GOLDEN RATIO OF FINANCE MANAGEMENT
VOLUME 6, ISSUE. 2 (2026)
Website: https://goldenratio.id/index.php/grfm
ISSN [Online]: 2776-6780

FINANCE | RESEARCH ARTICLE

Credit Risk in Regional Development Banks: The Roles of Operational Inefficiency, Profitability, and Independent Commissioners

Iqbal Alfahruli[1], L. Lutfi[2]

[1, 2] Magister of Management, Faculty of Economics and Business, Universitas Hayam Wuruk Perbanas, Surabaya. Indonesia. Email: iqbal.alfahruli@gmail.com[1] , lutfi@perbanas.ac.id[2]

ARTICLE HISTORY

Received: May 08, 2026
Revised: June 26, 2026
Accepted: August 02, 2026

DOI
https://doi.org/10.52970/grfm.v6i2.2264

ABSTRACT

This study examines the effects of operational inefficiency, profitability, and independent commissioners on credit risk in Indonesian Regional Development Banks (RDBs). Regional Development Banks (RDBs), locally known as Bank Pembangunan Daerah, are provincially owned financial institutions that play a vital role in promoting regional economic development. Credit risk remains a major concern for RDBs because of their strategic intermediation function and their vulnerability to non-performing loans (NPLs). Using panel data from 23 conventional RDBs over the 2018–2024 period, this study analyzes 161 bank-year observations through panel data regression, with the Random Effect Model identified as the most appropriate estimation technique. Credit risk is measured by the non-performing loan (NPL) ratio, operational inefficiency by the operating expense-to-operating income (OEOI) ratio, profitability by return on equity (ROE), and board independence by the number of independent commissioners. The findings reveal that operational inefficiency has a positive and significant effect on credit risk, indicating that lower cost efficiency increases the deterioration of loan quality. In contrast, profitability has a negative and significant effect on credit risk, suggesting that more profitable banks are better able to maintain asset quality and absorb potential losses. Independent commissioners also have a negative and significant effect on credit risk, demonstrating the importance of board independence in strengthening oversight and mitigating risk. However, independent commissioners do not moderate the relationships between operational inefficiency and credit risk or between profitability and credit risk. This study contributes to the banking and corporate governance literature by providing empirical evidence from Indonesian RDBs, an underexplored segment of the banking industry in emerging markets. The findings suggest that, rather than functioning as a moderating mechanism, independent commissioners serve as an important direct governance mechanism for mitigating credit risk. From a practical perspective, RDBs should improve operational efficiency, maintain sustainable profitability, and strengthen board independence to enhance credit risk management and support long-term financial stability.

ISSN [Online]: 2776-6780

Keywords: Credit Risk, Operational Inefficiency, Profitability, Independent Commissioners, Regional Development Banks.
JEL Code: G21, G32, G34

I. Introduction

The banking sector plays a strategic role in maintaining economic stability and supporting national development through financial intermediation. Within this context, Regional Development Banks (RDBs) occupy a distinctive position, serving not only as commercial intermediaries but also as agents of regional development. RDBs support local economic activity, particularly by financing micro, small, and medium-sized enterprises (MSMEs), which constitute the backbone of regional economies. Their stability is therefore critical, as the performance of RDBs affects both regional financial systems and the sustainability of financing for productive sectors. The primary issue addressed in this study is the persistent vulnerability of Indonesia's Regional Development Banks (RDBs) to credit risk, as reflected in the recurring increase in non-performing loans (NPLs) despite continuous regulatory improvements and banking reforms. Despite their strategic importance, RDBs face greater challenges in managing credit risk than other banking groups. According to the Indonesian Banking Supervision Report issued by the Financial Services Authority (OJK, 2024), the NPL ratio of RDBs exhibited a more volatile trend during the 2021–2024 period than those of state-owned and private national banks. While the NPL ratio of state-owned banks declined from 3.20% to 2.03% and that of private national banks decreased from 2.91% to 2.10%, the NPL ratio of RDBs fell only temporarily from 2.54% in 2021 to 2.13% in 2022 before rising again to 2.48% in 2024. This rebound indicates that RDBs continue to face persistent structural and managerial weaknesses in credit quality management, making them more vulnerable to instability in financial intermediation. This issue is particularly important because increasing credit risk weakens the intermediation function of RDBs, especially in lending to MSMEs, which is inherently more vulnerable to default risk. Higher NPL ratios constrain productive lending by increasing loan-loss provisions and placing greater pressure on profitability and capital adequacy. The resurgence of NPLs therefore signals not only deteriorating asset quality but also unresolved weaknesses in internal governance and credit risk management. Identifying the internal determinants of credit risk is therefore essential for strengthening the stability of regional banking institutions.

One important internal determinant is operational inefficiency. A high operating expense-to-operating income (OEOI) ratio reflects poor managerial efficiency, ineffective internal processes, and inadequate credit monitoring systems. According to the bad management hypothesis, operational inefficiency reflects poor managerial quality, which increases the likelihood of deteriorating loan quality (Berger & DeYoung, 1997). Previous studies have shown that inefficient banks tend to exhibit weaker internal oversight and lower managerial discipline, thereby increasing credit risk (Barra & Ruggiero, 2023; Chaibi & Ftiti, 2015). This issue is particularly relevant for RDBs, which often face limitations in operational scale, digital transformation, and the quality of human capital. Profitability is another important determinant of credit risk. It reflects a bank's ability to generate earnings while capturing asset management efficiency, managerial quality, and loss-absorption capacity. More profitable banks generally maintain stronger asset quality, adopt more prudent lending policies, and possess better monitoring capabilities, thereby reducing credit risk (Misman & Bhatti, 2020; Nikolaidou & Vogiazas, 2017). Conversely, declining profitability may encourage management to engage in greater risk-taking in an effort to preserve returns, thereby increasing the likelihood of non-performing loans (Abdelaziz et al., 2022; Saleh & Afifa, 2020). In the context of Indonesian RDBs, pressure to maintain profitability, particularly Return on Equity (ROE), amid technological constraints and limitations in human resource quality may encourage risk-shifting behaviour. Management may relax prudential lending standards to achieve short-term profit targets or accommodate political intervention from regional governments as controlling shareholders. These structural conditions accelerate the deterioration of productive asset quality and weaken banks' ability to absorb potential borrower defaults. Profitability therefore reflects not only financial performance but also the effectiveness of risk management. The effects of operational inefficiency and profitability on credit risk are also influenced by governance quality, particularly the role of independent commissioners. From the perspective of Agency Theory, independent commissioners help constrain managerial opportunism and strengthen decision-making discipline (Jensen & Meckling, 1976).

A stronger presence of independent commissioners is expected to improve monitoring effectiveness, enhance credit oversight, and reduce excessive risk-taking (Mollah et al., 2019; Pathan & Faff, 2013). Empirical evidence also suggests that independent commissioners are negatively associated with credit risk because they strengthen supervisory effectiveness and managerial discipline (Debrah et al., 2022; Lu & Boateng, 2018). Beyond their direct influence, independent commissioners may also moderate the relationships between internal bank conditions and credit risk. They may mitigate the adverse effects of operational inefficiency through stronger internal controls and enhanced managerial discipline while ensuring that profitability supports prudent risk management rather than excessive credit expansion (Harkin et al., 2022; Moussa, 2019). This role is also consistent with Resource Dependence Theory, which views independent commissioners as strategic resources that contribute expertise, external experience, and objective perspectives to improve credit risk management (Pfeffer & Salancik, 2015). Although these relationships have been widely examined, previous findings remain inconclusive, and most studies have treated independent commissioners solely as independent variables rather than as moderating variables. This gap is particularly relevant in the context of RDBs, whose developmental mandate, local government ownership, and relatively bureaucratic governance structures may create unique credit risk dynamics (Karim et al., 2023; Khan & Wang, 2021). Previous empirical studies investigating the determinants of banking credit risk have produced inconsistent findings while leaving an important gap in the literature. Recent studies by Wiguna et al. (2025) and Fransiska and Ismanto (2025) on Indonesian commercial banks found that operational efficiency and profitability do not significantly affect NPLs. In contrast, evidence from both developing and developed countries consistently shows that operational inefficiency has a positive effect on credit risk, whereas strong profitability reduces NPLs (Barra & Ruggiero, 2023; Bsoul et al., 2022; Naili & Lahrichi, 2022). Furthermore, most studies have examined corporate governance mechanisms, particularly independent commissioners, only as direct explanatory variables or mediators (Kartika et al., 2022; Moussa, 2019). Such a linear approach is insufficient to capture the complexity of governance dynamics within regional banks because it overlooks the contingent role of independent oversight in moderating the effects of internal financial conditions on credit risk.

