much faster than traditional bank runs (Leonov, 2022; , (Fernández-Villaverde et al., 2021; . This dynamic is further complicated by the increased transparency and real-time capabilities of digital currencies, which can lead to panic-induced withdrawals during periods of market uncertainty (Fernández-Villaverde et al., 2021; , ACAR & Kaya, 2024).

3. Cybersecurity and Operational Risks

The infrastructure supporting CBDCs is not immune to cybersecurity threats. The reliance on digital platforms raises concerns regarding potential cyberattacks that could compromise sensitive data or disrupt the operations of the financial system (Pirgmann, 2023; , Lee et al., 2021; , Gunawan et al., 2024). Moreover, operational risks associated with user authentication and data protection are critical components of CBDC implementation (Ceylan, 2024). These risks necessitate robust security measures to safeguard against data breaches and system failures, which could have far-reaching consequences on public trust and systemic stability (Sethaput & Innet, 2023).In conclusion, while the potential benefits of CBDCs may include enhanced efficiency in payments and financial inclusion, the systemic risks associated with their implementation cannot be overlooked. These challenges highlight the need for careful policy planning and risk mitigation strategies to ensure that CBDC adoption strengthens rather than undermines the financial system.

4. DISCUSSION

4.1. Interpretation of Findings

The implementation of Central Bank Digital Currency (CBDC) indeed reveals a strategic paradox wherein financial inclusion must be weighed against potential destabilizing effects on the banking system. CBDCs are recognized for their capability to provide the unbanked population with more accessible formal financial services, which can significantly enhance financial inclusion (Ozili, 2022)(Tercero-Lucas, 2023). (Ozili, 2022) discussed the role of CBDCs, Fintech, and cryptocurrencies in improving financial inclusion by increasing access to formal financial services for unbanked individuals (Ozili, 2022). Furthermore, Tercero-Lucas (2023) highlighted that the growth of CBDCs could enhance financial inclusion by reaching underserved populations and reducing some costs associated with the payment system (Tercero-Lucas, 2023). It is anticipated that a well-designed CBDC could streamline access to financial services while lowering transaction costs and reducing time barriers (Pratiwi, 2024).

However, this expansion of financial access does not come without risks. The transition to CBDC could result in substantial diversions of funds from traditional banks, potentially leading to disintermediation, where financial services bypass traditional intermediaries (Ozili, 2023)Gunawan et al., 2024). This outcome raises concerns regarding bank runs, which could arise if depositors shift their savings en masse to CBDCs, thus straining banks' liquidity and operational stability (Kim et al., 2022; (KIM & Kwon, 2022). The literature indicates that widespread CBDC adoption may elevate liquidity risk in the banking sector and increase the likelihood of bank panic (KIM & Kwon, 2022), while also presenting challenges through vulnerabilities to cyber attacks and operational failures (Ozili, 2023).

The dual-edged nature of CBDC as a facilitator for financial inclusion juxtaposed with its potential to disrupt financial stability signifies the need for robust policy design and technological frameworks. Consequently, integrating financial inclusion theory with systemic risk theory is essential, as these frameworks can help mitigate the adverse effects while promoting inclusive financial ecosystems (Mohammed et al., 2024).

4.2. Policy Implication

The implications of Central Bank Digital Currency (CBDC) design are substantial for central banks globally, particularly in balancing financial inclusion with systemic stability. A key principle is the adoption of a risk-sensitive design that mitigates potential instability while promoting greater financial access (Bindseil, 2020; (Lukonga, 2023; Ozili, 2022). This paper outlines several policy options that central banks might consider to ensure effective CBDC implementation. One viable approach involves the implementation of a hybrid CBDC model that integrates account-based and token-based features. This model allows for flexibility in transactions and access, catering to diverse user needs while maintaining security (Fahad & Bulut, 2024; Lee et al., 2021; . Moreover, the proposed hybrid structure could enhance the efficiency and effectiveness of payment systems, creating a more inclusive financial ecosystem (Gunawan et al., 2024; Kim et al., 2022).

Another significant recommendation is the development of a tiered remuneration system for CBDC balances. Smaller balances, which are critical for promoting financial inclusion, could be exempt from interest, while larger balances might be subject to limits or negative interest. This mechanism would disincentivize the mass shift of funds from commercial banks to CBDCs, thereby protecting the traditional banking sector from disintermediation risks, which has been a major concern among economists regarding CBDC adoption (Bindseil, 2020; (Lukonga, 2023; Kim et al., 2022). This system could effectively sustain the role of intermediaries while allowing for the benefits of CBDC to be realized (Kiff et al., 2020).

Additionally, establishing restrictions on daily transactions or maximum balance limits for both individuals and corporations is vital. These measures protect the financial system from large-scale withdrawals and ensure that CBDC remains a complement to, rather than a replacement for, existing banking arrangements (Tronnier, 2021). Studies have highlighted that balanced adoption leads to enhanced financial resilience, emphasizing the need for thoughtful design in CBDC frameworks (Gunawan et al., 2024; Jiang, 2024).

Finally, the role of intermediary institutions cannot be understated. An intermediated CBDC can help maintain essential banking functions, allowing traditional banks to continue facilitating a wide array of financial services, thereby promoting a stable financial environment (Lukonga, 2023; Lee et al., 2021; Sanchez-Roger & Puyol-Antón, 2021). By encouraging a collaborative approach between CBDC and existing financial institutions, central banks can foster an ecosystem that champions both stability and inclusion.

In conclusion, the path toward a successful CBDC requires careful consideration of its design and implementation policies. These include creating hybrid models, establishing tiered remuneration systems, implementing balance limits, and maintaining the role of intermediaries. Such strategies will enable central banks to leverage the full potential of CBDCs while ensuring the stability of the financial system.

