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THE EFFECT OF CAR, NIM, BOPO, AND LDR ON ROA IN BUMN BANKS IN THE PERIOD 2013-2022

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Abstract
This study aims to see the effect of CAR (Capital Adequacy Ratio), NIM (Net Interest Margin), BOPO (Operating et al.), and LDR (Loan to Deposit Ratio) on ROA (Return on Assets) in BUMN Banks in the period 2013 - 2022. The data source for this research is secondary through the websites of each company listed on the Indonesia Stock Exchange. The population used in this study The population in this study are state-owned banks listed on the Bursa Efek Indonesia (BEI). The sample in this study is the financial statements of state-owned banks, namely Reports on Calculation of CAR, NIM, BOPO, LDR, and ROA financial ratios for 2013-2022, a total of 40 samples. The analysis technique used is R Square analysis and Path Analysis. The results of the study show that NIM and LDR have a positive effect on ROA. CAR and BOPO hurt ROA, while CAR, NIM, BOPO, and LDR affect ROA in R Square.

Keywords: CAR, NIM, BOPO, LDR, ROA, BEI

1. Introduction

Economic development has a significant impact on the banking industry. Banks can increase loans and achieve better results when the economy grows and stabilizes. (Nasib, 2019). The banking industry in Indonesia is also known as the heart of the world economy because the strength and weakness of the Indonesian economy can be seen from the development of the Indonesian banking industry (Rinanda, 2021). Banks with good financial performance can be measured by the profitability ratio that continues to grow in its operating activities, and banking financial performance indicators can be seen from CAR (Capital et al.) in fulfilling the capital adequacy ratio, which means that it can accommodate the effects of banking industry losses, NIM (Net Interest Margin) measures the ability to manage productive assets in creating net interest income, BOPO (Operating et al.) equates operational expenses with operational income in banking companies and LDR (Loan to Deposit Ratio) which displays banking liquidity (Annisa, 2021).

The following research phenomena occurred in BUMN Banks during the period 2013-2022, which were studied over ten years:

Table 1. Development of Return on Assets (ROA) of BUMN Banks for the Period 2013-2022

YEARS	BRI	BNI	BTN	BANK MANDIRI
2013	5.03	3.40	1.79	3.66
2014	4.73	3.50	1.14	3.57
2015	4.19	2.60	1.61	3.15
2016	3.84	2.70	1.76	1.95

2017	3.69	2.70	1.71	2.72
2018	3.68	2.80	1.34	3.17
2019	3.50	2.40	0.13	3.03
2020	1.98	0.50	0.69	1.64
2021	2.72	1.40	0.81	2.53
2022	3.76	2.50	1.02	3.30

Source: Indonesia Stock Exchange

Table 2. Development of Capital Adequacy Ratio (CAR) of State-Owned Banks for the Period 2013-2022

YEARS	BRI	BNI	BTN	BANK MANDIRI
2013	16.99	15.20	15.62	14.93
2014	18.31	16.20	14.64	16.60
2015	20.59	19.50	16.97	18.60
2016	22.91	19.40	20.34	21.36
2017	22.96	18.50	18.87	21.64
2018	20.15	18.50	18.21	20.96
2019	21.52	19.70	17.32	21.39
2020	19.59	16.80	19.34	19.90
2021	24.27	19.70	19.14	19.60
2022	22.30	19.30	20.17	19.46

Source: Indonesia Stock Exchange

Table 3. Development of Net Interest Margin (NIM) of State-Owned Banks for the Period 2013-2022

YEARS	BRI	BNI	BTN	BANK MANDIRI
2013	8.55	6.10	5.44	5.63
2014	8.51	6.20	4.47	6.29
2015	8.13	6.40	4.87	5.90
2016	8.00	6.20	4.98	5.94
2017	7.93	5.50	4.76	5.68
2018	7.45	5.30	4.32	5.52
2019	6.98	4.90	3.32	5.46
2020	6.00	4.50	3.06	4.48
2021	6.89	4.70	3.99	4.73
2022	6.80	4.80	4.40	5.16

Source: Indonesia Stock Exchange

Table 4. Development of Operational Costs to Operating Income (BOPO) of BUMN Banks for the Period 2013-2022

YEARS	BRI	BNI	BTN	BANK MANDIRI
2013	60.58	67.10	82.19	62.41
2014	65.42	69.80	88.97	64.98
2015	67.96	75.50	84.83	69.67
2016	68.69	73.60	82.48	80.94
2017	69.14	71.00	82.06	71.78

2018	68.40	70.20	85.58	66.48
2019	70.10	73.20	98.12	67.44
2020	81.22	93.30	91.61	80.03
2021	74.30	81.20	89.28	67.26
2022	64.20	68.60	86.00	57.35

