

FACTORS AFFECTING BANK PERFORMANCE: AN EMPIRICAL STUDY OF KBMI 1 AND KBMI 4 BANK GROUPS

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Abstract

Bank performance is the result of the bank's efficiency and effectiveness in carrying out its role as a financial intermediary institution, one of the indicators of bank performance is the ability to generate profitability which measures the bank's ability to generate profits from operational activities. Profitability can be used to measure the health level of a bank in addition to attracting the interest of investors and the public. The study will compare the relationship between financial performance and profitability in the KBMI 1 and KBMI 4 bank groups so that the purpose of this study is to analyze the difference in banking performance in the group of banks that have small core capital (KBMI 1) and the group of banks that have large core capital (KBMI 4). The variables used are CAR, CIR, LDR, NPL as independent variables and ROA as dependent variables. The study used a quantitative approach with a Linear Regression analysis test using dummy data, statistical tools using R. The result of the interaction between each variable in the group was that CAR increased ROA in KBMI 1 and KBMI 4. CIR only decreases ROA in KBMI 1, KBMI 4 is more resistant to low efficiency problems. LDR has a positive impact on ROA in KBMI 4 but negative and insignificant in KBMI 1. NPL reduces ROA but the impact is lighter in the KBMI 4 group.

Keywords: Bank Performance, Profitability, Dummy Regression, KBMI Bank Groups, ROA, Financial Ratios

INTRODUCTION

The banking sector plays a key driver in distribution and financing. The performance of banks determines the stability of the financial system and national economic growth. Poor national banking conditions can be an indicator of economic weakness, especially in developing countries such as Indonesia (Warjiyo, Solikin, 2020). The analysis of banks' financial performance aims to determine decision-making capacity based on data (Tutar, H., et al, 2025). This is a reference for investors, the government and stakeholders to assess the performance of banks. Financial performance such as Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM) and Operating Profit Margin (OPM), is considered good if the value is higher (Khalifaturfiah, 2023). The financial performance of banks is related to efficiency because it reflects the bank's ability to manage resources to generate profitability. Benbachir, (2025) highlights the importance of banking efficiency in economic growth and financial stability in the Middle East and North Africa (MENA) region. Still in the MENA Region, Youssef, I.S., et al, (2025) examined bank performance with empirical findings that there was a significant variation between liquidity, credit risk, and capital adequacy on bank profitability. The difference is that this study involves macroeconomic factors such as inflation and GDP.

The main indicators that measure the performance of banks are Return on Assets (ROA), Capital Adequacy Ratio (CAR), Cost to Income Ratio (CIR), Loan to Deposit Ratio (LDR), Non-Performing Loan (NPL). ROA was chosen because it reflects the bank's efficiency in generating profits from its assets. Meanwhile, other indicators such as CAR, CIR, LDR and NPL are believed to have a

significant influence on ROA. Research by Tomak and Yilmaz (2025), the variables of CAR, NPL, and Liquidity have a significant impact on ROA on the performance of Government-owned, Private and foreign banks in Turkey. Trisnawati and Alfayed (2024) examined the KBMI 3 bank group, where CAR and LDR have a significant positive influence on ROA while BOPO has a significant negative influence on ROA, on the other hand, NPL does not have a significant influence on ROA. A similar study was conducted by Nurdhianto (2025) with the object of bank KBMI 3, the findings showed that operational efficiency (BOPO) does not have a significant relationship with financial performance but is not the case with capital and risk has a dominant influence on financial stability and performance. Ramadhanti et al, (2019) examined the relationship between CAR, LDR and NPL to ROA, the results of the study are that CAR and LDR have a positive and significant effect on ROA while NPL has a negative and significant influence on ROA.

The problem of operational inefficiencies is a major source of overall performance gaps, with high operational costs and scale-related challenges reducing efficiency, while strong state support and strong capital positions contribute to better outcomes (Pham, 2025). The issue of efficiency is also discussed by Najjar and Sadik (2025), the findings of the study are that capital adequacy and management efficiency are important predictors of the profitability of commercial banks. These indicators have different influences depending on the capital owned by the bank. Therefore, this study was conducted to compare the influence of CAR, CIR, LDR and NPL on ROA in the bank group based on core capital ownership (KBMI). In this study, bank groups with core capital ownership of up to 6 trillion (KBMI 1) and bank groups with core capital ownership of more than 70 trillion (KBMI 4) will be used. The category of banks based on core capital is important to analyze because each group has different characteristics and operational challenges. The selection of this group, from the lower limit (KBMI 1) and the upper limit (KBMI 4) aims to determine the extent of the influence of financial indicators on the performance of banks with significant differences in core capital.

