

ANALYSIS OF THE INFLUENCE OF RISK-BASED BANK RATING (RBBR) ON BANK HEALTH LEVEL: A COMPARATIVE STUDY OF CORE 4 CAPITAL BANK GROUP IN INDONESIA 2020-2024

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Abstract: This study aims to analyze the influence of Risk Profile, Good Corporate Governance (GCG), Earnings, and Capital on the level of bank health based on Risk-Based Bank Rating (RBBR) in Core Capital Bank Group 4 (KBMI 4) in Indonesia for the period 2020–2024. This study uses a quantitative approach with a comparative and longitudinal causal design through panel data regression analysis. The research objects consist of PT Bank Central Asia Tbk, PT Bank Mandiri (Persero) Tbk, PT Bank Negara Indonesia (Persero) Tbk, and PT Bank Rakyat Indonesia (Persero) Tbk, with secondary data in the form of quarterly financial reports totaling 80 observations. The independent variables in this study include Risk Profile measured through NPL and LDR, GCG through self-assessment scores, Earnings through ROA and NIM, and Capital through CAR, while the dependent variable is the composite value of bank health level. The results show that Risk Profile and Capital do not significantly influence the composite level of bank health, while GCG and Earnings have a significant effect. GCG is the most dominant factor in determining the soundness of banks in KBMI 4. Simultaneously, Risk Profile, GCG, Earnings, and Capital significantly influence the composite score of bank soundness. This finding indicates that the soundness of KBMI 4 banks is determined more by the quality of governance and the ability to generate sustainable profits than by risk profile and capital adequacy separately. Therefore, bank management needs to strengthen GCG implementation, improve asset efficiency, maintain profitability, and continue to control risk and capital adequacy in accordance with regulatory requirements.

Keywords: *Risk-Based Bank Rating, bank soundness, Good Corporate Governance, Earnings, Capital, Risk Profile.*

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1. Introduction

Banks perform a central intermediation function by channeling funds from surplus units to households and firms that require financing. This function depends on public confidence, operational continuity, and effective risk management. Consequently, bank soundness is not only an internal performance issue but also a determinant of financial-system stability and real-sector activity (Lontoh et al., 2026; Rianti Bidin et al., 2024). A soundness assessment

must capture a bank's ability to manage credit and liquidity risk, implement accountable governance, generate sustainable earnings, and maintain sufficient capital.

Indonesia initially assessed commercial banks through the CAMEL framework. Bank Indonesia later introduced the Risk-Based Bank Rating (RBBR) through Bank Indonesia Regulation No. 13/1/PBI/2011, and the Financial Services Authority strengthened the framework through POJK No. 4/POJK.03/2016. RBBR evaluates four integrated factors: Risk Profile, Good Corporate Governance (GCG), Earnings, and Capital. The framework responds to the increasing complexity of banking operations and the need for a forward-looking assessment of inherent risks, risk-management quality, governance, profitability, and loss absorbing capacity (Otoritas Jasa Keuangan, 2016; Pratiwi & Setyarini, 2023).

This study focuses on Core Capital Bank Group 4, or KBMI 4, which consists of Bank Central Asia, Bank Mandiri, Bank Negara Indonesia, and Bank Rakyat Indonesia. These institutions have core capital exceeding IDR 70 trillion and account for a substantial share of Indonesian banking assets, credit, and profits. Their size and interconnectedness make their soundness relevant to national financial stability (Gumilang et al., 2025; Otoritas Jasa Keuangan, 2025). A deterioration in any major KBMI 4 institution may transmit pressure to depositors, borrowers, investors, and the broader economy.

Recent industry indicators reinforce the need for continuous assessment. OJK surveillance data for the third quarter of 2025 reported a capital adequacy ratio of 25.15%, return on assets of 2.53%, net interest margin of 4.58%, non-performing loans of 2.24%, and a loan-to-deposit ratio of 84.19% (Otoritas Jasa Keuangan, 2025). Although the aggregate banking sector remained resilient, lower profitability and capital ratios alongside a modest increase in problem loans indicate that soundness cannot be inferred from a single ratio. It requires an integrated assessment of governance, risk, earnings, and capital.