To address these theoretical and empirical gaps, this study proposes an integrative framework by positioning independent commissioners as a moderating variable. This framework is grounded in the integration of Agency Theory and Resource Dependence Theory. Independent commissioners are viewed not merely as instruments of regulatory compliance but also as boundary-spanning governance mechanisms that provide professional expertise, objective judgment, and institutional legitimacy to counterbalance non-economic pressures. Through this framework, this study examines whether independent commissioners strengthen supervisory effectiveness and resource mobilization in mitigating the adverse effects of operational inefficiency on NPLs while reinforcing the role of profitability as a buffer against banking risk. The novelty of this study lies in its reconstruction of a governance moderation model within Indonesian Regional Development Banks (RDBs), which possess distinctive ownership structures and are particularly vulnerable to local political intervention. Unlike previous studies that generally relied on aggregate samples of conventional commercial banks (Wiguna et al., 2025; Fransiska & Ismanto, 2025), this study focuses exclusively on RDBs and employs a robust panel data regression approach to empirically examine the moderating role of independent commissioners (Ebenezer & Omar, 2015). From an interdisciplinary perspective, this study integrates the literature on corporate governance, the political economy of public financial institutions, and financial risk management. The findings are expected to contribute to the theoretical development of banking governance while providing practical policy recommendations for the Financial Services Authority (OJK) and regional governments in evaluating board governance reforms, standardizing board competencies, and strengthening prudential banking practices to ensure the long-term stability of the regional banking system.

II. Literature Review and Hypothesis Development

2.1. Credit Risk

Credit risk refers to the potential loss arising from a borrower's failure to fulfill contractual obligations under agreed lending terms. In the banking industry, credit risk is the most critical type of risk because financial intermediation fundamentally depends on loan quality and borrowers' repayment capacity. Credit risk is commonly measured using the non-performing loan (NPL) ratio, which represents the proportion of non-performing loans to total loans and reflects the deterioration of a bank's productive asset quality (Fitriani et al., 2025). A higher NPL ratio indicates greater pressure on profitability, liquidity, and financial stability. Akhter (2023) and Naili and Lahrichi (2022) identify the NPL ratio as the most widely used proxy for credit risk in banking studies because it effectively captures the quality of credit management and the effectiveness of banks' risk control practices. In the context of Regional Development Banks (RDBs), credit risk is particularly important because these banks play a significant financial intermediation role in supporting productive regional sectors, especially micro, small, and medium-sized enterprises (MSMEs), which are inherently more vulnerable to default than large corporate borrowers.

2.2. Agency Theory

ISSN [Online]: 2776-6780

Agency Theory explains that the separation of ownership and control creates potential conflicts of interest due to information asymmetry, differing risk preferences, and imperfect monitoring mechanisms between principals and agents (Jensen & Meckling, 1976). In the banking industry, agency conflicts arise when managers pursue growth, profitability, or other short-term objectives in ways that increase the bank's exposure to risk, particularly credit risk. Hunjra et al. (2021) argue that bank risk-taking behavior is often driven by weak internal monitoring, which encourages managerial decisions that increase exposure to non-performing loans. Similarly, Moussa (2019) demonstrates that weak internal governance, particularly ineffective board oversight, increases credit risk by providing greater opportunities for managerial opportunism. From this perspective, credit risk reflects not only borrower default but also weak managerial discipline and ineffective internal governance.

2.3. Resource Dependence Theory

Resource Dependence Theory views the board of commissioners as a strategic organizational resource that provides access to knowledge, expertise, external networks, and objective perspectives (Pfeffer & Salancik, 2015). In the banking industry, the board performs not only a monitoring function but also a strategic role in improving the quality of decision-making and strengthening the effectiveness of risk management. Moussa (2019) found that a more independent board structure enhances supervisory quality and improves credit risk management. In the context of Regional Development Banks (RDBs), which are characterized by local government ownership and relatively bureaucratic governance structures, independent commissioners play an important role not only in monitoring management but also in providing objective and professional judgment in credit-related decision-making.

2.4. Operational Inefficiency and Credit Risk

Operational inefficiency reflects a bank's inability to manage operating costs effectively while generating sufficient operating income and is commonly measured by the operating expense-to-operating income (OEOI) ratio. A high OEOI ratio indicates weak managerial efficiency, ineffective internal processes, and inadequate operational oversight, which may ultimately impair financial performance and reduce the quality of productive assets, including loans (Akhter, 2023; Barra & Ruggiero, 2023). Conceptually, inefficient banks face greater cost pressures and have a more limited capacity to absorb potential loan losses, making them more vulnerable to higher credit risk and non-performing loans (NPLs) (Bsoul et al., 2022; Naili & Lahrichi, 2022). From the perspective of the Bad Management Hypothesis, operational inefficiency reflects poor managerial quality, which increases credit risk because inefficient banks tend to exhibit weaker credit screening, monitoring, and loan control systems (Berger & DeYoung, 1997). A high OEOI ratio therefore reflects not only cost inefficiency but also weaknesses in business process management, particularly in financial intermediation and credit portfolio oversight. When management fails to control operating costs efficiently, banks face tighter resource constraints and weaker monitoring capabilities, making credit quality more vulnerable to deterioration (Akhter, 2023). Empirical evidence consistently shows that operational inefficiency has a positive effect on credit risk. Banks with lower operational efficiency tend to exhibit higher NPL ratios because weak efficiency undermines the quality of financial intermediation, credit supervision, and risk management capacity (Akhter, 2023; Barra & Ruggiero, 2023). Similar findings from emerging markets confirm that a high OEOI ratio is a key determinant of increasing credit risk because it reflects poor managerial quality and weak credit portfolio management (Bsoul et al., 2022; Naili & Lahrichi, 2022; Sistiyarini & Poerwanti, 2021). In the context of Regional Development Banks (RDBs), a high OEOI ratio may further exacerbate credit risk because these banks generally face greater constraints in terms of scale, operational efficiency, and managerial capacity than national commercial banks, thereby limiting their ability to maintain loan quality (Fransiska & Ismanto, 2025). From the perspective of Agency Theory, operational inefficiency represents agency costs arising from ineffective managerial oversight. Managers may engage in suboptimal resource allocation, thereby weakening risk management functions and increasing credit risk. In contrast, Corporate Behavior Theory suggests that managerial limitations, cognitive biases, and bounded rationality may contribute to inefficient operational decisions that adversely affect credit quality.

H1 : Operational inefficiency has a positive effect on credit risk.

2.5. Profitability and Credit Risk

Profitability reflects a bank's ability to generate earnings from its managed resources and represents managerial effectiveness in performing the financial intermediation function. In banking research, profitability is commonly measured using either return on assets (ROA) or return on equity (ROE), with ROE being preferred when the focus is on shareholders' capital efficiency and risk-bearing capacity (Odebode et al., 2024). This study employs ROE because it captures how efficiently banks utilize shareholders' equity to generate earnings and serves as an important indicator of bank soundness (OJK, 2017). A higher ROE reflects more efficient utilization of shareholders' equity, stronger operational performance, better managerial quality, and more effective credit monitoring. More profitable banks generally maintain higher asset quality, implement more prudent lending policies, and possess greater capacity to absorb potential loan losses through retained earnings and loan-loss reserves, thereby reducing credit risk (Akhter, 2023; Moussa, 2019). Conceptually, high profitability indicates that a bank performs its financial intermediation function effectively while maintaining an appropriate balance between business expansion and asset quality. More profitable banks typically possess stronger internal capabilities to reinforce control systems, improve credit assessment quality, and monitor borrowers more effectively. In this context, profitability serves as an internal mechanism that mitigates credit risk by providing banks with greater capacity to absorb potential loan losses without immediately undermining financial stability. Profitability is therefore widely regarded as a proxy for both managerial quality and risk management capability (Barra & Ruggiero, 2023; Naili & Lahrichi, 2022).

Empirical evidence generally indicates that profitability has a negative effect on credit risk. More profitable banks tend to maintain higher-quality loan portfolios because they benefit from more efficient asset management, stronger credit oversight, and healthier financial intermediation. Several studies have confirmed that higher profitability reduces non-performing loans (NPLs), suggesting that a bank's ability to generate earnings is closely associated with its ability to maintain loan quality (Akhter, 2023; Barra & Ruggiero, 2023; Moussa, 2019; Naili & Lahrichi, 2022). However, the relationship between profitability and credit risk is not always linear. Under certain circumstances, high profitability may encourage banks to assume greater risk in an effort to sustain or enhance future returns. Highly profitable banks may have stronger incentives to expand lending more aggressively, thereby increasing their tolerance for credit risk. In such cases, profitability no longer functions solely as a risk buffer but may also stimulate risk-taking behavior that increases exposure to non-performing loans (Jabbouri & Naili, 2019; Kharabsheh, 2019). Therefore, the relationship between profitability and credit risk is context-dependent, as profitability may function either as a mechanism that constrains risk or as one that amplifies risk, depending on governance quality and managerial behavior.