Source: Indonesia Stock Exchange

Table 5. Development of Loan To Deposit Ratio (LDR) of State-Owned Banks for the Period 2013-2022

YEARS	BRI	BNI	BTN	BANK MANDIRI
2013	88.54	85.30	104.42	82.97
2014	81.68	87.80	108.86	82.02
2015	86.88	87.80	108.78	87.05
2016	87.77	90.40	102.66	85.86
2017	88.13	85.60	103.13	87.16
2018	88.96	88.80	103.49	96.74
2019	88.64	91.50	113.50	96.37
2020	83.66	87.30	93.19	82.95
2021	83.67	79.70	92.86	80.04
2022	79.17	84.20	92.65	77.61

Source: Indonesia Stock Exchange

Based on the provisions of the Bank Indonesia Circular Letter (No.6/23/DPNP dated May 31, 2004), a good ROA standard is 1.5%, so the more significant the ROA, the better the company's performance because the more significant the return. Table 1 shows a decrease in ROA from YEARS 2013 to 2022. This shows that the company could be more efficient in using its assets to generate profits. The provisions in Bank Indonesia Circular Letter No. 6/23/DPNP YEARS 2004 state that the CAR ratio owned by banks amounts to at least 8%. Table 2 shows that the capital adequacy ratio from YEARS 2013 to 2022 continues to increase, and the ratio of each year is greater than 8%. This shows that BUMN Bank has sufficient capital reserves to maintain the financial stability of the bank.

According to Bank Indonesia Regulation No. 13/1/PBI/2011, the average bank's best standard Net Interest Margin (NIM) is 5%. In Table 3, it can be seen that the net interest margin from YEARS 2013-2022 has decreased. A decrease in NIM means the bank receives less interest on loans and other interest-earning assets than the interest paid on deposits. A decrease in NIM does not always mean negative. Banks may sometimes choose to lower NIM to gain a more significant market share or deal with intense competition. According to Bank Indonesia Regulation No. 13/1/PBI/2011, the best standard for Operating Expenses over Operating Income (BOPO) ratio is around 80%. In table 4, it can be seen that BOPO from YEARS 2013-2022 has increased. Although from YEARS 2013 to 2022, BOPO in BUMN Banks continues to increase, only a few YEARS pass the ratio above 80%.

In some cases, an increase in BOPO may reflect that banks may choose to invest more resources in developing new products and services, expanding branch networks, or improving technological infrastructure. An increase in BOPO may be considered a long-term investment expected to increase future revenues and profitability. According to

Bank Indonesia Circular Letter Number 15/41/DKMP, LDR's lower limit is 78%, and the upper limit is 92-100%. Table 5 shows that the Loan To Deposit Ratio (LDR) from YEARS 2013-2022 has decreased. The decline in LDR can be influenced by external factors such as changes in market interest rates or regulatory changes every year that affect bank lending policies or customer preferences regarding investment and savings.

2. Theoretical Background

Capital Adequacy Ratio (CAR)

High Capital Adequacy Ratio (CAR) is used in developing its business and preventing losses due to its bank credit line. The higher the bank's CAR, the more likely the bank will extend credit to the public and vice versa. According to the Circular Letter of the Financial Services Authority Number /SEOJK.03/2019 concerning the Health Level Assessment System for People's Financing Banks, CAR is formulated as follows:

$$CAR = \frac{Capital}{ATMR} \times 100\%$$

Net Interest Margin (NIM)

Net Interest Margin (NIM) is a ratio used to measure the ability of bank management to manage its productive assets to generate net interest income (Dewi, 2017). Financial institutions can maximize income from their lending and investment activities with a high NIM. This can increase operating income and the ability of financial institutions to generate profits. ROA tends to increase if financial institutions can maintain relatively low funding costs and earn substantial interest income. According to Bank Indonesia Circular Letter No.13/24/DPNP dated October 25, 2011, NIM is formulated as follows.

$$NIM = \frac{Net\ Interest\ Income}{Average\ Earning\ Assets} \times 100\%$$

Operating Expenses to Operating Income (BOPO)

The ratio of Operating Expenses to Operating Income (BOPO) is often called the efficiency ratio, which is used to measure the ability of bank management to control operating costs against operating income (Lemiyana, 2016). High BOPO can suppress ROA because enormous operating costs can reduce the potential profit generated by financial institutions from their assets. Therefore, financial institutions or companies must maintain operational efficiency and manage operating costs well so that ROA remains high. According to SE. No.6/23/DPNP YEARS 2004 is formulated as follows:

$$BOPO = \frac{Operational\ Costs}{Operating\ Income} \times 100$$

Loan to Deposit Ratio (LDR)

