
Size, Capital Adequacy Ratio (CAR), Loan to Deposit Ratio (LDR), and Operating Expenses/operating Income (BOPO) Increase ROE in KBMI 1 in Indonesia Banks?

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Abstract

Aim/purpose – This study examines the effects of Size, Operating Expenses/Operating Income (BOPO), Loan to Deposit Ratio (LDR), and capital adequacy ratio (CAR) on the return on equity (ROE) of bank category KBMI 1 in Indonesia. Since the bank KBMI 1 has a capital requirement of only Rp 6 Triliyon. The survival of banks with small capital will be challenged by economic conditions. In this study, the sample used only 7 banks listed in the BEI Jakarta. The study utilizes secondary data obtained from the secondary data, audit financial reports, or annual reports published during the period from 2019 to 2024 with a panel data regression analysis technique, chosen model with Chow test and Hausman test of which model is efficient to be employed either Fixed Effect Model (FEM) or Random effect model (REM), from the test of the model, specifically a Fixed Effects Model (FEM), was chosen. **Findings** – This study found that Size has a positive and significant but Operating Expenses/ Operating Income (BOPO) has a negative and significant impact on ROE. Loan to Deposit Ratio (LDR) and Capital Adequacy Ratio (CAR) have no significance in increasing the profitability during the period of study; most of the banks suffer losses in the COVID-19 period. However, simultaneously, the size, Operating Expenses/Operating Income (BOPO), Loan to Deposit Ratio (LDR), and capital adequacy have a significant in increase the Return on Equity of banks in the core capital bank category one (KBMI 1) in Indonesia.

Keywords: Size, Operating Expenses/Operating Income (BOPO), Loan to Deposit Ratio, Capital Adequacy Ratio (CAR), and Return on Equity (ROE)

1. Introduction

1.1 Introduce the Problem

The research gap in this study, regarding banks under the category of the core capital category one (KBMI 1) below 6 trillion Rupiah, some banks have contributed good company performance, and some have not; on the other hand, there are several bank suffer losses during 2019 up to 2024. A bank is an institution under regulation made and supervised tightly by the Financial Services Authority in Indonesia. The bank must be comply with the regulation issued by OJK and Bank of Indonesia. The capital is a problem of the small bank (KBMI 1) for expansion the credit, however some digital bank has developed very fast however the traditional bank is very conservatism in expansion the credit. Some suffer loss but the other gain in operated the bank. The challenge of this bank KBMI 1 study is capital adequacy increase but does not effect the profitability of the bank. Loan to Deposit Ratio increase but does not effect the profitability also. This may be indicated that the the bank has significant on non-performing-loan, but the financial report during 2019-2024 does not show NPL increased also.

1.2 Explore the Importance of the Problem

There are several indicators in a bank to determine whether there are performances in excellent condition or not, such as capital adequacy ratio, loan to deposit ratio, operating income/operating expenses (BOPO), and non-performing loan (NPL). Banks are the entry point of the crisis; if the bank's condition is generally good, then the economic condition in general indicates that it is also good. Likewise, savings and loans between customers do not have problems. When the economy is not doing well, banks will experience a lot of bad loans, thus disrupting banking conditions, which ultimately has a big impact on the economy in both good and bad situations. Credit risk affects the bank's profitability, such as Return on Equity (ROE) and depreciation due to non-performing loans (Cobbinah et al., 2024). A bank's balance sheet is also made up of shareholders' assets, liabilities, and equity, but it has some significant differences. To achieve financial performance and sustainability, banks need to include sustainable finance on their balance sheets in the banking industry (Perdana et al., 2023).

1.3 Describe Relevant Scholarship

The following is an explanation of the components of Assets: Gross Loan, Loan Loss Allowance, and Net Loan. Gross Loan is the total amount of money that the bank has disbursed to customers. The bank allocates a certain amount of funds as Loan Loss Allowance to cover loans that are estimated to be bad or in default. During the COVID-19 pandemic, Banks in Indonesia experienced an increase in NPLs (Annas et al., 2024). Net Loans are obtained by deducting the Loan Loss Allowance from the Gross Loan. Investments: Cash and cash equivalents, investment securities, trading assets, intangible assets. Kewajiban bank adalah sumber pendanaan utama yang digunakan untuk membiayai asetnya, terutama pinjaman. The Customer deposits are generally the largest source of funding, but banks also obtain funds from other sources such as commercial securities, loan funds, and long-term debt.

