

The Effect of Bank Soundness Based on Risk-Based Bank Rating on Banking Financial Performance: An Empirical Study of IDX-IC Listed Banking Stocks on the Indonesia Stock Exchange, 2020-2024

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Abstract - This study analyzes the effect of bank soundness, measured through the Risk-Based Bank Rating (RBBR) approach, on the financial performance of banking companies listed on the Indonesia Stock Exchange. RBBR is represented by liquidity risk, credit risk, operational risk, good corporate governance, market-related profitability, and capital adequacy, while financial performance is proxied by Return on Assets (ROA). The study applies a quantitative causal design using secondary annual-report data from 14 banking companies observed during 2020-2024, producing 70 firm-year observations. Panel data regression is employed with model selection tests and robust standard errors to address heteroskedasticity. The empirical results show that the independent variables jointly have a significant effect on ROA. Partially, the operating expenses to operating income ratio (BOPO) has a negative and significant effect on ROA, whereas the independent commissioner ratio has a positive and significant effect. Loan to Deposit Ratio, Non-Performing Loan, Net Interest Margin, and Capital Adequacy Ratio are not statistically significant. These findings imply that operational efficiency and independent governance are more decisive for bank profitability than liquidity, credit risk, interest margin, or capital adequacy within the observed period.

Keywords - Bank Health, Banking, Capital Adequacy Ratio, Financial Performance, Good Corporate Governance, Risk-Based Bank Rating, Return on Assets.

I. INTRODUCTION

The banking sector plays a strategic intermediation role by collecting funds from the public and distributing them to productive sectors. Because of this role, bank soundness is not merely an internal managerial concern but also a public-interest issue related to financial-system stability [2]. During 2020-2024, Indonesian banking operated amid post-pandemic recovery, global geopolitical tension, commodity-price instability, and tighter financial conditions [1], [3], [4]. These developments have made it even more critical to risk-based bank soundness assessment and continuous profitability monitoring [2], [8]. The risk based approach is formally guided in the assessment of commercial bank soundness in Indonesia. The Risk Based Bank Rating (RBBR) approach consists of four key pillars: Risk Profile, Good Corporate Governance (GCG), Earnings and Capital, which is commonly referred to as the RGEC model [2]. This approach is more extensive than one that is based exclusively on accounting measures as it links the financial measures with the risk management and governance aspects [8] [9].

The Return on Assets (ROA) is a commonly used metric for the financial performance of banking. ROA measures the effectiveness of using assets to generate earnings [4] [8]. Profitable banks tend to be more resilient in sustaining public trust, fortifying financial resilience and enabling sustainable intermediation [3], [4]. However, high ROA is not necessarily achieved by combining high capital, good liquidity, and high interest margin if the operating cost,

governance quality, and asset quality are not well managed [8],[10]. The study is based on the theories of signaling and agency theories. A signaling perspective of a sound RBBR profile gives information to investors, depositors and regulators about a bank's risk-control capacity and business resilience [5]. At the agency level, governance mechanisms, especially independent oversight, minimize managerial opportunism, and contribute to aligning managerial decisions with shareholder and stakeholder interests [6,11]. Therefore, RBBR indicators are expected to explain variation in ROA.

Prior studies report mixed evidence regarding the effect of RBBR indicators on financial performance and firm value. Some findings show significant effects of non-performing loans, net interest margin, operational efficiency, governance, or capital adequacy, while others report weak or insignificant relationships [8], [11]. Evidence on market, operational, liquidity, credit, and capital risk also show that banking profitability is shaped by multiple bank-specific factors rather than a single soundness indicator [12]-[15]. This inconsistency indicates a research gap, especially for the 2020-2024 period after major pandemic-related shocks and regulatory developments. Accordingly, this article examines whether liquidity risk, credit risk, operational risk, GCG, market-related profitability, and capital adequacy affect the ROA of IDX-IC listed banking companies in Indonesia.

