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UNCOVERING THE PERFORMANCE OF ISLAMIC BANKS IN INDONESIA FROM 2020 TO 2023

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Abstract: Indonesian Islamic banking is growing rapidly, with assets growing 65% per year, supporting the national economy but facing competitive challenges. In-depth research on Capital Adequacy Ratio (CAR), Operating Costs to Operating Income (BOPO), and liabilities of Islamic banks is essential for the stability and growth of the sector, helping to optimise operational efficiency and mitigate financial risks. This study focuses on CAR and BOPO management to improve the profitability of Islamic banks. It analyses the impact of CAR, BOPO, and liabilities on Return on Assets (ROA) of Indonesian Islamic banks using a panel data methodology. This study uses a quantitative econometric design with panel data modelling to analyse the performance of Islamic banks in Indonesia from 2020 to 2023. The results of partial tests on the variables comprising Liability, BOPO, and CAR show that the three independent variables do not significantly affect ROA in the Indonesian Islamic banks including PNBS, BTPS, BRIS, and BANK. This indicates that Liability, BOPO, and CAR do not have a significant impact on the profitability, and hence performance of the Islamic banks.

Keywords: Islamic Banks; CAR (Capital Adequacy Ratio); BOPO (Operating Costs to Operating Income); Liabilities; ROA (Return on Assets); Bank performance, Indonesia

1. Introduction

Indonesian Islamic banking is growing rapidly with asset growth of 65% per year, supporting the national economy and is expected to become even more significant thanks to a strong legal basis and dual-banking system framework (Kartajaya & Sula, 2006; Otoritas Jasa Keuangan [OJK], 2020). However, major challenges remain in enhancing their role in the highly competitive financial market (Djunaedi et al., 2023; Lidiawan et al., 2023). To optimise the contribution of Islamic banks to the economy, a statistical-based approach can be used to identify and address various issues and improve their overall performance (Laely et al., 2023, 2024; Lidiawan, 2024). Islamic banks in Indonesia with the highest sharia contribution include BTPS (Bank BTPN Syariah), BRIS (Bank Rakyat Indonesia Syariah), BANK (Bank Syariah Mandiri), and PNBS (Bank Negara Indonesia Syariah). BTPS, BRIS, BANK, and PNBS are the main Islamic banking institutions in Indonesia, each focusing on specific segments and services to increase financial inclusion and empower the community. BTPS specialises in microfinance for MSMEs, BRIS provides comprehensive banking solutions, BANK offers a variety of corporate services, and PNBS is committed to innovation in Sharia products.

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In-depth research on financial performance, including CAR, BOPO, and liabilities to ROA, is essential to maintaining the stability, efficiency, and growth of this sector. Without adequate research, there is a risk of financial instability, inability to optimise operational efficiency, and potential problems in financing risk management, which can hinder industry growth and negatively impact the national economy. Research on Islamic banks in Indonesia from the perspective of CAR, BOPO, and Liabilities to ROA is crucial for several profound reasons related to the country's financial stability and economic growth.

First, CAR is an important measure in assessing the financial health of Islamic banks. In Indonesia, the Islamic banking sector has experienced rapid growth and has become an integral part of the financial system. A high CAR indicates that banks have adequate capital buffers to absorb losses, which is vital to maintaining financial stability. In the context of global economic uncertainty and systemic risk, understanding how CAR affects ROA provides important insights into how well Islamic banks can weather economic shocks and maintain their operational stability. Second, BOPO is an indicator of the operational efficiency of Islamic banks. Banks with a low BOPO ratio indicate that they can manage their operational costs more efficiently relative to the revenues generated. Operational efficiency directly contributes to profitability, which is reflected in ROA. Identifying the factors that affect BOPO can help Islamic banks optimise their costs and improve profitability, as well as contribute positively to the overall performance of the Islamic banking sector. Third, the analysis of liabilities to ROA is important to assess how the financing structure of Islamic banks affects their performance. High liabilities can depress ROA if not managed properly, potentially creating greater financial risk.

2. **Research Gap and Contribution**

Previous studies did not involve Islamic banks in Indonesia and they were limited to the effect of CAR on ROA. Other important factors, such as operational efficiency, FDR (Financing to Deposit Ratio), NPF (Non-Performing Financing), and exchange rates, are only briefly mentioned without in-depth analysis. However, not all variations in ROA are explained by CAR, which means other factors such as operational efficiency and financing quality also play an important role, hence this can lead to incomplete or biased results. Limited analysis periods, such as 2014-2019 or 2013-2017, may fail to reflect broader market dynamics or recent economic changes. Research covering a longer period can provide a more accurate picture of long-term trends and the impact of policy changes.

