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INDONESIAN BANKS RISK-TAKING: THE EFFECT OF RISK PROFILE, GOOD CORPORATE GOVERNANCE, EARNINGS AND CAPITAL (RGEC)

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ABSTRACT

This study examines the effect of RGEC framework, comprises four key components: Risk Profile, Good Corporate Governance, Earnings, and Capital, on the risk-taking behavior of banks in Indonesia. Banks' risk-taking behavior is proxied by the Z-Score, which reflects bank stability and insolvency risk. Within the RGEC framework, risk profile is proxied by Non-Performing Loans (NPLs), Good Corporate Governance is proxied by Institutional Ownership (INST), earnings is proxied by Operational Inefficiency (BOPO), and capital is proxied by Capital Adequacy Ratio (CAR). This study employs a quantitative approach using a dynamic panel data regression model estimated with the two-step System Generalized Method of Moments (GMM). The sample consists of 33 banks listed on the Indonesia Stock Exchange (IDX) over the period 2017–2022, using secondary data obtained from banks' annual financial statements. The empirical results indicate that Non-Performing Loans (NPLs), Institutional Ownership, and Operational Inefficiency (BOPO) have a negative and significant effect on the Z-Score, suggesting that higher credit risk, stronger institutional ownership, and lower operational efficiency increase banks' risk-taking behavior. In contrast, the Capital Adequacy Ratio (CAR) has a positive but insignificant effect on the Z-Score, indicating that higher capital adequacy tends to reduce banks' risk-taking behavior, although the effect is not statistically significant. Overall, the findings highlight the importance of RGEC components in explaining variations in risk-taking behavior among Indonesian banks and provide relevant insights for banking regulators and bank management in strengthening prudential supervision and risk governance.

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INTRODUCTION

The banking sector plays a strategic role in the financial system as a financial intermediary that mobilizes funds from surplus units and allocates them to deficit

units through credit distribution, thereby contributing to economic growth and financial stability. Nevertheless, banks also operate as profit-oriented institutions, with interest income from lending activities serving as the primary source of profitability. The strong reliance on credit activities inherently exposes banks to various types of risk, particularly credit risk and liquidity risk. Banks' risk-taking behavior reflects managerial decisions regarding the level of risk exposure undertaken to enhance profitability, particularly through credit expansion and investment activities (Boamah et al., 2021). However, excessive risk exposure significantly increases the likelihood of financial distress and insolvency risk, thereby threatening the stability of the banking system (Athari & Irani, 2022).

In Indonesia, the increase in the Non-Performing Loans (NPLs) ratio from 2.53% in 2019 to 3.18% in 2020 indicates a deterioration in banks' credit risk during periods of economic uncertainty. Given the systemic importance of the Indonesian banking sector, which dominates the asset composition of the national financial system, the Financial Services Authority (OJK) implements the Risk-Based Bank Rating (RBBR) framework to assess banks' health. This framework evaluates bank health through four main components, namely risk profile, Good Corporate Governance (GCG), earnings, and capital, collectively referred to as RGEC. The RGEC framework emphasizes a comprehensive and forward-looking assessment of banks' financial conditions and risk management practices to support long-term stability (Fakhrudin & Aji, 2024).

Within the RGEC framework, the risk profile component, proxied by Non-Performing Loans (NPLs), represents banks' exposure to credit risk and may encourage risk-shifting behavior or gambling for resurrection (Kao & Wan, 2024). Good Corporate Governance, particularly institutional ownership, is expected to mitigate excessive managerial risk-taking by strengthening monitoring mechanisms and aligning managerial incentives with shareholders' interests (Tiwari, 2024). The earnings component reflects a bank's ability to generate profits efficiently, declining profitability or increasing operational inefficiency may pressure managers to adopt riskier strategies to restore performance (Fatimah et al., 2023). Meanwhile, capital, measured by the Capital Adequacy Ratio (CAR), indicates a bank's capacity to absorb losses, although higher capital levels under certain conditions may also encourage increased risk-taking due to moral hazard considerations (Kurniasari & Zunaidi, 2022). In addition to RGEC components, operational efficiency plays a significant role in shaping bank risk-taking behavior. Inefficiency, commonly proxied by the ratio of operating expenses to operating income (BOPO), reflects weaknesses in cost management and revenue generation. Empirical evidence suggests that inefficient banks face greater performance pressure and are more likely to engage in higher risk activities as a means of compensating for declining profitability (Yuwonoputro et al., 2019).