Loan Deposit Ratio (LDR) shows a bank's ability to repay funds withdrawn by depositors using liquidity sources, namely loans disbursed (I Gusti Ayu Dwi Ambarawati, 2018). A high LDR can increase the bank's profit potential but also increase the credit risk borne by the bank and vice versa. According to Bank Indonesia Regulation Number 17/11 / PBI / 2015 concerning Statutory Reserves of Commercial Banks in Rupiah and Foreign Exchange for Conventional Commercial Banks, LDR is formulated as follows:

$$LDR = \frac{\text{Credit}}{\text{Third Party Funds}} \times 100$$

3. Methods

A population is an object or subject in an area and fulfills certain conditions related to research problems (Unaradjan, 2019, p. 110). The population in this study are state-owned banks listed on the Indonesia Stock Exchange (IDX). The sample is part of the population with specific characteristics or conditions to be studied. The sample in this study is the financial statements of BUMN Banks, namely the CAR, NIM, BOPO, LDR, and ROA financial ratio calculation reports for 2013-2022.

The type of data in this study uses quantitative data. Quantitative data is a type of data in the form of numbers derived from calculating each variable measurement attribute (Leon et al., 2023). The data source in this study uses secondary data because the data is taken via the Internet or through the official website for each period from 2013 to 2022. According to (Leon et al., 2023), Secondary data comes from parties or institutions that have used or published it because the data can be ascertained and published, so there is no need to test its validity and reliability. The operationalization definition of the variables used and their indicators are:

Table 6. Definition of Operational Variables

Variable	Definition	Indicators	Scala
Capital Adequacy Ratio (CAR) (X1)	A high Capital Adequacy Ratio is used in developing its business and preventing losses due to its bank credit line.	$\text{CAR} = \frac{\text{Capital}}{\text{ATMR}} \times 100\%$	Ratio
Net Interest Margin (NIM) (X2)	Net Interest Margin (NIM) is a ratio used to measure the ability of bank management to manage its productive assets to generate net interest income.	$\text{NIM} = \frac{\text{Net Interest Income}}{\text{Average Earning Assets}} \times 100\%$	Ratio
Operating Expenses to Operating Income (BOPO) (X3)	The ratio of Operating Expenses to Operating Income (BOPO) is often called the efficiency ratio, which is used to measure the ability of bank management to control operating costs against operating income.	$\text{BOPO} = \frac{\text{Operational Costs}}{\text{Operating Income}} \times 100\%$	Ratio
Loan to Deposit Ratio (LDR) (X4)	Loan to Deposit Ratio (LDR) shows the ability of a bank to repay withdrawal of funds by depositors made using liquidity	$\text{LDR} = \frac{\text{Credit}}{\text{Third Party Funds}} \times 100$	Ratio

	sources, namely credit channeled.		
Return On Asset (ROA) (Y1)	Return On Asset (ROA) is a ratio to measure the company's ability to utilize its assets for profit.	$\text{ROA} = \frac{\text{Profit Before Tax}}{\text{Total Assets}} \times 100$	Ratio

Data analysis used in this study uses SmartPLS analysis because the sample in this study amounted to a small number, namely 40 samples (Harahap, 2018). The analysis technique used in this research is SEM analysis with PLS, an alternative technique in SEM analysis where the data used does not have to be multivariate normally distributed. Data processing and presentation in this study using the SmartPLS 3 application.

4. Results and Discussion

Table 7. Hasil Uji R-Square

	R Square	R Square Adjusted
ROA	0.982	0.980

Source: Data processed (2023)

From Table 7, it can be seen that the R-square value of Return On Assets (ROA) is 0.982, which means that the Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Operational Costs to OpeRational Income (BOPO), and Loan to Deposit Ratio (LDR) can influence Return On Assets (ROA) by 98.2% and other factors outside of this study influence the rest.

Hypothesis Test

Table 8. Path Analysis

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
BOPO -> ROA	-0.653	-0.646	0.058	11.200	**0.000**
CAR -> ROA	-0.068	-0.069	0.026	2.620	**0.010**
LDR -> ROA	0.071	0.063	0.035	2.008	**0.047**
NIM -> ROA	0.487	0.487	0.051	9.614	**0.000**

Source: Data processed (2023)

From Table 8. it can be seen that:

1. It is known that the original sample value is negative, which is 0.068. Then, the value of the p-values shows a value <0.05, which is 0.010. The data shows that the criteria are met, so it can be concluded that the capital Adequacy Ratio (CAR) hurts Return On Assets (ROA).
2. It is known that the original sample value is positive, which is 0.487. Then, the value of the p-values shows a value <0.05, which is 0.000. The data shows that the criteria

are met, so it can be concluded that (Net Interest Margin (NIM) has a positive effect on Return On Assets (ROA).

