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Effectiveness of RGEC Banks Soundness Level, Exchange Rate and Interest Rate in Predicting Potential Bank Bankruptcy

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Abstract

This study examines the RGEC-based bank soundness level, Exchange Rate, and Interest Rate in predicting potential banking bankruptcy. The sample in this study consists of 152 data obtained from 38 banking sector companies listed on the Indonesia Stock Exchange (IDX) during the 2020-2023 period. The results of this study show that Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR) and Self-Assessment Good Corporate Governance (GCG) have a significant positive effect on the potential for bankruptcy, on the other Return on Asset (ROA) have a negative and significant impact on the potential for bankruptcy. Furthermore, the Capital Adequacy Ratio (CAR), Exchange Rate, and Interest Rate have no effect on the potential for bankruptcy. The study results show that four indicators, out of the five indicators of RGEC banks' soundness level, are effective in predicting potential bankruptcy. These results show that if bank management wants to predict and anticipate bankruptcy based on its health level, it can be considered to see and maintain NPL, LDR, GCG self-assessments, and ROA.

Keywords: *NPL; LDR; GCG; ROA; CAR; Exchange Rate; Interest Rate*

Introduction

Banking plays a crucial role in national development because, in the economy, banks serve as financial service providers for the public, businesses, and the government. The role of banks as financial intermediaries enables the distribution of funds from those with surplus funds (creditors) to those in need of funds (debtors). Therefore, the banking industry facilitates the flow of capital necessary for economic growth. However, this important role comes with challenges, as many customers are concerned about banks' ability to meet their obligations.

This customer distrust becomes a crucial factor in considering a bank's failure to meet its financial obligations, as it can have severe consequences for the bank's sustainability, including bankruptcy (Rizki and Gunarsih, 2024). Corporate bankruptcy impacts stakeholders and affects the entire economic chain. This situation can result in losses for investors who risk losing their entire investment, employees losing their jobs, incomplete payments to creditors, loss of revenue for the government, and decreased income for suppliers.

The Springate method was developed by an academic named Edward I. Springate in 1978. Initially, this method used 19 financial ratios, which were refined through testing and research, ultimately selecting four key ratios for predicting corporate bankruptcy (Prakoso et al., 2022). The S-Score assessment is based on four main financial ratios covering various critical aspects of a company's financial performance. By integrating these factors, the Springate S-Score evaluates a company's likelihood of bankruptcy by classifying the

resulting score that indicate low, moderate, or high bankruptcy risk (bfi.co.id, 2023).

The Springate S-Score utilizes the Multiple Discriminant Analysis (MDA) model, a statistical technique used to classify observations into specific groups based on individual characteristics. One advantage of MDA is that it considers all relevant company characteristics and financial ratios (Ananda, 2019). The Springate bankruptcy prediction model is simpler compared to other models, such as the Altman Z-Score, yet remains effective in providing insights into a company's financial stability. In bankruptcy prediction analysis, the Springate model has an accuracy rate of 92.5% (Springate, 1978).

According to Altman's theory, the relationship between bank performance and the potential for bankruptcy can be explained through an analysis of financial ratios that reflect the health of an entity. Good bank performance—reflected in high profitability (such as Return on Assets/ROA), adequate liquidity, maintained asset quality (low Non-Performing Loans/NPL), and strong capital adequacy (Capital Adequacy Ratio/CAR)—will result in a high Z-Score. This score indicates sound financial conditions and a low risk of bankruptcy. Conversely, if a bank experiences declining performance, such as rising bad loans (high NPL), low efficiency, decreasing profits, or weak capital, the Z-Score will decrease, indicating a higher risk of bankruptcy. Thus, Altman's theory emphasizes that poor financial performance directly increases the likelihood of a bank being in an unstable financial condition or even going bankrupt.

