

Climate Change as a Business Risk: Perspective from Indonesia's Banking Sector and Regulators

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ABSTRACT

Climate change is increasingly recognized as one of the most significant risk that impacts economic stability and the financial system, particularly banking. Although several studies have examined climate change as one of the significant risks that must be considered in the banking business, these studies are generally conducted in developed countries. In developing countries, research on this topic is still relatively limited. This study examines how leading Indonesian banks perceive climate change as a business risk and evaluate their preparedness to align climate risk into their risk management concept, and analyze the regulatory responses from the Financial Services Authority and Bank Indonesia. This research designed as a qualitative study and using a semi-structured interviews with executives from eight major commercial banks and key regulators as respondents. This study uses thematic analysis to identify key patterns in institutional readiness and challenges. The findings indicate that although banks demonstrate a strong awareness of climate-related risks, there are still significant gaps in data availability, methodological tools, and regulatory standardization. Furthermore, the research findings highlight the structural gap between international frameworks and domestic implementation capacity. This study provides three main contributions to the literature. First providing empirical evidence from the banking sector in developing countries, particularly Indonesia. Second, presenting an integrated perspective between banks and regulators in viewing climate risk. Third, identifying the main implementation gap between international standard under Basel Committee on Banking Supervision (BCBS) framework and readiness of Indonesian banking sector.

Keywords: Climate Change, Banks, Financial Risk, Business Risk, Bank of Indonesia, OJK, Basel Committee on Banking Supervision

JEL Classification: G21, Q54, G32, E58

1 Introduction

Climate change is increasingly viewed not only as an environmental problem, but also as a critical issue for the economic, financial, and business sectors (Battiston et al., 2021; Campiglio et al., 2018). Growing evidence suggests that climate-related factors can significantly influence macroeconomic conditions, including economic structure, GDP growth, financial systems, and investment dynamics (IPCC, 2022). As climate-related events become more frequent and severe, both governments and corporations are compelled to incorporate climate related risk into their strategic and risk management practices. Consequently, climate change is now widely regarded as a material business risk that requires systematically assessment, oversight, and management across sectors, including the banking industry.

For the banking sector, climate-related risks may affect repayment capacity of borrowers, disrupt supply chains and business operations, reduce collateral values, and decrease market valuations, thereby influencing overall financial performance and stability (BCBS, 2022). In response to these emerging challenge, the Basel Committee on Banking Supervision (BCBS) issued global guidance for banks on steps they should take to incorporate climate risk into their risk management practice. The guidance emphasizes that climate-related financial risks may affect banks across different sizes, complexities, business models, and operational characteristics during the transition toward low-carbon economic activities.

In developed countries, studies on how climate change can significantly impact the economy and the financial and banking systems have been extensively conducted. However, in developing countries, particularly Indonesia, there is still a lack of research and empirical evidence on how banks in Indonesia perceive climate change as a business risk that they must measure and mitigate, as well as their readiness to adopt international regulatory standards related to climate change risk. Considering Indonesia's high level of exposure to physical climate-related risks, the Indonesia Financial Services Authority (IFSA) has introduced several strategic initiatives related to climate risk management, such as the Climate Risk Management and Scenario (CRMS) as a guide for banking (IFSA, 2024). However, the guidelines issued by IFSA have not yet fully integrated climate risk into the banking risk management framework. This condition indicates a potential gap between international standards under the BCBS framework and the readiness of the banking sector in Indonesia.

This study aims to address this gap by answering the following research question, (1) How Indonesian banks perceive climate change as a business risk? (2) To what extent are these banks prepared to implement the climate risk framework as regulated by BCBS, and (3) what challenges do banks and regulators face in integrating climate risk into banking practices?

This study makes three principal contributions. First, providing empirical evidence from the banking sector in developing countries, particularly Indonesia, where climate risk studies. Second, offering an integrated institutional perspective by combining the views of regulators and banks. Third, identifying the gap between international standards under the BCBS framework and the readiness of the Indonesia banking sector.

Furthermore, the findings provide practical recommendation for banks to implement climate change to their existing risk management system, and for regulator how to strengthen policy coherence to make effective integration on climate related risk and financial system.

