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Banking Risk Analysis and Its Effect on Bank Performance in Indonesia

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Abstract:
This research investigates the effect of various banking risks, including operational expense risk (BOPO), capital risk (CAR), liquidity risk (LDR), market risk (NIM), and credit risk (NPL) on a bank's Return on Assets (ROA). The study is a descriptive quantitative analysis, concentrating on the descriptive aspects through a quantitative perspective. The study focuses on a sample of 44 banking companies that are listed on the Indonesian Stock Exchange (BEI). Method of sample selection Purposive Sampling is a technique that relies on specific criteria set by the investigator, focusing on entities that submitted annual reports within the 2015-2019 timeframe and are registered on the Indonesian Stock Exchange, specifically involving 32 banks. The data for this study was obtained from secondary sources, specifically banking financial reports from 2015 to 2019. The results reveal that operational cost risk (BOPO) has a significant negative impact on ROA, as does capital risk (CAR). On the other hand, liquidity risk (LDR) demonstrates a positive, yet statistically insignificant, effect on ROA. Furthermore, market risk (NIM) and credit risk (NPL) both have a significant negative effect on ROA.

JEL: E44; G21; G32

Keywords:
BOPO; CAR; LDR; NIM; NPL; ROA

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1. Introduction

The bank is one of the institutions that helps a country's economy grow. The rise of banks in a country can even show how well the economy is doing. Banking Law Number 10 of 1998 says that banks are businesses that take money from individuals in the form of savings and give it to people in the form of credit or other things to help many people live better lives. So, banks have two jobs: they take money from those who have too much and provide it to people who don't have enough. Banks can help many people live better lives by acting as middlemen. Banks' major jobs are to get money from the community, give money to the community, and offer banking services (Ismail, 2013).

The banking sector is essential to the financial system and plays a key role in driving the economic development of a nation. A bank is a commercial institution that functions within the finance or financial services sector. In the banking industry, institutions are stringently supervised by Bank Indonesia, the nation's central bank, due to their operations engaging several stakeholders within society. A comprehensive understanding and management of banks will undoubtedly foster a robust financial system. An effective financial system will enhance banking performance and profitability. According to the Financial Services Authority Regulation no. 18 / POJK.03 / 2016 on Risk Management Implementation for Commercial Banks, eight types of risks are recognized: credit risk, market risk, operational risk, liquidity risk, legal risk, strategic risk, compliance risk, and reputational risk.

Both internal and external factors affect how profitable a bank is. Internal factors that influence bank performance include cash flow, operating risk, credit risk, market risk, capital adequacy, and liquidity risk. External factors, on the other hand, encompass monetary policy, fluctuations in exchange rates, inflation, interest rates, securities, treasury management, globalization, competition between banks and non-bank financial institutions, as well as the emergence of new technologies and financial instruments (Yulistiani & Suryatini, 2016; IMF, 2025; Review of Financial Studies, 2023; National Academy of Sciences, 2025; European Central Bank, 2021; Federal Reserve, 2023).

There are various methods for assessing a company's performance. The company's financial reports are the variables or indications that are used to make the assessment. The worth of a business will go up if a public corporation does well. You may figure out how well a company is doing by looking at and studying its financial reports. People frequently rely on historical data regarding a company's financial status and performance to make predictions about its future outcomes. Other things that directly interest users include dividend payments, wages, changes in security prices, and the company's ability to meet its obligations when they come due. Performance is something that any business must do well, because it shows how well the business can manage and use its resources.

While companies typically use return on equity (ROE) to measure profitability, banks rely on ROA for the same purpose. Return on Asset (ROA) looks at how well a firm can make money from its operations, while Return on Equity (ROE) solely looks at how much money the business owner makes from their investment (Mawardi, 2005). ROA is utilized in this study to determine how well banks are doing. ROA is a profitability statistic that shows how well a company uses all of its assets to make money. Bank Indonesia rules say that a good ROA level is about 1.5%, according to Number 3/30/DPNP from December 14, 2001.