Bank activities are recorded in the balance sheet through changes in the loan volume on the asset side and the volume of customer deposits or other funding instruments on the liability side. Loans and deposits represent the largest share of total assets and total liabilities, indicating that the bank's core business is to manage the movement of money. By analyzing the balance sheet, we can deduce whether there has been an increase or decrease in the bank's activity, as well as how the bank is using its resources to finance its loans. The Bank Income Statement is generating income from interest, not sales income. Interest costs are classified as operating expenses, making funding a fundamental part of core operations. The integration of funding into operations fundamentally changed the way profitability and efficiency were measured for banks. The higher the LDR, the higher the bank's income, thereby increasing the bank's capital (Anisa & Sutrisno, 2020).

The performance of banks is highly dependent on balance sheets. Loans = Assets; Deposits are debts to customers but also serve as raw materials to generate loans. The classification of debt is more complex. Unlike non-bank companies, customer deposits blur the line between funding and operations, which makes the classification complicated. Declining economic growth (GDP) has an impact on a decline in credit, which leads to a decrease in interest income in banks (Masdjojo et al., 2023). According to Regulation of POJK 12/2021 (OJK, 2021), Bank Group Based on Core Capital (KBMI), KBMI 1: Up to 6 trillion rupiah, KBMI 2: More than 6 trillion rupiah up to 14 trillion rupiah, KBMI 3: More than 14 trillion rupiah up to 70 trillion rupiah, KBMI 4: More than 70 trillion rupiah.

1.4 State Hypotheses and Their Correspondence to Research Design

Capital Adequacy Ratio and Return On Equity (ROE)

Capital Adequacy Ratio (CAR) is a ratio that links a bank's capital to risk-weighted assets. In essence, a CAR shows how strong a bank's capital is in absorbing unexpected losses arising from a variety of risks, including credit risk, market risk, and operational risk. To measure the adequacy of capital to support risk-weighted assets, the size of the CAR is also determined in terms of providing credit to the public and the capacity of banks to disburse credit (Priharta & Gani, 2023). Capital adequacy ratio (CAR) measures a bank's risky assets financed by a bank's capital, such as loans, securities, and bills to other banks (Fiana & Endri, 2025). OJK implements minimum capital provision obligations for commercial banks in Indonesia in line with international standards from the *Basel Committee on Banking Supervision* (BCBS).

Formula: Minimum Capital Provision Obligation in Indonesia. The Capital Provision Obligation (CAR) and the Basel Standard are $CAR = (\text{Tier 1 Capital} + \text{Tier 2 Capital}) / \text{Risk Weighted Assets}$.

Hypothesis 1: Capital Adequacy Ratio has a positive and significant effect on ROE

Operating Expenses/Operating Income (BOPO) and Return On Equity (ROE)

The efficiency of bank management and the opportunities a bank can take. Banks that are less efficient show high OE/OI (BOPO) and have a negative impact on bank profitability. OE/OI is inversely proportional to the bank's profitability (Supriyono & Herdhayinta, 2019). Total Operating Expenses/Operating Income measures the efficiency of a bank's operating costs. Formula: $BOPO = \text{Total Operational Costs} / \text{Total Operational Income}$. BOPO is calculated based on the ratio of operating costs to operating income. BOPO shows the efficiency of the management bank and determines what strategies or opportunities can be taken by the manager.

Hypothesis 2: Operating Expenses/Operating Income has a negative and significant effect on ROE.

Loan Deposit Ratio (LDR) and Return On Equity (ROE)

The higher the LDR, the greater the credit provided, so that the bank's income can increase the bank's capital (Anisa & Sutrisno, 2020). The loan-to-deposit ratio (LDR) is a measure of how much depository funds are restricted by the regulator from being lent by the bank. (Natufe & Evbayiro-Osagie, 2023). Loan to Deposit Ratio (LDR) measures third-party funds against Core Capital Weighted Assets (ATMRs). When the risk is below average, the LDR is not determined by the size of the banking risk. In general, banks provide credit without referring to CAR, ROE, or NPM. Government policies are here to support public demands so that the wheels of the economy rotate (Widiyanto et al., 2023). LDR formula = $\text{Total Credits} / \text{Total Third-Party Funds}$. Measures the liquidity risk/effectiveness of bank fund disbursement. LDRs can be used to measure funding effectiveness. As LDRs increase, bank profits increase, based on the assumption that banks can provide financing effectively (Muhammad et al., 2020).