2 Literature Review

2.1 Climate Related in Financial Risk

Climate change has become viewed as a financial risk because it may affect economic and business activity and also the stability of financial institutions. According to BCBS (2022), climate related risk could potentially impact the safety and soundness of individual financial institutions and have broader implication to financial stability. This statement was reinforced by Financial Stability Board (FSB, 2021), which stated that climate-related risks have a significant impact on the stability of the financial system and require active coordination by the relevant regulators. Recent studies recognised climate change as a new source of risk for the financial system (Battiston et al., 2021). From the literature, these risk grouped into physical risk and transition risks. Physical risk arising from extreme climate change events that impact to economic losses and asset deterioration. Transition risk emerge from policy and regulation associated to a low-carbon economy.

Previous studies has demonstrated that climate change risk is not an independent risk, but rather embedded of existing risks, particularly operational risk and credit risk. Climate disruptions result in an increase in debtor defaults, which may affect credit quality, reduce collateral and asset valuations, and disrupt supply chain and banking operations, thereby increasing operational costs (Nieto, 2019).

In addition, previous research (Kılıç & Kuzey, 2019) highlights that the disclosure of climate change and risk management practices in banks is influenced by governance structure, regulations, and market expectations, rather than solely by bank initiatives. Similarly, research conducted by Feridun and Gungor (2020) shows that the integration of climate risk into banking practice is driven more by regulatory and supervisory pressure rather than internal awareness.

2.2 Basel Committee on Banking Supervision (BCBS) Framework

The Basel Committee on Banking Supervision (BCBS, 2022) framework emphasizes that climate change will impact at least 4 existing risks in banking, namely liquidity risk, credit risk, market risk, and operational risk. The key supervisory expectations include governance, integrated risk management, scenario analysis, and disclosure. BCBS highlights that banks should adopt a forward-looking approach to assess the long-term impacts of climate change through stress testing and scenario analysis. Climate impact and the transition to an environmentally friendly economy as triggering financial risks for the banking sector through two channels. The first relates to physical risk cause by climate-related events that may damage assets, credit loss. The second relates to transition risk, which may affect to market valuation and business continuity.

2.3 Role of Regulators

Previous study (Park & Kim, 2020) provides a comprehensive overview of the role of regulators in sustainable finance and green banking by providing policy, handbook, regulatory framework.

In the context of Indonesia, Indonesia Financial Service Authority (IFSA) has released a comprehensive guide on Climate Risk Stress Testing for Indonesian guidance for banking in June 2023. This guide enabling banks to conduct stress testing exercises that evaluate the potential influence of climate change on their risk assessment processes. Apart from that, in March 2023, IFSA also issued a Climate Risk Management and Scenario Analysis (CRMS) guide consisting of 6 books, which is expected to help banks in developing a

climate risk management framework to measure the impact of climate on bank business performance and sustainability.

However, existing literature states that the effectiveness of regulation highly depends on the readiness of each financial institution to adopt and implement it in their business. Regulatory initiatives alone are not sufficient without the enhancement of capacity and strategic initiatives made by each bank.

2.4 Research Gap

Although there have been a few previous studies discussing climate to financial risk, empirical evidence on the readiness of banks in developing countries, particularly Indonesia, to face and address climate risk as a business risk remains limited. Additionally, previous studies have not discussed the perspective of banks and their readiness to implement international standards related to climate risk under the BCBS framework, and have not included the perspective of regulator.

This study provides an integrated analysis of banks perspective and readiness, as well as the regulatory perspective within the Indonesian context.

3 Research Methodology

This study adopts a qualitative research design to comprehensively understand how Indonesian banks perceive climate change as a business risk, particularly their preparedness to incorporate climate change into business risk assessment and existing risk management practices. A qualitative approach was chosen because it can describe the perspectives and challenges faced by banks in a comprehensive manner that cannot be captured through quantitative methods.

The research methodology employed in this study involves the use of in-depth and semi-structured interviews to obtain the subjective narratives and reflections of the participants. Participants/informants were selected by purposive sampling based on their expertise in risk management and regulatory supervision.