4.3. Theoretical Implication

Theoretically, this research contributes to developing a conceptual framework related to the CBDC Trade-off Model. This model clarifies the relationship between factors driving financial inclusion (such as digital access, low transaction costs, and mobile penetration) with systemic risk factors (such as disintermediation, liquidity risk, and cybersecurity). This

framework can be a reference for further research in empirically testing the dynamics of these trade-offs in various country contexts.

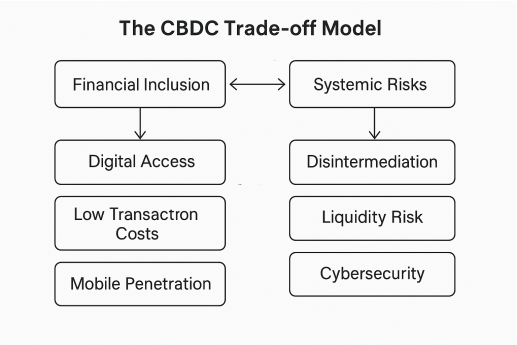

Figure 6. Framework CBDC Trade-off Model
Source: Processed Data, 2025

4.4. Research Limitation

This research has several limitations. First, the approach used is based on literature studies so it depends on the availability and quality of previous publications. Second, considering that the implementation of CBDC at the global level is still at the pilot project or experimental stage, the availability of empirical data that is longitudinal or based on real experience is still very limited. This limits the generalizability of the findings especially in the context of the long-term impact of CBDC adoption.

4.5. Future Research Directions

To enrich the literature and expand understanding of the dynamics of Central Bank Digital Currency (CBDC) implementation, it is highly recommended that further research be directed at several strategic research agendas. First, future studies need to adopt an empirical approach based on primary data, in particular by exploring the experiences of countries that have implemented CBDC pilot projects, such as China with the Digital Yuan, the Bahamas with the Sand Dollar, and Nigeria with the e-Naira. Empirical studies in these countries will be very helpful in uncovering the reality on the ground, both in terms of successes, challenges and the socio-economic dynamics that accompany them.

Second, future research also needs to contribute to the development of simulation models or CBDC policy experiments to measure in a more structured way the potential impact on customer behavior, banking system stability, and the effectiveness of monetary policy transmission. This kind of simulation allows researchers and regulators to test various CBDC implementation scenarios, so as to anticipate risks and formulate more precise mitigation strategies.

Third, it is also important to integrate a technological perspective more deeply in CBDC policy studies, especially regarding the issues of blockchain scalability, privacy-preserving mechanisms, and cyber security aspects. This approach is relevant considering that the success of a CBDC is not only determined by monetary policy design alone, but also depends heavily on the reliability, efficiency and security of the technology used.

Fourth, the social and behavioral dimensions, especially regarding the perception and level of public trust in CBDC, also need to be the main focus in future research. These non-technical factors have a crucial role in determining the level of adoption and sustainability of CBDC implementation, considering that public trust is a fundamental prerequisite in a digital financial system managed by a central bank.

Thus, it is hoped that this advanced research agenda will be able to enrich academic literature, as well as provide significant practical contributions to the development of more inclusive, secure and stable CBDC policies in various jurisdictions.

5. CONCLUSION

This research aims to explore and analyze the trade-off between financial inclusion and financial stability in the implementation of Central Bank Digital Currencies (CBDCs), using a Systematic Literature Review (SLR) approach. Based on the results of a study of relevant literature, this research succeeded in answering the main research question and sub-research questions systematically.

First, regarding Research Question 1 (What are the trade-offs between financial inclusion and financial stability in the implementation of CBDCs?), the results of this study confirm that there are complex relationship dynamics between the benefits of expanding financial access and the potential for disruption to financial system stability. CBDC is able to become a strategic instrument to strengthen financial inclusion, but on the other hand, widespread adoption of CBDC also increases systemic risk exposure, especially related to banking disintermediation, digital bank runs, and cyber security challenges.

Second, answering Research Question 2 (How does CBDC promote financial inclusion in unbanked populations?), it was found that CBDC operational mechanisms, especially those based on digital technology such as mobile access, e-wallets, and low transaction fees, are very effective in reaching unbanked and underserved community groups. CBDC enables financial engagement for groups previously underserved by conventional banking systems.

Third, related to Research Question 3 (What are the systemic risks arising from mass CBDC adoption?), this study identifies the main risks that arise, including bank disintermediation, the potential for bank run-on in crisis conditions, cybersecurity threats, and operational risks due to dependence on technological infrastructure.

5.1. Research Contribution

This research provides an important theoretical contribution by integrating the financial inclusion and financial stability literature within a CBDC trade-off analysis framework. In addition, this research also proposes a new conceptual framework to understand these dynamics, thereby enriching the literature in the field of digital finance.

Practically, this research provides recommendations for monetary authorities and policy makers to design CBDC based on risk mitigation, such as implementing a hybrid CBDC model, transaction restrictions, tiered systems, and strengthening data protection and cyber security systems.

5.2. Practical Recommendations and Further Research Agenda

The main recommendation for regulators is the need for CBDC design that is not only oriented towards expanding financial inclusion, but also pays attention to aspects of the stability of the financial system as a whole. Policy implementation needs to consider options such as:

- CBDC daily balance or transaction restrictions for individuals.
- Tiered remuneration system to control incentives for using CBDC.
- CBDC integration with existing financial infrastructure without completely replacing the role of banks.

The next research agenda needs to be directed at empirical studies based on real CBDC implementation data, especially in pilot project countries such as China, Nigeria and the Bahamas. In addition, the development of simulation models of the impact of CBDC policies on

various macroeconomic and financial stability scenarios is an important space for future exploration.

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