Various elements that affect the performance of banks include BOPO, CAR, LDR, NIM, and NPL. Bank Indonesia regulations define BOPO as the ratio of total operating costs to total operating income. Operational efficiency is evaluated by banks to ascertain if their operations pertaining to core business activities align with the expectations of management and shareholders. Additionally, it assesses whether the bank has effectively and appropriately utilized all its production factors (Mawardi, 2005; Kartika & Syaichu, 2006; Sasongko, 2011; Sudiyatno & Suroso, 2010; Syafriana et al., 2008; Yulistiani & Suryatini, 2016). As a result, the operational efficiency of a bank is reflected in the BOPO ratio, which significantly impacts the bank's performance.

A financial statistic that pertains to banking capital is known as the Capital Adequacy Ratio (CAR). This metric indicates how the capital of a bank influences its ability to function in an efficient manner. It is possible for a bank to properly manage all of its operations, which will result in an anticipated growth in shareholder value, and vice versa (Muljono, 1999). If a bank’s capital is sufficient to absorb unavoidable losses, it can continue to operate. Therefore, the Capital Adequacy Ratio (CAR) affects the performance of banks.

Quantifying a bank's ability to fulfill its commitments is accomplished through the use of the Temporary Loan to Deposit Ratio (LDR). As a result, a higher Loan-to-Deposit Ratio (LDR) is associated with better bank profits, given that the bank is able to appropriately deploy its credit. As a consequence, improved bank profitability would result in enhanced bank performance. Consequently, the magnitude of a bank's Loan-to-Deposit Ratio (LDR) will have an effect on the performance of the bank being discussed.

Net interest margin, often known as NIM, is a measure of market risk that is caused by fluctuations in market factors and has the potential to have a negative impact on the bank. As per the regulations imposed by Bank Indonesia, the interest rate is considered to be a proxy for market risk. This risk is quantified by the disparity between the interest rates on funding (funding) and the interest rates on loans (lending). In absolute terms, the difference between total funding interest expenses and total loan interest revenues is referred to as the Net Interest Margin (NIM) in the banking industry (Mawardi, 2005). In the end, the magnitude of NIM will have an effect on the profit and loss of the bank, which will consequently have an effect on its performance.

A Non-Performing Loan (NPL) is the ratio of total non-performing loans to the total credit extended to borrowers. A bank is considered to have a high NPL if the quantity of non-performing loans exceeds the total credit extended to borrowers. A high non-performing loan (NPL) ratio in a bank would elevate costs, including those associated with provisioning for productive assets and other expenses; thus, an increase in a bank's NPL adversely affects its performance. Research by Yurdakul (2014) indicates that the escalation of banks credit risk is affected by the rise in money supply, unemployment rate, inflation rate, and interest rate. A bank that extends low-risk loans typically generates substantial profits. Conversely, if a bank extends credit with significant risk, it will yield minimal earnings. To ensure effective financial risk management, it is essential for banks to understand the impact of banking risks on their financial performance.

2. Literature Review

2.1. Variables

Economic Financial performance

The performance of banking institutions can be evaluated using financial ratio analysis. Bank soundness is regulated by Bank Indonesia through Circular Letter Number 6/23/DPNP dated 31 May 2004, which pertains to all commercial banks engaged in conventional business activities regarding the assessment system for their soundness. Additionally, Bank Indonesia Regulation Number 6/10/PBI/2004, dated 12 April 2004, mandates that banks evaluate their health status. The evaluation of banking performance encompasses intermediation, profitability, risk, and additional factors.