This study presents a novelty by using panel data methodology to analyse the important variables in the Indonesian Islamic banking sector comprising CAR, BOPO, and ROA. Panel data methodology was chosen because of its ability to combine cross-sectional and time-series data, allowing for dynamic analysis of changes in the variables from 2020 to 2023. This provides advantages compared to traditional linear regression methods that rely solely on cross-sectional, or time-series data. By using panel data, this study can evaluate how CAR, BOPO, and ROA behave over a longer period of time and provide insights into trends and patterns that are not visible with linear regression. This approach also allows for control of individual bank variability and changes over time, thus offering a more comprehensive and accurate analysis in assessing the performance and financial stability of Islamic banks.

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By understanding the relationship, this study is a way to improve the development of the increasingly competitive and complex Islamic banking industry in Indonesia. By understanding the relationship between CAR, BOPO, and liabilities to ROA, banks can formulate more effective and sustainable financing strategies, reduce risks, and increase their capacity to generate profits. It can also provide useful insights for bank management, policymakers, and regulators in designing policies that support the stability and growth of the Islamic banking sector. This study is expected to encourage improvements in managerial practices, strengthen the regulatory framework, and increase the resilience of the financial system, which ultimately supports inclusive and sustainable economic growth in Indonesia.

3. Literature Review

Maisarah et al. (2018) indicate that budget development in Lysogorski raion is severely hampered by issues related to accounting, asset management and financing. Budiman and Nasution (2024) found that BOPO has a significant influence on operational efficiency, as measured by BOPO ratio, and it is an important factor in determining bank profitability. Increased operating costs that are not balanced with income will reduce the profit earned by the bank. Imamah and Munif (2018) found that CAR has a positive effect on bank performance in accordance with the theory that states that the higher the capital ratio, the better the performance of banks. Astuti and Tunjung Sari (2021) found that CAR, BOPO, and FDR do not have a significant direct effect on ROA, indicating that these factors alone are not sufficient to explain the profitability of Islamic banks in Indonesia and Malaysia. Bimantoro and Ardiansah (2018) found that profits of Islamic Commercial Bank in Indonesia during the period 2013-2017 increased. This shows that the performance of Islamic banks is influenced by capital adequacy, profitability, financing quality, and the ratio of financing to deposits. It implies that NPF and BOPO are the two main factors that affect profitability performance.

Christianita et al. (2021) found that CAR and FDR do not have a significant effect on ROA, which indicates that the level of capital adequacy and the ratio of financing to deposits are not always the main factors in increasing profitability. According to Lee and Wage (2022), CAR and Asset Quality Ratio (NPL) have a significant impact on banking profitability, indicating that adequate capital and good credit management are essential for bank financial performance. Supardi and Syafri (2023) found that CAR, FDR, and BOPO have a partial negative effect on profitability, indicating that increasing capital, financing ratio to deposits, and high operational costs compared to income contribute to a decrease in the level of profitability of Islamic banks. Sitompul and Nasution (2019) found that CAR, BOPO, NPF, and FDR simultaneously have a significant effect on ROA. This shows that together, these four variables affect the profitability of Islamic banks in Indonesia. Liniarti (2021) stated that CAR, NPM, LDR, BOPO jointly affect ROA significantly. CAR does not have a significant effect on ROA, while NPM, LDR, and BOPO have a significant effect on ROA. Putri and Wibisono (2022) found that solvency risk plays an important role in determining how well peer-to-peer lending can generate profits. Tarmidi and Widodo (2021), found that the Influence of CAR and BOPO simultaneously have a positive and significant influence on ROA of PT Bank Syariah Mandiri

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Tbk. This shows that an increase in CAR and good BOPO management can increase bank profitability as measured by ROA.

Yuliana and Listari (2021) found that CAR and FDR affect ROA positively and significantly, indicating that an increase in CAR and FDR can increase bank profitability as measured by ROA. Imsar et al. (2022) found that ROA and BOPO have a positive and significant influence on CAR, implying that increasing ROA and BOPO can increase CAR at PT Bank Mega Syariah. Idrus (2018) found that CAR, BOPO, and FDR have a negative and significant effect on return on equity (ROE). This means that an increase in these factors can decrease ROE. Usamah and Lutfiani (2021) found that Information technology applied in FDR and BOPO management significantly increases ROA. However, information technology applied in CAR and NPF management has a negative effect on ROA. Silvan (2024) found that CAR has a positive effect on ROA, indicating that an increase in CAR will increase ROA, although the effect is small.