II. MATERIALS AND METHODS

A. Research Design, Population, and Sample

This research uses a quantitative causal design. Consistent with empirical banking-performance studies that examine the influence of bank-specific ratios on profitability [8], [10]. The object of analysis is the banking subsector listed on the Indonesia Stock Exchange based on the IDX Industrial Classification (IDX-IC). The observation period covers 2020 to 2024. The final sample consists of 14 banking companies with complete annual-report data, generating 70 firm-year observations. The sampling method is purposive sampling. The main criteria are: the company is classified in the banking subsector, is consistently listed during the observation period, publishes complete annual reports or financial statements, and provides the financial-ratio and governance data required for the RBBR-based analysis [18], [19].

B. Variables and Measurement

The dependent variable is financial performance, proxied by Return on Assets (ROA). The independent variables represent RBBR dimensions: liquidity risk, credit risk, operational risk, good corporate governance, earnings or market-related profitability, and capital adequacy [2], [8], [9].

Table 1. Operational Definition of Variables

Variable	Proxy	Measurement	Expected Link with ROA
Financial performance	ROA	Net income / Total assets x 100%	Dependent variable
Liquidity risk	LDR	Total loans / Third-party funds x 100%	Credit distribution capacity may increase or reduce ROA depending on loan quality
Credit risk	NPL	Non-performing loans / Total loans x 100%	Higher NPL is expected to reduce ROA
Operational risk / efficiency	BOPO	Operating expenses / Operating income x 100%	Higher BOPO is expected to reduce ROA
Good Corporate Governance	ICR	Independent commissioners / Board of commissioners	Higher independent oversight is expected to improve ROA
Earnings / interest margin	NIM	Net interest income / Earning assets x 100%	Higher NIM is expected to improve ROA
Capital	CAR	Capital / Risk-weighted assets x 100%	Higher CAR may strengthen resilience and affect ROA

C. Data Analysis Technique

$$ROA_{it} = \alpha + \beta_1 LDR + \beta_2 NPL + \beta_3 BOPO + \beta_4 ICR + \beta_5 NIM + \beta_6 CAR + \epsilon$$

ROA = Return on Assets

α = Intercept

β = Regression coefficients of the independent variables

<i>LDR</i>	= Loan-to-Deposit Ratio
<i>NPL</i>	= Non-Performing Loan ratio
<i>BOPO</i>	= Operating Expenses to Operating Income ratio
<i>ICR</i>	= Independent Commissioner Ratio
<i>NIM</i>	= Net Interest Margin
<i>CAR</i>	= Capital Adequacy Ratio
ε	= Error term

Model selection is conducted through the Chow test, Hausman test, and Lagrange Multiplier test to compare the Common Effect Model, Fixed Effect Model, and Random Effect Model. Classical assumption tests are then applied. Following standard econometric procedure. The heteroskedasticity test indicates heteroskedasticity; therefore, the final inference uses robust standard errors.

III. RESULTS AND DISCUSSION

A. Descriptive Statistics

Table 2 presents the descriptive statistics for 70 firm-year observations. ROA has an average value of 1.98, indicating that the sampled banks generally generated positive returns on assets. LDR averages 78.32, NPL averages 2.81, BOPO averages 76.34, the independent commissioner ratio averages 0.55, NIM averages 4.95, and CAR averages 24.47. Overall, the descriptive profile indicates that the banks maintained relatively strong capital and manageable credit risk, although operational efficiency varied across banks.

Table 2. Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.	Observations
ROA	1.98	4.22	0.15	1.09	70
LDR	78.32	98.04	32.68	14.35	70
NPL	2.81	7.99	0.97	1.12	70
BOPO	76.34	111.70	41.70	13.45	70
ICR	0.55	0.83	0.25	0.10	70
NIM	4.95	7.70	2.86	1.05	70
CAR	24.47	35.70	5.42	5.44	70

B. Model Selection and Assumption Testing

The model selection results indicate that the Common Effect Model is appropriate for the final regression. The Chow test does not reject the pooled model, and the Lagrange Multiplier test also supports the Common Effect Model. The Hausman test is reported for completeness.

