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The Influence of Credit, Risk, and Efficiency on Profitability with Independent Commissioners' Moderation

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Abstract

This study investigates the determinants of profitability in Indonesia's Regional Development Banks (BPD) by examining the roles of credit distribution, credit risk, operational efficiency, and the proportion of independent commissioners as a moderating variable. Using panel data from 23 BPDs over the 2013–2023 period and employing a quantitative approach with fixed effect panel regression, the analysis finds that the average ROA of BPDs is 1.84% and ROE is 16.64%, both lower than those of non-BPD banks. Results show that Loan to Deposit Ratio (LDR) has a significant positive effect on ROA (coefficient 0.005557; t-value 2.54), with every 1% increase in LDR raising ROA by 0.0056%. Operational efficiency, as measured by POBO, also positively impacts profitability (coefficient 0.053626; t-value 23.17), while a 1% increase in POBO boosts ROA by 0.054%. Non-Performing Loans (NPL) do not significantly affect ROA, but negatively affect ROE. The proportion of independent commissioners (mean 66.32%) has a significant negative effect on ROA (coefficient –0.003460; t-value –2.68), and does not significantly moderate the LDR-ROA relationship. The models have high explanatory power (R^2 = 0.9136 for ROA; R^2 = 0.7767 for ROE). The study concludes that credit distribution and operational efficiency are primary drivers of BPD profitability, but increasing independent commissioners may reduce ROA. It is recommended that BPDs optimize lending, improve efficiency, and refine governance for sustainable performance.

Keywords: Operational Efficiency, Independent Commissioners, Credit, Profitability, Credit Risk

INTRODUCTION

The banking and financial sector plays a pivotal role in advancing Indonesia's economic growth by managing credit, enhancing profitability, and ensuring the implementation of sound corporate governance. As one of the core functions of financial institutions, credit exerts a substantial influence on profitability, which serves as a fundamental indicator for evaluating corporate performance (Otoritas Jasa Keuangan, 2023).

Bank profitability exerts a direct influence on economic stability and growth. Strong financial performance enables banks to expand credit and financial services, thereby stimulating economic activity (Klein and Weill, 2022). The reinvestment of profits into internal operations enhances service quality and lending capacity, fostering a positive cycle between profitability and reinvestment. This dynamic constitutes a fundamental pillar in strengthening the banking sector and advancing broader economic development (Yigermal, 2017).

Profitability constitutes a central component of banking operations and functions as a critical indicator of financial stability and institutional soundness. It carries strategic importance across multiple dimensions, including capital adequacy, economic stability, operational efficiency, and market confidence. In terms of capital adequacy, profitability strengthens the capital base, facilitates the absorption of potential losses, and ensures adherence to regulatory requirements (Kishibayeva et al., 2023).

Table 1. ROA and ROE of Conventional Commercial Banks (BPD and Non-BPD)

Year	ROA		ROE	
	BPD	Non-BPD	BPD	Non-BPD
2021	1,78%	2,02%	26,77%	21,39%
2022	1,85%	2,10%	14,41%	15,39%
2023	1,90%	2,15%	8,74%	23,21%
Mean	1,84%	2,09%	16,64%	19,99%

Source: Indonesian Banking Statistics December 2021-2023 (Financial Services Authority)

Table 1 illustrates that conventional Regional Development Banks (BPD) exhibit weaker profitability performance than conventional non-BPD banks, as reflected in both Return on Assets (ROA) and Return on Equity (ROE). On average, BPD banks record an ROA of only 1.84%, notably lower than the 2.09% achieved by non-BPD banks. Similarly, the ROE of BPD banks is 16.64%, falling short of the 19.99% recorded by non-BPD banks. The disparity became particularly pronounced in 2023, when the ROE of non-BPD banks rose sharply from 15.39% to 23.21%, whereas the ROE of BPD banks declined from 14.41% to 8.74%. Given this persistent underperformance, the present study investigates the determinants of profitability in BPD banks, assessed through ROA and ROE. The analysis focuses on key factors, including credit distribution, credit risk, operational efficiency, and the composition of independent commissioners.

Credit represents the primary source of bank income, particularly through interest generated from loans and advances. Effective credit allocation enhances profitability by enabling firms to optimize financial resources for operational growth and the pursuit of new investment opportunities (Wijayanti & Mardiana, 2020). Empirical evidence consistently demonstrates that credit distribution exerts a significant positive influence on bank profitability. As the principal driver of interest income, credit has been shown to strengthen bank profits and overall financial performance (Kadek, 2022a; Widyawati et al., 2022). Furthermore, Baradwaj et al. (2014) emphasize that although inherently risky, aggressive credit expansion continues to yield short-term profitability gains.

The positive effect of lending on profitability is inseparable from the influence of credit risk (Ben-Ahmed, 2023). Credit risk, commonly measured by Non-Performing Loans (NPL), exerts a negative impact on bank profitability, as elevated NPL levels indicate a rise in problematic loans that diminish interest income and increase credit loss provisions. Empirical studies consistently confirm that NPLs have a significant adverse effect on bank profitability, as they reflect the accumulation of non-performing assets, leading to reduced interest revenues and higher provisioning costs (Abdelaziz et al., 2022) (Ekinci & Poyraz, 2019).