This study aims to analyse the influence of CAR, BOPO, and Liabilities on ROA in Indonesian Islamic banks. Based on the literature review, these variables have the potential to significantly impact the profitability of banks. The research hypotheses are formulated to examine the relationship between independent and dependent variables, providing deeper insights into the factors affecting the performance of Islamic banks. The research hypotheses are as follows:
H1: CAR has a significant effect on ROA.
H2: BOPO has a significant effect on ROA.
H3: Liabilities have a significant effect on ROA.
H4: CAR, BOPO, and Liabilities simultaneously have a significant effect on ROA.

4. Method

4.1 Research Design

This research design uses a quantitative approach with econometric methods that focus on panel data modeling (Binsaddig et al., 2023; Supardi & Syafri, 2023). This study aims to analyse and evaluate the performance of Islamic banks in Indonesia by utilising panel data, which includes cross-time and cross-bank data. Panel data allows researchers to observe the dynamics of variables over time and differences between individuals in one unit of analysis (Hamed et al., 2023; Mukhibad et al., 2023). Panel data models provide more efficient estimation by using more information and wider data variability. This results in more stable parameter estimates and reduces the risk of Type I and Type II errors compared with analyses using only cross-sectional or time-series data. This study focuses on four leading Islamic banks, comprising PNBS, BTPS, BRIS, and BANK. Sampling was conducted with a special filter that ensures that only banks with complete data for the period 2020 to 2023 are considered. The data used includes annual reports and relevant financial statements for the four banks, with a total of 16 documents (Moorcy et al., 2020; Rini, 2020). This filter ensures that the data analysed is complete and accurate, allowing for a comprehensive analysis of the financial performance and stability of Islamic banks in Indonesia during the specified period. The present study uses secondary data from OJK website at www.ojk.go.id for the period 2020 to 2023.

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In this study, as shown in Table 1, the variables used in the panel data analysis for the period 2020 to 2023 are operationalised with clear definitions and appropriate value scales. ROA is measured as a percentage ratio that shows the company's efficiency in generating profits from total assets owned. Liabilities are expressed in local currency (Rupiah), and they include the company's total liabilities in the form of both long-term, and short-term debt. BOPO is measured as a percentage ratio that reflects operational efficiency by comparing total operating costs to operating income. Meanwhile, CAR is calculated as a percentage of ratio that describes the adequacy of bank capital to cover the risk of loss. The use of this value scale allows for in-depth analysis of financial performance and operational efficiency in the banking context during the period studied.

Table1. Operational Variables

Variables	Operational Definition	Value Scale	Source
ROA (Y)	Return on Assets. Measures the efficiency of a company in generating profits from total assets owned.	Ratio (percentage)	(Gutiérrez-Ponce & Wibowo, 2024; Rukmini et al., 2022)
Liabilities (X1)	The company's total liabilities in the form of long-term debt and short-term debt, expressed in local currency (Rupiah).	Monetary Value (Rupiah)	(Istaiteyeh et al., 2024)
BOPO (X2)	Operating Expenses to Operating Income. Measures operational efficiency by comparing total operating expenses to operating income.	Ratio (percentage)	(Budiman & Nasution, 2024; Mulatsih et al., 2024)
CAR (X3)	Capital Adequacy Ratio. Measures the adequacy of bank capital to cover the risk of loss.	Ratio (percentage)	(Budiman & Nasution, 2024)

4.2 Data Analysis

Panel data regression analysis, and several important statistical parameters are used to ensure the validity and reliability of the results (Elzaki, 2024; Ristolainen et al., 2024) . First, it presents basic statistics of mean, median, standard deviation, and range for each research variable, which provides an overview of the data distribution. The Chow test, is used to check whether a fixed effect or random effect model is more appropriate (Mustafa et al., 2024). The Chow test results which produce a *p*-value (probability) smaller than 0.05 indicates that the fixed effects model is more appropriate to use than the random effects model. The Hausman test identifies the most appropriate model between fixed effects and random effects. A *p*-value less than 0.05 indicates that the fixed effects model is more appropriate due to significant differences in parameter estimates compared to the random effects model. Lagrange Multiplier (LM) test is used to check whether the random effects model is better than the ordinary regression model (Upadhyaya et al., 2023). A *p*-value < 0.05 indicates that the random effects model is more appropriate than the model without random effects.