In this study, banks' risk-taking behavior is measured using the Z-Score, a widely used indicator of bank stability and insolvency risk that combines profitability, capital strength, and earnings volatility. A lower Z-Score indicates a higher probability of insolvency and greater risk-taking behavior, while a higher Z-Score reflects stronger financial stability (Muchtar & Samosir, 2020). Although the literature on banks' risk-taking has expanded substantially, empirical findings regarding the effects of RGEC components remain mixed, particularly in developing countries such as Indonesia. Therefore, this study aims to examine the effect of Risk Profile, Good Corporate

Governance, Earnings, and Capital (RGEC) on banks' risk-taking behavior in Indonesia. By providing empirical evidence based on Indonesian banking data, this study is expected to contribute to the banking risk literature and offer relevant policy implications for regulators and bank management in strengthening prudential supervision, risk governance, and financial system stability.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Non-Performing Loans (NPLs) to Banks' Risk-Taking

Empirical studies indicate that Non-Performing Loans (NPLs), representing the proportion of problematic loans, reflect declining asset quality and weak credit management. Higher NPL ratios signify increased exposure to credit risk, which negatively affects profitability, liquidity, and overall bank financial performance through heightened credit loss provisions and reduced cash flows.

Arhinful et al. (2025) demonstrate that an increase in NPLs not only reflects deteriorating asset quality but also reinforces banks' risk-taking behavior, as management faces pressure to restore short-term performance by expanding credit distribution and allocating funds to higher-risk assets. From the perspective of agency theory, declining asset quality exacerbates conflicts of interest between shareholders and managers, prompting managers to adopt more aggressive and risky strategies to offset performance declines and protect personal interests, including compensation and reputation.

This behavior also reflects a failure of anticipated income theory, in which misjudgments in debtor creditworthiness lead to the accumulation of non-performing loans rather than generating the expected returns. Therefore, higher NPL ratios are associated with an increase in banks' risk-taking behavior, particularly in lending activities, supporting Hypothesis 1 (H1) and aligning with the empirical findings of Kao & Wan (2024), which show a positive relationship between problematic loans and banks' risk-taking behavior.

H1: The Positive Impact of Non-Performing Loans (NPLs) to Indonesian Banks' Risk-Taking.

Institutional Ownership (INST) to Banks' Risk-Taking

Empirical studies indicate that institutional ownership, representing the proportion of bank shares held by institutional investors, is generally associated with a stronger influence on managerial decision-making processes. Higher levels of institutional ownership are typically linked to a reduction in banks' risk-taking behavior, as institutional investors provide effective monitoring mechanisms, more comprehensive access to information, and a long-term investment orientation that enforces managerial discipline (Tiwari, 2024).

From the perspective of agency theory, institutional investors help mitigate conflicts of interest between managers (agents) and shareholders (principals) by strengthening oversight, reducing information asymmetry, and aligning managerial incentives with long-term stability. Enhanced monitoring limits managers from pursuing short-term gains through risky strategies, such that banks with higher institutional ownership

levels tend to adopt more conservative lending and investment policies, prioritizing prudent risk management (Vo & Joseph, 2025). Accordingly, institutional ownership exerts a negative influence on banks' risk-taking behavior, reducing risk exposure and enhancing financial stability, supporting Hypothesis 2 (H2) and consistent with empirical literature on the role of institutional governance in constraining excessive risk-taking behavior in the banking sector.

H2: The Negative Impact of Institutional Ownership to Indonesian Banks' Risk-Taking.

Operational Inefficiency (BOPO) to Banks' Risk-Taking

Empirical studies indicate that operational inefficiency, proxied by the Operating Expense to Operating Income ratio (BOPO), increases banks' risk-taking behavior. According to Irawan et al. (2025), a higher BOPO reflects lower operational efficiency and weak managerial performance, thereby amplifying cost pressures, eroding profitability, and reducing financial stability, which in turn increases vulnerability to risk. From the perspective of agency theory, inefficiency may arise from conflicts of interest between shareholders and managers, where managers are incentivized to pursue personal goals or short-term performance targets rather than maintaining long-term stability (Sukendri et al., 2024).