Return On Asset (LONG)

Return on Assets (ROA) is utilized to assess bank profitability, as Bank Indonesia, the regulatory authority, emphasizes the profitability metric of banks, which is evaluated based on assets mostly funded by public deposits. "A higher Return on Assets (ROA) indicates a greater level of profitability for a bank and reflects a more favorable position regarding asset utilization" (Dendawijaya, 2009). Return on Assets (ROA) was selected as a metric to assess banks financial performance due to its capacity to evaluate a company's efficiency in creating profits via the utilization of its owned assets.

$$ROA = \frac{Total\ profit\ before\ tax}{Average\ Total\ Assets} \times 100\%$$

A favorable ROA ratio signifies that the entire assets employed in bank operations generate profits for the institution. A negative ROA signifies that the entire assets employed are incapable of generating a profit, resulting in a loss. According to Bank Indonesia Circular Letter Number 13/24/DPNP dated 25 October 2011, the minimum Return On Asset (LONG) ratio is 1.5%.

B. Operational Risk (BOPO)

IBI (2016) defines operational risk as the risk arising from deficiencies and/or malfunctions in internal procedures, human error, system failures, and/or external events that impact banking operations. Operational risk is attributable to people resources, procedures, systems, and external events. The metric for assessing operational risk is the ratio of Operational Expenses to Operational Income, referred known as BOPO. BOPO is a ratio that compares operational expenses to operational revenue. Fundamentally, banks serve as mediators in the collection and distribution of public funds, resulting in operational costs and revenues primarily influenced by interest expenses and interest income (Dewi, 2015). An rise in operational costs will lead to a reduction in profit before tax, thereby diminishing bank profitability. Manikam & Syafruddin (2013) assert that BOPO is utilized to assess the efficiency of banks in executing their operational tasks. A high BOPO value signifies a decline in the bank's profitability. If the BOPO number is low, it can be concluded that bank profitability grows.

C. Capital Risk (CAR)

The potential for loss associated with risk capital is contingent upon the quality of the assets managed by the bank. Risk capital represents a situation in which the bank is unable to absorb the losses that arise. A useful metric for assessing the size of capital is the Capital Adequacy Ratio (CAR). The capital adequacy ratio represents the proportion of capital to assets, adjusted for risk factors. Proportion This illustrates the extent to which distant activities involve risks that can be supported by internal capital resources, alongside securing funds from external sources like public contributions, loans, and more. CAR represents an analysis of the relationship between capital and risk-weighted assets. A high CAR value signifies that the bank possesses greater capital, reflecting an elevated level of public trust in depositing funds with the institution. Individuals are more likely to feel secure in placing their funds with banks when there is a high level of capital adequacy present. An increase in the CAR value correlates with an increase in the bank's profitability.

D. Liquidity Risk (LDR)

Liquidity risk arises when a bank cannot meet its short-term obligations, leading to potential disruptions in the company's operations. Liquidity risk is often referred to as short-term liquidity risk. For instance, short-term obligations like delays in banks disbursing employee salaries or tardiness in settling electricity bills, among others. Rustam (2017) defines liquidity risk as the potential challenge a company faces when it cannot fulfill its maturing debts using cash flow funding sources and/or high-quality liquid assets that can be used as collateral, all while maintaining its operational stability and financial health.
The lack of access to cash flow funding sources, which leads to liquidity risk, can stem from an inability to produce cash flows from productive assets or from asset sales, including liquid assets, as well as challenges in generating cash flow through fundraising, inter-company transactions, and loans received.

The Loans to Deposit Ratio (LDR) is one of the most important ratios for figuring out how risky it is for banks to lend money. Prasetiono (2015) says that LDR shows how much credit a bank gives out that is paid for by third-party funds. It also shows how well the bank can satisfy its obligations to depositors while also giving credit to borrowers. Dendawijaya (2014) supports this idea by saying that LDR shows the balance between a bank's liquidity and its lending activity, which is very important for financial stability.