Operational efficiency constitutes a crucial determinant of bank profitability (Wulandari et al., 2016). An increase in the POBO ratio indicates that operating costs consume a greater share of income, thereby reducing efficiency and diminishing profitability. Empirical findings demonstrate that operational efficiency, as reflected by the POBO ratio, has a significant negative effect on bank profitability. A high POBO ratio signals weak cost efficiency, which in turn contributes to a decline in ROA (Amalia & Nugraha, 2021; Wijayanti & Mardiana, 2020). Moreover, Lutfi et al. (2020) and Zhu et al. (2020) highlight that banks capable of effectively managing operational efficiency generally attain higher profitability through improved control of operating expenses. Consequently, enhanced operational efficiency is strongly associated with increased profitability. Financial innovations and efficiency mechanisms play a crucial role in determining profitability through their influence on risk and liquidity. Handini & Brumadyadisty (2025) demonstrate that the perceived adoption of tokenized derivatives significantly enhances market liquidity and pricing efficiency, with liquidity acting as a mediating variable. These

findings underscore that efficiency and risk management are central to achieving sustainable profitability, and governance structures such as independent commissioners are essential to ensure that such innovations contribute positively rather than increase systemic vulnerabilities.

A company, organization, or institution is made up of multiple people, each of whom has different interests (Rhamadona et al., 2023). The presence of independent commissioners positively affects bank profitability by enhancing oversight and mitigating conflicts of interest within the board. Their independence enables objective evaluation of management policies and promotes the transparency necessary to strengthen trust among investors and stakeholders (Indrati & Handayani, 2022). Empirical evidence demonstrates that a greater proportion of independent commissioners improves ROA, ROE, asset management efficiency, and the overall quality of strategic decision-making (Brogi & Lagasio, 2019; Hakimi et al., 2020; Khan & Wang, 2021).

Profitability remains a core metric in the evaluation of banking performance, reflecting the institution's ability to generate sustained earnings from both operational activities and managed assets. The Financial Services Authority (OJK, 2019) conceptualizes profitability as a bank's capability to optimize resource utilization in order to produce consistent income and maintain financial soundness. Numerous empirical investigations have established the pivotal role of profitability, particularly measured through indicators such as Return on Assets (ROA) and Return on Equity (ROE), in reinforcing banking sector stability and resilience (Buchory, 2023; Klein & Weill, 2022; Wulandari et al., 2016).

The academic literature largely centers on commercial and Islamic banking, whereas focused empirical analyses addressing Regional Development Banks (BPDs) remain relatively rare. This limited attention persists despite the distinctive business models, governance mechanisms, and regional mandates that characterize BPDs. Much of the existing research examines credit expansion, operational efficiency, and risk in national commercial banks, frequently neglecting the specific institutional and ownership attributes of BPDs (Mery & Dony, 2021; Wulandari et al., 2016). While corporate governance is a well-explored domain, few studies have systematically included governance variables, particularly the moderating effect of independent commissioners, within the relationship between credit distribution and bank profitability. Research by Buchroy (2023), Brogi and Lagasio (2019), and Khan and Wang (2021) demonstrates that board structure and independence shape banking outcomes, although these works primarily analyze large commercial or cross-border banks rather than regionally governed development banks . This highlights an empirical gap and underscores the imperative for research that addresses the specificities of the BPD context.

Based on these considerations, this study articulates its research agenda around examining the influence of credit, credit risk, and operational efficiency on profitability in Regional Development Banks, while also testing the moderating role of the proportion of independent commissioners. The analysis is structured to determine whether credit distribution, credit risk, and operational efficiency materially affect BPD profitability and to what extent independent commissioners either directly impact or moderate these relationships.

The findings of this research contribute to the extension of corporate governance theory by empirically scrutinizing the interplay between governance practices and financial performance in regional development banking environments, where public ownership and developmental priorities coexist with commercial objectives. Additionally, the study advances financial intermediation theory by elucidating the mechanisms through which credit allocation and efficiency improvements affect profitability.

From a managerial and regulatory perspective, the results provide strategic guidance for BPD leadership in optimizing credit allocation, bolstering operational efficiency, and strengthening the substantive oversight role of independent commissioners. The study's policy implications also inform local governments and regulatory authorities such as OJK in the

refinement of governance frameworks and credit risk management, thereby supporting greater stability and sustainability within the regional financial system.

RESEARCH METHODS

This study employs a quantitative approach to examine the effect of credit on profitability, with the proportion of independent commissioners serving as a moderating variable (Creswell & Creswell, 2018). The population consists of all conventional Regional Development Banks (BPDs) operating in Indonesia. The sampling process applied purposive sampling, a method based on specific criteria to ensure the selection of data most relevant to achieving the research objectives. The sample includes BPDs engaged in conventional banking activities during the period 2013–2023. The data comprise annual financial ratios and the proportion of independent commissioners, obtained from secondary sources such as the annual financial reports of BPDs. These reports were accessed through the official website of the Financial Services Authority (https://www.ojk.go.id) as well as the respective bank websites. Data collection was conducted using documentation techniques by compiling publicly available data from institutional websites. The analysis employed descriptive statistics, panel data regression methods, panel regression estimations, model selection tests (Chow test, Hausman test, and Lagrange Multiplier test), along with hypothesis testing through partial t-tests and simultaneous F-tests.