3.1 Data Collection Methods

This study used primary data and secondary data. Primary data were obtained from in-depth and semi-structured interviews, with regulators and executive-level employees in the Indonesian banking industry. Meanwhile, secondary data are acquired through document analysis such as annual report, and sustainability reports from the sampled banks, and relevant studies from other researchers.

The samples in this research consist of eight largest banks in Indonesia which are representatives of state-owned banks, national private banks and sharia commercial banks, and regulators in charge of micro prudential supervision (IFSA) and macro prudential supervision (Central Bank of Indonesia). The selected Banks represent major players in Indonesia Banking sector, which are expected to have higher exposure to climate risk and have strong capacity to adopt international standards.

3.2 Respondents

Interviews were conducted with key stakeholders:

1. Bank: eight risk management executives from state-owned, private, and sharia banks
2. Indonesia Financial Services Authority: Department of Banking Regulation
3. Central Bank: Sustainability Specialist in Department of Macroprudential Policy

This respondent combination will capture perspective from both the banking players and regulators.

3.3 Data Analysis

The data analysis used in this study employs thematic analysis. The data from the interviews are systematically categorized into key themes according to the research objectives, namely banks' perceptions of climate risk, their level of readiness, and the challenges faced in implementing climate risk within their respective risk management frameworks, as well as the regulators' perspectives on the direction and approach to supervision related to climate risk. This process allows the identification of patterns, similarities, and differences across responses from banks and regulators.

This study uses source triangulation as a technique to ensure the validity of the data. The study ensures data validity by examining the consistency of response provided by informants in order to achieve data dependability. To ensure data dependability, the results are cross-checked with each bank's ESG report and regulatory insight and policy perspective from Indonesia Financial Service Authority (IFSA).

The results of the data analysis are presented in the next section, which highlight the perspective and readiness of Indonesian banks in measuring climate change as a business risk, as well as the perspective of regulators (Indonesia Financial Service Authority and Bank Indonesia) on integrating climate risk into banking risk management framework.

4 Findings

4.1 The perspective of Indonesian banks in facing business risks due to climate change

The findings indicate that in general the eight banks understand the business risks due to climate change. All respondents have the same perspective, that climate change through both transition and physical risk may have potential implications for credit risk, asset quality, and financial performance. This awareness has been communicated at the strategic level, including Boards of Directors (BOD), Boards of Commissioners (BOC), as well as to the shareholders.

As a response, banks have taken several steps to address climate-related risk. There is a variation in how banks translate their understanding into practice. A limited number bank which has an advanced capacity or bank that are part of international banking group have formally integrated climate risk into their risk management framework, while others still at early-stage implementation. This reflects a gap between awareness and implementation. All Banks with advanced capacity have dedicated ESG division, structured capacity building programs, and have engaged with an external consultant. In contrast, banks at an early stage implementation are still continue to focus on building awareness and initial preparation.

Regarding earlier implementation plans in terms of measuring climate risk as one of the business risks, all banks in principle will comply with the provisions of the Indonesia Financial Service Authority (IFSA) and as a first step, they have now conducted stress testing according to IFSA guidelines and requests.

These findings suggest that although awareness of climate change as a business risk is relatively high, the translation of this awareness into systematic risk management practices remains uneven and shaped by their capacity and regulator influence.

4.2 Bank's Readiness to Implement Climate-Related Financial Risk Framework

The findings reveal different level of readiness among the banks in adopting BCBS climate risk framework. Two banks did not give a specific opinion on the Basel Principles, while other Banks consider that the 12 Basel Principles or known as the principles outlined by the Basel Framework and IFSA Guidance are essential for addressing climate change risks in the banking sector in Indonesia. However, banks emphasized that the principles need to review and adjust periodically to ensure that they remain relevant to the evolving climate risk landscape and the specific conditions of the Indonesian banking sector.

Several key challenges identified across banks including (i) the limited availability and reliability of climate even data, (ii) insufficient understanding of how climate change may affect to banking performance, and (iii) limited availability of institutional guidance and reliable assessment approach from regulators.