Risk management is a crucial factor in evaluating a bank's financial health. This assessment serves as the key to ensuring that a bank remains in a sound financial condition and can face potential risks, thereby maintaining trust and overall financial system stability. The Financial Services Authority Regulation (POJK) No. 4/POJK.03/2016 establishes criteria for assessing the financial health of commercial banks in Indonesia. This regulation ensures that commercial banks operate soundly, comply with capital requirements, and implement proper risk management to protect customers.

Key aspects are the focus of the RGEC assessment, which is used to evaluate a bank's financial health. This approach comprehensively assesses the bank based on Risk Profile, Good Corporate Governance (GCG), Earnings, and Capital. Overall, this strategy helps banks become more prepared to face risk changes and potential challenges, enhances competitiveness, and prevents issues that may affect the bank's stability (Rizki and Gunarsih, 2024).

Although RGEC provides a solid framework for assessing a bank's financial health, research findings vary regarding the impact of each aspect on bank bankruptcy or financial distress. Each RGEC indicator, such as Non-Performing Loan (NPL), Loan to Deposit Ratio (LDR), Good Corporate Governance (GCG), Return on Assets (ROA), and Capital Adequacy Ratio (CAR), has different effects depending on the context and other influencing variables.

For NPL, some studies, such as Rizki and Gunarsih (2024), found that NPL does not affect bankruptcy, while (Apriliasari et al., 2024) stated otherwise. These inconsistent findings highlight the need for further research to understand the relationship between NPL and bankruptcy.

Regarding LDR, studies by Mahmud et al. (2021) and Ginting et al. (2024) found that LDR influences bankruptcy, whereas Aminah et al. (2019) found no significant relationship. These findings suggest the need for a deeper understanding of other influencing factors, such as bank liquidity conditions or different managerial strategies.

Research on GCG also shows mixed results. Rizki and Gunarsih (2024) and Mahmud

et al. (2021) found a negative effect of GCG on bankruptcy, while Labita & Yudowati (2020) and Wandari, (2017) found no significant impact. These differences indicate a lack of understanding of how GCG implementation across banks affects financial stability.

For ROA, research by Rizki and Gunarsih (2024) and Aminah et al. (2019) found no significant effect on bankruptcy, while Labita & Yudowati (2020) and Anggraini (2017) found that ROA has a significant impact. These variations suggest differences in understanding how external factors or economic conditions influence the relationship between ROA and bankruptcy.

Finally, for CAR, Labita & Yudowati (2020) found that CAR has a significant positive effect on bankruptcy, while Haq & Harto, (2019) concluded that CAR does not significantly affect bankruptcy. These findings indicate the need for further investigation into how different capital structures and regulations influence the relationship between CAR and bankruptcy.

The evaluation of a bank's financial health not only considers internal factors but also takes into account macroeconomic factors that influence currency value. Natasa et al. (2023) and Femiliana et al. (2020) stated that interest rates do not affect the bankruptcy of the banking sector. However, this contradicts the findings of Khotimah et al. (2024), who discovered that interest rates influence the potential for bank bankruptcy.

When the exchange rate declines, export-import activities decrease, which in turn disrupts national development related to investments. Since the Indonesian rupiah is weaker than the US dollar, depreciation can impact the amount of debt that must be repaid. This happens because funds that should be allocated for growth are instead used to pay off existing debt. Sabrina (2019) found that exchange rates affect bankruptcy, whereas Darmawan (2017) concluded that exchange rates do not influence bankruptcy.

Exchange rates and interest rates are key macroeconomic factors that must be closely monitored, as they directly affect the financial health of banks. A severe decline in these factors could negatively impact financial performance in the banking industry, potentially leading to financial instability. However, previous research presents conflicting results, indicating the need for further studies to clarify the relationship between interest rates, exchange rates, and bank bankruptcy.