Previous RBBR studies commonly examined one bank and relied on descriptive ratio analysis. Munawaroh and Sisdianto (2024), for example, evaluated Bank Rakyat Indonesia, while Pratiwi and Setyarini (2023) focused on Bank Central Asia. Research on KBMI 4 has also used CAMEL rather than the current RBBR framework (Harsono, 2024). These designs describe health categories but provide limited inferential evidence on the relative and simultaneous effects of RBBR components across the largest banks. This study addresses that gap through a comparative longitudinal panel-data analysis of all KBMI 4 banks for 2020-2024.

The analysis is grounded in signaling theory and risk-management theory. Financial ratios, governance self-assessments, and composite soundness ratings transmit information to regulators, depositors, and investors concerning managerial quality and institutional resilience (Zhafirah et al., 2021). Agency theory further explains why governance, transparency, and monitoring are necessary to limit conflicts between bank managers and stakeholders (Jensen & Meckling, 1976). In this framework, RBBR functions as an integrated signal rather than a collection of isolated ratios.

Risk Profile is represented by non-performing loans (NPL) and the loan to deposit ratio (LDR). Higher credit risk can reduce earnings and capital, while excessive loan funding may weaken liquidity. GCG reflects the quality of transparency, accountability, responsibility, independence, and fairness in bank management. Earnings, represented by return on assets (ROA) and net interest margin (NIM), indicate the capacity to generate sustainable income. Capital is represented by the capital adequacy ratio (CAR), which measures a bank's capacity to absorb unexpected losses (Ayu et al., 2022; Iswardhani, 2025).

Based on these relationships, the study tests five hypotheses: H1, Risk Profile significantly affects the composite bank soundness score; H2, GCG significantly affects the composite score; H3, Earnings significantly affects the composite score; H4, Capital significantly affects the composite score; and H5, Risk Profile, GCG, Earnings, and Capital jointly affect the composite score. The objective is to estimate each effect, identify the dominant factor, and provide evidence for regulators, bank management, investors, and future research.

2. Research Method

The study used a quantitative causal-comparative and longitudinal design based on panel data. The population comprised all four banks classified as KBMI 4: PT Bank Central Asia Tbk, PT Bank Mandiri (Persero) Tbk, PT Bank Negara Indonesia (Persero) Tbk, and PT Bank Rakyat Indonesia (Persero) Tbk. Total sampling was applied because every KBMI 4 bank published complete quarterly financial reports for 2020-2024. Four banks observed over five years and four quarters generated 80 bank-quarter observations.

Secondary data were collected from the banks quarterly financial statements and governance reports. The dependent variable was the composite bank soundness score. The independent variables comprised NPL and LDR for Risk Profile, the self-assessment rating for GCG, ROA and NIM for Earnings, and CAR for Capital. GCG and the composite soundness rating used ordinal scores in which lower values represent stronger assessments.

Table 1. Operational Definition of Variables

Variable	Indicator	Measurement	Regulatory source
Risk Profile	NPL	Problem loans / Total loans x 100%	SE BI No. 13/24/DPNP/2011
Risk Profile	LDR	Total loans / Third-party funds x 100%	SE BI No. 06/23/DPNP/2004
GCG	Self-assessment	Rating 1-5	SE BI No. 15/15/DPNP/2013
Earnings	ROA	Net income / Total assets x 100%	SE BI No. 13/24/DPNP/2011
Earnings	NIM	Net interest income / Average earning assets x 100%	SE BI No. 06/23/DPNP/2004
Capital	CAR	Capital / Risk-weighted assets x 100%	SE BI No. 13/24/DPNP/2011
Bank soundness	Composite score	Integrated RBBR rating	POJK No. 4/POJK.03/2016

Source: Indonesian banking regulations.

