JSMB Vol. 13(1) 2026 Page. 50-68
Jurnal Studi Manajemen dan Bisnis
http://journal.trunojoyo.ac.id/jsmb

Comparative Analysis of CAMELS and RGEC Methods in Assessing Banking Resilience in Indonesia

[1]Cantika Salsabila Pratiwi, [2]Wisudanto
[1]Airlangga University, [2]Airlangga University
Coresponding Author Email: cantika.salsabila.pratiwi-2024@feb.unair.ac.id

Received: 30/05/2026 Accepted: 13.06.2026 Published: 29.06.2026 DOI:

Abstract:

Purpose: This study aims to compare the effectiveness of the CAMELS and RGEC frameworks in assessing banking resilience in Indonesia amid increasing economic uncertainty. The study investigates which framework provides a better explanation of banking resilience under conditions characterized by exchange rate volatility, inflationary pressures, and monetary tightening policies.

Design/methodology/approach: This study employs a quantitative research design using panel data regression analysis. The sample consists of commercial banks listed on the Indonesia Stock Exchange during the period 2020–2025. Banking resilience is measured using Return on Assets (ROA). The CAMELS framework is represented by Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), Operational Efficiency Ratio (BOPO), Net Interest Margin (NIM), Loan to Deposit Ratio (LDR), and Net Open Position (NOP), while the RGEC framework comprises Risk Profile, Good Corporate Governance (GCG), Earnings (NIM), and Capital (CAR). Firm Age and Firm Size are included as control variables.

Findings: The results reveal that within the CAMELS framework, BOPO and LDR have significant negative effects on ROA, while NIM has a significant positive effect. CAR, NPL, and NOP do not significantly affect banking performance. Under the RGEC framework, Risk Profile negatively affects ROA, whereas NIM positively influences banking performance. However, GCG and CAR are not statistically significant. Furthermore, the RGEC model demonstrates greater explanatory power than the CAMELS model, as indicated by its higher adjusted R^2 value, suggesting that a risk-based approach provides a more comprehensive explanation of banking resilience during periods of economic uncertainty.

Research limitations/implications: This study uses ROA as the sole proxy for banking resilience, which may not fully capture the multidimensional nature of banking resilience, including liquidity, solvency, and market-based resilience. In addition, the insignificant effect of GCG may be associated with the relatively homogeneous governance ratings among listed banks. The findings contribute to the literature on bank soundness assessment by providing empirical evidence on the comparative effectiveness of CAMELS and RGEC frameworks in explaining banking resilience under uncertain economic conditions.

Practical implications: The findings provide useful insights for bank management, investors, and regulators in evaluating bank performance, strengthening risk management practices, and enhancing financial stability. The results also highlight the importance of incorporating risk-based assessment approaches into banking supervision and performance evaluation.

Originality/value: This study contributes to the banking and financial stability literature by providing a comparative analysis of the CAMELS and RGEC frameworks in assessing banking resilience in Indonesia during a period of heightened economic uncertainty. The study offers

empirical evidence regarding the relative explanatory power of traditional financial ratio-based and risk-based approaches in evaluating banking resilience.

Keywords : banking resilience; CAMELS; Economic Uncertainty,; Indonesia; RGEC

INTRODUCTION

The banking sector plays a crucial role in maintaining financial system stability and supporting economic growth through its intermediation function, liquidity provision, and credit distribution to households and businesses (Al-Homaidi et al., 2018). As financial intermediaries, banks facilitate the efficient allocation of funds within the economy and contribute significantly to economic development. According to Financial Intermediation Theory developed by Gurley and Shaw (1960) and further advanced by Diamond (1984), banks create value by mobilizing savings and channeling them into productive investments while managing liquidity and credit risks. Therefore, maintaining bank soundness and resilience is essential to ensure the sustainability of economic activities and financial system stability.

In recent years, the global economy has experienced increasing uncertainty due to geopolitical tensions, inflationary pressures, capital outflows, and monetary tightening policies implemented by many countries (Karkowska et al., 2023). These conditions have also affected Indonesia through exchange rate depreciation and heightened market volatility. The weakening of the Indonesian rupiah against the United States dollar has increased concerns regarding credit risk, liquidity pressure, and market risk exposure within the banking sector. During periods of economic uncertainty, banks are expected to maintain adequate capital, asset quality, profitability, liquidity, and risk management practices to ensure financial stability and support economic activities (Berger & Bouwman, 2015).

Banking resilience refers to the ability of banks to absorb economic shocks, maintain financial stability, and continue performing their financial intermediation functions during periods of uncertainty and financial stress (Danisman et al., 2021). In addition, Risk-Based Supervision Theory promoted by the Basel Committee on Banking Supervision (BCBS) emphasizes that banking stability depends not only on financial performance but also on effective risk management, governance quality, and capital strength. Therefore, bank soundness assessment frameworks play an important role in evaluating the ability of banks to remain stable under economic uncertainty.

Two of the most widely used bank soundness assessment frameworks are CAMELS and RGEC (Ledhem & Mekidiche, 2020). The CAMELS framework evaluates bank conditions through Capital, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk. Meanwhile, the RGEC

framework adopts a risk-based approach consisting of Risk Profile, Good Corporate Governance, Earnings, and Capital. Compared to CAMELS, RGEC places greater emphasis on governance and risk management aspects in assessing banking stability and sustainability.