The research hypothesis is formulated as follows:

H1: Credit has a positive effect on the profitability of regional development banks
H2: Credit risk has a negative effect on the profitability of BPD banks
H3: Operational efficiency has a positive effect on the profitability of BPD banks
H4: Independent commissioners have an effect on the profitability of BPD banks
H5: Independent commissioners strengthen the effect of credit on the profitability of BPD banks

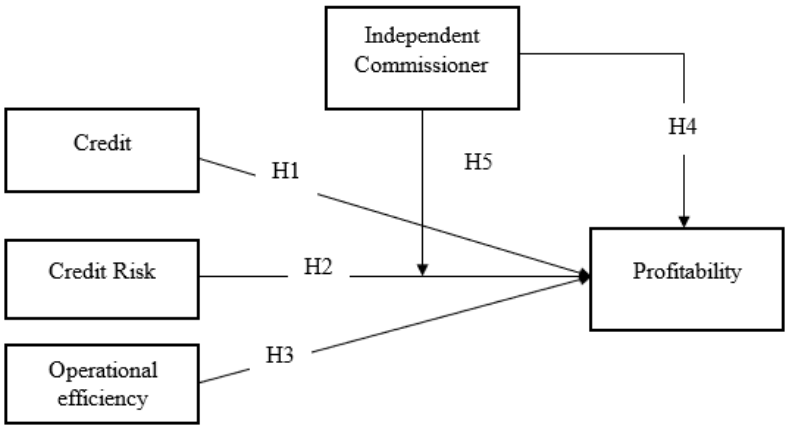

Figure 1. Conceptual Framework

RESULT AND DISCUSSION

Descriptive Statistical Analysis of BPD in Indonesia

Descriptive statistics represent the initial phase of quantitative data analysis, designed to provide an overview of the collected data. This process involves the treatment of both independent and dependent variables through the calculation of measures such as the mean, standard deviation, and range of values for each variable.

Table 2. Descriptive statistical analysis

	ROA	ROE	LDR	NPL	POBO	KIN	ASSETS_MILLION
Mean	2,574625	17,92435	89,88032	2,620237	132,6895	66,31941	26.252.182
Median	2,600000	17,53000	89,88000	2,290000	132,0655	66,66667	16.850.899
Maximum	4,960000	37,51000	128,4300	15,03000	168,0108	100,0000	176.477.958
Minimum	0,010000	-0,360000	49,29000	0,290000	100,4419	0,000000	1.797.346.
Std. Dev.	0,833537	6,557729	12,42528	2,143183	12,15341	17,51689	28.284.078

The average Return on Assets (ROA) of 2.5746 demonstrates that BPDs in Indonesia generally generate adequate profits from their assets. The median value of 2.6000, which is nearly identical to the mean, indicates a symmetrical distribution and the absence of extreme deviations. The highest ROA of 4.9600, recorded by BPD Sulawesi Selatan dan Barat, reflects strong efficiency and optimal asset management, while the lowest value of 0.0100, observed in BPD Maluku dan Maluku Utara, indicates very weak profitability that may be associated with efficiency problems or poor credit quality. A standard deviation of 0.8335 suggests low to moderate variability in ROA, implying that differences in profitability across BPDs remain within reasonable limits.

The average Return on Equity (ROE) of 17.9244 indicates that, overall, BPDs provide relatively high returns to shareholders. The median of 17.5300, which is close to the average, reflects a balanced distribution without major distortions. The maximum ROE of 37.5100, achieved by Bank Bengkulu, highlights strong profit generation from equity, likely driven by operational efficiency (BOPO below 70% or POBO around 140%) and effective risk management (NPL averaging 0.4%). In contrast, the minimum ROE of –0.3600 in Bank Maluku dan Maluku Utara signifies losses and profitability pressures. The standard deviation of 6.5577 reveals substantial variation across banks, pointing to significant differences in equity management and profitability strategies.

The Loan to Deposit Ratio (LDR) averaged 89.8803, suggesting that BPDs, in general, effectively utilised third-party funds for credit disbursement. The median value of 89.8800, identical to the average, signals symmetrical distribution and consistent intermediation practices. The highest LDR of 128.4300, recorded by BPD Sulawesi Tengah, illustrates aggressive credit expansion that exceeded mobilised deposits, thereby increasing liquidity risk. Conversely, the lowest LDR of 49.2900, observed in BPD Kalimantan Timur dan Utara, demonstrates a conservative approach that may limit net interest margins and intermediation efficiency. The standard deviation of 12.4253 indicates moderate variability in credit disbursement strategies among BPDs.

The Non-Performing Loan (NPL) ratio averaged 2.6202, showing that BPDs were generally able to maintain loan quality within acceptable regulatory limits, as the figure remained below the 5% threshold. The median of 2.2900, slightly lower than the average, suggests that most BPDs performed better than the mean, though some extreme cases pushed the average upward. The maximum NPL of 15.0300, recorded by BPD Papua, indicates severe issues in credit risk management and loan recovery. By contrast, the minimum NPL of 0.2900 in BPD Kalimantan Tengah demonstrates excellent asset quality management. The standard deviation of 2.1432 reveals considerable disparities in credit quality, reflecting differences in risk management capabilities and regional economic contexts.

The average POBO ratio (Operating Income to Operating Expenses) was 132.6895, confirming that BPDs generally generated higher operating income than operating expenses, indicating efficient operations at the industry level. The median value of 132.0655, close to the mean, highlights a symmetrical distribution and balanced efficiency performance. The maximum POBO of 168.0108, recorded by BPD Kalimantan Tengah, shows very high efficiency, whereas the minimum of 100.4419 in BPD Maluku dan Maluku Utara indicates the lowest efficiency, close to breakeven. The standard deviation of 12.1534 indicates low to moderate variability in operational efficiency, suggesting manageable differences across BPDs.