The analysis included descriptive statistics, panel-model selection, classical-assumption diagnostics, and hypothesis testing. The Chow test compared the common-effects and fixed-effects models, the Hausman test compared fixed and random effects, and the Lagrange Multiplier test compared common and random effects (Hsiao, 2022). Variance inflation factors assessed multicollinearity. The Wald, Jarque-Bera, and Wooldridge tests assessed

heteroskedasticity, normality, and serial correlation. Because the residuals were non-normal and autocorrelated, the final fixed-effects estimates used robust standard errors. Statistical significance was evaluated at 5% (Baltagi, 2021).

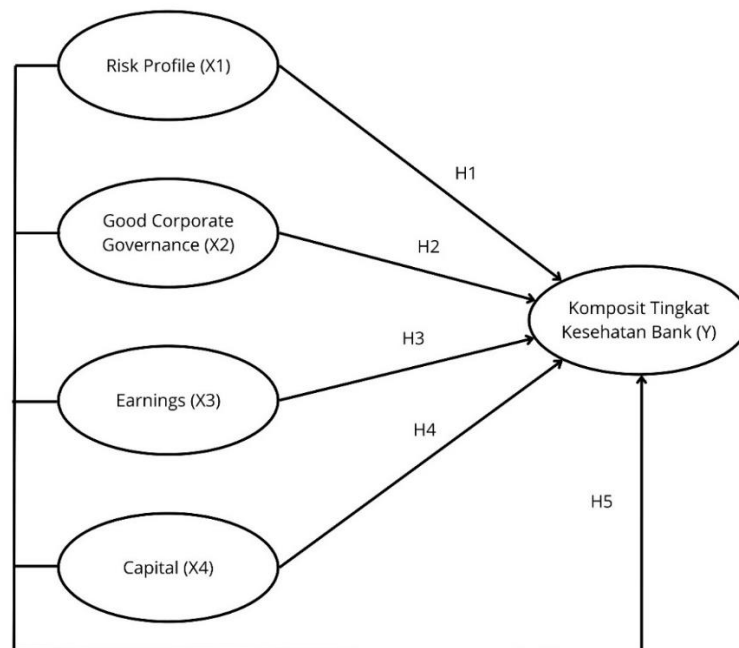


Figure 1. Conceptual Framework of The Research

The hypotheses for this research include:

H1 = Risk Profile has a significant effect on the composite bank health level

H2 = Good Corporate Governance has a significant effect on the composite bank health level

H3 = Earnings have a significant effect on the composite bank health level

H4 = Capital has a significant effect on the composite bank health level

H5 = Risk Profile, GCG, Earnings, and Capital have a significant effect on the composite bank health level

3. Results and Discussion

3.1. Results

Table 2. Descriptive Statistics

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	N
NPL	0.026	0.028	0.043	0.009	0.008	80
LDR	0.820	0.848	0.980	0.605	0.093	80
GCG	1.799	1.800	2.599	1.000	0.798	80
ROA	0.028	0.030	0.042	0.005	0.008	80
NIM	0.054	0.052	0.074	0.040	0.009	80
CAR	0.220	0.215	0.295	0.161	0.034	80
Composite TKB	1.799	1.800	2.599	1.000	0.798	80

Source: Secondary data processed (2026).

The sample consisted of 80 observations. Average NPL was 2.6%, while average LDR was 82.0%, indicating generally controlled credit risk and liquidity across KBMI 4. Average ROA was 2.8%, NIM was 5.4%, and CAR was 22.0%. CAR ranged from 16.1% to 29.5%, showing that all observations remained above minimum regulatory capital requirements. The GCG and composite soundness scores averaged 1.799. Their relatively large standard deviation of 0.798 reflects persistent differences in ratings among the four banks.

Table 3. Panel-Data Model Selection

Test	Null model	Alternative model	Probability	Decision
Chow	CEM	FEM	0.000	FEM
Hausman	REM	FEM	0.000	FEM
Lagrange Multiplier	CEM	REM	1.000	CEM

Source: Secondary data processed (2026).