Previous studies have examined the relationship between CAMELS and RGEC components and banking performance. Nguyen et al. (2020) found that CAMELS indicators effectively explain banking performance and stability in commercial banks. Lestari and Wirakusuma (2018) reported that RGEC components significantly influence organizational performance and firm value. Furthermore, Aebi et al. (2012) highlighted the importance of risk governance in maintaining banking performance during periods of financial distress. However, existing studies primarily focus on profitability, bank soundness, or specific crisis periods such as the COVID-19 pandemic. Limited evidence is available regarding the comparative effectiveness of CAMELS and RGEC in explaining banking resilience during broader periods of economic uncertainty characterized by exchange rate depreciation, inflationary pressures, and monetary tightening policies. Moreover, previous studies generally examine the determinants of banking performance separately rather than directly comparing the explanatory power of CAMELS and RGEC frameworks.

Therefore, this study aims to compare the effectiveness of the CAMELS and RGEC frameworks in explaining banking resilience among commercial banks listed on the Indonesia Stock Exchange during the period 2020–2025. This study contributes to the banking and financial stability literature by providing empirical evidence regarding which framework offers greater explanatory power in assessing banking resilience under conditions of economic uncertainty (Nguyen et al., 2024). The findings are expected to provide useful insights for regulators, investors, and bank management in strengthening banking stability and risk management practices.

LITERATURE REVIEW

Financial Intermediation Theory

Financial Intermediation Theory was introduced by Gurley and Shaw (1960) and further developed by Diamond (1984). The theory explains that banks function as financial intermediaries that collect funds from surplus units and channel them to deficit units through lending activities. The effectiveness of this intermediation process depends on adequate capital, asset quality, profitability, and liquidity management. Therefore, bank soundness indicators are important determinants of banking resilience and financial performance

Risk-Based Supervision Theory

Risk-Based Supervision Theory originates from the supervisory framework developed by the Basel Committee on Banking Supervision (BCBS), which emphasizes that banking stability depends on the effective management of risk exposure, governance quality, capital adequacy, and sustainable earnings. Under this approach, supervisory authorities allocate greater attention to banks with higher risk profiles and evaluate not only financial performance but also the effectiveness of governance and risk management practices (Alina et al., 2024). Therefore, banking resilience is viewed as a function of both financial strength and risk management capability, providing the conceptual foundation for the RGEC framework.

Agency Theory

Agency Theory was proposed by Jensen and Meckling (1976) to explain the relationship between principals (shareholders) and agents (management). The theory suggests that governance mechanisms are necessary to reduce conflicts of interest and improve organizational performance. In the banking sector, Good Corporate Governance (GCG) is expected to strengthen transparency, accountability, and risk management effectiveness.

Banking Resilience

Banking resilience refers to the ability of banks to withstand economic shocks, maintain financial stability, and continue performing their intermediary functions during periods of uncertainty and financial stress. According to Berger and Bouwman (2015), resilient banks are capable of maintaining profitability, liquidity, asset quality, and lending capacity despite adverse economic conditions. Therefore, banking resilience is closely related to bank soundness and financial performance.

CAMELS Framework and Hypothesis Development

The CAMELS framework is one of the most widely used approaches for assessing bank soundness. Developed by banking regulators in the United States, the framework evaluates banking conditions through six dimensions: Capital, Asset Quality, Management, Earnings, Liquidity, and Sensitivity to Market Risk. According to Nguyen et al. (2020), the CAMELS framework provides a comprehensive assessment of banking performance and financial stability.

Capital and Banking Resilience

Capital adequacy reflects a bank’s ability to absorb potential losses and maintain operational stability. Capital Adequacy Ratio (CAR) is commonly used to measure the sufficiency of bank capital in supporting banking

activities and mitigating financial risk. Banks with stronger capital positions are generally more capable of withstanding economic shocks and maintaining profitability (Nguyen et al., 2020). Therefore, capital adequacy is expected to strengthen banking resilience

H1: Capital positively affects banking resilience.

Asset Quality and Banking Resilience

Asset quality reflects the level of credit risk faced by banks and is generally measured using the Non-Performing Loan (NPL) ratio. Higher NPL levels indicate greater default risk and ineffective loan management, which may reduce profitability and banking stability. Wisudanto and Fikri (2023) argued that lower NPL ratios indicate better banking performance because effective credit management reduces the possibility of loan defaults and enhances profitability.

H2: Asset quality negatively affects banking resilience.

Management and Banking Resilience

Management efficiency reflects the effectiveness of bank management in controlling operational activities and utilizing resources efficiently. This aspect is commonly measured using the Operational Cost to Operational Income ratio (BOPO). Higher operational costs may reduce profitability and weaken banking performance. Golin (2013) explained that inefficient management practices may increase operational burdens and reduce financial performance.

H3: Management negatively affects banking resilience.