The proportion of Independent Commissioners (KIN) averaged 66.32%, showing general compliance with OJK's minimum requirement of 50%. The median of 66% reflects a relatively uniform distribution across banks. The maximum of 100% suggests that some BPDs relied entirely on independent commissioners, potentially enhancing oversight and decision-making objectivity. The minimum of 0%, observed in BPD Papua during 2016–2017, demonstrates non-compliance with governance requirements and highlights governance weaknesses that could increase decision-making risks. The standard deviation of 17.5169 indicates moderate variation in the implementation of board independence across BPDs, influenced by ownership structures and governance policies.

The total assets of BPDs averaged IDR 26,252,182 million, with a median of IDR 16,850,899 million. Bank Jawa Barat dan Banten (Bank BJB) reported the highest assets at IDR 176,477,958 million, reflecting its status as one of the largest BPDs. In contrast, the lowest value of IDR 1,797,346 million was likely recorded by Bank Maluku dan Maluku Utara or Bank Bengkulu. The standard deviation of IDR 28,284,078 million highlights substantial disparities in asset size among BPDs in Indonesia.

Model Selection Test

To determine the most suitable model for managing panel data, researchers must conduct a series of statistical tests. The Chow test is first employed to compare the accuracy of the Common Effect Model and the Fixed Effect Model. Subsequently, the Hausman test is applied to evaluate whether the Fixed Effect Model or the Random Effect Model provides a more appropriate specification. Finally, the Lagrange Multiplier test is used to assess whether the Random Effect Model offers greater suitability than the Common Effect Model.

Table 3. Results of ROA Model Selection Test

Test Type	Test Purpose	Test Statistics	p-value	Decision
Chow Test	Determining whether the Fixed Effect model is more appropriate than the Common Effect model	F = 7,643725, Chi-square = 141,204666	0,0000	Reject H0 → Use Fixed Effect Model
Hausman Test	Determining whether the Random Effect model is more appropriate than the Fixed Effect model	Chi-square = 54.019724	0,0000	Reject H0 → Use Fixed Effect Model
Lagrange Multiplier Test	Determining whether the Random Effect model is more appropriate than the Common Effect model	Breusch-Pagan: Cross-section = 37,35407, Time = 103,9908, Both = 141,3449	Cross-section = 0,0000, Time = 0,0000, Both = 0,0000	Reject H0 → Use Fixed Effect Model

The test results reported an F-value of 7.643725 and a Chi-square value of 141.204666 with a significance level of 0.0000. These findings led to the rejection of the null hypothesis, indicating that the Fixed Effect (FE) model is more appropriate than the Common Effect (CE) model. This outcome demonstrates the presence of significant cross-sectional differences among BPDs, thereby necessitating a model capable of capturing the unique characteristics of each entity through the inclusion of specific effects.

The Hausman test was subsequently employed to determine the more suitable model between the Fixed Effect (FE) and Random Effect (RE) specifications. The results yielded a Chi-square value of 54.019724 with a p-value of 0.0000, leading to the rejection of the null hypothesis and supporting the FE model as the more appropriate choice. This suggests that the heterogeneity among BPDs is not random but instead correlated with the independent variables in the model, thereby violating the basic assumptions of the RE model and reinforcing the suitability of the FE approach.

The Lagrange Multiplier (LM) test was also conducted to compare the Random Effect (RE) model with the Common Effect (CE) model. The Breusch-Pagan LM test produced values of 37.35407 for cross-section, 103.9908 for time, and 141.3449 for the combined dimensions, all with significance levels of 0.0000. These results indicate that the RE model provides a better fit than the CE model. Nevertheless, the earlier tests demonstrated that the FE model generated more valid estimates, leading to the exclusion of the RE model as the primary specification.

Taken together, the results of all three tests consistently confirmed that the Fixed Effect model represents the most appropriate approach for analysing the determinants of Return on Assets (ROA) in Regional Development Banks (BPDs) during the period 2013–2023.

ROA Panel Data Regression Test

Rawls' theory of justice, particularly the notion of "justice as fairness," offers a philosophical foundation for critiquing Indonesia's remission framework. Rawls argues that social and legal institutions must uphold equal basic liberties and permit inequalities only when they serve the interests of the least advantaged members of society (Sari, 2020). Denying remission to drug offenders who have demonstrated genuine behavioral improvement contravenes this principle, as it disadvantages a specific group without clear evidence that such harm produces broader societal benefits. Furthermore, the policy deepens social inequality, given that most drug offenders originate from economically marginalized backgrounds.

Panel data represents a combination of time series and cross-sectional observations within a defined period. This method integrates the characteristics of both data types, allowing for more comprehensive analysis (Gujarati & Porter, 2021). Based on the panel data regression model estimated using EViews software and supported by structured testing, the Fixed Effect model was identified as the most appropriate specification for this study. The selection reflects the alignment of the model with the inherent characteristics of the data employed.