The Chow and Hausman tests both produced probabilities below 0.05 and supported the fixed-effects model. Although the Lagrange Multiplier test favored the common-effects model, the combination of the Chow and Hausman results indicated that unobserved, time-invariant bank characteristics were correlated with the regressors. The fixed-effects model was therefore selected.

Table 4. Goodness of Fit and Diagnostic Tests

Assessment	Test/statistic	Value	Interpretation
Model fit	R-squared	0.9963	Very high explanatory power
Simultaneous effect	Prob > chi2	0.000	Model significant
Heteroskedasticity	Wald p-value	1.000	No heteroskedasticity
Normality	Jarque-Bera p-value	0.000	Residuals non-normal
Autocorrelation	Wooldridge p-value	0.000	Serial correlation present
Sample	Observations / banks	80 / 4	Balanced panel

Source: Secondary data processed (2026).

The model was jointly significant, with a probability of 0.000 and an R-squared of 0.9963. The Wald test found no heteroskedasticity. However, the Jarque-Bera and Wooldridge tests indicated non-normal residuals and serial correlation. Robust standard errors were consequently used. The very high R-squared must be interpreted cautiously because the composite soundness score is conceptually constructed from the same RBBR dimensions represented by the independent variables, producing substantial mechanical overlap.

Table 5. Multicollinearity Test

Variable	VIF	Tolerance
NPL	2.31	0.432681
LDR	2.81	0.355246
GCG	3.10	0.322587
ROA	3.85	0.259523

Variable	VIF	Tolerance
NIM	1.72	0.580214
CAR	3.21	0.311268

Source: Secondary data processed (2026).

All VIF values were below 10 and all tolerance values exceeded 0.10. The model therefore showed no material multicollinearity among the six explanatory indicators.

Table 6. Fixed-Effects Regression with Robust Standard Errors

Variable	Coefficient	Robust Std. Error	t-statistic	p-value	Result
NPL	0.00896	0.0026	0.35	0.750	Not significant
LDR	-0.00002	0.0001	-0.24	0.827	Not significant
GCG	1.19268	0.0485	24.58	0.000	Significant (+)
ROA	0.01001	0.0027	3.65	0.036	Significant (+)
NIM	-0.00597	0.0012	-4.79	0.017	Significant (-)
CAR	-0.00052	0.0005	-1.02	0.385	Not significant
Constant	-0.34633	0.0872	-3.97	0.029	Significant

Source: Secondary data processed (2026).

NPL and LDR were statistically insignificant, so H1 was not supported. GCG was positive and significant and had the largest t-statistic, supporting H2 and establishing GCG as the dominant factor. Because lower GCG and composite scores represent better assessments, the positive coefficient indicates that a deterioration in the GCG rating was associated with a deterioration in the composite soundness rating. ROA and NIM were significant with different coefficient signs, supporting H3 at the Earnings dimension. CAR was insignificant, so H4 was not supported. The simultaneous model probability of 0.000 supported H5.

3.2. Discussion

Risk Profile and Bank Soundness

Risk Profile, represented by NPL and LDR, did not significantly affect the composite soundness score during 2020-2024. The result suggests that credit-risk and liquidity variations among KBMI 4 banks were not large enough to explain rating differences after controlling for bank-specific fixed effects. These banks generally maintained NPL and LDR within manageable ranges and applied internal risk thresholds. The finding is consistent with Harb et al. (2021), who showed that risk indicators do not always dominate bank-performance assessments when risk-management systems are mature. It differs from studies that position credit risk as the primary driver of health deterioration (Dewi Novalia & Asyiqin, 2024). The result does not imply that NPL and LDR are unimportant. They remain prudential constraints whose influence may become stronger during severe credit or liquidity shocks.