From perspective of the resources, all banks confirm that they have established dedicated ESG group or division, focusing on aiding banks in measuring climate change-related risks pertinent to business and financial operations. Additionally, four banks specifically have engaged external consultants to support their climate change risk assessment efforts, in conjunction with forming specialized groups or divisions. This finding shows that banks with advanced capacity are more ready to implement the BCBS framework.

It is also consistent with the previous studies (Kılıç & Kuzey, 2019; Feridun & Güngör, 2020), which emphasized that the integration of climate risk in banking is strongly influenced by regulatory frameworks and governance structures rather than purely voluntary initiatives.

4.3 How is IFSA policy related to banking risk management due to climate change

From regulatory perspective, IFSA has taken a progressive step to support the integration of climate risk into banking supervision. In March 2024 IFSA published Climate Risk Management and Scenario Analysis (CRMS) to guide Banks in integrating climate risk into the Bank's Risk Framework. CRMS is an integrated framework covering governance, strategy, risk management, and disclosure aspects to assess the resilience of banks' business models and strategies in facing climate change across short, medium, and long terms.

In addition, IFSA has actively conducted various capacity-building initiatives to enhance the Bank's knowledge of climate change, including Introduction to Climate Risk Management, GHG Calculation Scope 1, 2, and 3, Climate Risk Management and Scenario Analysis Workshop, and Sustainable Finance Event Forum. More capacity-building activities will be held in the future, including a Sustainable Finance Taxonomy Seminar, ESG Data Reporting and Disclosure, Climate Risk Integration in the Banking Risk Framework, Maturity Assessment, Climate Target Setting, and Transition Plan Scenario.

Despite of the initiatives, IFSA faces three challenges, limited Availability of supporting data, lack of data standardization, and policy coherence and consistency. These challenges emphasize that the integration of climate risk is not only a technical issue at the bank level but also a systemic issue requiring coordinated regulatory development.

These findings align with previous study about the role of regulators in sustainable finance (e.g., Park & Kim, 2020), which highlights that regulatory frameworks are critical in driving the adoption of climate risk management practices. However, in the Indonesian

context this study show that regulatory effectiveness is closely linked to the availability of supporting infrastructure and the readiness of financial institutions.

4.4 IFSA's response to the possibility of adopting the effective management framework for financial risks related to climate change developed by the BCBS from the side

The findings show that IFSA has progressively been aligning its regulatory framework with international standard including the BCBS principles, through a series of regulatory initiatives and supervisory regulation including the issuance of a Consultative Paper “Principles for the Effective Management and Supervision of Climate-related Financial Risks (2022), Climate Risk Stress Testing Guidelines (2023), Climate Risk Management and Scenario Analysis (CRMS) Guidance (2024). That guidance was followed by the initial climate risk stress testing phase 1 in May 2023 and phase 2 in July 2024.

Climate risk as a business risk become a concern for the FSA and remain in a development phase. IFSA is beginning to incorporate climate-related factors into Banks' risk management framework, however, full implementation has not yet been achieved.

The integration of climate risk into supervisory practices, including stress testing and the CRMS framework, prove that regulators are progressing from conceptual theory to practical implementation. However, the continued focusing on capacity-building indicates that banks still require significant support to effectively adopt these frameworks.

These findings reveal a gap between regulatory design and implementation, indicating that alignment with international standards alone is inadequate without enhancement steps in institutional capacity. This finding complements prior studies on regulatory-driven climate risk adoption, while highlight that in emerging economies, implementation gaps remain a critical issue.

4.5 Central Bank's Perspective on Integration of Climate Risk into Macro Prudential Supervision, Impact on Financial Stability and Economic Resilience, and Policy Recommendations

From the central bank's perspective, climate change is considered a systemic risk that may affect financial stability and economy. To reduce risks, the central bank works proactively with the government and other stakeholders to ensure the financial and macroeconomic systems are maintained and stable. The crucial element to remember is that macroprudential policy calibration tries to keep the financial system stable. In Indonesia, the central bank employs three macroprudential strategies: improving food security, maintaining a stable and balanced intermediation function to prevent procyclicality, and promoting enhanced financial access and sustainable finance.