Earnings and Banking Resilience

Earnings reflect a bank's ability to generate profits from its operational activities. Net Interest Margin (NIM) is commonly used to measure earnings performance because it indicates the effectiveness of banks in generating income from productive assets. According to Nadi (2017), banks with stronger earnings tend to demonstrate better financial performance and operational sustainability.

H4: Earnings positively affect banking resilience.

Liquidity and Banking Resilience

Liquidity reflects a bank's ability to meet short-term obligations and support lending activities. Loan to Deposit Ratio (LDR) is commonly used to assess liquidity conditions. Excessively high LDR levels may expose banks to liquidity pressure and increase vulnerability during periods of economic uncertainty. Puspitasari et al. (2021) found that liquidity risk may negatively affect banking profitability and stability.

H5: Liquidity negatively affects banking resilience.

Sensitivity to Market Risk and Banking Resilience

Sensitivity to market risk reflects a bank's exposure to fluctuations in exchange rates and interest rates. This component is commonly measured using Net Open Position (NOP). Effective management of market risk exposure may strengthen banking stability and profitability during periods of economic uncertainty (Nophiansah, 2018).

H6: Sensitivity to market risk affects banking resilience.

RGEC Framework and Hypothesis Development

The RGEC framework is a risk-based bank soundness assessment approach implemented by banking regulators in Indonesia. The framework consists of Risk Profile, Good Corporate Governance, Earnings, and Capital. Compared to CAMELS, RGEC places greater emphasis on governance quality and risk management effectiveness in evaluating banking stability and sustainability. This perspective is consistent with the risk governance literature, which highlights the importance of governance mechanisms and risk management structures in reducing bank risk-taking and enhancing banking stability (Abid et al., 2021; Nguyen, 2022)

Risk Profile and Banking Resilience

Risk profile reflects the level of risks faced by banks, including credit risk, liquidity risk, operational risk, and market risk. Banks with higher risk exposure are generally more vulnerable to financial instability and profitability deterioration. Wardoyo and Agustini (2015) argued that effective risk management contributes positively to banking performance by reducing financial uncertainty.

H7: Risk profile negatively affects banking resilience.

Good Corporate Governance and Banking Resilience

Good Corporate Governance (GCG) reflects the effectiveness of governance practices implemented by banks in maintaining transparency, accountability, and managerial effectiveness. Based on Agency Theory, strong governance mechanisms help reduce agency conflicts and improve organizational performance. Lestari and Wirakusuma (2018) found that governance quality positively influences firm performance and sustainability.

H8: Good Corporate Governance positively affects banking resilience.

Earnings and Banking Resilience

The earnings component in the RGEC framework reflects the bank's ability to generate sustainable profits and maintain operational efficiency. Strong earnings improve financial flexibility and enable banks to withstand economic shocks more effectively (Xu et al., 2019)

H9: Earnings positively affects banking resilience.

Capital and Banking Resilience

Capital adequacy reflects a bank's financial strength in absorbing losses and supporting operational activities. Banks with stronger capital positions tend to demonstrate greater resilience and financial stability during periods of economic uncertainty (Nguyen et al., 2020).

H10: Capital positively affects banking resilience.

RESEARCH METHODS

This study employs a quantitative research approach with a hypothesis-testing design using secondary data and panel data regression analysis. The objective of this study is to compare the effectiveness of the CAMELS and RGEC frameworks in explaining banking resilience among conventional commercial banks in Indonesia during the post-pandemic period. Banking resilience is proxied by Return on Assets (ROA), which reflects a bank's ability to generate profits from its assets and maintain financial performance under conditions of economic uncertainty.

The population of this study consists of all conventional commercial banks listed on the Indonesia Stock Exchange (IDX) during the period 2020–2023. The sample was selected using a purposive sampling technique based on the following criteria:

1. Conventional commercial banks listed on the Indonesia Stock Exchange during the period 2020–2023.
2. Banks supervised by the Financial Services Authority (OJK).
3. Banks that consistently published complete annual reports during the observation period.
4. Banks with complete data for all variables used in this study.

The sample selection procedure is presented in Table 1.

Table 1. Sample Criteria

Criteria	Number of Bank
Conventional commercial banks listed on IDX (2020–2023)	44
Bank delisted during the observation period	(1)
Bank with incomplete data	(5)
Final sample	38

Based on the sample selection process, 38 banks met the research criteria. With a four-year observation period, the study initially generated 152 bank-

year observations. After data screening and the exclusion of incomplete observations, the final dataset consisted of 138 observations.

This study utilizes secondary data obtained from annual reports, financial statements, and corporate governance disclosures published by commercial banks and the Financial Services Authority (OJK). Financial data were collected from audited annual reports. Risk Profile and Good Corporate Governance (GCG) data were obtained from banks' self-assessment disclosures reported in annual reports in accordance with OJK regulations concerning bank soundness assessment.

The dependent variable is banking resilience measured by Return on Assets (ROA). ROA is selected because it reflects the efficiency of banks in utilizing assets to generate profits and is widely recognized as an indicator of banking performance and resilience. The independent variables consist of CAMELS and RGEC components.