Method

Data and Sample

In this research, annual reports from banks are used to analyse ratios such as NPL, LDR, GCG, ROA, and CAR, as well as macroeconomic factors like interest rate and exchange rate. The population in this study refers to a general area consisting of objects/subjects with specific characteristics determined by the researcher for further analysis and conclusions (Sugiyono, 2022). In this case, the population includes banking sector companies listed on the Indonesia Stock Exchange (IDX) for the period from 2020 to 2023. In this study, the method used is purposive sampling, where the researcher selects samples based on specific criteria relevant to the research objectives. Here are the sample criteria determined by the researcher:

a. Private, government, and Islamic banking companies listed on the Indonesia Stock Exchange (IDX) for period 2020- 2023
b. Banking companies that have published annual financial reports on the IDX for the years 2020-2023.
c. Banking companies that have published data related to the variables NPL, LDR,

GCG, ROA, and CAR for the period 2020-2023.

Variable and Definitions Variable

The independent variables used are based on the RGEC assessment, including NPL, LDR, GCG self-assessment, ROA, CAR, as well as interest rate and exchange rate as macroeconomic factors. On the other hand, the dependent variable used in this study is bankruptcy, which is proxied using the Springate S Score. According to Rudianto (2013), the Springate method will indicate whether a company is in the safe zone or the bankruptcy zone. The criteria used to assess the company's sustainability are as follows:

a. If the S-Score index ≥ 0.862, the company is categorized as being in the safe zone (healthy).
b. If the S-Score index ≤ 0.862, the company is categorized as being in the unhealthy zone (potentially bankrupt).

The overall variables measurements are described in the table 1 below:

Tabel 1 Definition Variables

Variable Dependent	**Definition**	**Measurement**
S- Score	Springate S Score	1,03(working capital/total asset) + 3,07(EBIT/total asset)+0,66(EBT/current liabilities) + 0,4(sales/total asset)
Variables Independent	**Definition**	**Measurement**
NPL	Non- Performning Loans	$\frac{Non-Performing\ Loans}{Total\ Loans}$
LDR	Loan-to-Deposit Ratio	$\frac{Total\ Loans\ Granted}{Total\ Third\ Party\ Funds}$
GCG	Self Assessment Good Corporate Governance	*Self- Assessment* GCG composite of the annual report
ROA	Return on Asset	$\frac{Net\ Income}{Total\ Asset}$
CAR	Capital Adequacy Ratio	$\frac{Total\ Capital}{Risk\ Weighted\ Asset}$
ER	Exchange rate	Rupiah to USD data from Bank Indonesia
IR	Interest Rate	BI Rate data from Bank Indonesia

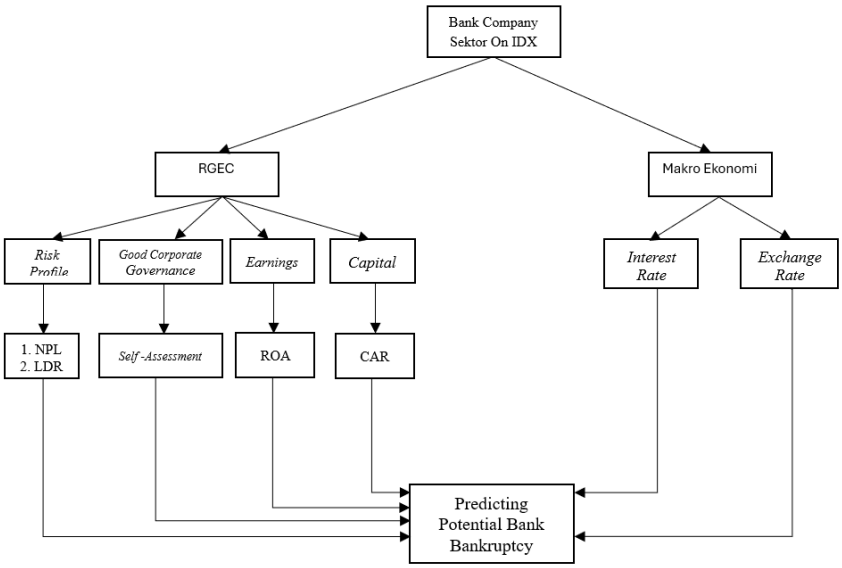
Analysis Method

In this study, a quantitative method is used, with data analysis techniques carried out using SPSS (Statistical Package for Social Science) software. The dependent variable in this study is categorical, so the determination of bankruptcy will be assessed using a dummy variable. Dummy variables are used in regression models when the independent variable is categorical (Ghozali, 2021). The determination is as follows:

a. If the company is in the safe zone, it is given a value of 0
b. If the company is in the bankruptcy zone, it is given a value of 1.