Furthermore, Ginting (2022) explains that a higher LDR indicates a bank's assertive lending approach, which could boost profitability while simultaneously increasing the bank's exposure to liquidity risk. Sutrisno (2025) delves deeper into the interplay between liquidity risk, capital, and third-party funds, emphasizing the collective impact of these elements on a bank's performance. Yatiningsih (2015) presents empirical evidence indicating that LDR, in conjunction with other factors like BOPO and NPL, has a significant effect on the ROA in Indonesian banks. Zainal and Suryani (2020) examine the critical factors influencing bank profitability, highlighting the significant impact of liquidity ratios such as LDR on ensuring financial stability. The LDR illustrates the relationship between the total credit allocated by the bank and the funds that the bank has received. Should the credit allocated by the bank surpass the established limit, it signifies that the distribution of funds is operating effectively. The bank will generate supplementary revenue from interest accrued via credit transactions. According to PBI No. 15/15/PBI/2013 issued by Bank Indonesia, the minimum Loan to Deposit Ratio (LDR) for banks is set at 78%, while the maximum is established at 92%. A high LDR value indicates that the bank will achieve greater profitability.

Market Risk (MRM)

Rustam (2017) defines market risk as the risk reflected in the financial position report and administrative accounts that arises from fluctuations in market prices. This encompasses risks associated with overall changes in market conditions, including the risk of variations in option prices. Market risk encompasses both specific risk and general market risk. Specific risk refers to the risk that arises from fluctuations in securities, influenced by factors associated with the security itself or its issuer. In the interim, systemic risk refers to the risk arising from fluctuations in market prices that impact multiple financial instruments.

A common ratio utilized for assessing market risk is the Net Interest Margin (NIM). Prasetiono (2015) indicates that NIM serves as a metric for assessing a bank's capability to generate net interest income through the allocation of available assets. When a financial institution generates interest from overseeing substantial asset portfolios, it can effectively mitigate potential challenges that may arise. To assess effectiveness in handling different risks associated with interest rates, financial institutions may utilize NIM. A higher NIM value indicates that the bank will achieve greater profitability. This phenomenon can be attributed to the rising interest income generated from productive assets overseen by financial institutions.

Credit Risk (NPL)

Credit risk refers to a scenario in which the borrower fails to repay the principal amount and any associated costs related to the investment as outlined in the terms of the credit agreement. Credit risk can lead to issues with cash flow and impact bank liquidity, as payments might be delayed or absent (Greuning & Bratanovic, 2011).

As outlined in Law Number 7 of 1992, article 1, paragraph 12, credit refers to the provision of money or equivalent bills, established through an agreement or a bill that can be considered equivalent. This arrangement occurs between a bank and another party, necessitating that the borrower repay the debt after a specified period, along with an agreed-upon amount of interest or profit sharing. The roles of credit within the economy encompass enhancing the usability of money, boosting the circulation and flow of funds, serving as a mechanism for economic stability, fostering enthusiasm for business endeavors, and promoting equitable income distribution.

To evaluate the extent of credit risk, bank management can analyze the institution's credit growth strategy, the nature of the credit issued, and the effectiveness of credit provision by examining the lists of approved credits, extended credits, and credit concentrations (IBI, 2016). Typically, banks allocate credit by evaluating multiple factors as a foundation for analysis to prevent low or declining productivity of productive assets (credit).

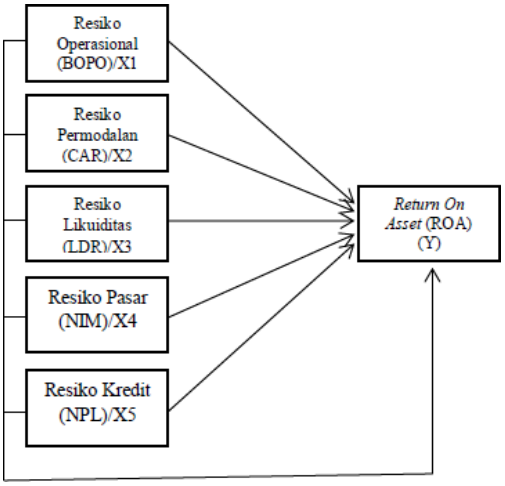

Figure 1: Research Framework

3. Data and Methodology

The research conducted is characterized by a descriptive approach utilizing quantitative methods. Descriptive research focuses on determining the value of each independent variable without establishing relationships or making comparisons with other variables. These variables can systematically characterize a population or a specific domain. Descriptive research is conducted primarily to objectively depict a situation (Sugiyono, 2007). The study focused on banking companies that are listed on the Indonesia Stock Exchange (BEI), with the research period commencing in June 2021.