Within the CAMELS framework, Capital is measured using the Capital Adequacy Ratio (CAR), Asset Quality using the Non-Performing Loan (NPL) ratio, Management using the Operational Cost to Operating Income ratio (BOPO), Earnings using Net Interest Margin (NIM), Liquidity using the Loan to Deposit Ratio (LDR), and Sensitivity to Market Risk using the Net Open Position (NOP). LDR is selected as the liquidity indicator because it reflects the bank's ability to channel public funds into loans and is widely used by OJK in assessing bank soundness.

Within the RGEC framework, Risk Profile and Good Corporate Governance (GCG) are measured using composite ratings disclosed in banks' annual reports, while Earnings and Capital are represented by NIM and CAR, respectively. Firm Age (FAGE) and Firm Size (FSIZE) are included as control variables.

The operational definitions of the variables used in this study are presented in Table 2.

Table 2. Operational Definition of Variables

Variable	Proxy	Measurement
Banking Resilience	ROA	Net Income / Total Assets
Capital	CAR	Capital / Risk-Weighted Assets
Asset Quality	NPL	Non-Performing Loans / Total Loans
Management	BOPO	Operating Expenses / Operating Income
Earnings	NIM	Net Interest Income / Earning Assets

Liquidity	LDR	Total Loans / Total Deposits
Sensitivity to Market Risk	NOP	Net Open Position Ratio
Risk Profile	Risk Rating	Composite Risk Profile Score (1–5)
GCG	GCG	Composite Risk Profile Score (1–5)
Firm Age	FAGE	Number of years since establishment
Firm Size	FSIZE	Natural logarithm of total assets

Panel data regression analysis is employed because it combines cross-sectional and time-series dimensions, thereby improving estimation efficiency and controlling for unobserved heterogeneity among banks. The analysis is conducted using EViews 12 software.Three alternative panel data models are estimated, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The most appropriate model is selected through a sequence of model selection tests consisting of the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test.To ensure the validity and robustness of the regression results, several diagnostic tests are performed. Multicollinearity is examined using the Variance Inflation Factor (VIF), heteroscedasticity is tested using the Breusch–Pagan test, and autocorrelation is evaluated using the Durbin–Watson statistic. These procedures are conducted to ensure that the regression model satisfies the assumptions of panel data analysis.

The regression models used in this study are specified as follows:

CAMELS Method

$$ROA_{it} = \alpha + \beta_1 CAR_{it} + \beta_2 NPL_{it} + \beta_3 BOPO_{it} + \beta_4 NIM_{it} + \beta_5 LDR_{it} + \beta_6 PDN_{it} + \beta_7 FAGE_{it} + \beta_8 FSIZE_{it} + \varepsilon_{it}$$

RGEC Method

$$ROA_{it} = \alpha + \beta_1 Risk_{it} + \beta_2 GCG_{it} + \beta_3 NIM_{it} + \beta_4 CAR_{it} + \beta_5 FAGE_{it} + \beta_6 FSIZE_{it} + \varepsilon_{it}$$

Where:
ROA_{it} = banking resilience of bank I in year t
α = contants term
β = regression coefficient
ε_{it}= Error term for bank i in year t

RESULTS
Descriptive Statistics

Table 3. Results of Descriptive Statistical Test

Variabel	N	Mean	Maximum	Minimum	Std. deviation
ROA	137	0.011	0.048	-0.038	0.015
CAR	137	0.324	0.981	0.108	0.172
NPL	137	0.013	0.045	0.000	0.011
BOPO	137	0.872	1.649	0.438	0.198
NIM	137	0.043	0.105	-0.023	0.019
LDR	137	0.866	1.682	0.205	0.281
PDN	137	0.012	0.098	0.000	0.016
Risk Profie	137	2.088	3.000	1.000	0.309
GCG	137	3.956	5.000	3.000	0.437
FAGE	137	45.021	110	10	20.619
FSIZE	137	31.636	35.320	28.580	1.631

Table 3 presents the descriptive statistics of the variables used in this study. Banking resilience, measured by Return on Assets (ROA), records an average value of 0.011, indicating that commercial banks generally maintained positive profitability during the observation period. However, the minimum value of –0.038 suggests that several banks experienced losses under certain economic conditions. The average Capital Adequacy Ratio (CAR) of 0.324 indicates that sampled banks maintained relatively strong capitalization levels. Meanwhile, the average Non-Performing Loan (NPL) ratio of 0.013 suggests that most banks were able to manage credit risk effectively. Operational efficiency, represented by BOPO, records an average value of 0.872, indicating variations in cost efficiency among banks.

In terms of profitability, the Net Interest Margin (NIM) shows an average value of 0.043, reflecting stable interest-based income generation. The average Loan to Deposit Ratio (LDR) of 0.866 indicates that banks were relatively effective in channeling collected funds into loans. Furthermore, the low average Net Open Position (NOP) suggests limited exposure to exchange rate fluctuations and market risk. Under the RGEC framework, Risk Profile records an average score of 2.088, while Good Corporate Governance (GCG) shows an average score of 3.956. These findings indicate that most banks maintained moderate risk management quality and governance practices. In addition, Firm Age and Firm Size exhibit substantial variation across the sampled banks, reflecting differences in organizational maturity and business scale.