Hypothesis 3: Loan-to-Deposit Ratio (LDR) has a negative and significant effect on ROE.

Bank Size dan Return On Equity (ROE)

The larger the bank's total assets, the greater the bank's ability to distribute credit, so that the funds obtained from interest income are also larger, and the Return on Equity is also larger. The size of the bank affects profitability. Most of Vietnam's commercial banks are relatively small, with a minimum government-required capital in Vietnam. These banks struggle to provide adequate financial services and maintain business sustainability (Chau et al., 2025). Digital transformation as a competitive advantage in generating sustainable profitability (Daeli & Wedari, 2025). Productivity and independence index affect Return on equity (ROE), capital adequacy, and income diversification. Productivity and profitability, COVID-19, and GDP affect net interest margin (NIM) (Natufe & Evbayiro-Osagie, 2023).

Hypothesis 4: Size has a positive and significant effect on ROE.

1. Method

This study uses the KBMI 1 Population where the banking capital is below Rp 6 Trillion, random sampling of 7 samples was carried out by random sampling, the test tool used views by testing the suitability of the model through the Chow Test and Hausman Test, model fixed effect model (FEM) or Random effect model (REM) is chosen then the t test and the F test were carried out, as well as classical assumption tests such as normality tests, heteroscedasticity tests and multicollinearity tests.

The Normality Test aims to find out whether the residual value is distributed normally or not by using *the Jarque-Bera Test (JB)*. The indicator used to decide whether this model is normally distributed or not is to use the assumption of Prob JB with an alpha level of 0.05 (5%), where:

1. If the Prob. JB > 0.05 , then it is normally distributed
2. If the Prob. JB < 0.05 , then it is abnormally distributed.

The purpose of the Multicollinearity test is to conduct a regression model test and find out whether in the research model there is an attachment among independent variables. If multicollinearity occurs, it means that the resulting variable tends to be high, which indicates a high standard of model error. This causes the estimation results to have an interpretation that the absence of a linear relationship of the free variable affects the bound variable.

The Heteroskedasticity test aims to test whether in the regression model there is variance disparity from the residual of one observation to another.

Reliability Test/Goodness of Fit (F Stat)

This test is used to test the significance of all regression variables together, assuming:

- If the value of prob (Fstat) is $< \alpha$, then it can be said that the estimated regression model is feasible.
- If the prob (Fstat) value is $> \alpha$, then it can be said that the estimated regression model is not feasible. In addition to the above indicators, the F test is also seen from the results of the F table using the reference $f1 = k-1$, and $df2 = n-k$, so that the F-table value can be searched in the distribution point table F using a probability of 0.05. Furthermore, the results of Ftable are compared with Fcalcul. Independent variables are said to be feasible if F calculated $> F$ table.