3. It is known that the original sample value is negative, which is 0.653. Then, the value of the p-values shows a value <0.05, which is 0.000. The data shows that the criteria are met, so it can be concluded that (OpeRational Cost to OpeRational Income (BOPO)) hurts Return On Assets (ROA).
4. It is known that the original sample value is positive, which is 0.071. Then, the value of the p-values shows a value <0.05, which is 0.047. From these data, it shows that the criteria are met, so it can be concluded that the loan Deposit Ratio (LDR) positively affects Return On Assets (ROA).

Effect of Capital Adequacy Ratio (CAR) on Return On Assets (ROA)

Based on the results of the research that has been done, it is found that CAR has a significant and negative effect on ROA. This can be seen from the t count of 2.620> t table 1.690 results, and the partial regression test results show significant and harmful results on the CAR variable on ROA of 0.010, more minor than the error tolerance value $\alpha = 0.05$; thus, H1 is accepted. The results of previous research state that the capital adequacy ratio directly has a significant effect on the return on assets (Widarno, 2019)(Muttaqien, 2020)(Ananda, 2020). This shows that when the company can maximize the capital adequacy ratio, it can encourage increased return on assets.

The Effect of Net Interest Margin (NIM) on Return On Assets (ROA)

Based on the results of the research that has been done, it is found that NIM has a significant and positive effect on ROA. This can be seen from the results of t count of 9.614> t table 1.690, and the partial regression test results show significant and positive results on the NIM variable on ROA of 0.000 less than the error tolerance value $\alpha = 0.05$; thus, H2 is accepted. The results of the study are in line with the results of previous studies, which state that net interest margin has a significant effect on return on assets (Dewi, 2020)(Iradianty, 2020)(Dayono, 2020). This indicates that when the net interest margin is getting better, it will be able to increase the return on assets.

The Effect of Operational Costs on OpeRational Income (BOPO) on Return On Assets (ROA)

Based on the results of the research that has been done, it is found that BOPO has a significant and negative effect on ROA. This can be seen from the results of t count of 11.200> t table 1.690, and the partial regression test results show significant and harmful results on the BOPO variable on ROA of 0.000 less than the error tolerance value $\alpha = 0.05$, H3 is accepted. The results of the study are similar to the results of previous studies, which state that operational costs on operational income directly have a significant effect on return on assets (Erlangga, 2015)(Wahyudi, 2020)(Hanifia, 2020).

The Effect of Loan to Deposit Ratio (LDR) on Return On Assets (ROA)

Based on the results of the research that has been done, it is found that LDR has a significant and positive effect on ROA. This can be seen from the results of t count of 2.008> t table 1.690, and the partial regression test results show significant and positive results on the CAR variable on ROA of 0.047, more minor than the error tolerance value $\alpha = 0.05$. Thus, H4 is accepted. The results of the study support the results of previous

studies, which state that the loan-to-deposit ratio has a significant effect on return on assets (Muttaqien, 2020)(Bachtiar, 2021)(Lestari, 2020).

The Effect of Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Operating Expenses to Operating Income (BOPO) and Loan to Deposit Ratio (LDR) on Return On Assets (ROA)

Based on the results of research conducted, Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Operational Costs to OpeRational Income (BOPO), and Loan to Deposit Ratio (LDR) can influence Return On Assets (ROA) by 98.2%. The rest is influenced by other factors outside of Return On Assets (ROA). The most significant ratio that affects ROA is the Net Interest Margin (NIM). This is because an increase in NIM can positively impact ROA because the difference between interest income and costs is more significant. The bank can generate more income from its assets, increasing net profit and ROA. The results of this study are by previous research, which states that the capital adequacy ratio, net interest margin, operational costs to operational income, and loan-to-deposit ratio have a significant effect on return on assets (Wibowo, 2020)(Hanifia, 2020)(Laoli, 2022).

5. Conclusion

Based on the results of data testing, discussion, and hypothesis testing that has been carried out in the previous chapter, it can be concluded that the first hypothesis, which states that the independent variable Capital Adequacy Ratio (CAR) hurts the dependent variable Return On Assets (ROA) is accepted. The second hypothesis, which states that the independent variable Net Interest Margin (NIM) positively affects the dependent variable Return On Assets (ROA), is accepted. The third hypothesis states that the independent variable, OpeRational Cost to OpeRational Income (BOPO), negatively affects the dependent variable, Return On Assets (ROA). The fourth hypothesis, which states that the independent variable Loan to Deposit Ratio (LDR) positively affects the dependent variable Return On Assets (ROA), is accepted. The fifth hypothesis states that the independent variables Capital Adequacy Ratio (CAR), Net Interest Margin (NIM), Operational Cost to OpeRational Income (BOPO), and Loan to Deposit Ratio (LDR) on the dependent variable Return On Assets (ROA) are accepted.

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