H2 : Profitability affects credit risk.

2.6. Independent Commissioners and Credit Risk

Independent commissioners are members of the board who have no financial, ownership, managerial, or familial relationships with management or controlling shareholders, enabling them to perform their supervisory responsibilities with greater independence. In banking governance, independent commissioners play a critical role in maintaining supervisory objectivity and improving the quality of strategic decision-making, particularly in credit risk management. Their presence is expected to strengthen managerial oversight, ensure the implementation of prudential principles, and promote more objective supervision of lending decisions (OJK, 2023). From the perspective of Agency Theory, independent commissioners help mitigate agency conflicts between managers and shareholders by strengthening oversight of managerial decisions, including credit policies. Through more independent supervision, the board can constrain managerial opportunism, reduce excessive risk-taking, and promote prudence in credit portfolio management. Independent commissioners therefore serve as an important governance mechanism for mitigating moral hazard and preserving asset quality (Jensen & Meckling, 1976; Mollah et al., 2019; Pathan & Faff, 2013). Beyond their monitoring role, independent commissioners can also be explained through Resource Dependence Theory as strategic resources that provide expertise, professional experience, and external networks to enhance risk evaluation and decision-making quality. Commissioners with adequate competence and experience can offer more objective perspectives in evaluating credit policies, strengthening oversight of asset quality, and improving strategic decisions related to credit risk management. Their role is therefore important not only from a formal governance perspective but also in substantively improving the effectiveness of bank risk oversight (Pfeffer & Salancik, 2015). Empirical evidence suggests that a higher proportion of independent commissioners is generally associated with lower credit risk, as reflected by lower non-performing loan (NPL) ratios. More independent boards tend to promote more prudent lending policies, strengthen risk oversight, and constrain excessive managerial risk-taking. Several studies have shown that independent commissioners contribute to lower credit risk by improving monitoring quality and strengthening governance discipline (Debrah et al., 2022; Hunjra et al., 2021; Moussa, 2019; Pathan & Faff, 2013). In the context of Regional Development Banks (RDBs), independent commissioners are particularly important for maintaining supervisory objectivity and ensuring that lending policies remain aligned with prudential banking principles, thereby contributing to lower credit risk.

H3 : Independent commissioners have a negative effect on credit risk.

2.7. The Moderating Role of Independent Commissioners in the Relationship between Operational Inefficiency and Credit Risk

ISSN [Online]: 2776-6780

Independent commissioners not only play a direct role in reducing credit risk but may also moderate the relationship between internal bank conditions and credit risk by strengthening governance oversight. Owing to their independence from management and controlling shareholders, independent commissioners are better positioned to reinforce managerial discipline, improve monitoring quality, and constrain decisions that may increase credit risk. They are therefore theoretically relevant not only as a direct governance mechanism but also as a moderating mechanism that can either strengthen or weaken the influence of internal bank conditions on credit risk (Jensen & Meckling, 1976; Pathan & Faff, 2013). According to Agency Theory, operational inefficiency may reflect managerial opportunism that is inconsistent with shareholders' interests, leading to less prudent lending decisions and higher credit risk (Jensen & Meckling, 1976). In the relationship between operational inefficiency and credit risk, independent commissioners are expected to weaken the adverse effect of operational inefficiency on credit risk. Operational inefficiency reflects weak managerial discipline, inefficient internal processes, and ineffective credit oversight, all of which contribute to increased credit risk. Under these conditions, independent commissioners can strengthen supervision, constrain managerial opportunism, and promote greater operational discipline, thereby mitigating the negative impact of operational inefficiency on credit quality (Mollah et al., 2019). Furthermore, they contribute expertise, professional experience, and external perspectives that enhance decision-making quality and strengthen risk governance, which may further reduce the positive effect of operational inefficiency on credit risk (Lu & Boateng, 2018; Pfeffer & Salancik, 2015). Thus, the presence of independent commissioners has the potential to moderate the impact of operational inefficiency on credit risk by strengthening oversight functions and improving the quality of corporate governance. Empirical evidence supports this argument. Ebenezer and Omar (2015) found that independent directors significantly moderate the effects of operational inefficiency and profitability on credit risk, confirming that board independence can reduce the adverse impact of operational weaknesses on bank credit risk. In the context of Regional Development Banks (RDBs), the moderating role of independent commissioners becomes even more important because these banks often face efficiency challenges arising from their regional development mandates and various non-commercial pressures. Therefore, the presence of independent commissioners is expected to mitigate the adverse effects of operational inefficiency on credit quality, thereby enabling banks to manage credit risk more effectively.

H4 : Independent commissioners weaken the positive effect of operational inefficiency on credit risk.

2.8. The Moderating Role of Independent Commissioners in the Relationship between Profitability and Credit Risk

In the relationship between profitability and credit risk, independent commissioners are expected to strengthen the ability of profitability to reduce credit risk. High profitability reflects a bank's stronger internal capacity to absorb losses, reinforce internal control systems, and improve the quality of credit management. However, high profitability may also encourage managers to assume greater risk in an effort to sustain or enhance future returns. In this context, independent commissioners help ensure that profitability is used to strengthen asset quality and financial stability rather than to support excessive credit expansion. Through stronger independent oversight, profitability is expected to function more effectively as a buffer against credit risk. Empirical evidence also suggests that independent commissioners moderate the relationship between profitability and credit risk by strengthening supervisory quality and limiting managerial risk-taking behavior (Chen, 2020; Lu & Boateng, 2018). Furthermore, according to Resource Dependence Theory, independent commissioners provide strategic resources in the form of expertise, professional experience, and external perspectives that enable the board to balance profitability objectives with prudent risk management (Hillman et al., 2009; Pfeffer & Salancik, 2015). Through effective oversight, profitability can be directed to serve as a buffer against credit risk and to strengthen the bank's financial stability rather than as a driver of excessive credit expansion. Empirical evidence also supports this proposition. Ebenezer and Omar (2015) found that independent directors significantly moderate the effects of operational inefficiency and profitability on credit risk, indicating that board independence strengthens governance oversight and makes the relationship between profitability and credit risk more manageable. In the context of Regional Development Banks (RDBs), the moderating role of independent commissioners is particularly important in ensuring that profitability is utilized to improve credit quality and enhance bank stability rather than to encourage excessive risk-taking through aggressive credit expansion.

H5 : Independent commissioners strengthen the negative effect of profitability on credit risk.

Based on the foregoing theoretical arguments and empirical evidence, this study develops a conceptual framework that links operational inefficiency, profitability, and independent commissioners to credit risk in Regional Development Banks (RDBs). The framework positions independent commissioners as both a direct governance mechanism and a moderating variable in the relationships between internal bank conditions and credit risk. Accordingly, the conceptual framework of this study is presented in Figure 1.

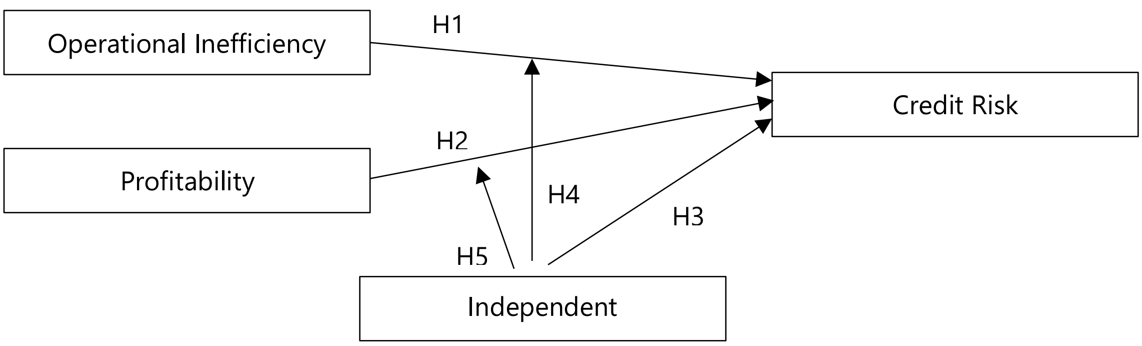

Figure 1. Conceptual Framework

III. Research Method

3.1. Research Design

This study employs an explanatory quantitative approach to examine the effects of operational inefficiency and profitability on credit risk in Indonesian Regional Development Banks (RDBs), while also testing the moderating role of independent commissioners. An explanatory quantitative design is appropriate because the study seeks to explain the causal relationships among variables through

ISSN [Online]: 2776-6780

empirical hypothesis testing using numerical data and statistical analysis. The unit of analysis consists of conventional Regional Development Banks in Indonesia, observed annually over the study period. Compared with qualitative approaches, which are more suitable for exploring managerial perceptions and organizational processes, the explanatory quantitative approach enables the statistical testing of theoretically derived hypotheses and produces findings that are more generalizable across banking institutions. Likewise, compared with case study methods, panel data analysis facilitates the simultaneous examination of both cross-sectional and time-series variations, thereby providing more robust evidence regarding the determinants of credit risk. This study employs panel data because this approach combines the advantages of cross-sectional and longitudinal analyses, increases the number of observations, reduces estimation bias resulting from omitted variables, and improves the efficiency of parameter estimation. Previous studies investigating bank credit risk have extensively employed panel data regression because it effectively captures both heterogeneity across banks and changes over time (Akhter, 2023; Barra & Ruggiero, 2023; Naili & Lahrichi, 2022).