Panel Data Model Selection Test

Tabel 4. Chow Test Results

Model	Prob.	Selected Model
CAMELS	0.0000	*Fixed Effect Model*
RGEC	0.0000	*Fixed Effect Model*

Source : Eviews 12 output, processed by the authors (2024)

Table 4 presents the results of the Chow test for both the CAMELS and RGEC models. The probability values for both models are 0.0000, which are below the significance level of 0.05. Therefore, the null hypothesis is rejected, indicating that the Fixed Effect Model (FEM) is more appropriate than the Common Effect Model (CEM). Consequently, the FEM is selected for further model evaluation.

Hausman Test

Tabel 5. Hausman Test Results

Model	Prob.	Selected Model
CAMELS	0.0015	*Fixed Effect Model*
RGEC	0.0266	*Fixed Effect Model*

Source : Eviews 12 output, processed by the authors (2024)

Table 5 presents the results of the Hausman test for the CAMELS and RGEC models. The probability values of 0.0015 and 0.0266 are below the 0.05 significance level, indicating that the Fixed Effect Model (FEM) is preferred over the Random Effect Model (REM). Therefore, FEM is selected as the most appropriate estimation model for both frameworks.

The model selection process was conducted using the Chow test and Hausman test. The Chow test indicated that the Fixed Effect Model (FEM) was more appropriate than the Common Effect Model (CEM), while the Hausman test further confirmed that FEM was preferred over REM. Since both tests consistently supported the use of FEM, the Fixed Effect Model was selected as the final estimation model for this study. Consequently, the Lagrange Multiplier (LM) test was not conducted, as its primary purpose is to distinguish between the Common Effect Model (CEM) and the Random Effect Model (REM), whereas the final model had already been determined through the Chow and Hausman tests.

Diagnostic Test Results

Multicollinearity Test

Table 6. Multicollinearity Test Results (CAMELS Model)

	CAR	NPL	BOPO	NIM	LDR	PDN	FAGE	FSIZE
X1_CAR	1.000	0.029	0.037	0.224	0.145	-0.338	-0.005	-0.519

X2_NPL	0.029	1.000	0.489	-0.375	0.083	-0.033	-0.357	-0.396
X3_BOPO	0.037	0.489	1.000	-0.497	0.076	-0.044	-0.285	-0.468
X4_NIM	0.224	-0.375	-0.497	1.000	0.125	0.017	0.188	0.259
X5_LDR	0.145	0.083	0.076	0.125	1.000	-0.131	0.061	-0.138
X6_PDN	-0.338	-0.033	-0.044	0.017	-0.131	1.000	0.002	0.354
X7_FAGE	-0.005	-0.357	-0.285	0.188	0.061	0.002	1.000	0.257
X8_FSIZE	-0.519	-0.396	-0.468	0.259	-0.138	0.354	0.257	1.000

Source: Processed EViews 12 output (2024).

Table 7. Multicollinearity Test Result (RGEC Model)

	Risk Profile	**GCG**	**NIM**	**CAR**	**FAGE**	**FSIZE**
X1_Risk Profile	1.000	-0.574	-0.466	0.038	-0.255	-0.342
X2_GCG	-0.574	1.000	0.344	-0.093	0.220	0.478
X3_NIM	-0.466	0.344	1.000	0.239	0.157	0.241
X4_CAR	0.039	-0.093	0.239	1.000	-0.017	-0.530
X5_FAGE	-0.255	0.220	0.157	-0.017	1.000	0.228
X6_FSIZE	-0.342	0.478	0.241	-0.530	0.228	1.000

Source: Processed EViews 12 output (2024).

Tables 7 and 8 show that all correlation coefficients among the independent variables are below the threshold value of 0.80. The highest correlation coefficient in the CAMELS model is 0.519, while the highest correlation coefficient in the RGEC model is 0.574. These values indicate the absence of serious multicollinearity problems among the explanatory variables. Therefore, all independent variables are considered suitable for inclusion in the regression models.

Table 8.Comparison Results of Panel Data Regression Model 1 and Model 2 Fixed Effects Model (FEM)

Table 8. Regression Results of CAMELS and RGEC Models

Variable	**CAMELS Coefficient**	**t-Statistic**	**RGEC Coefficient**	**t-Statistic**
Constant	0.046811	1.317502	-0.012025	-0.221770
CAR	-0.001329	-0.336927	-0.006924	-1.186669
NPL	-0.032056	-0.467336	–	–
BOPO	-0.051793**	-12.444220	–	–
NIM	0.254236**	3.994369	0.312082**	3.782487
LDR	-0.010482**	-3.342618	–	–
PDN	-0.019363	-0.712135	–	–
Risk Profile	–	–	-0.011037**	-4.004358
GCG	–	–	0.000176	0.064946
Firm Age (FAGE)	0.000484***	1.644525	0.001472**	3.654170
Firm Size (FSIZE)	-0.000415	-0.362529	-0.001011	-0.595151

Variable	CAMELS Coefficient	t-Statistic	RGEC Coefficient	t-Statistic
R^2	0.962		0.911	
Adjusted R^2	0.9440		0.8709	

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source: Processed EViews 12 output (2024).