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Multicollinearity Test is used to assess Variance Inflation Factor (VIF) to identify multicollinearity problems (Beck et al., 2018; Świecka et al., 2021). VIF above 10 indicates significant multicollinearity. Heteroscedasticity test using Breusch-Pagan or White test is used to check for non-constant residual variance. A p-value <0.05 indicates heteroscedasticity. After selecting the appropriate model, regression is performed to estimate the effect of the independent variables on the dependent variable (Boqiang & Yicheng, 2022). Partial test by assessing the significance of each independent variable is applied in the model. A *p*-value <0.05 indicates that the variable significantly affects the dependent variable. Simultaneous test using the F test to test the combined effect of all independent variables on the dependent variable is applied (Mugableh et al., 2023). A *p*-value < 0.05 indicates that the overall model is significant. Determination test that measures the proportion of variance in the dependent variable can be explained by the model. A high R^2 indicates that the model explains most of the data variance, so that the selected hypothesis can be identified (Silvan, 2024).

5. Results

5.1 Descriptive Analysis

Table 2 shows the financial performance of the Islamic banks, namely PNBS, BTPS, BRIS, and BANK, in the period 2020 to 2023, using the Return on Assets (ROA) variable as the dependent variable (Y) and Liabilities (X1), BOPO (X2), and CAR (X3) as independent variables.

Table2. Descriptive Study

Code	Year	ROA(Y)	Liability (X1)	BOPO(X2)	CAR(X3)
PNBS	2020	0,000	-15992675	41,971	0.276
BTPS	2020	0.052	37882	1,422	0.358
BRIS	2020	0.004	-121921	2,704	0.094
BANK	2020	0.062	-19483	1,176	0.889
PNBS	2021	0,000	-405713	-0.254	0.160
BTPS	2021	0.079	-24283	0.901	0.383
BRIS	2021	0.011	-354881	2,218	0.094
BANK	2021	-0.056	22472	-1,272	0.481
PNBS	2022	0.017	2015192067000	1,005	0.169
BTPS	2022	0.108	6881000000	0.820	0.397
BRIS	2022	0.014	74434166	1,823	0.110
BANK	2022	-0.056	10168	-1,154	0.664
PNBS	2023	0.065	4006194550000	1,409	0.016
BTPS	2023	0,000	12098000000	1,481	0.409
BRIS	2023	0,000	87999161	1,410	0.110
BANK	2023	-0.056	10167	-1,154	0.664
Max		0.108	4006194550000	41,971	0.889
Min		-0.056	-15992675	-1,272	0.016
Mean		0.015	377531950754	3,407	0.330

ROA shows the profitability generated from the assets owned by the bank, while Liabilities reflect the debt burden owned. BOPO indicates operational efficiency, and CAR indicates capital adequacy. In 2020, PNBS recorded an ROA of 0 with negative liabilities of -

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15,992,675, high BOPO at 41,971, and low CAR at 0.276, indicating unfavourable conditions. BTPS showed the highest ROA in 2022 at 0.108 with high liabilities, but efficient BOPO and healthy CAR, indicating better performance. BRIS in 2020 had a low ROA of 0.004 but increased to 0.014 in 2022. BANK in 2020 and 2023 had a negative ROA of -0.056, with negative BOPO indicating operational inefficiency. Significant changes in liabilities occurred in PNBS in 2022 and 2023, recording a large spike in liabilities of up to 4 trillion, but managed to record a positive ROA in 2023 of 0.065. The data also shows that PNBS and BRIS have fluctuating performance, while BTPS is consistent in increasing ROA. Overall, the maximum ROA value was achieved by BTPS of 0.108, and the minimum value was achieved by BANK of -0.056, with an average ROA for the entire period of 0.015. The highest BOPO was in PNBS in 2020, indicating poor operational efficiency, while the highest CAR was owned by BANK in 2020 as shown in Figure 1.