3. Results

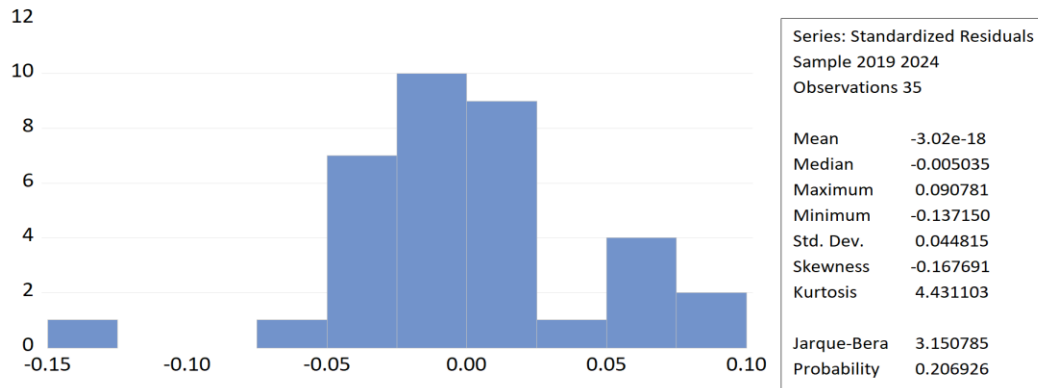
3.1 Descriptive Statistics

	BOPO	CAR	LDR	SIZE	ROE
Mean	0.826286	0.530391	0.844000	16.43023	6.57E-05
Median	0.840000	0.405200	0.690000	16.64668	0.022300
Maximum	1.470000	1.699200	2.510000	17.91368	0.082500
Minimum	0.260000	0.115900	0.120000	14.59478	-0.405300
Std. Dev.	0.247756	0.360751	0.509320	0.754271	0.090716
Skewness	-0.071664	1.311071	1.511086	-0.393664	-3.048756
Kurtosis	3.730325	4.540509	5.491916	2.798673	13.11040
Jarque-Bera	0.807797	13.48782	22.37545	0.963107	203.2916
Probability	0.667712	0.001178	0.000014	0.617823	0.000000
Sum	28.92000	18.56370	29.54000	575.0582	0.002300
Sum Sq. Dev.	2.087017	4.424806	8.819840	19.34344	0.279801
Observations	35	35	35	35	35

- The average of operating expenses/ operating income 82.6%, this is indicated bank has average profitability, is very good, with a standard deviation of around 24.77%.
- The average of the Capital Adequacy Ratio 53.03% is quite safe, because the regulatory requirement of CAR is only 8%.
- The average of the Loan to Deposit Ratio 84.4% is quite optimal, the regulation requirement is 90% up to 110% according to Indonesia Bank Law.
- The size of the bank used in the sample category KBMI 1, it means the capital is below Rp 6 trillion.
- Return on Equity shows the lowest percentage and median around 2.23% only; however, the standard deviation is only 9.07%, which means the profitability representation with ROE of the bank category KBMI 1 is very low.

3.2 Statistics and Data Analysis

Normality Test

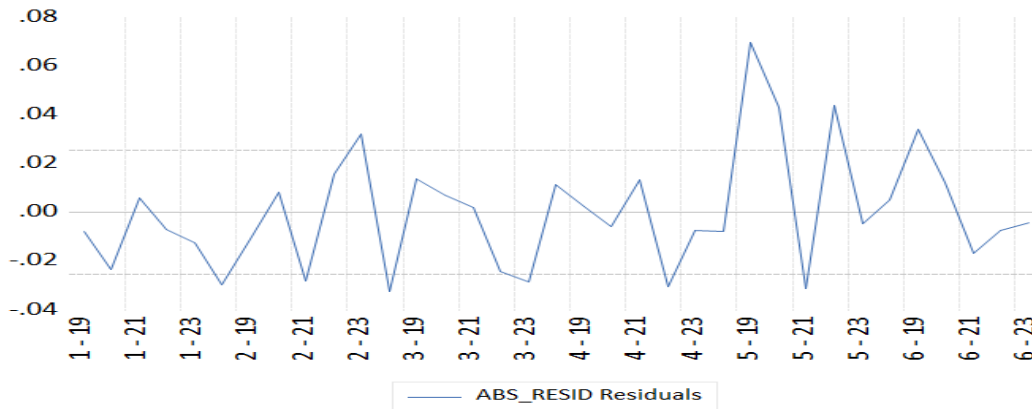


The value of the Prob. Jarque-Bera > 0.05 is normally distributed. It means the sample meets the requirements or passes the normality test.

Heteroskedasticity Test

Dependent Variable: ABS_RESID
 Method: Panel Least Squares
 Date: 04/11/26 Time: 10:09
 Sample: 2019 2024
 Periods included: 6
 Cross-sections included: 6
 Total panel (unbalanced) observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.410499	0.122216	3.358799	0.0021
BOPO	0.108897	0.025387	4.289415	0.0002
CAR	0.003329	0.017149	0.194098	0.8474
LDR	0.003087	0.010881	0.283724	0.7786
SIZE	-0.028819	0.007765	-3.711230	0.0008
R-squared	0.430007	Mean dependent var		0.031352
Adjusted R-squared	0.354008	S.D. dependent var		0.031567
S.E. of regression	0.025372	Akaike info criterion		-4.378815
Sum squared resid	0.019311	Schwarz criterion		-4.156623
Log likelihood	81.62926	Hannan-Quinn criter.		-4.302114
F-statistic	5.658064	Durbin-Watson stat		1.841067
Prob(F-statistic)	0.001623			



It did not pass the heteroscedasticity test because the variables BOPO and Size were Prob.<0.05, but the residual graph test passed. Attached are the residual graph results where the graph results do not exceed the -500 and +500 limits.