Research Framework

The research framework used in this study can be seen in the image below:



Results and Conclusion

Descriptive Statistics

The results of the descriptive statistics for the dependent variable and independent variables can be seen in the Table below. Descriptive statistics provide a comprehensive overview of the research data.

Tabel 2 Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
NPL	152	0,00%	9,23%	2,78%	1,64%
LDR	152	12,35%	373,61%	84,56%	36,19%
GCG	152	1	3	1,94	0,32
ROA	152	-14,75%	11,43%	1,04%	3,01%
CAR	152	10,78%	169,92%	34,13%	21,63%
ER	152	14.050	15.568	14.817	674,30
IR	152	3,50%	6,00%	4,68%	1,08%
S-Score	152	0	1	0,20	0,039

Based on the descriptive analysis, the results show that the Non-Performing Loan (NPL) variable has an average value of 2.78%, reflecting a relatively controlled level of non-performing loans. The loan-to-deposit ratio (LDR) variable shows an average value of 84.56%, generally indicating adequate liquidity in the bank, although there are some outliers. For Good Corporate Governance (GCG), the average value of 1.95 suggests that the company's governance quality is categorized as healthy. The Return on Assets (ROA) variable has an average value of 1.04%, indicating that the company's profitability is generally low but still considered acceptable. Meanwhile, the Capital Adequacy Ratio (CAR), with an average value of 34.13%, indicates overall good capital adequacy. The Exchange Rate (ER) shows an average of IDR 14,817, reflecting stable exchange rate fluctuations. Lastly, the Interest Rate (IR) variable has an average of 4.68%, suggesting that the interest rate is in a moderate range.

Regresion Logistic Analysis

In this study, logistic regression test analysis is conducted to determine whether the independent variables have an impact on the dependent variable. The steps for testing the logistic regression model are as follows: Overall Model Fit, Goodness of Fit, Coefficient of Determination (Nagelkerke R Square), and classification Matrix.

Tabel 3 Overall Model Fitt

Model	*Model Fitting Criteria*	*Likelihood Ratio Tests*		
	-2 Log Likelihood	*Chi-Square*	*df*	*sig*
Step 0	151,007			
Step 1	59,473	91,533	7	0,000

Table 3 above shows that the initial value of -2 Log Likelihood is 151.007, and after the 9th iteration, this value decreased to 59.473. This decrease indicates an improvement in model fit when the independent variables were included. The value of -2 Log Likelihood (59.473) < X2 table (173.004), so we accept H0, which indicates that the model with the inclusion of independent variables is a good fit with the data

Tabel 4 Goodness of Fit

Chi-Square	*df*	*Sig*
9,578	8	0,296

The results of the Model Fit Test in Table 4 show a Chi-square value of 9.578 > 14.067, or with a significance level of 0.296 > 0.05, indicating that the model can predict its observed values. Therefore, it can be concluded that the model is considered a good fit.

Tabel 5 Coefficient of Determination

Step	*-2 Log likelihood*	*Cox & Snell R Square*	*Nagelkerke R Square*
1	59,473	0,452	0,718

The coefficient of determination test results in table 5 can be seen from the Nagelkerke R Square value of 0.718. This indicates that the independent variables have a predictive power of 71.8% on the company's bankruptcy, while variables outside the model influence the remaining 28.2%.

Tabel 6 Classification Table

Observed	*Predicted*		
	Safe Zone	*Bankruptcy*	*Percentage Correct*
Safe Zone	121	1	99.2
Bankruptcy	7	23	76.7
Overall Percentage			94.7

Based on the results of the prediction accuracy test shown in Table 4.5, it can be concluded that the logistic regression model has an overall accuracy of 94.7%. Overall, this logistic regression model performs very well in classifying the data, although there is room for improvement in accuracy for the bankruptcy category.