Regression Results

Comparison Between CAMELS and RGEC

Variable	CAMELS		RGEC	
	Coefficient	t-Statistic	Coefficient	t-Statistic
C	0.046811	1.317502	-0.012025	-0.221770
CAR	-0.001329	-0.336927	-0.006924	-1.186669
NPL	-0.032056	-0.467336		
BOPO	-0.051793**	-12.44422		
NIM	0.254236**	3.994369	0.312082**	3.782487
LDR	-0.010482**	-3.342618		
PDN	-0.019363	-0.712135		
Risk			-0.011037**	-4.004358
GCG			0.000176	0.064946
X7_FAGE	0.000484***	1.644525	0.001472**	3.654170
X8_FSIZE	-0.000415	-0.362529	-0.001011	-0.595151
R Square	0.911		**0.962**	
Adjusted R Square	0.8709		**0.944**	

Source : Eviews Processed Data 12,2024
Note : *,**,*** Significance in a 1%,5%,10%

CAMELS Model

The panel data regression results for the CAMELS model estimated using the Fixed Effect Model (FEM) are presented in Table 11. The results indicate that BOPO, NIM, LDR, and Firm Age (FAGE) significantly influence banking resilience as measured by Return on Assets (ROA). The coefficient of BOPO is negative and statistically significant, suggesting that higher operational inefficiency reduces bank profitability. In contrast, NIM exhibits a positive and significant relationship with ROA, indicating that banks with higher interest income tend to achieve better financial performance.

The coefficient of LDR is negative and significant, implying that excessive loan disbursement relative to deposits may increase liquidity pressure and reduce profitability. Meanwhile, CAR, NPL, PDN, and Firm Size (FSIZE) do not have a statistically significant effect on ROA. Among the control variables, Firm Age (FAGE) shows a positive and significant coefficient, indicating that older banks tend to exhibit greater operational experience and stability, which contributes positively to banking performance.

RGEC Model

The regression results for the RGEC model estimated using the Fixed Effect Model (FEM) reveal that Risk Profile, NIM, and Firm Age (FAGE) significantly affect banking resilience. The Risk Profile variable has a negative and significant coefficient, indicating that higher risk exposure tends to reduce bank profitability. Conversely, NIM shows a positive and significant relationship with ROA, suggesting that stronger interest-based income contributes positively to banking performance.

The results further indicate that Firm Age positively influences banking resilience, implying that more mature banks tend to demonstrate greater stability and profitability. However, Good Corporate Governance (GCG), Capital Adequacy Ratio (CAR), and Firm Size (FSIZE) do not exhibit statistically significant effects on ROA during the observation period.

The CAMELS model records an R^2 value of 0.911 and an adjusted R^2 value of 0.8709, indicating that approximately 87.09% of the variation in banking resilience can be explained by the independent variables included in the model. Meanwhile, the RGEC model reports an R^2 value of 0.962 and an adjusted R^2 value of 0.9440, suggesting that approximately 94.40% of the variation in banking resilience is explained by the model. These findings indicate that the RGEC framework provides greater explanatory power than the CAMELS framework in explaining banking resilience among Indonesian commercial banks during the 2020–2023 period.

DISCUSSION

The findings indicate that several components of the CAMELS framework, namely Capital Adequacy Ratio (CAR) and Non-Performing Loans (NPL), do not significantly affect banking resilience as measured by Return on Assets (ROA). Therefore, H1 and H2 are not supported. This finding is consistent with Nguyen et al. (2020), who reported that capital adequacy does not necessarily improve profitability when banks already maintain capital levels above regulatory requirements. Similarly, the insignificant effect of NPL suggests that credit risk remained relatively manageable during the observation period, limiting its impact on profitability. From the perspective of Financial Intermediation Theory, capital and asset quality are important for maintaining banking stability; however, their influence on profitability may become less pronounced when banks operate within relatively stable regulatory environments.

In contrast, management efficiency represented by BOPO has a significant negative effect on banking resilience, supporting H3. This finding is consistent with Golin (2013), who argued that inefficient operational management reduces profitability and organizational performance. The result suggests that banks with higher operating costs relative to operating

income tend to exhibit lower profitability. Furthermore, Net Interest Margin (NIM) positively and significantly affects ROA, supporting H4. This finding confirms previous studies indicating that stronger interest-based income contributes positively to banking profitability and sustainability. Liquidity, measured by the Loan to Deposit Ratio (LDR), also demonstrates a significant negative effect on ROA, supporting H5. Excessive loan expansion relative to deposits may increase liquidity pressure and reduce financial performance, particularly during periods of economic uncertainty.

Within the RGEC framework, Risk Profile exhibits a significant negative effect on banking resilience, supporting H7. This finding is consistent with Risk-Based Supervision Theory, which emphasizes that higher risk exposure weakens banking stability and profitability. Banks with greater risk exposure face higher uncertainty and are therefore more vulnerable to declines in financial performance. Meanwhile, Good Corporate Governance (GCG) does not significantly affect banking resilience, indicating that H8 is not supported. This finding may be explained by the relatively homogeneous governance ratings among Indonesian commercial banks, which reduce the variability of governance measures across the sample. In addition, governance mechanisms may influence banking performance indirectly through improvements in risk management, strategic decision-making, and internal control systems rather than directly affecting profitability. This explanation is consistent with Agency Theory, which suggests that governance mechanisms primarily function to reduce agency conflicts and strengthen monitoring effectiveness, with benefits that are often reflected in long-term stability rather than short-term profitability indicators.