Good Corporate Governance and Bank Soundness

GCG was the most influential variable. Under the scoring structure, a higher GCG value denotes weaker governance, while a higher composite value denotes weaker soundness. The positive coefficient therefore indicates aligned deterioration: poorer governance assessments

were associated with poorer overall soundness assessments. This supports the view that governance determines the quality of credit decisions, internal control, disclosure, compliance, and risk oversight (Ayu et al., 2022; Yanti et al., 2026). Agency theory also explains the result. Strong governance reduces information asymmetry and limits managerial behavior that may conflict with depositor, investor, and regulator interests. For large and systemically relevant banks, consistent governance can stabilize stakeholder confidence even when financial ratios fluctuate.

Earnings and Bank Soundness

Earnings significantly affected bank soundness. ROA captures the efficiency with which assets generate profits, while NIM captures the net return from financial intermediation. The significance of ROA is consistent with Fadhilah et al. (2024), who link stronger profitability to better financial performance. NIM showed a negative coefficient, indicating that its relationship with the coded composite score differed from that of ROA. One explanation is the exceptional operating environment during the COVID-19 period, when loan restructuring and payment adjustments under POJK No. 11/POJK.03/2020 affected interest income, asset quality, and margin behavior (Otoritas Jasa Keuangan, 2020). The mixed signs also indicate that profitability should be assessed through multiple indicators rather than a single margin measure.

Capital and Bank Soundness

CAR did not significantly affect the composite score. KBMI 4 banks maintained relatively homogeneous capital positions that remained far above minimum requirements. Once capital exceeds the prudential threshold, additional capital may not directly improve the rating unless it is accompanied by productive asset allocation, effective risk management, and sustainable earnings. This result is consistent with Andika (2025), who found that capital adequacy does not automatically improve bank performance. It differs from Dwiyani Pratistha et al. (2025), who identified capital as an important factor among regional banks. The contrast indicates that capital may have greater explanatory power in banks with more heterogeneous or constrained capital structures than in highly capitalized KBMI 4 banks.

Simultaneous Effect and Managerial Implications

Risk Profile, GCG, Earnings, and Capital jointly affected the composite soundness score. The finding confirms the integrated logic of RBBR: bank soundness reflects the interaction of risk exposure, governance, profitability, and loss-absorbing capacity. Even though NPL, LDR, and CAR were insignificant individually, they remain part of the joint institutional signal received by regulators and market participants. The result supports a holistic management approach. Banks should strengthen governance and asset efficiency while keeping credit risk, liquidity, margins, and capital within prudent limits.

For management, the dominant role of GCG requires consistent transparency, accountable decision-making, independent oversight, and effective internal controls. Profitability should be improved through efficient asset use and prudent credit allocation rather than excessive risk-taking. OJK may also strengthen the credibility of GCG assessment by complementing bank self-assessments with intensive on-site supervision or independent verification. Investors should incorporate governance quality and disclosure practices alongside conventional financial ratios. The study is limited to four banks and internal factors. Future studies should include smaller banks, Islamic banks, interest rates, inflation,

economic growth, and alternative soundness measures that reduce mechanical overlap between the dependent composite score and its explanatory components.

4. Conclusion

- 1) Risk Profile (represented by NPL and LDR) and Capital (represented by CAR) did not have a significant partial effect on the composite bank soundness score during the 2020–2024 periods.
- 2) Good Corporate Governance (GCG) and Earnings significantly affected the composite score, with GCG emerging as the dominant factor based on its coefficient significance and t-statistic.
- 3) The RBBR components jointly had a significant effect, confirming that bank soundness should be evaluated as an integrated institutional condition rather than through isolated financial ratios.
- 4) The research provides comparative longitudinal evidence using fixed-effects panel regression across all Indonesian KBMI 4 banks, successfully identifying governance as the primary differentiating factor during the study window.
- 5) Bank management should prioritize credible governance, efficient asset utilization, sustainable profitability, and prudent risk controls while continuously maintaining regulatory capital.
- 6) Regulators should strengthen the external validation of governance assessments to ensure robust industry standards.
- 7) Subsequent studies should expand the sample size, incorporate macroeconomic variables, and test alternative dependent measures to improve causal interpretation.

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