The central bank also establishing an integrated climate regulation framework to ensure long-term economic growth while also maintaining financial system stability.

Central Bank adopts a macroprudential approach in its policy framework, focusing on the stability of the financial system as a whole rather than individual banks. In line with its statutory mandate to support sustainable economic growth. The central Bank aims to ensure that Indonesia's economic resilience remains strong and durable. This includes mitigating potential disruptions arising from climate-related risks to maintain economic stability and promote sustainable long-term development.

5 Conclusion and Recommendation

5.1 Conclusion

This study examines the perspectives of banks in Indonesia on viewing climate change as a business risk, as well as their readiness to integrate climate-related risks into their risk management framework in accordance with the BCBS framework. In addition, this study analyses the responses of regulators, particularly the Financial Services Authority (OJK) and Bank Indonesia, in promoting the integration of climate risks into the banking system.

The results demonstrate that Indonesian banks generally have a commendable knowledge and awareness regarding climate-related risks, both physical and transition risks. However, the integration of climate risk into the bank's risk management framework remains relatively unimplemented by most banks. Only a small number of banks have an adequate capacity to integrate climate risk into their risk management framework.

From the regulator's perspective, the Indonesia Financial Services Authority (IFSA) and the central bank have taken progressive steps to integrate climate risk into the financial system through the development of supervisory frameworks and policy initiatives. This implementation is still in the transition phase with several significant challenges related to data availability, methodological limitations, and institutional capacity.

This study contributes to the literature in three ways. First, it provides empirical evidence from the context of a developing country—particularly Indonesia—on the readiness of banks to address climate change as a business risk. Second, it offers an integrated perspective by combining the perspectives of banks and regulators. Third, identifying the gap between international standards under the BCBS framework and the readiness of the banking sector to implement them.

5.2 Recommendation

Based on the findings, this study offers several policy and practical implications for both regulators and banks. For the Indonesia Financial Services Authority (IFSA), the findings indicate the importance of developing a regulatory framework that is aligned with Basel principles while remaining responsive to the specific characteristics of the Indonesian banking industry. Such a framework should not only reflect the realities of banking operations in major cities, but also consider the conditions faced by banks operating in smaller regions. In addition, regulatory adjustments are needed to accommodate the distinctive business models of Islamic banks, whose core activities and risk characteristics differ from those of conventional banks.

The regulator also needs to strengthen rules and procedures that provide clear guidance for banks in integrating climate change risk into their existing risk management frameworks and risk assessment processes. Clear regulatory direction is essential to ensure that climate-related risks are not treated as separate or peripheral issues, but as part of the broader banking risk management system. Furthermore, IFSA should establish rules related to the types, quality, and sources of data that banks may use in assessing climate change risks and conducting stress testing. Access to standardized and reliable data would help banks conduct more accurate analyses and simulations, thereby improving their understanding of how climate change may affect their assets, portfolios, and overall risk exposure.

For banks, the findings suggest the need to begin with a gap analysis to assess their current position and readiness to integrate climate change risk into existing risk management systems. This step is important because each bank may have different levels of capacity,

data availability, business exposure, and institutional preparedness. Banks should also strengthen collaboration with relevant stakeholders, particularly climate data providers, non-governmental organizations, and government institutions such as BNPB and BMKG. Such collaboration would enable banks to obtain more comprehensive, granular, and valid data to support the measurement and management of climate-related risks.

In addition, banks need to develop internal models and climate risk concepts that are suitable for their respective business models, portfolio structures, and long-term business strategies. Rather than adopting a uniform approach, each bank should build climate risk management practices that reflect its specific exposure, operational context, and strategic direction. By doing so, banks can gradually strengthen their resilience to climate-related risks while supporting the broader transition toward a more sustainable financial system.

Disclosure

Conflict of Interest

The author declares no conflict of interest.

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Author's Contribution

The authors conceived the research idea, designed the study, reviewed the literature, analyzed data, and prepared the manuscript.

Data Availability

The datasets generated and/or analysed during the current study are available from the corresponding author upon reasonable request.

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