Hypotheses Test

Partial tests are used to examine whether each independent variable, consisting of NPL, LDR, GCG, ROA, CAR, Exchange Rate, and Interest Rate, affects the dependent variable, which is the bankruptcy of banking companies. Below is the table of the hypothesis test results:

Tabel 7 Partial Signification Test Results

Variable	B	Wald	Sig
NPL	0,521	5,839	0,016
LDR	0,053	11,500	0,001
GCG	4,249	6,545	0,011
ROA	-2,895	13,413	0,000
CAR	-0,048	1,519	0,061
Exchange Rate	0,001	0,177	0,674
Interest Rate	-0,182	0,026	0,871
Constant	-23,010	1,056	0,304

The results in table 4.6 show that the variables influencing the model are NPL, LDR, GCG, and ROA ($p<0.05$), while other variables such as CAR, Exchange Rate, and Interest Rate do not significantly influence the model because they have values that are not significant ($p>0.05$).

Discussion

The first hypothesis in this study is that NPL has a positive effect on the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 5.839 > 1.655 with a significance value of 0.016 < 0.05. This means that H1 is accepted, indicating that NPL has a significant positive effect on the potential bankruptcy of the banking sector. This finding is supported by studies by Suhartanto et al. (2022) and Ginting et al. (2024), which found that NPL affects the potential for bankruptcy. The higher the NPL a bank has, the more loans are in default, increasing the credit loss provisions. This, in turn, reduces the bank's profits and liquidity. In response to high NPL, banks must increase their credit loss provisions to anticipate potential losses in the future. With a high number of problematic loans, banks will face difficulties in meeting short-term financial obligations and attracting additional capital. A high NPL rate can trigger a liquidity crisis and decrease the bank's ability to survive in the long term.

The second hypothesis in this study is that LDR positively affects the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 11.500 > 1.655, with a significance value of 0.001 < 0.05. This means that H2 is accepted, indicating that LDR has a significant positive effect on the potential bankruptcy of the banking sector. This finding aligns with studies by Mahmud et al. (2021) and Ginting et al. (2024), which found that LDR affects bankruptcy. A low LDR ratio indicates that the bank is not maximizing its revenue generation through loans. Banks with low LDR have untapped lending capacity, leading to potential lost profits. Therefore, an excessively low LDR can be a negative signal, as the bank fails to optimize the income potential derived from loans. On the other hand, an excessively high LDR can expose the bank to higher liquidity risk, as

the bank may not have enough reserves to cope with sudden changes in demand or financial problems.

The third hypothesis in this study is that GCG has a positive effect on the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 6.545 > 1.655 with a significance value of 0.011 < 0.05. This means that H3 is accepted, indicating that GCG has a significant positive effect on the potential bankruptcy of the banking sector. This finding is supported by studies conducted by Rizki and Gunarsih (2024) and Mahmud et al. (2021), which found that GCG has a negative effect on bankruptcy. Self-assessment of Good Corporate Governance (GCG) can be an important tool for predicting the potential bankruptcy of a company. Good GCG management ensures that every strategic and operational decision is made with caution and based on accurate information. In the banking context, the implementation of good management governance allows banks to manage risks more effectively and efficiently, while also improving adaptability to challenges and emerging issues. Ultimately, this will have a positive impact on operational and financial performance, as well as minimize bankruptcy risks through more responsible management focused on sustainability.