The results also reveal that Firm Age positively influences banking resilience, indicating that more mature banks tend to possess greater operational experience, stronger customer relationships, and more established risk management practices. These characteristics contribute positively to profitability and organizational stability during periods of economic uncertainty.

A comparison of the two frameworks indicates that the RGEC model provides greater explanatory power than the CAMELS model. The CAMELS model records an adjusted R^2 value of 0.8709, whereas the RGEC model achieves an adjusted R^2 value of 0.9440. This finding indicates that the RGEC framework explains approximately 94.40% of the variation in banking resilience, compared to 87.09% explained by the CAMELS framework. The superior performance of RGEC may be attributed to its risk-based approach, which incorporates Risk Profile and Good Corporate Governance alongside earnings and capital indicators. Consequently, the RGEC framework appears to provide a more comprehensive assessment of banking resilience under conditions of economic uncertainty, while the CAMELS framework remains useful for evaluating short-term financial performance through traditional financial ratio indicators.

CONCLUSION, LIMITATION AND FUTERE RESEARCH

This study compares the effectiveness of the CAMELS and RGEC frameworks in explaining banking resilience among conventional commercial banks listed on the Indonesia Stock Exchange during the 2020–2023 period. The findings indicate that several financial performance indicators, particularly operational efficiency (BOPO), earnings (NIM), liquidity (LDR), and risk profile, play important roles in explaining banking resilience as measured by Return on Assets (ROA). Meanwhile, capital adequacy and governance variables do not demonstrate significant effects on banking resilience during the observation period.

More importantly, the comparison results reveal that the RGEC framework provides greater explanatory power than the CAMELS framework. The RGEC model achieves an adjusted R^2 value of 0.9440, compared to 0.8709 for the CAMELS model, suggesting that a risk-based assessment approach offers a more comprehensive explanation of banking resilience under conditions of economic uncertainty. This finding supports Risk-Based Supervision Theory, which emphasizes the importance of risk management and governance mechanisms in maintaining banking stability. Therefore, this study contributes to the banking literature by providing empirical evidence that risk-oriented assessment frameworks may better capture the determinants of banking resilience than traditional financial ratio-based approaches.

From a managerial perspective, the findings suggest that bank management should prioritize effective risk management practices, operational efficiency, and sustainable earnings generation to strengthen banking resilience. In addition, regulators may consider further enhancing risk-based supervisory approaches, as these appear to provide a more comprehensive assessment of banking conditions during periods of economic uncertainty.

This study is subject to several limitations. First, the analysis is limited to conventional commercial banks listed on the Indonesia Stock Exchange, which may not fully represent the entire Indonesian banking industry. Second, banking resilience is measured solely through Return on Assets (ROA), which primarily reflects financial performance and may not capture broader dimensions of resilience. Future studies may extend the analysis by incorporating Islamic banks, non-listed banks, or cross-country samples to improve generalizability. Furthermore, future research could employ alternative measures of banking resilience, such as Z-score, capital buffer, or financial stability indicators, to provide a more comprehensive assessment of banking resilience under different economic conditions

Acknowledgments

The authors would like to thank all parties who contributed to this research, including academic supervisors, colleagues, and institutions that provided support and access to the required data. Their valuable assistance and constructive feedback greatly contributed to the completion of this study

Authors' Contributions : Cantika Salsabila Pratiwi contributed to conceptualization, methodology, software, formal analysis, investigation, data curation, visualization, project administration, and writing of the original draft. Wisudanto contributed to conceptualization, validation, supervision, and manuscript review and editing. Both authors participated in the review and revision process and approved the final version of the manuscript.

Funding Statement: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflicts of Interest: the authors declare no conflicts of interest.

Declaration of use of generative AI and AI-assisted technologies: The authors declare that generative AI and AI-assisted technologies were used only to improve the language, grammar, readability, and formatting of the manuscript. The authors take full responsibility for the content of the publication.

Ethical Compliance: This study utilized secondary data obtained from publicly available financial reports and databases. No human participants or animals were directly involved in this research; therefore, ethical approval was not requireds.

REFERENCES

Abid, A., Gull, A. A., Hussain, N., & Nguyen, D. K. (2021). Risk governance and bank risk-taking behavior: Evidence from Asian banks. *Journal of International Financial Markets, Institutions and Money, 75*, 101466. https://doi.org/10.1016/j.intfin.2021.101466

Aebi, V., Sabato, G., & Schmid, M. (2012). Risk management, corporate governance, and bank performance in the financial crisis. *Journal of Banking & Finance, 36*(12), 3213–3226. https://doi.org/10.1016/j.jbankfin.2011.10.020

Alina, G., Zhurakhovska, L., Dugalova, G., Utegenova, Z., Omarova, B., & Murzatayev, Y. (2024). Risk-based regulation and supervision of second-tier banks: Experience of EU countries. *Business: Theory and Practice, 25*(2), 548–562. https://doi.org/10.3846/btp.2024.19604