3.2. Population and Sample

The population consists of all Regional Development Banks operating in Indonesia. The sample was selected using a purposive sampling technique based on three criteria. First, all Regional Development Banks listed by the Financial Services Authority (OJK) during the 2018–2024 period were identified. Second, banks operating under Islamic banking principles were excluded because their financing structures, governance mechanisms, and risk profiles differ substantially from those of conventional banks. Third, banks with incomplete annual reports, missing corporate governance disclosures, or unavailable financial information related to the study variables were excluded. Based on these criteria, the final sample consists of 23 conventional Regional Development Banks, resulting in 161 bank-year observations. Although purposive sampling enhances internal validity by ensuring data completeness and comparability across observations, it may limit external validity because the findings are primarily generalizable to Regional Development Banks operating under similar institutional and regulatory environments rather than to the banking industry as a whole.

3.3. Data Sources and Data Collection Procedures

This study uses secondary data obtained from annual financial statements published by the Financial Services Authority (OJK) through its official website, as well as annual reports collected from the official websites of each sampled bank. These sources provide both financial and non-financial information relevant to the research variables. The dataset consists of bank-level financial ratios measuring credit risk, operational inefficiency, profitability, and the composition of independent commissioners. Data were collected using the documentation method by compiling, recording, and processing information from annual reports, financial statements, and other official documents published by OJK and the sampled banks. This method is appropriate because the variables examined are derived from publicly available institutional records and official financial disclosures. Furthermore, the documentation method provides objective and verifiable evidence obtained from publicly available institutional records, thereby minimizing respondent bias and enhancing the reliability of the research findings (Sekaran & Bougie, 2017).

ISSN [Online]: 2776-6780

3.4. Data Classification and Variable Measurement

This study includes one dependent variable, two independent variables, one moderating variable, and two interaction terms. The dependent variable is credit risk, proxied by the non-performing loan (NPL) ratio, which is measured as the ratio of non-performing loans to total loans. The first independent variable is operational inefficiency, proxied by the operating expense-to-operating income (OEOI) ratio, which reflects managerial efficiency. The second independent variable is profitability, proxied by return on equity (ROE), which measures the bank's ability to generate earnings from shareholders' equity. ROE is adopted in this study because previous credit risk studies have identified equity-based profitability as an appropriate performance indicator associated with non-performing loans (Odebode et al., 2024). The moderating variable is independent commissioners (INCOM), measured by the proportion of independent commissioners to the total number of commissioners. To examine the moderating effects, two interaction terms are constructed by multiplying each independent variable by the moderating variable: OEOI × INCOM and ROE × INCOM. All variables are measured on a ratio scale. The operational definitions and measurements of the variables are presented in Table 1.

Table 1. Research Variables and Their Measurements

Variable	Data Type	Definition	Measurement	Scale	Sources
Credit Risk (NPL)	Financial Data	Credit risk is measured using the non-performing loan (NPL) ratio, defined as the proportion of non-performing loans to total loans.	NPL = (Non-performing Loans / Total Loans) × 100	Ratio	Akhter (2023); Naili & Lahrichi (2022)
Operational Inefficiency (OEOI)	Financial Data	Operational inefficiency is measured using the operating expense-to-operating income (OEOI) ratio.	OEOI = (Operating Expenses / Operating Income) × 100	Ratio	Barra & Ruggiero (2023); Arnanto & Lutfi (2025)
Profitability (ROE)	Financial Data	Profitability is measured using return on equity (ROE), which reflects the bank's ability to generate earnings from shareholders' equity.	ROE = (Net Income After Tax / Average Equity) × 100	Ratio	Akhter (2023); Bsoul et al. (2022)

ISSN [Online]: 2776-6780

Variable	Data Type	Definition	Measurement	Scale	Sources
Independent Commissioners (INCOM)	Non-Financial Data	Independent commissioners are measured by the proportion of independent commissioners on the board of commissioners.	INCOM = (Number of Independent Commissioners / Total Number of Commissioners) × 100	Ratio	Hunjra et al. (2021); Ramly & Ramli (2022)

The data collected are classified into financial and non-financial data. This classification distinguishes information obtained from financial statements from governance-related information disclosed in annual reports. Financial data consist of quantitative accounting information obtained from audited financial statements and annual reports. These data include credit risk, operational inefficiency, and profitability. Because these variables are expressed as financial ratios, they are measured on a ratio scale, which has an absolute zero point and allows meaningful comparisons across banks and time periods. Non-financial data consist of information on the composition of the board of commissioners, specifically the proportion of independent commissioners, obtained from the corporate governance section of annual reports. This variable is also measured on a ratio scale because it is expressed as the percentage of independent commissioners relative to the total number of commissioners. As presented in Table 1, three variables are classified as financial data because they are derived from audited financial statements and represent the banks' financial condition and operational performance. In contrast, independent commissioners are classified as non-financial data because they represent a corporate governance characteristic disclosed in annual reports rather than a financial accounting measure. All variables are measured on a ratio scale, allowing the application of parametric statistical techniques and panel data regression analysis.

3.5. Data Analysis Procedure

The data analysis was conducted in two stages: descriptive analysis and inferential analysis. Descriptive analysis was performed to provide an overview of the characteristics of the data by presenting the mean, maximum, minimum, and standard deviation. This analysis helps identify data distribution patterns, the degree of variation, and the overall tendency of each variable before conducting inferential analysis. Inferential analysis was conducted using panel data regression with EViews software. EViews was selected because it provides comprehensive tools for panel data estimation, model selection, diagnostic testing, and moderation analysis. Specifically, EViews was used for data processing, descriptive statistical analysis, panel model estimation, the Chow test, the Hausman test, the Lagrange Multiplier (LM) test, and moderated regression analysis. The software also facilitates the efficient analysis of longitudinal banking data and produces robust estimators that are widely used in banking and finance research. Panel data regression was employed because it enables the simultaneous estimation of cross-sectional (banks) and time-series dimensions, thereby producing more efficient estimates than separate cross-sectional or time-series analyses (Gujarati, 2021). Three panel data models were considered in this study: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). The most appropriate model was selected based on the results of the Chow test, Hausman test, and Lagrange Multiplier (LM) test. The baseline model was used to examine the direct effects of operational inefficiency, profitability, and independent commissioners on credit risk, as specified in Equation (1):

$$NPL_{it} = \alpha_1 + \beta_1 OEOI_{it} + \beta_2 ROE_{it} + \beta_3 INCOM_{it} + \varepsilon_{it}$$

To examine the moderating role of independent commissioners, the baseline model was extended by incorporating interaction terms between independent commissioners and each independent variable, as specified in Equation (2):

$$NPL_{it} = \alpha_1 + \beta_1 OEOI_{it} + \beta_2 ROE_{it} + \beta_3 INCOM_{it} + \beta_4 (INCOM \times OEOI)_{it} + \beta_5 (INCOM \times ROE)_{it} + \varepsilon_{it}$$

Hypothesis testing was conducted through several procedures. First, the t-test was used to evaluate the individual effect of each explanatory variable on credit risk. A hypothesis was considered supported when the probability value (p-value) was below the 5% significance level. Second, the F-test was employed to determine whether all explanatory variables jointly affected credit risk. Third, the coefficient of determination (Adjusted R^2) was used to evaluate the explanatory power of the regression model. Finally, the moderating effects were assessed by examining the significance of the interaction coefficients (INCOM × OEOI and INCOM × ROE). A statistically significant interaction coefficient indicates that independent commissioners modify the strength or direction of the relationship between the corresponding independent variable and credit risk.