To compensate for declining efficiency and profitability, managers may implement more aggressive lending and investment strategies, relax credit standards, and expand high-risk loan portfolios. This behavior deviates from prudent banking practices, as inefficiency drives increased risk-taking rather than performance improvement. Therefore, this study hypothesizes that a higher BOPO is positively associated with banks' risk-taking behavior, consistent with empirical evidence reported by Yuwonoputro & Syaichu (2019).

H3: The Positive Impact of Inefficiency (BOPO) to Indonesian Banks' Risk-Taking.

Capital Adequacy Ratio (CAR) to Banks' Risk-Taking

Angkut et al. (2025) indicate that a higher Capital Adequacy Ratio (CAR) does not necessarily constrain banks' risk-taking behavior and, under certain conditions, may even encourage increased risk exposure, as larger capital reserves enhance a bank's capacity to absorb potential losses.

Banks with capital above the regulatory minimum often expand credit distribution and allocate funds to higher-risk assets, consistent with the risk absorption mechanism that reduces perceived loss risk. Excessive capitalization can weaken managerial prudence and market discipline, thereby increasing the propensity for risk-taking, particularly in environments with lax supervision or strong growth incentives. Therefore, this study hypothesizes that a higher Capital Adequacy Ratio (CAR) is associated with an increase in banks' risk-taking behavior (H4).

H4: The Positive Impact of Capital Adequacy Ratio (CAR) to Indonesian Banks' Risk-Taking.

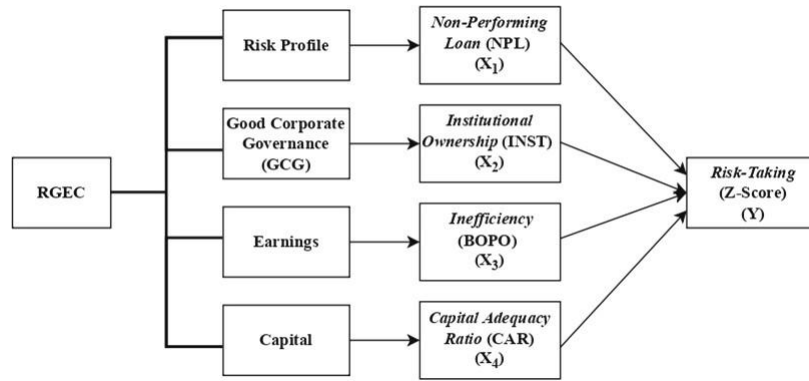


Figure 1. Theoretical Framework

METHODS

This study adopts a quantitative descriptive research design to examine the effect of the RGEF framework on banks' risk-taking behavior in Indonesia. The study population comprises 47 banks listed on the Indonesia Stock Exchange (IDX), from which 33 banks were selected using purposive sampling. Sample selection was based on the availability of complete financial statements for the 2017–2022 period, ensuring data consistency and reliability. This non-probability sampling approach was applied to guarantee that the analyzed units provide sufficient and accurate data for robust model estimation.

The empirical analysis employs a dynamic panel data approach using the two-step System Generalized Method of Moments (GMM) estimator, which effectively addresses potential endogeneity, unobserved bank-specific heterogeneity, and autocorrelation commonly present in financial panel data. The two-step System GMM is specifically utilized to mitigate bidirectional causality and control for unobserved heterogeneity across banks. The model examines the effects of Non-Performing Loans (NPLs), Institutional Ownership (INST), Operational Inefficiency (BOPO), and Capital Adequacy Ratio (CAR) on banks' risk-taking behavior, proxied by the Z-Score. The empirical model is specified as follows:

$$Z\text{-Score}_{it} = \alpha + \beta_1 Z\text{-Score}_{it-1} + \beta_2 NPL_{it} + \beta_3 INST_{it} + \beta_4 BOPO_{it} + \beta_5 CAR_{it} + \epsilon_{it}$$

Notes:

- Y = Z-Score
- α = Constant
- β_1 - β_5 = Regression coefficient of independent variables
- X1 = NPL (Non-Performing Loan)
- X2 = INST (Institutional Ownership)
- X3 = BOPO (Operational Inefficiency)
- X4 = CAR (Capital Adequacy Ratio)
- e = error term

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Descriptive analysis is conducted to provide an overview of the dataset characteristics. This analysis identifies the distribution, mean values, and patterns of each variable, offering an initial understanding of the data prior to subsequent empirical analysis.