The fourth hypothesis in this study is that ROA has a negative effect on the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 13.413 > 1.655 with a significance value of 0.000 < 0.05. This means that H4 is accepted, indicating that ROA has a significant negative effect on the potential bankruptcy of the banking sector. This finding is supported by studies conducted by Labita and Yudowati (2020) and Anggraini (2017), which found that ROA has a significant effect on bankruptcy. ROA is used to determine how well a bank generates profit from its assets. The higher the ROA, the more efficient the bank is at managing its assets to generate profit. Banks with high ROA tend to have better profitability, enabling them to better withstand financial crises. On the other hand, banks with low ROA may face difficulties in meeting their short-term obligations, potentially leading to bankruptcy

The fifth hypothesis in this study is that CAR has a negative effect on the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 1.519 < 1.655 with a significance value of 0.061 > 0.05. This means that H5 is rejected, indicating that CAR has no significant negative effect on the potential bankruptcy of the banking sector. This finding is supported by research by Haq & Harto (2019), which found that CAR does not have a significant impact on the potential bankruptcy. A low CAR ratio indicates that a bank has low capital reserves, which reflects a decline in the bank's health. However, although CAR is an indicator of bank stability, it is not always the primary determinant in predicting bank bankruptcy. Berger and Bouwman (2013) state that CAR only reflects capital adequacy based on risk-weighted assets (RWA), but does not take into account managerial factors such as risk management, credit innovation, or liquidity.

The sixth hypothesis in this study is that the Exchange Rate positively affects the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 0.177 < 1.655, with a significance value of 0.674 > 0.05. This means that H6 is rejected, indicating that the Exchange Rate does not significantly affect the potential bankruptcy of the banking sector. This result is supported by research by Yulilusman and Hernando (2023) and Femiliana et al. (2020), which found that the exchange rate does not significantly affect bankruptcy. Banks involved in international transactions may be affected by currency exchange rate fluctuations. Debt in foreign currencies can become more expensive when exchange rates move unpredictably, thus increasing the risk of

losses and affecting the bank's financial stability. However, these exchange rate fluctuations can be mitigated by banks with good risk management practices. Therefore, it can be concluded that exchange rate fluctuations do not always have a direct or significant effect on banking bankruptcy.

The seventh hypothesis in this study is that the Interest Rate has a negative effect on the potential bankruptcy of the banking sector. Based on the hypothesis test results, the Wald value is 0.026 < 1.655 with a significance value of 0.871 > 0.05. This means that H7 is rejected, indicating that the Interest Rate does not significantly affect the potential bankruptcy of the banking sector. This result is supported by research by Yulilusman and Hernando (2023) and Femiliana et al. (2020), which found that the interest rate does not significantly affect bankruptcy. An increase in interest rates can raise funding costs for banks and reduce loan demand, which impacts interest income. High interest rates also increase the risk of non-performing loans, as borrowers with variable-rate loans may struggle to pay installments. Banks that fail to manage interest rate changes effectively are at risk of higher costs and lower income. However, even though high interest rates have the potential to affect financial stability, their impact on bank bankruptcy is not always significant, especially for banks with effective hedging strategies against interest rate fluctuations.

Conclusion and Limitation

Based on the results of the study, the findings are Non-Performing Loan (NPL) has a significant positive effect on the potential for bankruptcy in the banking sector. Similarly, Loan-to-Deposit Ratio (LDR) also shows a significant positive influence on banking bankruptcy potential. Good Corporate Governance (GCG) is found to have a significant positive effect on the potential for bankruptcy as well.

On the other hand, Return on Assets (ROA) has a significant negative impact on banking bankruptcy, meaning higher ROA reduces the likelihood of bankruptcy. However, Capital Adequacy Ratio (CAR) does not show a significant effect on the potential for bankruptcy. Exchange rate fluctuations are found to have no significant impact on the potential for bankruptcy in the banking sector, and Interest rate changes also do not show a significant effect on banking bankruptcy.

In conducting data tabulation for financial ratios such as NPL, LDR, GCG, ROA, and CAR, the researcher chose to use the financial ratios that were already published by the banks without performing the calculations themselves. This study did not include inflation and economic growth variables to analyze their impact on the potential bankruptcy of the banking sector. In addition, the data used is limited to publicly listed companies (excluding regional banks) and does not take into account qualitative variables such as risk management or OJK intervention.

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