Al-Homaidi, E. A., Tabash, M. I., Farhan, N. H. S., & Almaqtari, F. A. (2018). *Bank-specific and macro-economic determinants of profitability of Indian commercial banks: A panel data approach*. *Cogent Economics & Finance, 6*(1), 1548072. https://doi.org/10.1080/23322039.2018.1548072

Baselga-Pascual, L., Trujillo-Ponce, A., & Cardone-Riportella, C. (2021). Factors influencing bank risk in Europe: Evidence from the financial crisis and economic uncertainty. *Emerging Markets Review, 49*, 100807. https://doi.org/10.1016/j.ememar.2021.100807

Berger, A. N., & Bouwman, C. H. S. (2015). *Bank liquidity creation and financial crises: New perspectives*. Academic Press. https://doi.org/10.1016/C2014-0-04033-4

Danisman, G. O., Demir, E., & Zaremba, A. (2021). Financial resilience to the COVID-19 pandemic: The role of banking market structure. *Journal of Financial Stability, 57*,100987. https://doi.org/10.1080/00036846.2021.1904118

Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies, 51*(3), 393–414. https://doi.org/10.2307/2297430

Golin, J., & Delhaise, P. (2013). The Bank Credit Analysis Handbook: A Guide For Analysts, Bankers And Investors. John Wiley & Sons.

Gurley, J. G., & Shaw, E. S. (1960). *Money in a theory of finance*. Brookings Institution.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Karkowska, R., Korzeb, Z., Matysek-Jędrych, A., & Niedziółka, P. (2023). *Banking, risk and crises in Europe: From the global financial crisis to COVID-19*. Routledge.

Ledhem, M. A., & Mekidiche, M. (2020). Economic growth and financial performance of Islamic banks: A CAMELS approach. *Islamic Economic Studies, 28*(1), 47–62. https://doi.org/10.1108/IES-05-2020-0016

Lestari, D. M. G., & Wirakusuma, M. G. (2018). The Effect of the RGEC (Risk Profile, Good Corporate Governance, Earnings,andCapital)Method on CompanyValue. *E Jurnal Accounting, 24*(3), 20492072.http://dx.doi.org/10.24843/EJA.2018.v24.i03. p15

Manopimoke, P., Ongphiphadhanakul, B., & Kerdnunvong, A. (2024). Exchange rate in emerging markets: Shock absorber or source of shocks? *Journal of International Money and Finance, 141*, 103017. https://doi.org/10.1016/j.jimonfin.2023.103017

Nadi, L. (2017). Analysis of the Influence of Car, Npl and NIM on Banking Profitability Listed on the Indonesia Stock Exchange. *Scientific Journal of Accounting, University of Pamulang*, *4*(2), 268496.https://dx.doi.org/10.32493/jiaup.v4i2.183

Nguyen, A. H., Nguyen, H. T., & Pham, H. T. (2020). Applying The CAMEL Model To Assess Performance Of Commercial Banks: Empirical Evidence From Vietnam. *BanksandBankSystems,15*(2), 177-186.http://dx.doi.org/10.21511/bbs.15(2).2020.16

Nguyen, Q. K., & Dang, V. C. (2022). The impact of risk governance structure on bank risk management effectiveness: Evidence from ASEAN countries. *Heliyon, 8*(10), e11192. https://doi.org/10.1016/j.heliyon.2022.e11192

Nguyen, P. D., Nguyen, H. H., Nguyen, H. T., & Nguyen, T. T. (2024). Determinants of bank profitability in Vietnam: A focus on the COVID-19 period. *Journal of Business Economics and Management, 25*(6), 1164–1185. https://doi.org/10.3846/jbem.2024.22070

Nophiansah, D. (2018). Factors Affecting Return On Asset (Case Study on Foreign Exchange Banks in Indonesia for the Period 2011–2015). *Accounthink: Journal of Accounting and Finance*, *3*(01). https://doi.org/10.35706/acc.v3i01.1215

Puspitasari, C., Aprilia, F., Mentarie, M., & Bilkis, M. S. (2021). The influence of NIM, LDR, and BOPO on banking profitability recorded on the IDX during the pandemic. *Global Financial Accounting Journal*, *5*(1), 47-57. https://doi.org/10.37253/gfa.v5i1.4714

Reuters Breakingviews. (2025). *Predictions 2026*. Reuters. https://www.reuters.com/commentary/predictions/

Xu, T., Hu, K., & Das, U. S. (2019). *Bank profitability and financial stability* (IMF Working Paper No. 19/05). International Monetary Fund. https://doi.org/10.5089/9781484390078.001

Wardoyo, W., & Agustini, R. M. (2015). The impact of the implementation of the RGEC on the value of companies that go public on the Indonesia Stock Exchange. *Performance JournalofBusinessandEconomics*,*19*(2),128-140.

Wisudanto, W., & Fikri, M. J. A. (2023). Gender diversity, risk, and profitability in the banking system. *JPEKA: Journal of Economics, Management and Finance Education*, *7*(2), 127-142. https://doi.org/10.26740/jpeka.v7n2.p127-142