This study employed a method to identify the data sample, specifically through Non-Probability Sampling, where the sample data must be selected based on specific criteria. The selection of samples is determined by specific criteria. Purposive sampling is a technique that relies on the considerations of the individual conducting the study. The samples utilized in this study consist of banking companies that are listed on the Indonesia Stock Exchange (BEI) and meet the following criteria: a) Banks listed on the Indonesia Stock Exchange during the period from 2015 to 2019, b) Banks that provide annual reports throughout the observation period from 2015 to 2019. The number of samples utilized in this study, as outlined in the sampling criteria above, is 32 banks.

This study employs secondary data. This secondary data is shown as a panel dataset, which has both time series and cross-sectional parts. This study's data comes from secondary sources, such as banking financial records from 2015 to 2019. You might find these reports on the Indonesia Stock Exchange website (www.idx.co.id) and on the official websites of the banks that made them. Also, reference books and other scholarly works were used, focusing on 32 banks that were listed on the Indonesia Stock Exchange during the time period in question.

The Fixed Effect Model (FEM) posits that individual differences exist in the intercepts. Nonetheless, the coefficient (slope) of the independent variables remains consistent across individuals or throughout time. The finite element model is outlined as follows:

$$LnROA_{it} = \beta 1_1 + \beta 1 lnBOPO_{it} + \beta 2 lnCAR_{it} + \beta 3 lnLDR_{it} + \beta 4 lnNPL_{it} + \beta 5 lnNIM_{it} + \mu_{it} \quad (1)$$

Let β1 represent the intercept, while β2, β3, and β4 denote the coefficients for the independent variables. In FEM, distinct intercepts are established for each individual cross-section, highlighting the variations among the different populations utilized in this study, which are derived from secondary data sourced from the World Bank. The data utilized in this study consists of panel data, derived from time series data spanning 11 years, along with cross-sectional data from five ASEAN countries: Indonesia, Malaysia, Cambodia, the Philippines, and Vietnam.

This study analyzes Gross Domestic Product (GDP) as the dependent variable, with internet users, mobile phone subscribers, and broadband internet subscribers as independent variables. The research employs quantitative data analysis, using Stata for processing. Multiple linear regression is applied to investigate the relationships between the independent and dependent variables. Panel data is used, and three estimation methods—pooled least squares, fixed effects models, and random effects models—are examined. To determine the most suitable model, several tests are conducted, including the Chow test, Hausman test, and Lagrangian multiplier test. Additionally, standard assumption tests for normality, multicollinearity, heteroscedasticity, and autocorrelation are performed, alongside partial t-tests, simultaneous F-tests, and a coefficient of determination test.

Before hypothesis testing, it is crucial to perform classical assumption tests to validate the model's parameters. The normality test ensures that the data follows a normal distribution, while the multicollinearity test checks for correlations between independent variables in the regression model. The Variance Inflation Factor (VIF) is used to detect multicollinearity. Multiple linear regression is applied to assess the relationship between the dependent and independent variables, usually to predict the value of one variable based on others. Hypothesis testing is then conducted to evaluate the model's significance, using the partial t-test to analyze the impact of individual independent variables, the F-test to assess the combined effect of all independent variables, and the coefficient of determination to measure the proportion of variance in the dependent variable explained by the independent variables.