Previous research states that capital has a very important role, the higher the capital, the better the bank. This is corroborated by data from the organization that there is a significant difference in performance between banks in the KBMI1 and KBMI 4 groups. ROA in KBMI 4 reached 3.77% while KBMI 1 was only 0.92% in December 2024. This difference indicates that large banks tend to be more efficient in generating profits than smaller banks. This study will validate this statement by involving the bank group in KBMI 1 and the bank group in KBMI 4. The difference in core capital is expected to affect various aspects of the bank's performance including Return on Assets (ROA), Capital Adequacy Ratio (CAR), Cost to Income Ratio (CIR), Loan to Deposit Ratio (LDR) and Non-Performing Loan (NPL).

The results of this study are expected to be a reference for bank management in managing capital, liquidity, operational efficiency and credit quality to increase profitability. In addition, the Regulator can also use these findings to formulate more targeted policies according to the characteristics of each bank group based on the core capital scale. In terms of theoretical contribution, this study aims to enrich the literature on factors that affect bank performance through a core capital scale comparison approach. The analysis was carried out using logistic regression to analyze the relationship between variables in each KBMI.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Research on bank performance has been carried out a lot, but it is still rare to analyze bank performance by comparing groups of banks based on core capital. This study will compare bank groups based on core capital, namely KBMI 1 and KBMI 4. The term KBMI emerged after the Financial Services Authority (OJK) issued POJK number 12/POJK.03/2021 concerning Commercial Banks where there is a change in the bank's core capital ownership limit. Before KBMI, the previous term was used, namely BUKU (Commercial Bank Based on Business Activities. The name change is also accompanied by an increase in the core capital limit implemented by the OJK.

Table 1. Differences between BUKU and KBMI

Perbedaan	BUKU	KBMI
Core Capital (<i>Tier 1 Capital</i> --- <i>CET1+AT1</i>)	BUKU 1 : under 1 trillion BUKU 2 : 1 trillion – 5 trillion BUKU 3 : 5 trillion – 30 trillion BUKU 4 : more than 30 trillion	KBMI 1 : up to 6 trillion KBMI 2: 6 trillion – 14 trillion KBMI 3: 14 trillion – 70 trillion KBMI 4 : more than 70 trillion

The core capital ownership structure has an important role in influencing the performance and efficiency of the bank. The efficiency of capital flows is much better than the efficiency of capital profitability, and the main internal cause of low efficiency in the banking sector is the inadequacy of capital profitability (Zhu and Wang, 2025). So this study will take the KBMI 1 group as the bank with the lowest core capital and KBMI 4 as the group with the largest core capital. Capital regulation is a core measure of modern financial regulation and can affect the effect of capital controls on systemic risk (Miao et al, 2025).

The variables ROA, CAR, CIR, LDR, NPL are variables that provide basic knowledge about the bank's performance. These variables have been widely used in research at home and abroad.

1. Return on Assets (ROA)

ROA measures the bank's ability to generate profits from its assets. The higher the ROA value, the more efficient the bank is in generating profits (Najjar and Sadik (2025). Banks that have large assets have the opportunity to bring high profits. Thus, KBMI 4 banks have the opportunity to generate higher profits than banks in KBMI 1.

2. Capital Adequacy Ratio (CAR)

CAR describes the ratio of a bank's capital adequacy in covering the risk of loss. Capital decisions affect a bank's ability to manage risk. Banks with higher CARs are able to cope with market shocks and losses due to non-performing loans because banks have sufficient reserves to cover those losses. Higher capital can reduce the risk of bankruptcy and help bank stability in the face of market volatility (Brealey, Myres and Allen, 2011). Banks with large core capital tend to have higher CARs, which in turn contributes to better ROA performance. Credit risk has a significant impact on bank profitability, whereas the model adequacy ratio (CAR) has a significant positive impact on bank profitability (Poudel, S.R, 2018).

H1: CAR has a significant positive effect on ROA in KBMI 1 and KBMI 4 banks

3. Loan to Deposit Ratio (LDR)

LDR describes a bank's liquidity by comparing the amount of credit disbursed against third- party funds. A high LDR can indicate liquidity risk while a low LDR indicates a bank that is less than optimal in disbursing credit. Increased liquidity risk is expected to have a negative impact on bank stability (O'Connell, 2022; Diko, 2019).

H2: LDR has a significant positive effect on ROA in KBMI 1 and KBMI 4 banks

4. Cost to Income Ratio (CIR)

CIR is a ratio that measures the operational efficiency of a bank by comparing operating costs to operating income. The term CIR is the same as BOPO, some literature in Indonesia uses the term BOPO but in some international terms it uses CIR. In this article, the term CIR will be used. The lower the CIR value indicates that the bank is efficient in managing its operating costs. A high ratio usually indicates low management efficiency. Efficient management of operational costs can have a positive impact on the bank's profitability and increase efficiency. (O'Connell, 2022; Jreisat and Bawazir, 2021). Banks with higher operational efficiency are able

to generate better profits, thereby increasing competitiveness in the market. Banks in KBMI 4 have the opportunity to have an advantage in terms of operational efficiency compared to small banks. So the hypothesis is:

H3: CIR has a significant positive effect on ROA in KBMI 1 and KBMI 4 banks

5. Non-Performing Loan (NPL)

NPL describes the percentage of non-performing loans to the total loans disbursed. High NPLs portray poor asset quality and have the potential to reduce bank profitability (O'Connell, 2022; Horobet et al., 2021; Jreisat and Bawazir, 2021). Banks with high NPLs tend to experience a decline in ROA because they have to allocate reserves for credit losses. Therefore, it is important to analyze the relationship between NPL, CAR and ROA in KBMI 1 and KBMI 4. Thus banks can develop better strategies to manage credit risk and improve performance.

H4: NPL have a significant positive effect on ROA in KBMI 1 and KBMI 4 banks

6. The Influence of Financial Variables on ROA

Several studies have shown that there is a link between CAR, LDR, CIR and NPL to ROA. In a study conducted by Ningsih and Ilhami (2023), it was found that CAR and LDR had a simultaneous effect on ROA, while research conducted by Hayatun and Aris (2021) did not find a significant relationship between ROA and CAR. What if the correlation is linked to banks that have differences in core capital, so it needs to be tested on the group of banks classified as KBMI 1 and KBMI 4.

7. Group of Banks by Core Capital (KBMI)

Banks are differentiated based on core capital ownership, the larger the core capital ownership, the greater the profitability produced. The group of banks included in KBMI 4 is a group of banks that have a core capital of more than 70 trillion rupiah, while KBMI 1 is a group of banks that have a core capital of up to 6 trillion rupiah. According to Hamidi et al's (2024) research, in the small bank group (KBMI 1) CASA or savings is a determining factor to increase ROA while BOPO and LDR are inhibiting factors in increasing profitability. The profitability of KBMI 4 banks is influenced by credit quality, liquidity and efficiency (Artha and Antari, 2023). Banks that have better capital have a lower risk of bankruptcy and achieve higher profit efficiency (Nyuyen and Nghiem, 2015). A study by Tomak and Ymaz (2025) with state-owned and foreign-owned banks proved that the size of banks does not significantly affect profitability, but in private banks there is a positive correlation between bank size and profitability.

RESEARCH METHODS

1. Research Design

This study uses a quantitative research design with a comparative study approach between KBMI 1 and KBMI 4. The analysis technique used is linear regression using dummy data. The statistical tool with the help of R. Dummy for the bank group is 0 for KBMI 1 and 1 for KBMI 4. The test was conducted to analyze the influence of independent variables (CAR, CIR, LDR, NPL) on dependent variables (ROA) in the KBMI 1 and KBMI 4 bank groups. To see the influence of independent variables on dependent variables, whether they differ between groups, there will be an interaction between dummy variables and independent variables.

2. Population and Sample

The research population is a bank classified as KBMI 1 and KBMI 4 in Indonesia. KBMI 1 is a bank that has a core capital of less than 6 trillion rupiah, while KBMI 4 is a bank that has a core capital of more than 70 trillion rupiah. The number of banks in KBMI

4 is 4 large banks, namely Mandiri, BCA, BRI, BNI. In 2023, the number of banks in KBMI 1 will be 68 banks. The fluctuation in the number of banks in KBMI 1 is greater than in KBMI 4, because it is more vulnerable to mergers between banks, acquisitions by large banks and the possibility of changing status to BPR.

3. Data and Data Source

The data used is a type of secondary data obtained from Indonesian Banking Statistics (SPI) obtained from the Financial Services Authority (OJK) website for the period January 2022 to December 2024. The 2022 election is due to a change from Commercial Banks Based on Business Activities (BUKU) to a Group of Banks Based on Core Capital (KBMI) by the OJK through POJK No. 12/POJK.03/2021 which is effective in October 2021.