Table 2. Descriptive Statistical Test Result

Descriptive Statistics				
Variable	Min	Max	Mean	Std. Dev.
Z-SCORE	-5.042379	99.05876	7.905147	13.50527
NPL	0.0000	0.1168	0.0334242	0.0203463
INST	0.3338	1.0000	0.7631662	0.1758876
BOPO	0.4728	2.8792	0.9137439	0.2728326
CAR	0.1052	1.2742	0.2525869	0.1387266

Source: Secondary Data Processed Using Stata 17

Based on the descriptive statistics, this study utilizes a total of 198 observations obtained from 33 banking companies in Indonesia over the observation period. Table 1 presents the descriptive statistical results for all variables employed in the analysis. The Z-Score, which proxies banks' risk-taking behavior and financial stability, exhibits a minimum value of -5.0424 and a maximum value of 99.0588, indicating substantial variation in banks' risk profiles. The mean Z-Score is 7.9051, with a relatively high standard deviation of 13.5053, suggesting considerable heterogeneity in risk-taking behavior among Indonesian banks. A lower Z-Score reflects higher insolvency risk, whereas a higher value indicates greater financial stability. The Non-Performing Loans (NPLs) ratio, which measures credit risk, records a minimum value of 0.0000 and a maximum value of 0.1168. The average NPL is 0.0334, with a standard deviation of 0.0203, indicating that, on average, banks maintain a relatively low level of problematic loans, although some banks experience substantially higher credit risk. A higher NPL ratio implies weaker credit quality and greater exposure to risk-taking behavior.

The Institutional Ownership (INST) variable ranges from a minimum of 0.3338 to a maximum of 1.0000, with a mean value of 0.7632 and a standard deviation of 0.1759. This indicates that, on average, a large proportion of bank shares are owned by institutional investors, suggesting relatively strong corporate governance structures. Higher institutional ownership is expected to enhance monitoring and influence banks' risk-taking decisions. The Operational Inefficiency ratio (BOPO) shows a minimum value of 0.4728 and a maximum value of 2.8792, with an average value of 0.9137 and a standard deviation of 0.2728. The relatively wide dispersion indicates differences in cost efficiency across banks. A higher BOPO reflects lower operational efficiency, which may encourage banks to engage in higher or excessive risk-taking to compensate for elevated operating costs. Finally, the Capital Adequacy Ratio (CAR) records a minimum value of 0.1052 and a maximum value of 1.2742, with a mean value of 0.2526 and a standard deviation of 0.1387. This suggests that, on average, banks maintain adequate capital buffers to absorb potential losses, although capital levels vary considerably across institutions. Higher capital adequacy provides greater loss-absorbing capacity, which may influence banks' incentives to undertake risk.

Sargan Test

The Sargan test is conducted to assess the validity of instruments in the GMM estimation. The null hypothesis assumes that the instruments are valid and uncorrelated with the error term. A Prob. Chi² greater than 0.05 indicates that the null hypothesis cannot be rejected, confirming that the instruments are statistically appropriate and reliable for the model.

Table 3. Result of Sargan Test

Model	Prob. Chi ²	Conclusion
I	0.2117	Instruments are valid

Source: Secondary Data Processed Using Stata 17

The Sargan test was employed to assess the validity of the instruments used in the GMM estimation. For the estimated model, the Prob. Chi² value is 0.2117, which exceeds the 0.05 significance level. This result indicates that the null hypothesis, stating that the instruments are uncorrelated with the error term cannot be rejected. Accordingly, the instruments are deemed valid, confirming the reliability and consistency of the GMM regression estimates.

Arellano-Bond Test

The Arellano-Bond test is conducted to detect autocorrelation in the differenced residuals of the dynamic panel model, focusing on first-order (AR(1)) and second-order (AR(2)) autocorrelation. While AR(1) is generally acceptable in GMM estimation, the key concern is AR(2). A p-value greater than 0.05 for the AR(2) test indicates the absence of second-order autocorrelation, confirming that the model meets the GMM estimator's consistency requirement.