4. Result and Discussion

Descriptive Statistic

Variable		Mean	Std. Dev.	Min	Max	Observations	
roa	overall	1.516125	1.587374	-9.58	4.73	N =	160
	between		1.421079	-3.892	4.026	n =	32
	within		.7423573	-4.171875	3.978125	T =	5
bopo	overall	86.17738	14.86901	56.04	195.7	N =	160
	between		13.26628	60.56	135.556	n =	32
	within		7.037106	58.92138	146.3214	T =	5
car	overall	20.70694	6.864519	8.03	66.43	N =	160
	between		5.398362	10.312	39.278	n =	32
	within		4.325788	1.088937	47.85894	T =	5
ldr	overall	84.67762	13.96598	41.99	145.26	N =	160
	between		12.96819	49.118	113.04	n =	32
	within		5.577223	67.44562	116.8976	T =	5
nim	overall	5.391312	1.93693	1.53	12	N =	160
	between		1.834039	1.888	11.52	n =	32
	within		.6874737	2.777313	10.49731	T =	5
npl	overall	2.30025	5.944953	.08	75	N =	160
	between		2.828951	.3	16.622	n =	32
	within		5.247936	-14.08175	60.67825	T =	5

Figure 2: Descriptive Statistic Result
Source: Secondary data processed, 2021

The data indicates that the average ROA for Conventional Banks from 2015 to 2019 was 1.516125, with a Standard Deviation of 1.587374. The maximum ROA recorded was 4.73, while the minimum was -9.58. The mean BOPO value for Conventional Banks from 2015 to 2019 was 86.17738, with a Standard Deviation of 14.86901. The peak BOPO level was recorded at 195.7, while the lowest level was noted at 56.04. The mean CAR value for Conventional Banks from 2015 to 2019 was 20.70694, with a Standard Deviation of 6.864519. The peak CAR level attained was 66.43, while the minimum recorded was 8.03. The mean LDR value for Conventional Banks from 2015 to 2019 was 84.67762, with a Standard Deviation of 13.96598. The peak LDR level attained was 145.26, while the minimum recorded was 41.99. The mean LDR value for Conventional Banks from 2015 to 2019 was 84.67762, with a Standard Deviation of 13.96598. The maximum LDR level recorded was 145.26, while the minimum was 41.99. The mean NIM value for Conventional Banks from 2015 to 2019 was 5.391312, with a Standard Deviation of 1.93693. The peak NIM level was recorded at 12, while the minimum was noted at 1.53. The mean NPL value for Conventional Banks from 2015 to 2019 was 2.30025, with a Standard Deviation of 5.944953. The peak NPL level was 75, while the minimum recorded was 0.08.

Hausmann Test

	Coefficients (b) fixed	(B) .	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
bopo	-.0997946	-.0998818	.0000872	.0022205
car	-.0123634	-.0066397	-.0057237	.0026211
ldr	.0039227	-.0018704	.0057931	.0030866
nim	-.0304351	.0643475	-.0947826	.0274248
npl	-.0007071	-.0018668	.0011597	.0002052

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 13.77
Prob>chi2 = 0.0172

Figure 3: Hausman Test Result
Source: Secondary data processed, 2021

This Hausman test operates under the assumption that if the p-value is below 0.05, the fixed effect model is appropriate. If the p-value exceeds 0.05, the random effects model is deemed more suitable. The table shows a p-value of 0.0172, which is below the 0.05 threshold, indicating that the fixed effect model is the correct choice for this analysis.

Chow Test

```
Fixed-effects (within) regression               Number of obs      =       160
Group variable: code                            Number of groups   =        32

R-sq:                                           Obs per group:
     within  = 0.8854                                         min =         5
     between = 0.9434                                         avg =       5.0
     overall = 0.9300                                         max =         5

                                                F(5,123)           =    190.06
corr(u_i, Xb)  = 0.2268                         Prob > F           =    0.0000
```