Table 4. Panel Data Regression Analysis (ROA) – Without Moderation and with Moderation KIN

Panel Data Regression Analysis (ROA) – Without Moderation					
Variable	**Coefficient**	**S.E.**	**t-count**	**t-table**	**Conclusion**
Constanta	13,85424	2,003985	6,913346		
LDR	0,005557	0,002191	2,536819	1,653	Significantly positive
NPL	-0,009500	0,012916	-0,735471	+/-1,972	Not significant
POBO	0,053626	0,002314	23,17171	1,653	Significantly positive
KIN	-0,003460	0,001290	-2,681619	+/-1,972	Significantly negative
UKR	-0,611384	0,058801	-10,39755	+/-1,972	Significantly negative
R-square	0,913633				
F-statistic	88,15458				
Prob(F-statistic)	0,000000				Significant
Regression Analysis of ROA with KIN Moderation					
Variable	**Coefficient**	**S.E.**	**t-count**	**t-table**	**Conclusion**
Constanta	14,04310	2,052122	6,843208		
LDR	0,005396	0,002224	2,426233	1,653	Significantly positive
NPL	-0,014769	0,017557	-0,841220	+/-1,972	Not significant
POBO	0,053568	0,002322	23,06920	1,653	Significantly positive
KIN	-0,003887	0,001612	-2,411995	+/-1,972	Significantly negative
UKR	-0,616180	0,059888	-10,28894	+/-1,972	Significantly negative
KIN*LDR	0,000130	0,000293	0,444069	+/-1,972	Not significant
R-square	0,913709				
F-statistic	84,70994				
Prob(F-statistic)	0,000000				

Based on Table 4, the regression equation model for ROA without moderation and with KIN Moderation are as follows.

Formula without moderation:

$$ROA = 13{,}85424 + 0{,}005557LDR_{it} - 0{,}009500NPL_{it} + 0{,}053626POBO_{it} - 0{,}003460KIN_{it} - 0{,}611384UKR_{it}$$

The interpretation of the panel data regression equation can be explained as follows. The constant value of 13.85424 indicates that when all independent variables are zero, the Return on Assets (ROA) is estimated at 13.85424%. The Loan to Deposit Ratio (LDR) variable shows a regression coefficient of 0.005557 with a t-value of 2.54, exceeding the critical value of 1.653, which confirms a positive and significant relationship with ROA. This result suggests that an increase in the proportion of loans to third-party funds significantly improves profitability, where every 1% increase in LDR raises ROA by 0.0056%.

The Non-Performing Loan (NPL) variable has a coefficient of –0.009500 with a t-value of –0.735, which is statistically insignificant, indicating that non-performing loans do not exert a significant impact on ROA in this model. In contrast, the POBO variable records a coefficient of 0.053626 with a highly significant t-statistic of 23.17, demonstrating that improvements in operational efficiency strongly enhance ROA. A 1% increase in POBO is associated with a 0.054% rise in profitability, confirming POBO as the most influential determinant of bank performance.

The Independent Commissioners (KIN) variable shows a negative coefficient of –0.003460 with a statistically significant t-value of –2.68, indicating that an increase in the proportion of independent commissioners reduces ROA. Specifically, every 1% rise in KIN decreases ROA by 0.0035%. Similarly, the Bank Size variable (UKR = LnTA) records a negative coefficient of –0.611384 with a t-value of –10.40, suggesting that larger bank size tends to lower profitability, where each 1% increase in total assets reduces ROA by 0.61%.

The coefficient of determination (R^2) of 0.9136 shows that 91.36% of the variation in ROA is explained by LDR, NPL, POBO, KIN, and UKR, while the remaining 8.64% is influenced by other factors not included in the model. This high R^2 demonstrates the strong explanatory power of the regression model. Overall, the analysis reveals that LDR, POBO, KIN, and UKR significantly affect ROA, with POBO being the dominant determinant. Meanwhile, NPL does not significantly influence profitability, suggesting that credit risk management has not yet fully impacted BPD performance. The negative effect of KIN highlights the tension between governance oversight and operational efficiency. Consequently, this model provides a useful basis for formulating policies aimed at enhancing operational efficiency and reinforcing corporate governance to improve the profitability of Regional Development Banks.

Formula with moderation KIN:

$$ROA = 14{,}04310 + 0{,}005396LDR_{it} - 0{,}014769NPL_{it} + 0{,}053568POBO_{it} - 0{,}003887KIN_{it} - 0{,}616180UKR_{it} + 0{,}000130KIN_{it} * LDR_{it}$$

The interpretation of the panel data regression equation can be outlined as follows. The constant (intercept) value of 14.04310, with a t-value of 6.843208, indicates that when all independent variables and interaction terms are equal to zero, the Return on Assets (ROA) is estimated at 14.04%. The Loan to Deposit Ratio (LDR) variable has a coefficient of 0.005396 with a t-value of 2.426233, exceeding the critical t-value of 1.653, confirming a statistically significant positive effect. This implies that every 1% increase in LDR raises ROA by approximately 0.0054%.

The Non-Performing Loan (NPL) variable records a coefficient of –0.014769 with a t-value of –0.841220, which lies within the critical range (±1.972). Although statistically insignificant, the negative sign indicates that higher levels of non-performing loans tend to reduce profitability, even if the effect is not robust in this model. In contrast, the POBO variable demonstrates a strong and highly significant effect on ROA, with a coefficient of 0.053568 and a t-statistic of 23.06920, well above the critical threshold. This suggests that a 1% improvement

in operational efficiency increases ROA by about 0.054%, underscoring POBO as a key determinant of bank profitability.

The Independent Commissioners (KIN) variable presents a coefficient of –0.003887 with a t-value of –2.411995, below the critical value of –1.972, indicating a significant negative relationship with ROA. This finding reveals that a 1% increase in the proportion of independent commissioners reduces ROA by 0.0039%. The interaction term between KIN and LDR (KIN*LDR) yields a coefficient of 0.000130 with a t-value of 0.444069, which falls within the critical range (±1.972), signifying a positive but statistically insignificant moderating effect. Thus, independent commissioners do not significantly alter the relationship between LDR and ROA.