Table 4. Result of Arellano-Bond Test

Model	P-value	Conclusion
I	0.6853	No second-order autocorrelation

Source: Secondary Data Processed Using Stata 17

The Arellano-Bond test for second-order autocorrelation (AR(2)) produces a p-value of 0.6853, which exceeds the 0.05 significance level. This result indicates the absence of second-order autocorrelation, thereby confirming that the consistency assumption of the GMM estimator is satisfied and that the estimation results are reliable for further analysis.

Bias Test

The bias test compares GMM estimation results with those from the Fixed Effects Model (FEM) and Pooled Least Squares (PLS). A model is considered unbiased if the GMM coefficients fall between the FEM and PLS estimates, ensuring that the GMM estimator produces parameter estimates that are consistent and efficient.

Table 5. Result of Bias Test

Model	FEM Estimate	GMM Estimate	PLS Estimate	Conclusion
I	0.29780568***	0.32948315***	0.45554595***	GMM is unbiased

Source: Secondary Data Processed Using Stata 17

The bias test, conducted by comparing GMM estimates with those from the Fixed Effects Model (FEM) and Pooled Least Squares (PLS), shows that the GMM coefficients for all four models lie between the FEM and PLS estimates. This indicates that the unbiasedness criterion is satisfied, confirming that the GMM estimations are reliable and robust.

GMM regression results

Table 6. Regression result

Variable	Coefficient	Std. Error	z	P> z	[95% conf. Interval]
Z-SCORE _{t-1}	0.3294831	0.0078915	41.75	0.000	0.3140161 0.3449502
NPL	-100.4028	34.08039	-2.95	0.003	-167.1991 -33.60647
INST	-13.38519	4.596453	-2.91	0.004	-22.39407 -4.376309
BOPO	-2.67225	.7597649	-3.52	0.000	-4.161361 -1.183138
CAR	3.970379	3.113287	1.28	0.002	-2.131552 10.07231
_cons	19.31894	3.777463	5.11	0.000	11.91525 26.72263

Source: Secondary Data Processed Using Stata 17

The estimation results indicate that the lagged Z-Score has a positive and statistically significant coefficient of 0.3295, suggesting the presence of persistence in banks' risk-taking behavior over time. This finding implies that banks exhibiting higher financial stability in the previous period tend to maintain more conservative risk-taking patterns in the subsequent period. The result confirms the dynamic nature of bank risk behavior, where past stability serves as an internal benchmark guiding current risk management decisions. The coefficient of Non-Performing Loans (NPLs) is negative and statistically significant at -100.4028, indicating that higher credit risk is associated with increased bank risk-taking behavior. Rising NPL levels reflect deteriorating asset quality, which undermines financial stability as evidenced by a decline in the Z-Score. Consequently, banks experiencing higher NPLs may engage in riskier activities in an attempt to compensate for weakened performance, thereby reinforcing excessive risk-taking behavior.

Institutional Ownership (INST) also exhibits a negative and significant coefficient of -13.3852, suggesting that a higher proportion of institutional shareholdings is associated with greater bank risk-taking. This finding supports the view that institutional investors, while enhancing monitoring mechanisms, may simultaneously exert pressure on management to pursue more aggressive strategies to achieve higher returns. As a result, increased institutional ownership may incentivize riskier lending and investment decisions, leading to a reduction in the Z-Score. The Operational Inefficiency ratio (BOPO) shows a negative and significant coefficient of -2.6723, indicating that lower operational efficiency is linked to higher risk-taking behavior. Banks with higher operating costs relative to income tend to assume greater risks in order to improve profitability and offset inefficiencies. This behavior ultimately weakens financial stability, as reflected by the decline in the Z-Score. In contrast, the

Capital Adequacy Ratio (CAR) exhibits a positive but statistically insignificant coefficient of 3.9704, indicating that higher capitalization is associated with a tendency toward lower bank risk-taking behavior, although the effect is not sufficiently strong to be statistically confirmed. This result suggests that, while well-capitalized banks possess greater loss-absorbing capacity, such capital strength does not necessarily translate into significantly more prudent risk-taking behavior. Consequently, the positive relationship between CAR and the Z-Score implies a potential stabilizing role of capital, but its impact on banks' financial stability appears limited within the observed period.