4. Variables Used

Dependent Variable: ROA1 dan ROA 4

Independent Variable: CAR1, CIR1, LDR1, NPL1 dan CAR4, CIR4, LDR4, NPL4

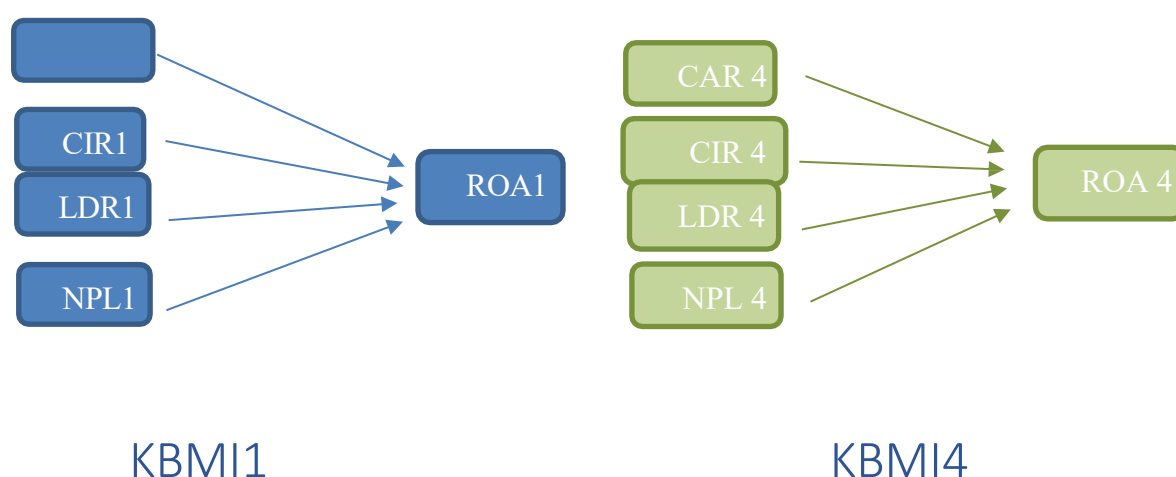


Figure 1. Variables Used

5. Data Analysis Techniques

This study uses linear regression analysis techniques with dummy data because it uses dummy variables, namely KBMI 1 (0) and KBI 4 (1). Before conducting the regression, a classical assumption test will be carried out on the variables used. The analysis tool used is R studio.

RESULTS AND DISCUSSION

The data will be analyzed by linear regression with dummy data, the statistical tool used is R. A comparison will be made between KBMI 1 and KBMI 4 with the variables that have been determined. The following will explain the relationship between each variable:

1. The relationship between CAR and ROA

The relationship between CAR and ROA is generally positive, where if the CAR value is high, the bank is able to absorb the risk so that it produces profitability and a high ROA. To ensure that the tested data meets classical assumption standards, normality, heteroscedasticity, and autocorrelation tests will be carried out. The normality test with Kolmogorov-Smirnov is 0.235 where the value was greater than so that the data was distributed normally. The heteroscedasticity test with Breusch-Pagan is 0.069, where the value is greater than so that the data are

homogeneous. The next test was an autocorrelation test with Durbin-Watson with a value of 0.660 (greater than $\alpha = 0.05$), the data did not autocorrelation. Furthermore, the results of the dummy regression with R will produce the following data:

Table 2. Results of the CAR Variable Interaction Test with KBMI

Variabel	Estimate	Std. Error	t value	Pr(> t)	Keterangan
(Intercept)	-1.153	0.836	-1.379	0.173	
KelompokKBMI4	2.457	1.195	2.056	0.044	signifikan
CAR	0.072	0.027	2.679	0.009	signifikan
KelompokKBMI4:CAR	0.028	0.046	0.623	0.535	non signifikan

Nilai R-square: 0.959

Model regresi yang terbentuk:

$$ROA = \beta_0 + \beta_1.KBMI4 + \beta_2.CAR + \beta_3.(KBMI4.CAR) + \varepsilon \dots\dots\dots (1)$$

$$= -1.153 + 2.457(KelompokKBMI4) + 0.072.CAR + 0.028(KelompokKBMI4.CAR) + \varepsilon$$

The predictive value of ROA when all variables are zero is (-1.153). Although the value is insignificant (=0.173), it is still described as a baseline. The score in the KBMI4 Group is 2,457, which means that KBMI 4 has a higher ROA score of 2,457 points than KBMI 1. The significant value (p=0.044) is the difference in the initial level (intercept) between KBMI 4 and KBMI 1 statistically real. The CAR coefficient = 0.072 and significant. This value is the CAR value for KBMI 1 where intraction has not been added to the slope. Significant results show that every increase in CAR of 1 unit will increase the ROA by 0.072 in KBMI 1. Group interactionKBMI4:CAR = 0.028 and not significant. This means that the effect of CAR in KBMI 4 is $0.072 + 0.028 = 0.100$ but because the addition of 0.028 is not significant (p=0.535), there is insufficient evidence that the effect of CAR is different between KBMI 1 and KBMI

4. The model is quite good because the data is normal, homogeneous and there is no autocorrelation and the R-square value of 0.959 shows that the model is able to explain the ROA variation of 95.9%, meaning that the fit model is very high. The relationship between CAR and ROA in both groups showed a similar relationship, meaning there was no evidence that the effect of CAR was different between KBMI 1 and KBMI 4. The role of ROA (capital) is relatively consistent between groups.