The Bank Size variable (UKR = LnTA) shows a coefficient of –0.616180 with a t-value of –10.28894, well below –1.972, confirming a significant negative effect. This suggests that a 1% increase in bank size, measured through the natural logarithm of total assets, reduces profitability by approximately 0.6162%. The coefficient of determination (R^2) of 0.913709 indicates that 91.37% of the variation in ROA is explained by the variables included in the model, reflecting strong explanatory power.

Overall, the regression results reveal that LDR and POBO exert significant positive effects on ROA, while KIN shows a significant negative impact. The moderating role of KIN on the relationship between LDR and ROA is not statistically significant, suggesting that independent commissioners tend to weaken rather than strengthen the positive effect of LDR on profitability. Meanwhile, NPL does not exhibit a significant effect, and UKR demonstrates a significant negative association with ROA.

Table 4, which presents the ROA model without moderation, reports an F-statistic of 88.15458 with a probability value of 0.000000, signifying that all independent variables collectively make a significant contribution in explaining variations in profitability (ROA). The coefficient of determination (R^2) of 0.913633 demonstrates that the model accounts for 91.36% of the variability in ROA, indicating exceptionally strong predictive power. Similarly, Table 4, which presents the ROA model with moderation, shows an F-statistic of 84.70994 with a probability value of 0.000000, confirming that all independent variables jointly exert a significant influence on ROA. The coefficient of determination (R^2) of 0.913709 reveals that the model explains 91.37% of the variation in ROA, further reflecting a very high level of predictive capability.

The regression results confirm that credit (LDR) significantly increases profitability (ROA) in Regional Development Banks (BPDs), supporting Hypothesis H1, as shown by a positive coefficient of 0.005557 and a t-value of 2.536819. Hypothesis H2 is not supported, since credit risk (NPL) has an insignificant negative effect on profitability (coefficient –0.009500; t-value –0.735471). Hypothesis H3 is strongly supported, with operational efficiency (POBO) significantly boosting ROA (coefficient 0.053626; t-value 23.17171). Hypothesis H4 is validated, indicating that independent commissioners significantly but negatively impact profitability (coefficient –0.003460; t-value –2.681619). However, Hypothesis H5 is not supported; the interaction between LDR and independent commissioners (LDR*KIN) is not significant (coefficient 0.000130; t-value 0.444069). The model's explanatory power is strong, with R^2 values of 0.850 (without moderation) and 0.914 (with moderation), showing that both models effectively account for most variations in ROA.

The results show that Loan to Deposit Ratio (LDR) and operational efficiency (BOPO) significantly and positively influence Return on Assets (ROA), while Independent Commissioners (KIN) and bank size (UKR) have a significant negative effect. Non-Performing Loans (NPL) are not significant in either model. The interaction term KIN*LDR is also insignificant, indicating that KIN does not moderate the LDR-ROA relationship. R^2 remains stable, and the F-statistic, though reduced, remains significant. Thus, while LDR and BOPO

enhance profitability and KIN and UKR diminish it, KIN does not strengthen LDR's effect. Practically, increasing KIN may suppress profitability rather than synergize with LDR, warranting cautious implementation.

Panel Data Regression Test of ROE

Based on the estimation of the panel data regression model using EViews software and the results of the conducted tests, the Fixed Effect model was identified as the most appropriate specification for this study. This choice reflects the alignment of the model with the characteristics of the data employed.

Table 5. Panel Data Regression Analysis (ROE) – Without Moderation and with Moderation KIN

Panel Data Regression Analysis (ROE) – Without Moderation					
Variable	**Coefficient**	**S.E.**	**t-count**	**t-table**	**Conclusion**
Constanta	270,4253	25,35083	10,66732		
LDR	0,052915	0,027711	1,909558	1,653	Significantly positive
NPL	-0,455965	0,163393	-2,790602	+/- 1,972	Significantly negative
POBO	0,316440	0,029276	10,80884	1,653	Significantly positive
KIN	-0,031542	0,016322	-1,932523	+/- 1,972	Not significant
UKR	-9,394488	0,743843	-12,62966	+/- 1,972	Significantly negative
R-square	0,776702				Significant
F-statistic	28,98608				Significantly positive
Prob(F-statistic)	0,000000				
Panel Data Regression Analysis (ROE) – with KIN Moderation					
Variable	**Coefficient**	**S.E.**	**t-count**	**t-table**	**Conclusion**
Constanta	263.5557	25.87659	10.18510		
LDR	0.047067	0.028045	1.678258	1,653	Significantly positive
NPL	-0.264294	0.221382	-1.193837	+/- 1,972	Not significant
POBO	0.318540	0.029280	10.87896	1,653	Significantly positive
KIN	-0.015990	0.020323	-0.786792	+/- 1,972	Not significant
KIN*LDR	-0.004737	0.003698	-1.280986	+/- 1,972	Not significant
UKR	-9.220065	0.755163	-12.20937	+/- 1,972	Significantly negative
R-square	0.778326				
F-statistic	28.08909				
Prob(F-statistic)	0.000000				

The regression estimation results listed in Table 5 use the Fixed Effect Model approach. Based on Table 5, the regression equation model for ROE without moderation and using moderation is as follows.

Formula without moderation:

$$ROE = 270{,}4253 + 0{,}052915LDR_{it} - 0{,}455965NPL_{it} + 0{,}316440POBO_{it} - 0{,}031542KIN_{it} - 9{,}394488UKR_{it}$$

The interpretation of the panel data regression equation is as follows. The constant value of 270.4253 suggests that when all independent variables are set to zero, the Return on Equity (ROE) is projected to reach this level. While mathematically valid, the practical interpretation of this constant is limited, as variables such as the Loan to Deposit Ratio (LDR), Non-Performing Loans (NPL), and the operating efficiency ratio (POBO) cannot realistically assume a value of zero.