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
bopo	-.0997946	.0033782	-29.54	0.000	-.1064815	-.0931076
car	-.0123634	.0052591	-2.35	0.020	-.0227734	-.0019534
ldr	.0039227	.0041039	0.96	0.341	-.0042007	.0120461
nim	-.0304351	.0347597	-0.88	0.383	-.0992398	.0383696
npl	-.0007071	.0043334	-0.16	0.871	-.0092848	.0078706
_cons	10.20571	.5244776	19.46	0.000	9.167542	11.24388
sigma_u	.34986736					
sigma_e	.28572493					
rho	.59990016	(fraction of variance due to u_i)				

```
F test that all u_i=0: F(31, 123) = 3.50                     Prob > F = 0.0000
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Figure 4: Chow Test Result
Source: Secondary data processed, 2021

The Chow test compares the effectiveness of two regression models, namely the fixed effect and common effect models. It suggests that if the p-value is below 0.05, the common effect model is suitable; however, if the p-value exceeds 0.05, the fixed effect model is more appropriate. The table shows a p-value of 0.000, which is less than 0.05, indicating that the common effect model is the most appropriate choice.

Langrange Multiplier Test

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Estimated results:
```

	Var	sd = sqrt(Var)
roa	2.519755	1.587374
e	.0816387	.2857249
u	.0368871	.1920601

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Test:   Var(u) = 0
                          chibar2(01) =    17.60
                Prob > chibar2 =   0.0000
```

Figure 5: Langrange Multiplier Test Result
Source: Secondary data processed, 2021

The Lagrange test suggests that if the p-value is less than 0.05, the random effects model is the best fit; if the p-value is greater than 0.05, the OLS model should be used for panel regression. The table shows a p-value of 0.000, which is below 0.05, indicating that the random effects model is the most appropriate for the panel data regression in this study.

Fixed Effect Regression Test

Table 1: Fixed Effect Regression Test Result
Source: Secondary data processed, 2021

Variables	Coefficient	Std. Error	T-statistic
BOPO	- .0997946	.0069807	-14.30***
CAR	- .0123634	.0034802	-3.55***
LDR	.0039227	.0045935	0.85*
NIM	-.0304351	.1316343	-0.23*
NPL	-.0007071	1.151975	8.86***
R-squared : 0.93			
Observation : 160			
Notes : Significant at *** 1%, ** 5%, *10%			

The findings of the Regression Test Figure above are derived from the regression estimation of the dependent variable ROA using the Fixed Effect Model, as shown below:

The estimation findings indicate that the variable coefficient of Operational Costs and Operational Income (BOPO) at -0.0997946 negatively affects ROA. This indicates that a 1 percent rise in the BOPO value results in a loss of 0.0997946 units in the ROA, provided all other independent variables remain constant.

The analysis of the test results regarding Operational Costs and Operational Income (BOPO) in relation to ROA for conventional commercial banks listed on the Indonesia Stock Exchange from 2014 to 2018 reveals a negative and significant correlation. BOPO is a metric that indicates the degree of efficiency a bank achieves in its operational management. An analysis of the expenses associated with a bank's core operations in relation to the revenue generated from these operations. Operational expenses including interest expenses, labor expenses, marketing expenses, and various other operational expenses. In the meantime, the operational income of a bank is derived from interest earned through interest income as well as other forms of operational income. Preliminary test findings indicate that the BOPO ratio has a negative and significant impact on the ROA ratio of Conventional Commercial Banks. This indicates that an increase in the BOPO value of a bank correlates with a decrease in the bank's profits, and the opposite holds true as well. The low BOPO ratio demonstrates the bank's capability to efficiently manage its operational activities, thereby fostering profit growth that the bank can realize.

The estimation results indicate that the coefficient value for the variable CAR, which is -0.0123634, exerts a negative influence on ROA. This indicates that an increase of 1 percent in the CAR results in a decrease of 0.0123634 units in the ROA, provided that the other independent variables remain constant. The CAR significantly negatively impacts ROA. The CAR indicates the extent of capital sufficiency that a bank possesses to mitigate potential risks associated with banking issues. This indicates that an increase in the CAR will lead to a decrease in profitability.