IV. Result and Discussion

4.1. Descriptive Statistics

The descriptive statistics presented in Table 2 indicate that, overall, conventional Regional Development Banks (RDBs) in Indonesia remained in relatively sound condition during the 2018–2024 period in terms of credit quality, operational efficiency, profitability, and corporate governance. Credit risk, proxied by the non-performing loan (NPL) ratio, recorded an average of 2.44%, suggesting that RDBs generally maintained satisfactory loan quality. However, the relatively high maximum value indicates that several banks continued to experience substantial pressure from non-performing loans. Operational inefficiency, proxied by the operating expense-to-operating income (OEOI) ratio, averaged 69.59%, indicating that RDBs generally operated efficiently. Nevertheless, the relatively high maximum value suggests that some banks still faced considerable challenges in maintaining operational efficiency.

Table 2. Descriptive Statistics of the Research Variables

Statistic	NPL	OEOI	ROE	INCOM
Mean	2.4416	69.5910	14.5323	2.1988
Median	2.4800	76.8900	14.3800	2.0000
Maximum	7.4500	91.2500	25.3700	5.0000
Minimum	0.2900	60.5800	4.9500	1.0000
Standard Deviation	1.2298	6.5994	4.4115	0.6784
Coefficient of Variation	0.5037	0.9483	0.3036	0.3085

In terms of profitability, the average return on equity (ROE) of 14.53% indicates that RDBs were generally able to generate relatively strong returns for their shareholders. Meanwhile, the average number of independent commissioners was 2.20, with a median of 2, indicating that most RDBs had formally established an independent oversight function within their board structures. Overall, these descriptive statistics suggest that, although RDBs generally operated under sound financial and governance conditions, substantial variation remained across banks in terms of operational efficiency, profitability, and credit risk. This variation implies that differences in managerial quality and corporate governance continue to play an important role in explaining the dynamics of credit risk among Regional Development Banks.

4.2. Panel Data Model Selection

The panel data model was selected through three sequential tests: the Chow test, the Hausman test, and the Lagrange Multiplier (LM) test. These procedures were performed to determine the most appropriate estimation model for examining the relationship between the independent variables and credit risk in Regional Development Banks (RDBs). As presented in Table 3, the results indicate that the Random Effect Model (REM) is the most appropriate estimation model for this study.

Table 3. Panel Data Model Selection Results

Testing Stage	Compared Models	Test Statistic	Probability	Decision	Selected Model
Chow Test	Common Effect Model (CEM) vs. Fixed Effect Model (FEM)	Cross-section Chi-square = 147.6976	0.0000	Probability < 0.05; H_0 rejected	Fixed Effect Model (FEM)
Hausman Test	Fixed Effect Model (FEM) vs. Random Effect Model (REM)	Cross-section Random = 3.1846	0.3640	Probability > 0.05; H_0 not rejected	Random Effect Model (REM)
Lagrange Multiplier (LM) Test	Common Effect Model (CEM) vs. Random Effect Model (REM)	Breusch–Pagan (Both) = 123.3050	0.0000	Probability < 0.05; H_0 rejected	Random Effect Model (REM)

The Chow test indicates that the Fixed Effect Model performs better than the Common Effect Model, suggesting the presence of cross-sectional heterogeneity among Regional Development Banks. The Hausman test further indicates that the Random Effect Model is more appropriate than the Fixed Effect Model, implying that bank-specific effects are not systematically correlated with the explanatory variables. This result is further supported by the Lagrange Multiplier test, which confirms that the Random Effect Model performs better than the Common Effect Model. Based on these sequential tests, the Random Effect Model was selected as the most appropriate specification because it more efficiently captures cross-sectional heterogeneity among Regional Development Banks.

4.3. Hypothesis Testing Results

The baseline regression results, presented in Table 4, show that operational inefficiency, proxied by the operating expense-to-operating income (OEOI) ratio, has a positive and statistically significant effect on credit risk, thereby supporting the first hypothesis. This finding indicates that higher operational inefficiency increases credit risk in Regional Development Banks. Profitability, proxied by return on equity (ROE), has a negative and statistically significant effect on credit risk, thereby supporting the second hypothesis and indicating that stronger profitability is associated with lower credit risk. Independent commissioners also have a negative and statistically significant effect on credit risk, supporting the third hypothesis. This finding suggests that the presence of independent commissioners strengthens governance oversight and contributes to reducing non-performing loans in Regional Development Banks. Collectively, the explanatory variables have a statistically significant effect on credit risk. However, the coefficient of determination indicates that the model explains only a relatively limited proportion of the variation in credit risk, suggesting that additional factors beyond those included in the model also influence credit risk in Regional Development Banks. The moderation model, presented in Table 5, shows that profitability remains statistically significant in explaining credit risk, whereas operational inefficiency and independent commissioners are no longer statistically significant. The interaction results further indicate that independent commissioners do not moderate the relationship between operational inefficiency and credit risk, leading to the rejection of the fourth hypothesis. Similarly, independent commissioners do not moderate the relationship between profitability and credit risk, resulting in the rejection of the fifth hypothesis. These findings suggest that independent commissioners primarily function as a direct governance mechanism in credit risk oversight but are not effective as a moderating mechanism capable of strengthening or weakening the relationships between internal bank conditions and credit risk. Although the moderation model remains statistically significant overall, the improvement in its explanatory power is only marginal, indicating that the moderating contribution of independent commissioners is relatively limited.

Table 4. Results of the Baseline Model (Without Moderation)

Variables	Coefficient	Standard Error	t-Statistic	p-Value	Conclusion
C	0.8061	1.7967	0.4487	0.6543	—
OEOI	0.0463	0.0194	2.3862	0.0182	Positive and Significant
ROE	-0.0888	0.0270	-3.2884	0.0012	Negative and Significant
INCOM	-0.2888	0.1236	-2.3350	0.0207	Negative and Significant
R-squared : 0.1953 F-statistic : 12.6995 Prob. (F-statistic) : 0.0000					

4.4. Discussion

a. Operational Inefficiency and Credit Risk

The hypothesis testing results indicate that operational inefficiency, proxied by the operating expense-to-operating income (OEOI) ratio, has a positive and statistically significant effect on credit risk, thereby supporting the first hypothesis. This finding indicates that higher operational inefficiency increases credit risk in Regional Development Banks (RDBs). It suggests that banks' inability to manage operating expenses efficiently weakens credit management quality and increases the likelihood of non-performing loans (Barra & Ruggiero, 2023).

Table 5. Results of the Moderation Model

Variables	Coefficient	Standard Error	t-Statistic	p-Value	Conclusion
C	5.0778	4.1954	1.2103	0.2280	—
OEOI	0.0049	0.0440	0.1109	0.9119	Not Significant
ROE	-0.1593	0.0697	-2.2837	0.0237	Negative and Significant
INCOM	-2.2777	1.7792	-1.2802	0.2024	Not Significant
INCOM × OEOI	0.0191	0.0184	1.0406	0.2997	Not Significant
INCOM × ROE	0.0338	0.0305	1.1067	0.2701	Not Significant
R-squared : 0.2022 F-statistic : 7.8566 Prob. (F-statistic) : 0.0000					

This finding is consistent with the descriptive statistics, which show that the average OEOI ratio of RDBs during the 2018–2024 period was 76.9591%, indicating that the banks generally operated within a reasonably efficient range. Based on SEOJK No. 14/SEOJK.03/2017, this average falls within the >75%–93% category, suggesting that RDBs were generally efficient in managing operating expenses relative to operating income (OJK, 2017). However, the maximum OEOI value of 91.2500% indicates that some RDBs experienced considerable efficiency pressure, with a substantial proportion of operating income being absorbed by operating expenses. This finding suggests that although RDBs were relatively efficient on average, several banks experienced operational inefficiencies that may have weakened the quality of credit management (Berger & DeYoung, 1997). This finding is consistent with the bad management hypothesis proposed by Berger and DeYoung (1997), which argues that operational inefficiency reflects weak managerial quality. A high OEOI ratio indicates that banks fail to manage operating costs efficiently, reflecting poor managerial efficiency, weak internal controls, and ineffective operational processes. In the banking sector, these weaknesses not only reduce cost efficiency but also impair credit screening, borrower monitoring, and loan portfolio supervision. Consequently, inefficient banks become more vulnerable to increased credit risk because of weaker control over asset quality (Naili & Lahrichi, 2022).