Table 3. Panel Model Selection Summary

Test	Probability	Decision
Chow test	0.4970	Common Effect Model
Hausman test	0.4278	Random Effect Model
Lagrange Multiplier test	0.2913	Common Effect Model
Final model	-	Common Effect Model with robust standard errors

Based on the model selection tests, the Common Effect Model (CEM) was selected because neither the Chow test nor the Lagrange Multiplier test indicated significant individual or random effects across the sampled banks. This suggests that the cross-sectional heterogeneity among the observed banks is relatively limited during the study period. Therefore, the pooled regression model provides the most parsimonious and statistically appropriate specification. To ensure reliable statistical inference, heteroskedasticity detected in the residuals was addressed by applying robust standard errors. The normality test produces a probability value of 0.793759, indicating normally distributed residuals. The multicollinearity test shows that all Variance Inflation Factor values are below 10: LDR 1.368, NPL 1.576, BOPO 1.571, ICR 1.248, NIM 1.150, and CAR 1.248. The heteroskedasticity test indicates heteroskedasticity, while the autocorrelation test produces a probability value of 0.0871, indicating no autocorrelation at the 5% level. Therefore, the regression inference is corrected using robust standard errors.

C. Regression Results

Table 4. Regression Results for ROA

Variable	Coefficient	Probability	Result
Constant	6.792245	0.0000	Significant
LDR	-0.001130	0.8453	Not significant
NPL	-0.045838	0.1749	Not significant
BOPO	-0.071509	0.0001	Negative significant
ICR	1.592421	0.0164	Positive significant
NIM	0.025238	0.3172	Not significant
CAR	-0.005711	0.4297	Not significant
R-squared	0.872089	-	Strong explanatory power
Adjusted R-squared	0.859907	-	85.99% explained variation
F-statistic	71.94997	0.0000	Model significant
Observations	70	-	-

The Adjusted R^2 value of 85.99% indicates that the proposed model has strong explanatory power in predicting variations in bank profitability. This suggests that the combined effect of the RBBR dimensions liquidity risk, credit risk, operational efficiency, corporate governance, earnings, and capital adequacy captures the major internal factors affecting banking performance throughout the study period. These findings also emphasize the practical value of the RBBR framework as a comprehensive instrument for evaluating bank soundness, supporting managerial decision-making, and enhancing regulatory supervision. The simultaneous test shows that all independent variables jointly affect ROA, as indicated by the F-statistic probability of 0.0000. The adjusted R-squared value of 0.859907 means that approximately 85.99 percent of the variation in ROA is explained by LDR, NPL, BOPO, ICR, NIM, and CAR, while the remaining 14.01 percent is explained by factors outside the model.

D. Discussion

Liquidity Risk. The estimation results show that the Loan-to-Deposit Ratio (LDR) has a negative but statistically insignificant relationship with ROA, indicating that liquidity risk did not materially influence bank profitability during the study period. A higher LDR reflects more lending activity and higher interest income but with too much lending can come too much liquidity pressure unless the risk of lending is managed prudently. The insignificant result could be due to the homogeneity of the liquidity positions of the observed banks, because most banks meet the prudential standards issued by OJK during the observation period.

As a result, the variation in LDR was not high enough to explain differences in profitability among banks. This finding is in line with [13] and [21], who also found that liquidity risk was not a significant determinant of profitability under the RBBR framework. Several earlier studies, however, found LDR to be positively associated with profitability, indicating a conditional relationship between LDR and profitability that is related to banks' lending quality, funding structure, and macroeconomic conditions. The results are consistent with those found in international banking literature, in which the tougher the liquidity rules, the more likely banks are to focus on financial stability instead of short-term profit maximization. Signaling Theory sees this as a way of improving the depositor's confidence and accentuating financial strength rather than profitability.