Residual Graph Test

Regression Test Results

Remarks	Coefficient	Sig.
C	-1.650786	0.0000*
BOPO	-0.278732	0.0000*
CAR	0.046100	0.2808
LDR	-0.018040	0.5009
Size	0.113933	0.0000*
R ²	75.5%	
Adjusted R ²	66.81%	
D-W	2.58	

Significancy *=1%, **=5%, ***=10%

The Model Equation is as follows:

$$ROE_{it} = -1.65078607681 - 0.278732434822*BOPO_{it} + 0.0460997792691*CAR_{it} - 0.0180401808974*LDR_{it} + 0.11393260743*SIZE_{it} + e_{it}$$

4. Discussion

Coefficient of Determinants (adjusted R-Squares) = 66.81%, this model explain variable BOPO, CAR, LDR, and Size increase the ROE, which can be explained; the remaining is determined by other factors outside the model, Ceteris Paribus. The critical limit values for t-statistical testing at the significance levels of 1%, 5%, and 10%, respectively, were 2.576, 1.96, and 1,645.

From the results of the independent variable t-statistic test: Size and BOPO indicate a significance of 1%. Meanwhile, LDR and CAR have no significant effect on ROE. Constant value means that if there is no Size, BOPO, CAR, or LDR, the ROE will only grow by a negative of 1.65%

The value of the Size Coefficient is 0.1139. If the other variable is constant, and the Size variable increases by 1%, then the ROE variable will increase by 0.11%, and vice versa. If the size variable decreases by 1%, then the ROE variable will increase by 0.1139%, *ceteris paribus*. This research is supported by Masdjojo et al (2023).

The value of the BOPO Coefficient is -0.2787. If the other variable is constant, and the BOPO variable increases by 1%, then the variable will decrease by 0.2787%, and vice versa. If the BOPO variable decreases by 1%, then the ROE variable will increase by 0.2787%, *ceteris paribus*. because the increase and decrease in BOPO are inversely proportional to ROE. This is

supported by research, Supriyono & Herdhayinta (2019), which states that BOPO negatively and significantly affects ROE.

The value of the LDR Coefficient is negative 0.018. If the other variable is constant, and the LDR variable increases by 1%, then the ROE variable will decrease by 0.018%, and vice versa, if the LDR variable decreases by 1%, the ROE variable will increase by 0.018%, *ceteris paribus*. Because the increase and decrease in LDR are inversely proportional to ROE, this is supported by research. The results of the research by Priharta & Gani (2025) show that in this study, the LDR does not have a significant effect because the LDR in KBMI 1 banks is not efficient compared to large banks.

The value of the CAR Coefficient is 0.046. If the other variables are constant, and the CAR variable increases by 1%, then the ROE variable will decrease by 0.046%, and vice versa, if the CAR variable decreases by 1%, the ROE variable will increase by 0.046%, *ceteris paribus*. CAR has a high enough standard deviation for KBMI 1 category banks, so that the fluctuations of CAR do not influence the significance of ROE not significant. Concerning the Minimum Capital Provision Obligation of Commercial Banks (POJK 2016/11)

The conclusion of the study indicates the following:

1. Bank Size has a positive and significant influence on Return on Equity.
2. Operating Expenses/Operating Income (BOPO) has a negative and significant influence on Return on Equity.
3. Loan to Deposit Ratio and Capital Adequacy Ratio do not affect Return on Equity due to inefficiencies in lending to KBMI 1 category banks.
4. Size, operating expenses/operating income (BOPO), Loan to Deposit Ratio (LDR), and Capital Adequacy Ratio together affect the Return on Equity (ROE).

Proper analysis of the bank to be assessed is very important (differences between different bank profiles in terms of activity, geographical exposure, risk, etc.). It will be useful to select the comparator company (not only as a multiple), but to calculate the discount rate, set the right capital requirements, etc.

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