ISSN [Online]: 2776-6780

From the perspective of Agency Theory, a high OEOI ratio also reflects greater agency costs arising from weak managerial discipline and ineffective internal oversight (Jensen & Meckling, 1976). Operational inefficiency indicates that management fails to allocate resources efficiently to support financial intermediation and risk management. This increases the likelihood of ineffective operational decisions, particularly in lending activities and credit supervision. From the perspective of Resource Dependence Theory, a high OEOI ratio further suggests that banks are unable to utilize their internal resources effectively to improve decision-making quality and risk management (Pfeffer & Salancik, 2015). Operational inefficiency therefore reflects not only cost-related problems but also limited organizational capacity to manage credit risk effectively. This finding is consistent with the studies of Barra and Ruggiero (2023), Bsoul et al. (2022), and Naili and Lahrichi (2022), all of which demonstrate that operational inefficiency increases credit risk. A higher OEOI ratio is associated with a greater likelihood of deteriorating loan quality. This result confirms that rising credit risk in RDBs is influenced not only by external conditions or borrower characteristics but also by the quality of internal bank management. Therefore, effective credit risk management in RDBs requires not only prudent lending policies but also greater operational efficiency, stronger internal controls, and continuous improvements in managerial quality (Bsoul et al., 2022).

b. Profitability and Credit Risk

The hypothesis testing results indicate that profitability, proxied by return on equity (ROE), has a negative and statistically significant effect on credit risk, thereby supporting the second hypothesis. This finding indicates that higher profitability reduces credit risk in Regional Development Banks (RDBs). It suggests that a bank's ability to generate returns from shareholders' equity plays a crucial role in maintaining loan quality and reducing the likelihood of non-performing loans (Akhter, 2023). This finding is supported by the descriptive statistics, which show that the average ROE of RDBs during the 2018–2024 period was 14.5323%, placing their profitability in the good category. Based on SEOJK No. 14/SEOJK.03/2017, this average falls within the 12%–<20% range, indicating that RDBs were generally able to generate relatively strong returns on shareholders' equity (OJK, 2017). This relatively high level of profitability suggests that most RDBs possessed sufficient capacity to utilize shareholders' equity productively to generate earnings. Such a condition supports the argument that more profitable banks are better positioned to preserve asset quality, strengthen loan-loss reserves, and improve the effectiveness of credit risk management (Bsoul et al., 2022). From a theoretical perspective, profitability reflects managerial effectiveness in utilizing bank resources productively and efficiently. A higher ROE indicates that banks are able to optimize shareholders' equity to generate earnings while also reflecting stronger asset management, greater operational efficiency, and sound managerial discipline.

In the banking industry, more profitable institutions generally possess greater capacity to strengthen internal controls, implement more prudent credit screening procedures, and improve borrower monitoring, thereby reducing the likelihood of non-performing loans (Moussa, 2019). Conversely, lower profitability may signal weaker internal management and encourage banks to pursue more aggressive lending strategies to increase earnings, thereby increasing their exposure to credit risk (Naili & Lahrichi, 2022). From the perspective of Agency Theory, high profitability indicates that management utilizes bank resources more efficiently and in closer alignment with shareholders' interests, thereby reducing agency conflicts (Jensen & Meckling, 1976). It suggests that management is not solely focused on achieving short-term earnings but is also capable of maintaining an appropriate balance between profitability and asset quality. From the perspective of Resource Dependence Theory, profitability reflects a bank's ability to transform internal resources into sustainable organizational performance (Pfeffer & Salancik, 2015). More profitable banks possess greater capacity to invest in stronger internal control systems, technological improvements, and more effective risk management processes. Profitability therefore reflects not only financial performance but also the organization's capability to maintain credit risk stability. This finding is consistent with those reported by Akhter (2023), Bsoul et al. (2022), Naili and Lahrichi (2022), and Moussa (2019), all of whom found that higher profitability reduces credit risk. Greater profitability is associated with a lower likelihood of non-performing loans. This result confirms that credit risk in RDBs is influenced not only by lending quality but also by the bank's ability to generate sustainable earnings. Therefore, strengthening profitability is important not only for improving financial performance but also for reinforcing the stability of credit quality in Regional Development Banks (Kartika et al., 2022).

c. Independent Commissioners and Credit Risk

The hypothesis testing results indicate that independent commissioners have a negative and statistically significant effect on credit risk, thereby supporting the third hypothesis. This finding indicates that greater board independence reduces credit risk in Regional Development Banks (RDBs). It suggests that the presence of independent commissioners strengthens board oversight, enhances managerial discipline, and reduces the likelihood of non-performing loans (Hunjra et al., 2021). This finding is supported by the descriptive statistics, which show that the average number of independent commissioners in RDBs during the 2018–2024 period was 2.1988, indicating that most RDBs had approximately two independent commissioners on their boards. This suggests that, from a formal governance perspective, most RDBs had implemented an independent oversight function as part of good corporate governance practices. According to OJK Regulation No. 17 of 2023, banks are required to have at least three members on the board of commissioners, with at least 50% serving as independent commissioners (OJK, 2023). The average observed in this study suggests that most RDBs generally complied with the minimum requirement for independent board representation, although the effectiveness of board oversight ultimately depends on the overall composition and quality of the board. From a theoretical perspective, this finding is consistent with Agency Theory, which views independent commissioners as a governance mechanism that mitigates agency conflicts by strengthening managerial oversight (Jensen & Meckling, 1976). In the banking industry, independent commissioners enhance the objectivity of supervision, constrain managerial opportunism, and reduce excessive risk-taking that may weaken loan quality (Moussa, 2019). Their presence also promotes greater managerial discipline by ensuring that strategic decisions, including credit policies, are made more transparently, prudently, and accountably. From the perspective of Resource Dependence Theory, independent commissioners serve not only as monitors but also as strategic resources that contribute objective judgment, professional expertise, and independent perspectives to the bank's decision-making process (Pfeffer & Salancik, 2015). In credit risk management, they improve the evaluation of lending policies, strengthen oversight of managerial decisions, and promote more objective risk governance. Consequently, independent commissioners enhance not only formal governance structures but also the substantive quality of credit risk supervision (Lu & Boateng, 2018). This finding is consistent with the studies of Hunjra et al. (2021) and Moussa (2019), both of which demonstrate that independent commissioners contribute to reducing credit risk. Stronger board independence decreases the likelihood of rising non-performing loans. This result confirms that effective credit risk management in

RDBs depends not only on financial performance but also on the strength of corporate governance and the quality of board oversight.

d. The Moderating Role of Independent Commissioners

The hypothesis testing results indicate that independent commissioners do not moderate the effects of operational inefficiency or profitability on credit risk, leading to the rejection of the fourth and fifth hypotheses. This finding indicates that although independent commissioners directly reduce credit risk, their presence is not sufficiently strong to strengthen or weaken the relationships between internal bank conditions and credit risk. In other words, independent commissioners appear to function more effectively as a direct governance mechanism for overseeing credit quality than as a moderating mechanism linking internal performance to credit risk (Lu & Boateng, 2018). This finding is supported by the moderation model, which shows that the interaction terms between independent commissioners and operational inefficiency, as well as between independent commissioners and profitability, are not statistically significant. This result suggests that the presence of independent commissioners in RDBs is not sufficiently influential to alter either the direction or the magnitude of the effects of OEOI and ROE on the non-performing loan (NPL) ratio. Empirically, this indicates that independent commissioners in RDBs continue to function primarily as formal overseers of general managerial policies rather than as substantive governance actors capable of influencing how operational efficiency and profitability translate into credit quality outcomes. From the perspective of Agency Theory, independent commissioners are expected not only to mitigate agency conflicts through direct monitoring but also to strengthen managerial discipline by ensuring that internal resources are managed prudently and accountably (Jensen & Meckling, 1976). However, the findings suggest that this moderating role remains limited. Although independent commissioners are effective in directly reducing credit risk, they are not sufficiently influential to intervene in the relationships between operational inefficiency, profitability, and credit risk. This finding implies that their governance function in RDBs remains concentrated on general oversight rather than on shaping the strategic mechanisms through which internal performance affects credit risk.