Credit Risk. The empirical findings indicate that Non-Performing Loans (NPL) have a negative but statistically insignificant effect on ROA. The negative coefficient is in line with theory, that deteriorating loan quality decreases profitability, but the results are not statistically significant, meaning that credit risk did not seem to be the main driver of bank performance during the observation period. One reason postulated is that the banks sampled had generally low NPL ratios as a result of effective credit evaluation, loan restructuring, and risk mitigation practices.

As a result, differences in credit quality among banks were relatively small and insufficient to generate meaningful variations in profitability. This result is consistent with [12] and [13], who likewise found that credit risk did not significantly influence the profitability of Indonesian commercial banks. However, this finding differs from studies that reported a significant negative association between NPL and ROA, indicating that the effect of credit risk may vary according to macroeconomic conditions, observation periods, portfolio characteristics, and banks' risk management

policies. There is also mixed evidence from international studies indicating that well-managed credit risk and adequate loan-loss provisioning can help to offset the adverse effects of NPLs on financial performance. So, having a low NPL ratio does not necessarily mean the profitability of a bank can be improved unless it is coupled with efficient use of resources and sustainable loan policies.

Operational Efficiency. The analysis shows that the Operating Expenses to Operating Income (BOPO) ratio is a negative and statistically significant determinant of ROA, meaning that the operating efficiency is the most important determinant of profitability in this study. A higher BOPO ratio suggests a greater percentage of operating income is being absorbed by operating expenses and thus less ability for banks to generate returns from their assets.

This finding highlights the importance of effective cost management in improving financial performance regardless of banks' liquidity or capital positions. The finding is consistent with [12] and [22] which found operational efficiency as one of the main contributors to profitability in the RBBR framework. Similar results are also found in international banking literature: effective cost control is consistently linked to a higher level of competitiveness and a more sustainable financial performance. The results support the efficiency hypothesis, which states that banks with a more efficient use of their resources are more likely to achieve high and stable profitability.

Good Corporate Governance. The independent commissioner ratio has a positive and statistically significant effect on ROA, indicating that stronger governance practices contribute positively to bank profitability. The more independent commissioners on the Board, the more effective the oversight, the better the internal control, the more effective the managerial accountability, the less agency conflicts, and the more effective the strategic decision-making.

This result corroborates [11] and [10] who reported that good corporate governance would positively affect bank performance through strengthening the supervisory function. The same conclusions have been reached in international studies, which find a positive relation between board independence and transparency, agency costs, and organizational performance. The results confirm Agency Theory, which theorizes that a proper monitoring mechanism can ensure that management decisions are aligned with shareholders' goals and that, in the end, it will lead to better firm performance.

Net Interest Margin. The regression results show that Net Interest Margin (NIM) has a positive but statistically insignificant effect on ROA, indicating that interest income alone was insufficient to explain differences in bank profitability. A higher NIM is an indicator of better income from banking operations, but the commercial banks in Indonesia have been broadening their revenue streams by offering more fee-based services, digital banking and other sources of non-interest income. This means that only the interest margins are not the sole measure of profitability.

Furthermore, the NIMs of the sampled banks did not vary significantly enough to establish a statistically significant relationship with ROA. This finding is consistent with [21], who also reported that the earnings dimension of the RBBR framework did not significantly affect financial performance. Conversely, several previous studies found a significant positive relationship between NIM and profitability, suggesting that the contribution of interest margins depends on interest-rate movements, competitive market conditions, and banks' income diversification strategies. Global data also shows that the steady income stream is becoming more dependent on alternative sources of income and efficiency.

Capital Adequacy. The results show that Capital Adequacy Ratio (CAR) negatively but not significantly affects ROA, which means that capital adequacy is used mainly as a precautionary measure rather than as a direct source of profitability. In the period of study, the CAR level of most of the sampled banks remained significantly high from the minimum level set by OJK, so that the differences among banks during the study period were relatively small.

Therefore, the variations in the profitability could not be attributed solely to the difference in capital adequacy ratio. Also, the holding of high levels of capital reserves with no commensurate level of asset utilization efficiency could limit short-term financial returns and asset utilization efficiency. This result is similar to that of [21] which also concluded that the capital adequacy was not found to have a significant impact on profitability of banks under RBBR framework.