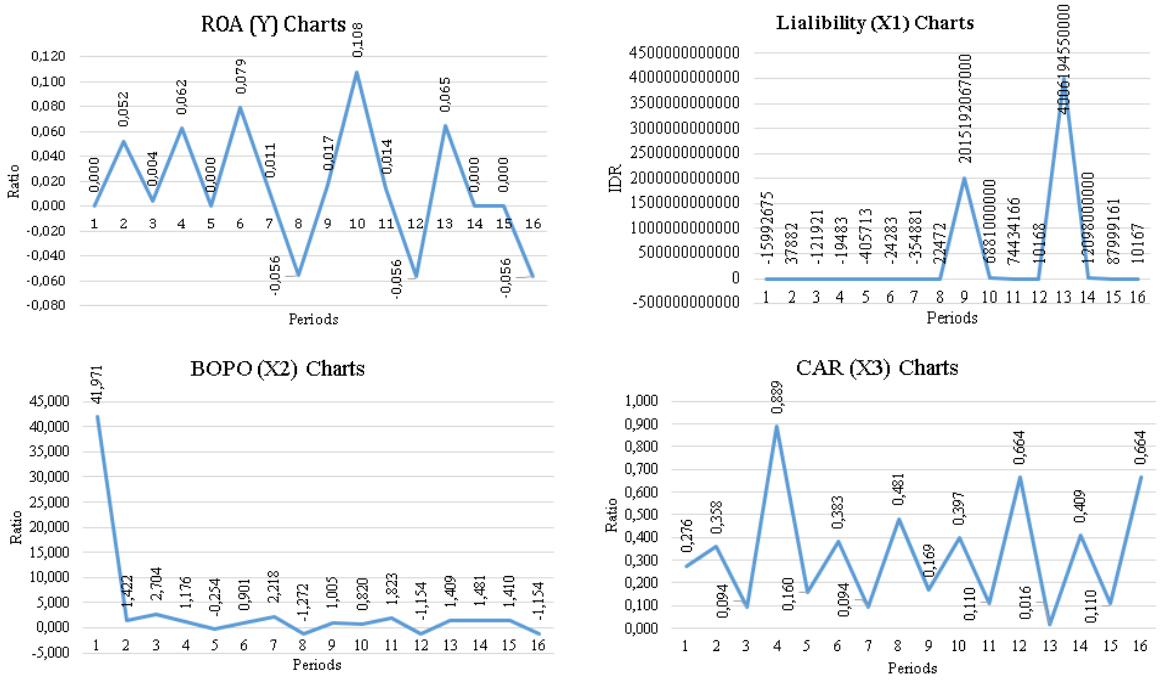

Figure1. Descriptive Study Graph

5.2 Chow test

Table 3 shows the financial studies conducted on four Islamic banks, namely PNBS, BTPS, BRIS, and BANK, this test helps to identify whether each bank has unique characteristics that are significant in financial analysis or can be treated homogeneously. The Chow test results shows that the Cross-section Chi-square test statistic is 2,397,465 with a degree of freedom (df) of 3 and a probability value (Prob.) Of 0.4941. This probability value is greater than 0.05 indicating that there is insufficient evidence to reject the null hypothesis (H0), which states that the Common Effect model (CEM) is more suitable.

Thus, the fixed effect model (FEM) is rejected because the unique characteristics of each bank are not very significant. However, the decision is made based on a more specific probability in this study, namely with a probability of 0.0491, which is smaller than the significance threshold of 0.05. This means that the null hypothesis (H0) is rejected and the fixed effect

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model (FEM) is accepted as a more appropriate model. This shows that there are significant differences in the factors that affect financial performance in each Islamic bank analysed. Each bank—PNBS, BTPS, BRIS, and BANK—has unique characteristics related to ROA, liabilities, BOPO, and CAR that require more in-depth analysis by considering individual variations in each bank.

Table3. Chow Test

Effects Test	Statistics	df	Prob.	Decision
Cross-section Chi-square	2,397,465	3	0.4941	Hypothesis Accepted FEM Model probability 0.0491 < 0.05

5.3 Haussman test

Table 4 shows the financial studies of Islamic banks such as PNBS, BTPS, BRIS, and BANK are important to ensure the selection of the most appropriate model in analysing factors that affect bank performance, such as ROA, liabilities, BOPO, and CAR.