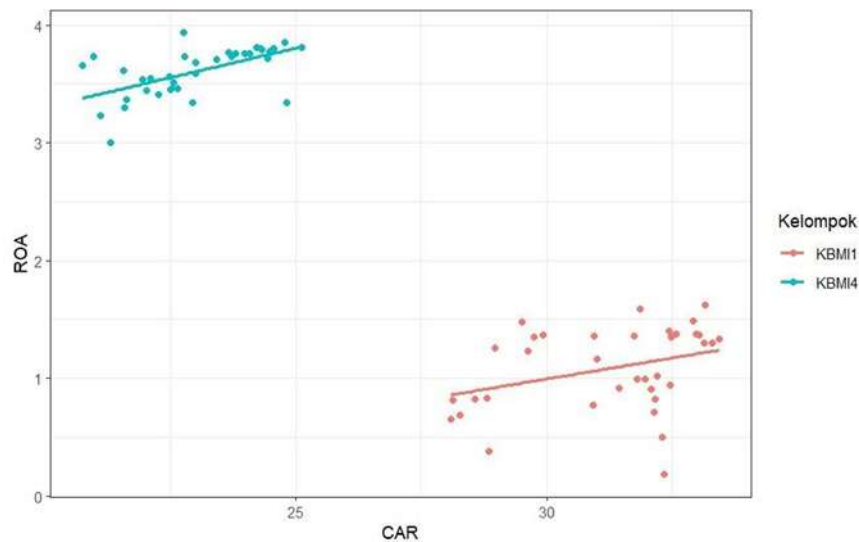


Figure 2. Visualisation of Original data vs data model of CAR and ROA

Figure 2 shows the relationship of the original data to the estimated data from the model. The scattered points are original data, while the straight line is the result of an estimate from a model that shows the average direction of the relationship between CAR and ROA in each KBMI. Both KBMI 1 and KBMI 4 have an upward trend, showing that the values of CAR and ROA are positively correlated. The higher the CAR, the higher the ROA value. The line on KBMI 4 (blue) is consistently above the KBMI1 line (red), meaning that the KBMI4 bank group tends to have a higher ROA than the KBMI1 bank group at the same CAR level. The slope in both groups of banks is both up, although not too steep. This is in line with the regression results that the interaction of KBMI4 and CAR is not significant, meaning that the slope of the relationship between CAR and ROA is similar for both groups.

2. The relationship between CIR and ROA

Cost to Income Ratio (CIR) is the ratio of a bank's operational efficiency which is calculated from total operating costs divided by total revenue. A low CIR value means that the bank's operational activities are efficient, on the contrary, a high CIR value indicates the bank's operational activities are inefficient (low efficient). The relationship between CIR and ROA is generally inversely proportional, meaning that if the CIR value is higher, the ROA value tends to decrease. Before testing the CIR and ROA variables, a classical assumption test will be carried out. The results of the Kolmogorov-Smirnov test obtained a p-value of 0.082, normal distributed data. The data was also free from heteroscedasticity due to the p-value of 0.656. The autocorrelation test with Durbin-Watson yielded a value of 0.396 which means that no autocorrelation occurred. The R-square value of 0.981 indicates that the model is able to explain the ROA variation of 98.1%, meaning that the fit model is very high. The results of the dummy regression with interaction test:

Table 3. Result of the Interaction Test of CIR variable with KBMI

Variabel	Estimate	Std. Error	t value	Pr(> t)	Keterangan
(Intercept)	11.221	0.977	11.483	0.000	
KelompokKBMI4	-8.018	1.056	-7.594	0.000	Signifikan
CIR	-0.112	0.011	-10.379	0.000	Signifikan
KelompokKBMI4:CIR	0.118	0.012	9.620	0.000	Signifikan

R-Square: 0.981

A regression model formed:

$$ROA = \beta_0 + \beta_1.KBMI4 + \beta_2.CIR + \beta_3.(KBMI4.CIR) + \varepsilon \dots\dots\dots (2)$$

$$= 11.221 - 8.018.(KelompokKBMI4) - 0.112.CIR + 0.118.(KelompokKBMI4.CIR) + \varepsilon$$

The ROA value in KBMI 1 if CIR = 0 is 11.221. It needs to be emphasized again that the CIR value cannot be zero, only this is used as the starting point of the regression line (baseline). The interception value in KBMI 4 = (-8,018) means that when CIR=0, the ROA value in KBMI 4 is 8,018 points lower than KBMI 1. Because the p value is above 0.05, there is a real difference between KBMI 1 and KBMI 4. In KBMI 1, the effect of CIR on ROA is (-0.112). This means that every 1 unit increase in CIR will decrease the ROA by 0.112 points. Negative and significant indicate that the higher the CIR value, the lower the ROA value. The interaction of the KBMI4 group: CIR was 0.118 and significant. This value is an additional effect of CIR on ROA in KBMI 4 compared to KBMI 1. So that in KBMI 4 the effect of CIR becomes: CIR = - 0.112+0.118 = 0.006 meaning that in KBMI 1, CIR has a strong negative effect on ROA. In KBMI 4, CIR has almost no practical effect (the effect is small). The interaction coefficient explains the difference in the influence (slope) of CIR on ROA between groups. The result of the interaction coefficient (KBMI4: CIR) = 0.118 shows that the effect of CIR on ROA in KBMI4 is different from that of KBMI1.