But, a few studies concluded that there is a positive relationship between CAR and profitableness, as higher capitalization will increase lending power and financial strength. International banking research also indicates that more capital can lead to greater stability and loss-absorption ability but it does not correspond to higher profits, unless the capital is used efficiently to facilitate productive investments.

IV. CONCLUSION

The results of this study indicate that bank soundness indicators measured using the RBBR method together influence the financial performance of banking companies listed on the IDX-IC in Indonesia during 2020-2024. Partially, BOPO has a negative and significant effect on ROA, demonstrating that operational efficiency is crucial for profitability. The relationship between independent governance and ROA is positive and significant, suggesting that independent governance boosts financial performance. LDR, NPL, NIM, and CAR do not show significant partial effects for ROA in the final model.

The results suggest such measures as operating-cost discipline, process efficiency and digital improvement of operations as key factors for bank management, and the need to reinforce independent oversight in the governance structure. These findings may also be shared with regulators as a reminder of the importance of efficiency and governance quality as effective alternatives to capital and risk-ratio monitoring. Investors should not rely on a single ratio such as CAR or NIM; instead, bank evaluation should integrate efficiency, governance, asset quality, and resilience indicators.

The study is limited to listed banking companies in Indonesia during 2020-2024 and measured only by ROA. Further research requires a longer time frame, more banking groups and the addition of macroeconomic variables, bank size, bank ownership, digitalization, mediation and moderation models to find a more comprehensive explanation of bank profitability.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest concerning the publication of this paper.

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V. REFERENCES

1. International Monetary Fund, *World Economic Outlook 2023: Navigating Global Divergences*, Washington, DC: IMF, 2023. Online: <https://www.imf.org/en/publications/weo/issues/2023/10/10/world-economic-outlook-october-2023>
2. Otoritas Jasa Keuangan Republik Indonesia, *Peraturan Otoritas Jasa Keuangan Nomor 4/POJK.03/2016 Tentang Penilaian Tingkat Kesehatan Bank Umum*, Jakarta: OJK, pp. 1–27, 2016. Online: <https://peraturan.bpk.go.id/Details/128351/peraturan-ojk-no-4poj032016-tahun-2016>
3. Otoritas Jasa Keuangan, *Statistik Perbankan Indonesia Tahun 2023*, Jakarta: OJK, 2024. Online: <https://ojk.go.id/id/kanal/perbankan/data-dan-statistik/statistik-perbankan-indonesia/Pages/Statistik-Perbankan-Indonesia---Januari-2023.aspx>
4. Bank Indonesia, *Synergy Reviving Intermediation Accelerating Economic Recovery*, Jakarta: Bank Indonesia, 2021.
5. M. Spence, "Job Market Signaling," *Quarterly Journal of Economics*, vol. 87, no. 3, pp. 355–374, 1973. [Google Scholar](#) | [Publisher Link](#)
6. M.C. Jensen, and W.H. Meckling, "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics*, vol. 3, no. 4, pp. 305–360, 1976. [Google Scholar](#) | [Publisher Link](#)
7. Q.K. Nguyen, and V.C. Dang, "The Impact of Risk Governance Structure on Bank Risk Management Effectiveness: Evidence From ASEAN Countries," *Heliyon*, vol. 8, no. 10, p. e11192, 2022. [Google Scholar](#) | [Publisher Link](#)
8. A.T. Basuki, and N. Sabilla, "The Influence of Bank Health Level With RGEC on Bank Financial Performance," *Asian Journal of Economics, Business and Accounting*, 2023. [Google Scholar](#) | [Publisher Link](#)
9. P. Marsella, and D.C. Pangestuti, "Assessment of Bank's Health Using Analysis Risk Profile, Good Corporate Governance, Earnings, Capital (RGEC)," *International Journal of Research in Business and Social Science*, vol. 12, no. 1, 2023. [Google Scholar](#) | [Publisher Link](#)
10. A. Nurwulandari, H. Hasanudin, and B. Subiyanto, "Risk Based Bank Rating and Financial Performance of Indonesian Commercial Banks With GCG as Intervening Variable," *Cogent Economics & Finance*, vol. 10, no. 1, 2022. [Google Scholar](#) | [Publisher Link](#)