The LDR variable records a negative coefficient of –0.052915 with a t-value of 1.91, which exceeds the critical threshold of 1.653, indicating a statistically significant effect. This result implies that a 1% increase in LDR tends to reduce ROE by 0.0529%. The NPL variable shows a coefficient of –0.455965 with a t-value of –2.79, which is below the critical value of ±1.972, confirming a significant negative influence on ROE. Thus, an increase of 1% in NPL is likely to decrease ROE by approximately 0.4560%.

The POBO variable, representing operational efficiency, demonstrates a positive coefficient of 0.316440 with a t-value of 10.80884, far exceeding the critical value of 1.653. This finding indicates a strong positive and statistically significant effect, suggesting that a 1% improvement in POBO increases ROE by 0.3164%. In contrast, the Independent Commissioners (KIN) variable shows a coefficient of –0.031542 with a t-value of –1.932523, which falls within the non-significant range of ±1.972. This implies that a 1% increase in the proportion of independent commissioners decreases ROE by 0.0315%, although the effect is not statistically significant.

The Bank Size variable (UKR = LnTA) records a coefficient of –9.394488 with a t-value of –12.63, well below –1.972, indicating a highly significant negative effect. This suggests that a 1% increase in total assets, measured by the natural logarithm of assets, reduces ROE by 9.3945%. The coefficient of determination (R^2) of 0.7767 shows that the model explains 77.67% of the variation in ROE, reflecting strong explanatory power, while the remaining 22.33% is attributable to factors outside the model.

Overall, the analysis demonstrates that NPL, POBO, KIN, and UKR significantly affect ROE. Among these variables, POBO emerges as the most dominant determinant, underscoring the importance of operational efficiency, although the direction of influence requires further contextualisation within efficiency theory.

Formula with moderation KIN:

$$ROE = 263.5557 + 0.047067LDR_{it} - 0.264294NPL_{it} + 0.318540POBO_{it} - 0.015990KIN_{it} - 9.220065UKR_{it} - 0.004737KIN_{it} * LDR_{it}$$

The interpretation of the panel data regression equation is as follows. The constant value of 263.5557 suggests that when all independent variables are equal to zero, the Return on Equity (ROE) is estimated at 263.56%. While mathematically valid, this result has limited practical meaning, as in the banking industry variables such as LDR, POBO, NPL, and KIN cannot realistically be zero.

The Loan to Deposit Ratio (LDR) variable records a negative coefficient of –0.047067 with a t-value of 1.678258, which exceeds the critical value of 1.653. This finding indicates that a 1% increase in LDR tends to reduce ROE by 0.0471%. The Non-Performing Loan (NPL) variable produces a coefficient of –0.264294 with a t-value of –1.193837, which falls within the non-significant range of ±1.972. Although statistically insignificant, the negative direction of the coefficient suggests that higher levels of non-performing loans are associated with lower ROE, where each 1% increase in NPL tends to reduce ROE by approximately 0.4560%.

The POBO variable, representing operational efficiency, has a positive coefficient of 0.318540 with a t-value of 10.87896, well above the threshold of 1.653. This indicates a highly significant positive effect, suggesting that a 1% increase in POBO improves ROE by 0.3185%. Conversely, the Independent Commissioner (KIN) variable has a coefficient of –0.015990 with a t-value of –0.786792, which lies within the non-significant range of ±1.972. This result shows that a 1% increase in the proportion of independent commissioners reduces ROE by 0.0160%, although the effect is not statistically significant.

The interaction between KIN and LDR (KIN*LDR) produces a coefficient of –0.004737 with a t-value of –1.280986, which also falls within the non-significant range of ±1.972. This indicates that independent commissioners do not significantly moderate the effect of LDR on ROE. The Bank Size variable (UKR = LnTA) shows a coefficient of –9.220065 with a t-value of –12.20937, far below –1.972, confirming a highly significant negative relationship. This suggests that a 1% increase in total assets, measured through the natural logarithm of assets, reduces ROE by approximately 9.2200%.

Table 5, which presents the ROE model without moderation, reports an F-statistic of 28.98608 with a probability value of 0.000000, indicating that all independent variables collectively make a significant contribution to explaining variations in profitability (ROE). The coefficient of determination (R^2) of 0.776702 shows that the model accounts for 77.67% of the variation in ROE, demonstrating very strong predictive power. Similarly, the ROE model with moderation, also presented in Table 5, records an F-statistic of 28.08909 with a probability value of 0.000000, confirming that all independent variables simultaneously have a substantial influence on profitability. The coefficient of determination (R^2) of 0.778326 indicates that the model explains 77.83% of the variation in ROE, further reflecting its very high predictive capability.

The regression results confirm that the Loan to Deposit Ratio (LDR) significantly and positively affects Return on Equity (ROE), supporting Hypothesis H1 (coefficient = 0.052915; t-value = 1.909558). Non-Performing Loans (NPL) have a significant negative effect on ROE, validating Hypothesis H2 (coefficient = –0.455965; t-value = –2.790602). Operational efficiency (POBO) strongly supports Hypothesis H3, showing a significant positive impact on ROE (coefficient = 0.316440; t-value = 10.80884). Hypothesis H4 is not supported, as independent commissioners (KIN) show an insignificant negative effect on ROE (coefficient = –0.031542; t-value = –1.932523). Similarly, Hypothesis H5 is rejected, with the interaction term (LDR*KIN) also showing an insignificant negative effect (coefficient = –0.004737; t-value = –1.280986). The models exhibit strong explanatory power, with R^2 values of 0.776702 (without moderation) and 0.778326 (with moderation), explaining about 77.67% and 77.8% of the variation in ROE, respectively.