- $[ROA]_{KBMI1} = 11.221 - 0.112.CIR$
- $[ROA]_{KBMI4} = (11.221 - 8.018) + (-0.112 + 0.118).CIR$
 $= 3.203 + 0.006.CIR$

The significant negative influence of CIR on ROA in KBMI 1 means that efficiency is very important for the performance of KBMI 1. The intercept value of KBMI 4 is lower than KBMI 1 because KBMI 1 and KBMI 4 have different cost structures and business models. The effect of CIR on ROA between groups showed significant interactions. In KBMI 1, the effect of CIR is negative (slope to the left). In KBMI 4, the effect of CIR is positive even though the value is almost zero. KBMI4 is a large group of banks that have a core capital of more than 70 trillion rupiah, but in the tests carried out there was no agreement between operational costs (CIR) and ROA. The difference between theory and empirical tests can be caused by several structural factors that cause the anomaly. Banks with large core capital not only rely on interest income but can also be from fee-based income such as commissions, foreign exchange, digital transactions. A high CIR does not really erode ROA because banks in KBMI4 have other sources to cover it.

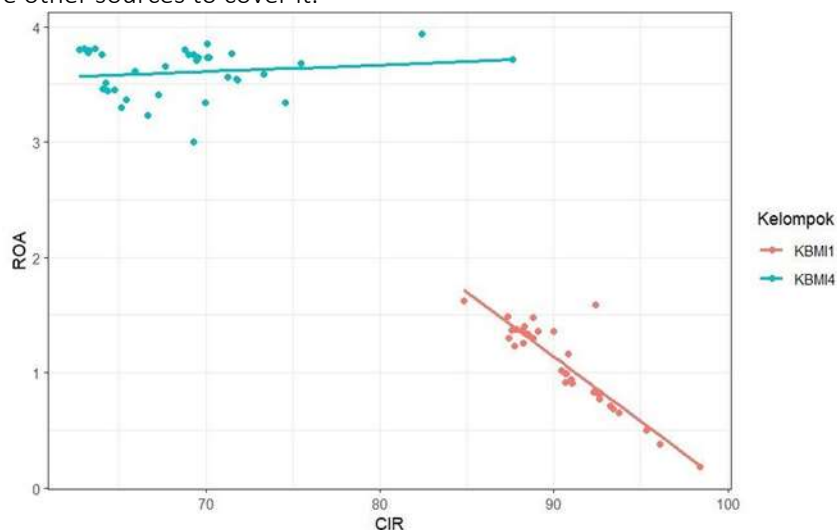


Figure 3. Visualization of original data vs data model of CIR and ROA

Figure 3 is a visualization of the relationship between CIR and ROA. Displays original data with empirical test results. KBMI1 has a negative slope, meaning that an increase in the CIR value will decrease the ROA value. KBMI4 has a positive slope, meaning that an increase in CIR will cause an increase in ROA even though the effect is small. There was a contrasting relationship between KBMI1 and KBMI4 in the CIR variable.

3. The Relationship between LDR and ROA

Loan to Deposit Ratio (LDR) is the total credit disbursement by banks to third-party deposits (DPK) collected by banks. theoretically the relationship between LDR and ROA is positive. If the LDR value increases, it will generate interest income so as to increase the bank's profit, thus the ROA value will increase. This data does not meet the classical assumption test due to heteroscedasticity, so a robust regression will be performed.

Table 4. Result of LDR and KBMI variable Interaction Test

Variabel	Estimate	Std. Error	t value	Pr(> t)	Keterangan
(Intercept)	2.629	0.781	3.365	0.001	
KelompokKBMI4	-1.278	0.960	-1.331	0.188	non-signifikan
LDR	-0.019	0.010	-1.885	0.064	non-signifikan
KelompokKBMI4:LDR	0.047	0.012	3.841	0.000	signifikan

R-square = 0.962

A regression model formed:

$$ROA = \beta_0 + \beta_1.(KelompokKBMI4) + \beta_2.LDR + \beta_3.(KelompokKBMI4.LDR) + \varepsilon \dots (3)$$

$$= 2.629 - 1.278(KelompokKBMI4) - 0.019.LDR + 0.047(KelompokKBMI4.LDR) + \varepsilon$$

Interpretation by group:

1. For KBMI1:

ROA = 2.629 - 0.019.LDR, negative correlation means that if the LDR value rises, the ROA value decreases, not significant.