The estimation results indicate that the lagged Z-Score has a positive and statistically significant effect on the current Z-Score, confirming the persistence of banks' risk-taking behavior over time. This finding suggests that banks with higher financial stability in the previous period tend to maintain more conservative risk-taking behavior in the subsequent period. This is consistent with Riani & Ikhwan (2025), who argue that such persistence reflects path dependence in managerial decision-making and risk governance, where past stability serves as an internal benchmark shaping future risk preferences and strategic choices.

Non-Performing Loans (NPLs) has a negative and statistically significant effect on the Z-Score, indicating that deteriorating asset quality weakens bank stability and encourages increased risk-taking behavior (Katuka et al., 2023). High credit risk increases pressure on banks to restore profitability, potentially prompting management to engage in riskier lending and investment activities. These results align with the risk-shifting hypothesis, which posits that banks facing declining asset quality tend to take greater risks to compensate for expected losses (Peydró et al., 2023). Institutional ownership also exhibits a negative and significant relationship with the Z-Score, suggesting that higher institutional shareholding is associated with increased bank risk-taking. This finding is in line with Tiwari (2024), implying that institutional investors do not always function as an effective monitoring mechanism to constrain managerial risk-taking. In environments characterized by short-term performance orientation and information asymmetry, institutional owners may even encourage managers to pursue more aggressive strategies to enhance short-term returns, potentially at the expense of long-term financial stability.

Operational inefficiency, proxied by the BOPO ratio, has a negative and significant effect on the Z-Score, indicating that banks with higher operating expenses relative to income tend to engage in greater risk-taking. An inefficient cost structure may compel bank management to adopt riskier strategies in an effort to improve profitability and operational performance, thereby increasing overall risk exposure (Yuwonoputro & Syaichu, 2019). This finding underscores the critical role of operational efficiency in supporting prudent risk management practices. Conversely, the Capital Adequacy Ratio (CAR) shows a positive but statistically insignificant effect on the Z-Score. This suggests that a higher capital buffer alone is insufficient to significantly constrain banks' risk-taking behavior (Ashraf et al., 2016). The insignificance of this stabilizing effect may reflect moral hazard considerations, whereby well-capitalized banks perceive a greater capacity to absorb losses, thereby exhibiting higher tolerance for risk-taking (Gupta & Jain, 2022), particularly in contexts where regulatory supervision and market discipline are not fully effective.

CONCLUSION

This study concludes that bank risk-taking behavior, as proxied by the Z-Score, is significantly affected by internal financial conditions and governance-related factors. The empirical evidence shows that Non-Performing Loans (NPLs) has a negative and statistically significant impact on the Z-Score, indicating that rising credit risk and deteriorating asset quality are associated with a higher tendency toward risk-taking. This result highlights the importance of sound credit risk management in preserving bank stability. Institutional Ownership has a negative and significant effect on the Z-Score, suggesting that a higher share of institutional investors is linked to increased banks' risk-taking. This finding implies that institutional ownership does not automatically serve as an effective monitoring mechanism to curb managerial risk behavior, particularly in contexts where the quality of governance and the effectiveness of investor oversight differ across institutions.

Operational inefficiency, measured by the BOPO ratio, also exerts a negative and significant influence on the Z-Score. This indicates that banks with higher operating costs relative to income are more likely to pursue riskier strategies in an effort to offset inefficiency and declining profitability. Accordingly, operational efficiency emerges as a crucial factor in supporting prudent risk management practices within the banking sector. By contrast, the Capital Adequacy Ratio (CAR) shows a positive but statistically insignificant relationship with the Z-Score, suggesting that higher capital buffers do not play a decisive role in reducing bank risk-taking. This outcome may reflect moral hazard behavior, whereby well-capitalized banks perceive a greater capacity to absorb potential losses and, as a result, are more inclined to take on higher risks.

Overall, the findings indicate that banks' risk-taking behavior is determined by a complex interaction between asset quality, ownership structure, and operational performance, while capital adequacy alone is insufficient to constrain excessive risk-taking. The study underscores the importance of strengthening credit quality supervision, improving governance effectiveness, and enhancing operational efficiency to foster financial stability and ensure sustainable banking practices.

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