11. M. Markonah, and J.H. Prasetyo, "The Impact of Good Corporate Governance on Financial Performance: Evidence From Commercial Banks in Indonesia," *Journal of Asian Finance, Economics and Business*, vol. 9, no. 6, pp. 45–52, 2022. [Google Scholar](#) | [Publisher Link](#)
12. M.T. Saputro, U.S. Al-Azizah, and N.H. Rachman, "The Effect of Size, Market Risk, Operational Risk, Liquidity Risk, and Credit Risk on Profitability in Banks in the KBMI 3 and KBMI 4 Categories 2017-2021," *International Journal of Trends in Accounting Research*, vol. 3, no. 2, 2022. [Google Scholar](#) | [Publisher Link](#)
13. A. Jaelani, W. Purwanti, and H. Indra Sari, "The Influence of Capital, Credit Risk, and Liquidity Risk on Financial Performance," *International Journal of Management Studies and Social Science Research*, vol. 6, no. 4, pp. 222–232, 2024. [Publisher Link](#)
14. R. Riyadi, et al., "The Impact of Credit Risk, Liquidity Risk, and Operational Risk on Banking Profitability: Case Study at KBMI Bank for Three Periods," *International Journal of Progressive Sciences and Technologies*, vol. 45, no. 2, pp. 139–149, 2024. [Google Scholar](#) | [Publisher Link](#)
15. J. Tangngisalu, R. Hasanuddin, and Y. Hala, "Effect of CAR and NPL on ROA: Empirical Study in Indonesia Banks," *Journal of Asian Finance, Economics and Business*, vol. 7, no. 6, pp. 9–18, 2020. [Google Scholar](#) | [Publisher Link](#)
16. A.S. Anjani, E. Indriani, and N.K., "Assessment Analysis of Bank Soundness Level Using RGEC Approach in Banking Companies Listed on the IDX in 2019-2021," *Jurnal Manajemen*, vol. 14, no. 1, pp. 30–45, 2023. [Google Scholar](#) | [Publisher Link](#)
17. D. Trihandayani, and I. Yunita, "Banking Health Analysis Using RGEC," *Proceedings/Journal Article*, pp. 81–91, 2022. [Google Scholar](#) | [Publisher Link](#)
18. I. Ghozali, *Aplikasi Analisis Multivariete Dengan Program IBM SPSS 23*, Semarang: Badan Penerbit Universitas Diponegoro, 2018. [Google Scholar](#) | [Publisher Link](#)
19. S. Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif dan R&D*, Bandung: Alfabeta, 2017. [Google Scholar](#) | [Publisher Link](#)
20. P.R. Sihombing, *Aplikasi EViews Untuk Statistisi Pemula*, Bekasi: PT Dewangga Energi Internasional, 2022. [Google Scholar](#) | [Publisher Link](#)
21. S.W. Asnaini, F.R. Radita, and S. Maesaroh, "Pengaruh Tingkat Kesehatan Bank Dengan Metode Risk Based Bank Rating Terhadap Kinerja Keuangan Pada Bank Umum Syariah di Indonesia," *Journal of Communication Education*, vol. 16, no. 2, pp. 71–86, 2022.
22. W.S. Rolianah, "Pengaruh Kesehatan BPRS (Metode DuPont System) Terhadap Pertumbuhan Ekonomi Dengan Inflasi Sebagai Variabel Moderasi," *Syarikat: Jurnal Rumpun Ekonomi Syariah*, vol. 7, no. 2, pp. 389–399, 2024. [Google Scholar](#) | [Publisher Link](#)