The KIN variable, representing management performance, was statistically insignificant in both models and further weakened with moderation. The UKR variable, indicating firm size, consistently showed a significant negative impact on ROE, suggesting larger firms have lower profit efficiency. The interaction term KIN*LDR was also insignificant, indicating KIN does not moderate the LDR-ROE relationship. Although the R^2 slightly increased from 0.7767 to 0.7783 with moderation, the 0.16% gain is substantively negligible. The F-statistic remained significant despite a slight decline. Overall, LDR, POBO, and UKR significantly influenced ROE, with POBO as the most dominant. NPL's effect vanished post-moderation, and KIN's impact further declined, reaffirming that KIN is not a moderator.

This research establishes that credit policy and operational efficiency function as central determinants of profitability in regional development banks. The demonstrated significant positive relationship between the Loan to Deposit Ratio and operational efficiency with profitability underscores the necessity of optimizing both intermediation processes and cost management within regional banking. These results indicate that robust credit allocation and

efficient operational management represent fundamental strategies for enhancing the competitive position of BPDs in an increasingly challenging market landscape.

The analysis also exposes ongoing challenges in credit risk management and corporate governance. The absence of a significant impact of non-performing loans on return on assets suggests that BPDs retain opportunities to improve risk mitigation practices, and that their financial performance does not yet fully account for default risk exposure. In contrast, the negative association between the proportion of independent commissioners and profitability reveals a tension between oversight objectives and operational efficiency. This finding points to the need for reconfiguring the role of independent commissioners so that their involvement supports, rather than impedes, optimal financial outcomes.

The strategic implications of these findings extend to both BPD management and regulatory authorities. For management, the evidence calls for sustained improvements in operational efficiency, credit quality, and a realignment of supervisory functions with organizational objectives. Regulatory compliance, in terms of independent commissioner appointments, must be accompanied by relevant competence, professional experience, and integrity to ensure effective governance and strategic oversight.

For regulators, including the Financial Services Authority, these results highlight the importance of establishing clear recruitment standards, robust performance evaluation protocols, and targeted training for independent commissioners. Flexible regulation and risk-based supervisory frameworks are critical to maintaining the stability of regional financial systems and preventing oversight roles from becoming ceremonial.

On a theoretical level, this study expands the literature on corporate governance by illustrating the limited moderating effect of independent commissioners in the regional development bank context, while reinforcing the pivotal role of operational efficiency as a driver of bank profitability.

As BPDs look forward, these insights provide an essential reference for redefining business strategies. Prioritizing high-quality credit expansion, cost efficiency, and adaptive, professional governance should form the core agenda. Advancements in digital transformation, investment in human capital, and meritocratic supervisory appointments are imperative for enabling BPDs to make more substantial contributions to both regional and national economic progress.

CONCLUSION

The analysis confirms that Regional Development Banks (BPD) in Indonesia remain less profitable than non-BPD banks. The average Return on Assets (ROA) for BPDs is 1.84%, while their average Return on Equity (ROE) is 16.64%. In contrast, non-BPD banks achieve an ROA of 2.09% and an ROE of 19.99%. The disparity widened significantly in 2023, as BPDs experienced a steep decline in ROE from 14.41% to 8.74%, whereas non-BPD banks saw an increase in ROE from 15.39% to 23.21%.

Panel data regression covering 23 BPDs from 2013 to 2023 indicates that the average Loan to Deposit Ratio (LDR) stands at 89.88%, with LDR exerting a statistically significant positive effect on both ROA (coefficient 0.005557; t-value 2.54) and ROE. Each 1% rise in LDR is associated with a 0.0056% increase in ROA. Operational efficiency, as measured by POBO, also plays a central role in driving profitability. The ROA model yields a coefficient of 0.053626 (t-value 23.17), showing that a 1% improvement in POBO may result in a 0.054% increase in ROA. The Non-Performing Loan (NPL) ratio, with a mean of 2.62%, does not significantly influence ROA (coefficient –0.009500; t-value –0.735) but has a significantly negative impact on

ROE (coefficient –0.455965; t-value –2.79). These findings indicate that credit risk is not yet fully incorporated into asset performance, although it does affect equity.

The proportion of independent commissioners (KIN) averages 66.32% and has a significant negative effect on ROA (coefficient –0.003460; t-value –2.68) but does not significantly affect ROE. Each 1% increase in KIN reduces ROA by 0.0035%. Furthermore, KIN does not significantly moderate the effect of LDR on profitability for either ROA (interaction coefficient 0.000130; t-value 0.44) or ROE. Bank size (UKR) demonstrates a consistently negative and significant relationship with profitability; a 1% increase in total assets leads to a 0.61% reduction in ROA and an approximately 9.39% reduction in ROE.

The regression models display strong explanatory power, with coefficients of determination (R^2) of 0.9136 for ROA and 0.7767 for ROE, meaning that the variables analyzed account for 77% to 91% of the variance in BPD profitability.

To enhance BPD profitability, institutions should prioritize the optimization of credit distribution and improvements in operational efficiency. It is also essential to redefine the role and qualifications of independent commissioners to ensure they contribute effectively to organizational performance without creating structural impediments. Continued enhancements in credit risk and asset management, along with adjustments to bank scale, are necessary to achieve superior efficiency and profitability.

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