From the perspective of Resource Dependence Theory, independent commissioners are expected to function as strategic resources by providing objective judgment, professional expertise, and supervisory capabilities that enhance the effectiveness of internal management (Pfeffer & Salancik, 2015). Nevertheless, the findings indicate that these strategic resources are not sufficiently strong to reinforce the effects of operational efficiency or profitability on reducing credit risk. This suggests that the role of independent commissioners in RDBs remains more formal than substantive, thereby limiting their ability to exert meaningful influence over internal managerial processes (Moussa, 2019). Overall, these findings suggest that independent commissioners in RDBs are more effective as a direct governance mechanism than as a moderating governance mechanism. Although they contribute directly to reducing credit risk, they have not yet demonstrated the capacity to strengthen or weaken the relationships between internal bank conditions and credit risk. These findings imply that improving governance in Regional Development Banks requires not only formal compliance with board independence regulations but also stronger substantive oversight, higher professional competence, greater functional independence, and a more influential role for independent commissioners in strategic decision-making processes (Hunjra et al., 2021).

e. Comparative Analysis of the Findings with Previous Research

The findings of this study are generally consistent with previous research indicating that poor operational performance increases credit risk, whereas higher profitability reduces credit risk. However, a more comprehensive analysis suggests that the similarities and differences between the present findings and those of previous studies cannot be explained solely by thematic convergence or divergence. Rather, they are also influenced by differences in research design and methodological approaches. Several previous studies have reported a positive relationship between operational inefficiency and credit risk in the commercial banking sector, including those conducted by Berger and DeYoung (1997), Chaibi and Ftiti (2015), and Barra and Ruggiero (2023). However, these studies were conducted primarily in highly competitive commercial banking environments. In contrast, the present study focuses on Regional Development Banks (RDBs), which operate under a dual mandate of pursuing both commercial objectives and regional development goals. This institutional distinction may intensify the adverse effect of operational inefficiency on credit quality because lending decisions in RDBs are influenced not only by commercial considerations but also by regional development priorities. Differences in research findings may also arise from variations in research design. Several previous studies employed cross-sectional data or relatively short observation periods, whereas this study utilizes seven years of panel data. Panel data analysis is more effective in controlling for unobserved heterogeneity and capturing changes over time, thereby producing more reliable and efficient parameter estimates. Furthermore, differences in variable measurement may also contribute to inconsistent empirical findings. For example, profitability has been measured using return on assets (ROA), return on equity (ROE), or net interest margin (NIM) in previous studies, each of which reflects a different dimension of bank performance. These methodological differences suggest that inconsistencies in empirical findings should be interpreted as the result of contextual and methodological variations rather than as contradictory evidence. Accordingly, this study contributes to the existing literature by demonstrating that the determinants of credit risk depend not only on institutional characteristics but also on methodological choices, including sample selection, variable measurement, and econometric model specification.

f. Managerial Implications

The findings of this study provide several practical implications for the management of Regional Development Banks (RDBs). First, because operational inefficiency significantly increases credit risk, bank management should prioritize initiatives aimed at improving operational efficiency and optimizing business processes. These initiatives may include the digitalization of credit application processes, the automation of loan monitoring systems, the implementation of data-driven credit scoring models, the elimination of redundant operational activities, and the integration of risk management information systems across business units. Second, efforts to improve profitability should emphasize long-term sustainability rather than excessive risk-taking. Management can strengthen profitability by improving asset utilization, diversifying revenue sources through fee-based services, enhancing portfolio diversification, and increasing the recovery rate of non-performing loans. In addition, strengthening early warning systems and credit monitoring procedures can simultaneously improve profitability while reducing credit risk. Third, although independent commissioners do not exhibit a significant moderating effect, their direct governance role remains essential. Regional Development Banks (RDBs) should strengthen board effectiveness by implementing competency-based appointment processes for independent commissioners, providing regular corporate governance training, appointing commissioners with expertise in banking and risk management, and establishing specialized board committees responsible for risk oversight. Furthermore, greater board diversity in terms of professional background, industry experience, and technical expertise may further enhance the quality of strategic supervision and corporate risk governance. Collectively, these initiatives would enable governance mechanisms to contribute more effectively to credit risk management, even though the moderating role of independent commissioners was not statistically significant in this study.

V. Conclusion

This study concludes that credit risk in Indonesian Regional Development Banks (RDBs) is primarily influenced by the quality of internal management and the effectiveness of corporate governance. Operational inefficiency increases credit risk, indicating that poor cost efficiency heightens the likelihood of deteriorating loan quality. In contrast, profitability reduces credit risk, suggesting that stronger earnings reflect more effective asset management and greater risk management capacity. Independent commissioners also contribute to reducing credit risk by strengthening board oversight and managerial discipline. However, independent commissioners do not moderate the effects of operational inefficiency or profitability on credit risk. This finding suggests that, within Regional Development Banks, independent commissioners function more effectively as a direct governance mechanism than as a moderating mechanism linking internal bank conditions to credit risk. This study offers several theoretical contributions to the banking governance literature. First, the positive effect of operational inefficiency on credit risk reinforces the bad management hypothesis by confirming that weak managerial efficiency and inadequate internal controls increase credit risk. Second, the negative effect of profitability on credit risk supports the view that profitability reflects not only financial performance but also managerial quality and the effectiveness of internal risk management. Third, the negative effect of independent commissioners on credit risk supports both Agency Theory and Resource Dependence Theory by demonstrating that board independence strengthens monitoring effectiveness and enhances governance quality in credit risk management. However, the insignificant moderating role of independent commissioners extends these theoretical perspectives by indicating that, in Regional Development Banks, board independence is more effective as a direct monitoring mechanism than as a strategic governance mechanism capable of altering the relationships between internal bank conditions and credit risk. From a practical perspective, these findings provide important implications for both bank management and regulators. For bank management, effective credit risk management should not rely solely on prudent lending policies but should also emphasize greater operational efficiency, sustainable profitability, and stronger internal oversight. For Regional Development Banks, improving cost efficiency, accelerating the digitalization of business processes, and strengthening credit management practices are essential for maintaining loan quality. For regulators, particularly the Financial Services Authority (OJK), the findings underscore the importance of strengthening governance in Regional Development Banks beyond mere compliance with board independence requirements by emphasizing board competence, substantive independence, and the effectiveness of oversight functions. Accordingly, effective credit risk management in Regional Development Banks requires an integrated approach that combines sound internal management, sustainable profitability, and high-quality corporate governance.

Future research should extend the present study in several directions. First, future studies may incorporate emerging determinants of banking stability, including Environmental, Social, and Governance (ESG) performance, digital transformation capability, financial technology (fintech)

ISSN [Online]: 2776-6780

adoption, cybersecurity readiness, and organizational innovation. Second, future research may employ more advanced analytical approaches, such as the Dynamic Panel Generalized Method of Moments (GMM), Panel Vector Autoregression (PVAR), Structural Equation Modeling (SEM), or multilevel analysis, to address potential endogeneity issues and capture more complex causal relationships. Third, comparative studies involving Regional Development Banks, state-owned banks, private commercial banks, and Islamic banks would provide deeper insights into how different institutional environments shape credit risk behavior. Finally, future research should move beyond structural governance indicators by examining qualitative dimensions of board effectiveness, including commissioners' expertise, board diversity, meeting frequency, committee effectiveness, and risk governance capabilities. Overall, this study demonstrates that operational efficiency and profitability remain key determinants of credit risk in Regional Development Banks. More importantly, the findings indicate that governance effectiveness cannot be fully assessed solely through structural governance indicators. Instead, future governance reforms should emphasize enhancing the substantive quality, professional expertise, and strategic influence of independent commissioners to strengthen the resilience and long-term sustainability of Regional Development Banks.

References

Abdelaziz, H., Rim, B., & Helmi, H. (2022). The Interactional Relationships Between Credit Risk, Liquidity Risk and Bank Profitability in MENA Region. Global Business Review, 23(3), 561–583. https://doi.org/https://doi.org/10.1177/0972150919879304

Akhter, N. (2023). Determinants of commercial bank's non-performing loans in Bangladesh: An empirical evidence. Cogent Economics & Finance, 11(1), 2194128. https://doi.org/https://doi.org/10.1080/23322039.2023.2194128

Arnanto, T. T., & Lutfi, L. (2025). Internal Financial Determinants of Profitability: Evidence From Rural Banks in Indonesia. Golden Ratio of Finance Management, 5(2), 573–586. https://doi.org/https://doi.org/10.52970/grfm.v5i2.1605

Barra, C., & Ruggiero, N. (2023). Bank-specific factors and credit risk: evidence from Italian banks in different local markets. Journal of Financial Regulation and Compliance, 31(3), 316–350. https://doi.org/https://doi.org/10.1108/JFRC-04-2022-0051

Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. Journal of Banking & Finance, 21(6), 849–870. https://doi.org/https://doi.org/10.1016/S0378-4266(97)00003-4

Bsoul, R., Milhem, M., & Odat, M. (2022). Determinants of banks' credit risk: Evidence from Jordanian banks listed on Amman Stock Exchange. Academic Journal of Interdisciplinary Studies, 11(5), 197–209. https://doi.org/https://doi.org/10.36941/ajis-2022-0137