2. For KBMI4:

ROA = (2.629-1.278) +(-0.019+0.047) LDR
 = 1.351+0.028LDR, positive correlation means that if the LDR goes up, the ROA goes up and is significant

Interpretation based on LDR:

1. For KBMI 1:

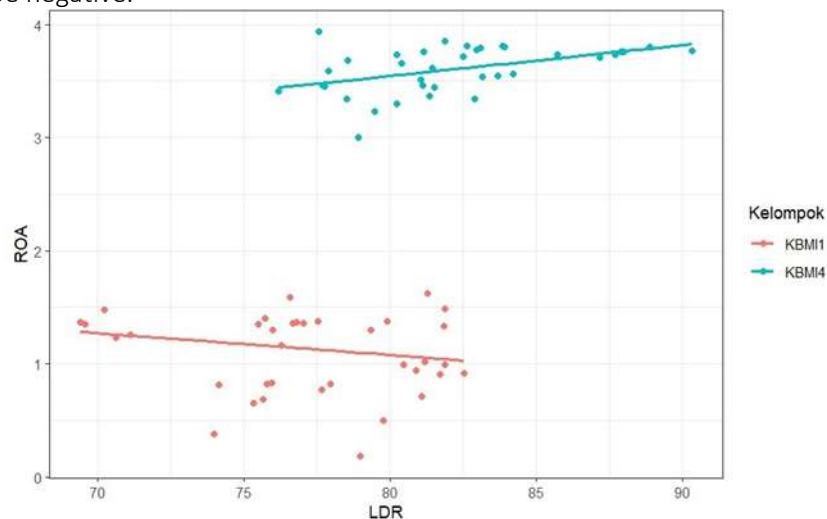
LDR = (-0.019) p value = 0.064. The LDR value has a negative influence on ROA, When the LDR value increases 1 units, it will decrease the ROA value by 0.019 points.

2. For KBMI 4:

LDR = (-0.019)+0.047 = 0.028. positive and significant value (p value = 0.000) shows that the increase in the ratio of credit to funds third tends to have a more positive performance impact on banks with large capital compared to banks with small capital (KBMI 1).

Bank KBMI4 has a better risk management structure (credit efficiency) so that it is able to convert an increase in LDR into an increase in ROA. On the other hand, KBMI1 banks face higher credit risks when the LDR increases, so the impact of ROA tends

to be negative.



Figur 4. Visualization of original data vs data model of LDR and ROA

Figure 4 shows the visualization of the original data with the modeled data for the LDR variable against ROA. The slope of KBMI 1 moves from the top right to the bottom left, indicating a tendency to a downward regression line (negative slope). The higher the LDR value, the lower the ROA. This is consistent with the regression results above where the LDR coefficient for KBMI1 is negative and insignificant. KBMI1 with small capital tends to experience a decrease in profitability when the LDR increases, likely due to deteriorating loan quality (increased risk burden).

In KBMI4, the slope moves from the bottom left to the upper right, indicating an upward regression line (positive slope). The LDR value increases, so the ROA value tends to increase. These results are in accordance with the significant interaction in the above regression test which shows that the effect of LDR on ROA is positive. KBMI4 is a bank with a large core capital, which is above 70 trillion rupiah, so with this capital, the bank can manage liquidity and risks better. The increase in credit disbursement (LDR) actually increases profitability (ROA).

4. The relationship of NPL and ROA

Non-Performing Loan (NPL) is a ratio that describes the level of congestion or non-performing loans. The higher the NPL value, the higher the cost to set aside impairment loss reserves (CKPN). This will reduce the bank's profit so that the value of the ROA will decrease. This data does not meet the classical assumption test so a robust regression will be carried out.

Table 5. Result of the Interaction test of NPL and KBMI

Variabel	Estimate	Std. Error	t value	Pr(> t)	Keterangan
(Intercept)	3.524	0.385	9.162	0.000	
KelompokKBMI4	1.074	0.410	2.617	0.011	signifikan
NPL	-0.871	0.140	-6.227	0.000	signifikan
KelompokKBMI4:NPL	0.461	0.154	2.992	0.004	signifikan

R-square: 0.981

A regression model formed:

$$ROA = \beta_0 + \beta_1. (KelompokKBMI4) + \beta_2. NPL + \beta_3. (KelompokKBMI4. NPL) + \varepsilon \dots (4)$$

$$= 3.524 + 1.074(KelompokKBMI4) - 0.871. NPL + 0.461(KelompokKBMI4. NPL) + \varepsilon$$

KBMI4= 1.074 (p value=0.011) is positive and significant. The ROA score in KBMI 4 is 1,074 points higher than KBMI 1. Because it is significant, there are differences between the KBMI 1 and KBMI 4 groups. The NPL value in KBMI 1 is (-0.871) and significant (p value=0.000). Every increase of 1 NPL unit will decrease the ROA by 0.871 points. Significant signs indicate that KBMI 1 is very sensitive to the increase in NPLs. Group Interaction KBMI4: NPL = 0.461 and significant (p value=0.004). then the influence of NPL on KBMI 4 is $(-0.871) + 0.461 = -0.410$. NPL also has a negative impact on KBMI 4 but the adverse effects are smaller when compared to KBMI 1. NPLs negatively impact all bank groups. however, KBMI 1 (-0.871) is more vulnerable when compared to KBMI 4 (-0.410). This difference indicates that KBMI 4 tends to be better able to manage the risk of non-performing loans. Interpretation by group:

- For KBMI 1:

ROA = $3.524 - 0.871 \cdot \text{NPL}$, NPL coefficient for KBMI 1 is (-0.871)

- For KBMI 4:

ROA = $3.524 + 1.074 \cdot (\text{Kelompok KBMI4}) - 0.871 \cdot \text{NPL} + 0.461 \cdot (\text{Kelompok KBMI4} \cdot \text{NPL})$
 = $3.524 + 1.074 - 0.871 \cdot \text{NPL} + 0.461 \cdot (\text{Kelompok KBMI4} \cdot \text{NPL})$

NPL Effect in KBMI4 = $-0.871 + 0.461 = -0.410$. So the net effect of NPLs on ROA is -0.410.

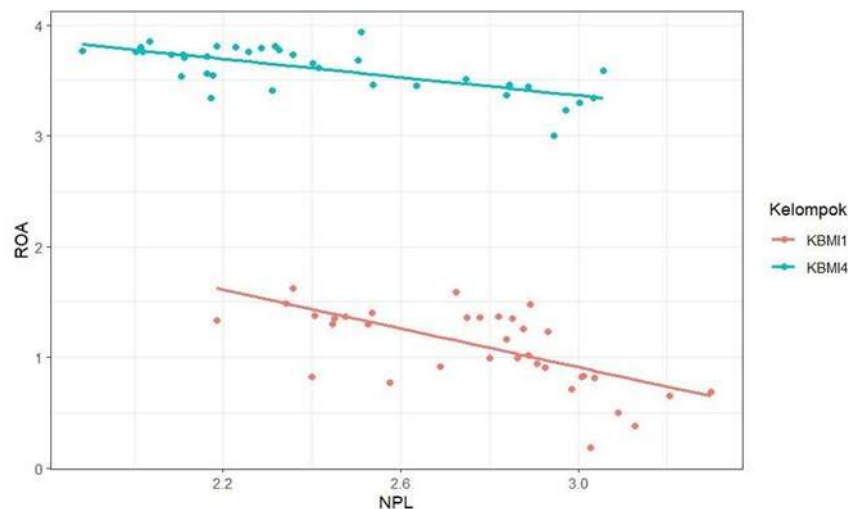


Figure 5. Visualization of original data vs data model of NPL and ROA

Figure 5 shows a visual between the original data and the model data. The red line representing KBMI1 has a sharp downtrend line. The higher the NPL, the lower the ROA value, so that the NPL has a significant negative impact on ROA. The blue line represents KBMI4 has a downward trend line but is more sloping when compared to KBMI1. NPLs remain negatively impacted on ROA but are lighter because banks classified as KBMI4 have better risk mitigation and credit diversification and they have large capital reserves to absorb losses.

CONCLUSION

This paper provides an overview of the comparison between the bank group in KBMI 1 and the bank group in KBMI 4. The difference between the two is in the ownership of core capital. Previous literature has discussed the importance of the role of capital in bank performance, the higher the bank's capital will show better performance. The results of this study, as well as answering the research hypothesis, are:

1. CAR and ROA have a positive and significant relationship in both groups of banks. Every

- 1 CAR point increase in KBMI 1 will increase the ROA by 0.072 points and is significant. Total effect on KBMI 4: $0.072 + 0.028 = 0.10$ points, interaction was not significant. Larger capital tends to increase profitability, but the effect is relatively the same between KBMI 1 and KBMI 4.
2. The results of the CIR variable test showed a difference in contrast between KBMI 1 and KBMI 4. For every 1point increase in CIR, the ROA will decrease by 0.112 points. In KBMI 4: $-0.112 + 0.118 = 0.0006$ points. CIR has a negative impact on ROA in KBMI 1 but does not have a significant effect on KBMI 4.
 3. The interaction test of KBMI 1 and KBMI 4 in LDR did not meet classical assumptions so treatment was carried out using robust regression. KBMI 1 shows a negative slope (-0.019), if the LDR value rises, the ROA value decreases by 0.019 points, not significant. KBMI 4 shows a positive slope $(-0.019 + 0.047 = 0.028)$, if the LDR rises, the ROA increases and is significant.
 4. The interaction test of KBMI 1 and KBMI 4 in NPL did not meet classical assumptions, so treatment was carried out using robust regression. Every 1point increase in NPL in KBMI 1 will increase the ROA by 0.871 points. In KBMI 4: $(-0.871 + 0.461 = -0.410$ points). NPL has a negative effect on KBMI 1 and KBMI 4 but the impact is lighter in KBMI 4.

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