The capital held by banks is not being managed efficiently, as the value of risk-weighted assets (RWA) in the sampled companies exceeds the capital allocated to support these RWA. Consequently, the elevated CAR negatively impacts banking profitability. The significant RWA value indicates the company's expansion in high-value assets, which correlates with an increased level of risk, ultimately leading to a reduction in profitability. Consequently, this study indicates that the CAR negatively influences the ROA in banking.

The CAR serves as a crucial determinant in the extent of credit allocated to both the public and the business sector. The higher the profit achieved, the larger the volume of credit that will be channeled, resulting in a greater CAR for the respective bank. Nevertheless, if profits from each year are not promptly allocated to shareholders, there will be an accumulation of retained earnings that will increase over time, resulting in capital growth that may not match the expansion of productive assets. This influences the bank's capacity to broaden fund distribution.

The estimation results reveal that the LDR coefficient, valued at 0.0039227, has a small but positive impact on ROA. This suggests that, holding other variables constant, a 1% increase in LDR would lead to a 0.0039227 rise in ROA. The effect test for LDR and ROA in conventional commercial banks from 2014 to 2018 shows a positive, yet statistically insignificant, relationship. LDR is calculated by comparing the total credit provided to the total third-party funds a bank can access. The findings indicate that while LDR and ROA are positively correlated, the relationship is not statistically significant. In other words, a higher LDR tends to increase ROA.

The LDR serves as a key ratio for assessing a bank's liquidity position. A high LDR level indicates that banks tend to allocate their funds towards credit activities to maximize profits. In essence, the value of other liquid assets available for meeting withdrawals at any time for the bank's short-term obligations is low. This situation can lead to reduced profits as the bank strives to uphold public confidence in its capacity to meet obligations for the funds deposited with it. The estimation results indicate that the variable coefficient value for Net Interest Margin (NIM) at -0.0304351 exerts a negative influence on ROA.

This indicates that an increase of 1 percent in the NIM value results in a decrease of 0.0304351 units in the ROA value, provided that the other independent variables remain constant. The findings from the analysis of the impact of Net Interest Margin on Return On Assets indicate a negative and statistically insignificant correlation. NIM is a ratio used to evaluate how effectively a bank manages its assets to generate net interest income from the interest it earns. A higher ratio signifies greater interest income generated by the bank from its productive assets. The estimation results show that the coefficient value fluctuates.

The Non Performing Loan (NPL) of -0.007071 adversely affects the ROA. This indicates that a 1 percent increase in the NPL value results in a decrease of 0.007071 units in the ROA value, assuming all other independent variables remain constant.

The results of the hypothesis testing show that credit risk management, as measured by NPL, negatively affects financial performance, as evaluated by ROA. The adverse impact demonstrated by non-performing loans suggests that an increase in NPL correlates with a decline in bank income and profits, resulting in a decrease in ROA. Given the significant impact of credit repayment rates on banking performance, it is essential to closely monitor the board of commissioners and directors regarding the segregation of responsibilities among the functions of analyzing credit applications, granting credit approval, and reviewing credit.

The NPL ratio assesses the proportion of non-performing loans relative to the total amount of credit disbursed. NPLs (Non Performing Loans) serve as a metric for banks to assess their capacity to manage the risk associated with credit repayment by borrowers (Dermawan, 2004). Preliminary findings indicate that fluctuations in Non Performing Loans will influence the profit growth trajectory of the Bank. This suggests that a rise in the bank's Non-Performing Loan (NPL) value will result in lower bank profits, while a decrease in NPLs will have the opposite effect.

5. Conclusion

The panel data regression analysis shows that operational cost risk (BOPO) has a significant negative impact on ROA, with capital risk (CAR) also negatively and significantly influencing ROA. In contrast, liquidity risk (LDR) has a positive, though weak, effect on ROA. Similarly, both credit risk and market risk (NIM) have a significant negative impact on ROA..

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