Chaibi, H., & Ftiti, Z. (2015). Credit risk determinants: Evidence from a cross-country study. Research in International Business and Finance, 33, 1–16. https://doi.org/https://doi.org/10.1016/S0378-4266(97)00003-4

Chen, Z. (2020). Does independent industry expertise improve board effectiveness? Evidence from bank CEO turnovers. International Review of Finance, 20(3), 665–699. https://doi.org/https://doi.org/10.36941/ajis-2022-0137

DebraH, E., Preko, A., & Ampadu, S. (2022). Examining the effect of board size on credit risk of universal banks in Ghana. Cogent Business & Management, 9(1). https://doi.org/https://doi.org/10.1080/23311975.2022.2157100

Ebenezer, O. O., & Omar, W. A. W. (2015). The Empirical Effects of Credit Risk on Profitability of Commercial Banks: Evidence from Nigeria. International Journal of Science and Research (IJSR), 5(8), 1645–1650. https://doi.org/https://doi.org/10.21275/ART2016315

Fitriani, F., Yusuf, M., & Maksar, M. S. (2025). Evolution and Determinants of Non-Performing Loan Burden in The Group of Seven (G7) Banking Sector. Golden Ratio of Finance Management, 5(2), 372–385. https://doi.org/https://doi.org/10.52970/grfm.v5i2.1211

Fransiska, W., & Ismanto, H. (2025). Determinan Risiko Kredit Bank Umum di Indonesia. REVITALISASI: Jurnal Ilmu Manajemen, 14(1), 84–96. https://doi.org/https://doi.org/10.32503/revitalisasi.v14i1.7128

Gujarati, D. N. (2021). Essentials of Econometrics. Sage Publications, 632.

Harkin, S. M., Mare, D. S., & Crook, J. N. (2022). Independence in bank governance structure: Empirical evidence of effects on bank risk and performance. Research in International Business and Finance, 52. https://doi.org/https://doi.org/10.1016/j.ribaf.2019.101177

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource Dependence Theory: A Review. Journal of Management, 35(6), 1404–1427. https://doi.org/https://doi.org/10.1177/0149206309343469

Hunjra, A. I., Hanif, M., Mehmood, R., & Nguyen, L. V. (2021). Diversification, corporate governance, regulation and bank risk-taking. Journal of Financial Reporting and Accounting, 19(1), 92–108. https://doi.org/https://doi.org/10.1108/JFRA-03-2020-0071

Jabbouri, I., & Naili, M. (2019). Determinants of nonperforming loans in emerging markets: evidence from the MENA region. Review of Pacific Basin Financial Markets and Policies, 22(4), 1–33. https://doi.org/https://doi.org/10.1142/S0219091519500267

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. Journal of Financial Economics, 3(4), 305–360. https://doi.org/https://doi.org/10.1016/0304-405X(76)90026-X

Karim, S., Manab, N. A., & Ismail, R. B. (2023). Assessing the governance mechanisms, corporate social responsibility and performance: the moderating effect of board independence. Global Business Review, 24(3), 550–562. https://doi.org/https://doi.org/10.1177/0972150920917773

Kartika, I., Sulistyowati, S., Septiawan, B., & Indriastuti, M. (2022). Corporate governance and non-performing loans: The mediating role of financial performance. Cogent Business & Management, 9(1). https://doi.org/https://doi.org/10.1080/23311975.2022.2126123?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle

Khan, I., & Wang, M. (2021). Evaluating corporate performance and bank productivity in China: the moderating role of independent directors. Sustainability, 13(6). https://doi.org/https://doi.org/10.36941/ajis-2022-0137

Kharabsheh, B. (2019). Determinants of bank credit risk: Empirical evidence from Jordanian commercial banks. Academy of Accounting and Financial Studies Journal, 23(3), 1–12. https://www.abacademies.org/articles/determinants-of-bank-credit-risk-empirical-evidence-from-jordanian-commercial-banks-8197.html

Lu, J., & Boateng, A. (2018). Board composition, monitoring and credit risk: evidence from the UK banking industry. Review of Quantitative Finance and Accounting, 51(4), 1107–1128. https://doi.org/https://doi.org/10.1007/s11156-017-0698-x?urlappend=%3Futm_source%3Dresearchgate.net%26utm_medium%3Darticle

ISSN [Online]: 2776-6780

Misman, F. N., & Bhatti, M. I. (2020). The determinants of credit risk: An evidence from ASEAN and GCC Islamic banks. Journal of Risk and Financial Management, 13(5), 89. https://doi.org/https://doi.org/10.36941/ajis-2022-0137

Mollah, S., Farooque, O., Mobarek, A., & Molyneux, P. (2019). Bank corporate governance and future earnings predictability. Journal of Financial Services Research, 56(3), 369–394. https://doi.org/https://doi.org/10.1007/s10693-019-00307-7

Moussa, F. Ben. (2019). The influence of internal corporate governance on bank credit risk: An empirical analysis for Tunisia. Global Business Review, 20(20), 640–667. https://doi.org/https://doi.org/10.1177/0972150919837078

Naili, M., & Lahrichi, Y. (2022). Banks' credit risk, systematic determinants and specific factors: recent evidence from emerging markets. Heliyon, 8(2). https://doi.org/https://doi.org/10.1016/j.heliyon.2022.e08960

Nikolaidou, E., & Vogiazas, S. D. (2017). Credit risk determinants in Sub-Saharan banking systems: Evidence from five countries and lessons learnt from Central East and South East European countries. Review of Development Finance, 7(1), 52–63. https://doi.org/https://doi.org/10.1016/j.rdf.2017.01.003

Odebode, O. K., Ezi, C. T., & Ishioro, B. O. (2024). Effects of non-performing loans on return on equity of selected commercial banks in Nigeria. World Journal of Advanced Research and Reviews, 21(1), 2599–2608. https://doi.org/10.30574/wjarr.2024.21.1.0194

OJK. (2017). Surat Edaran Otoritas Jasa Keuangan No.14/SEOJK.03/2017 tentang Penilaian Tingkat Kesehatan Bank Umum. Jakarta: Otoritas Jasa Keuangan. https://ojk.go.id/id/kanal/perbankan/regulasi/surat-edaran-ojk/Pages/Surat-Edaran-Otoritas-Jasa-Keuangan-Nomor-14-SEOJK.03-2017.aspx

OJK. (2023). Peraturan Otoritas Jasa Keuangan Nomor 17 Tahun 2023 Tentang Penerapan Tata Kelola Bagi Bank Umum. Jakarta: Otoritas Jasa Keuangan. https://ojk.go.id/id/regulasi/Pages/Penerapan-Tata-Kelola-Bagi-Bank-Umum.aspx

OJK. (2024). Laporan Surveillance Perbankan Indonesia - Triwulan IV 2024. Jakarta: Otoritas Jasa Keuangan. https://ojk.go.id/id/kanal/perbankan/data-dan-statistik/laporan-profil-industri-perbankan/Pages/Laporan-Surveillance-Perbankan-Indonesia---Triwulan-IV-2024.aspx

Pathan, S., & Faff, R. (2013). Does board structure in banks really affect their performance? Journal of Banking & Finance, 37(5), 1573–1589. https://doi.org/https://doi.org/10.1016/j.jbankfin.2012.12.016

Pfeffer, J., & Salancik, G. R. (2015). External control of organizations: Resource dependence perspective. Routledge.

Ramly, Z., & Ramli, N. M. (2022). Board Capital, Board Independence, and Bank Risk-Taking: The Case of a Small Emerging Country. Asia-Pacific Social Science Review, 22(2), 116–135. https://doi.org/https://doi.org/10.59588/2350-8329.1424

Saleh, I., & Afifa, M. A. (2020). The effect of credit risk, liquidity risk and bank capital on bank profitability: Evidence from an emerging market. Cogent Economics & Finance, 8(1). https://doi.org/https://doi.org/10.1080/23322039.2020.1814509

Sekaran, U., & Bougie, R. (2017). Penelitian unruk Bisnis: Pendekatan Pengembangan-Keahlian (6th ed.). Salemba Empat.

Sistiyarini, E., & Poerwanti, R. (2021). Determinan Kredit Bermasalah Pada Bank Devisa Di Indonesia. Jurnal Ekonomi Dan Bisnis, 8(2), 179–187. https://doi.org/https://doi.org/10.34308/eqien.v8i2.251

Wiguna, U. A., Wijaya, D. D., Leon, F. M., & Lestari, H. S. (2025). Faktor Penentu Resiko Kredit Perbankan di Indonesia. Syntax Literate: Jurnal Ilmiah Indonesia, 10(5), 5483–5500. https://doi.org/https://doi.org/10.36418/syntax-literate.v10i5.58753