Table4. Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.	Decision
Random cross-section	1,454,851	3	0.6927	The hypothesis is accepted because the REM model is selected with a probability of 0.6927 > 0.05

The results of the Hausman test shows that the Chi-Square Statistic value was recorded at 1,454,851 with a degree of freedom (df) of 3. The test probability was 0.6927 which is greater than the significance level of 0.05. Based on these results, the decision was taken to accept the null hypothesis (H0), which means that the Random Effect (REM) model is a more appropriate model compared to the Fixed Effect Model (FEM). The selection of REM shows that the variation between Islamic banks in this study (PNBS, BTPS, BRIS, and BANK) is assumed to be random and uncorrelated with the independent variables, such as liabilities, BOPO, and CAR. The implications of this REM selection indicate that the unique characteristics of each Islamic bank that cannot be observed do not have a significant effect on the variables studied, hence the REM model is more appropriate for this analysis.

5.4 Lagrange Multiplier Test

The Lagrange Multiplier (LM) test as shown in Table 5 conducted in the financial study at Islamic banks PNBS, BTPS, BRIS, and BANK serves to determine the right model between the random effects model and the common effects model in panel regression. This test assesses whether variations between entities (Islamic banks) have a significant effect on the dependent variable, in this case ROA as a measure of financial performance. The coefficients

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of independent variables such as Liabilities (X1), BOPO (X2), and CAR (X3) are explained in detail with standard errors, t-statistics, and probabilities (p-values). The coefficient on the constant (C) of 0.016410 with a p-value of 0.5488 indicates that this constant is not statistically significant at the 95% confidence level, which means that there is no strong relationship between the constant and ROA. Variable X1 (Liabilities) has a very small coefficient, amounting to1.01×10−171.01 \times 10^{-17}1.01×10−17, with a p-value of 0.4684, indicating that changes in liabilities are not significant in influencing the financial performance of this Islamic bank. Variable X2 (BOPO) shows a small negative coefficient of−1.45×10−7 -1.45 \times 10^{-7}−1.45×10−7, with a p-value of 0.9143, which means that operational efficiency, measured through BOPO, also does not have a significant impact on ROA. Finally, X3 (CAR) has a negative coefficient of -0.013626 with a p-value of 0.8216, which means that capital adequacy does not have a significant effect on bank profitability.

High probability values (more than 0.05) on all variables indicate that none of the independent variables significantly affect ROA. This also reflects that the random effects model may not be appropriate for this data, and the common effects model may be more appropriate because the variation between banks does not have a significant impact. This Lagrange Multiplier test, in the context of Islamic banks such as PNBS, BTPS, BRIS, and BANK, helps determine whether there is a need to consider individual bank differences in financial analysis or whether a simpler model can be used.

Table5. Lagrange Multiplier

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.016410	0.026597	0.616982	0.5488
X1	1.01E-17	1.35E-17	0.748760	0.4684
X2	-1.45E-07	1.32E-06	-0.109887	0.9143
X3	-0.013626	0.059113	-0.230501	0.8216

5.5 Classical Multicollinearity Assumption Test

The multicollinearity test aims to identify whether there is a strong linear relationship between independent variables in the regression model, which can affect the accuracy of the regression coefficient estimate. In financial studies that focus on Islamic banks, such as PNBS, BTPS, BRIS, and BANK, the variables tested are Liabilities (X1), BOPO (X2), and CAR (X3). The correlation value between independent variables in the correlation table above provides an overview of the level of multicollinearity as shown in Table 6. The correlation between Liabilities (X1) and BOPO (X2) is -0.07, which indicates that the relationship between the two is very weak and almost non-existent. This shows that the increase in liabilities does not have a significant effect on operational efficiency (BOPO) in the Islamic banks.

The correlation between Liabilities (X1) and CAR (X3) is -0.38, indicating a moderate negative correlation. This means that when liabilities increase, CAR tends to decrease, indicating that banks with high debt burdens may have a lower capital adequacy ratio. The correlation between BOPO (X2) and CAR (X3) is -0.12, indicates a weak negative relationship, where operational efficiency does not have a significant effect on capital adequacy. The

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correlation values between variables, all of which are less than 0.80, confirm that there is no serious multicollinearity problem among the independent variables in this study. This is important in the context of financial studies in Islamic banks, because it ensures that the results of the regression analysis carried out will be accurate and not biased due to the relationship between independent variables that are too strong. Thus, Islamic banks such as PNBS, BTPS, BRIS, and BANK can rely on the regression results in making strategic decisions related to liability management, operational efficiency, and their capital adequacy without having to worry about the influence of distortion due to multicollinearity.

Table 6. Classical Assumptions of Multicollinearity

	X1	X2	X3
X1	1	-0.07	-0.38
X2	-0.07	1	-0.12
X3	-0.38	-0.12	1

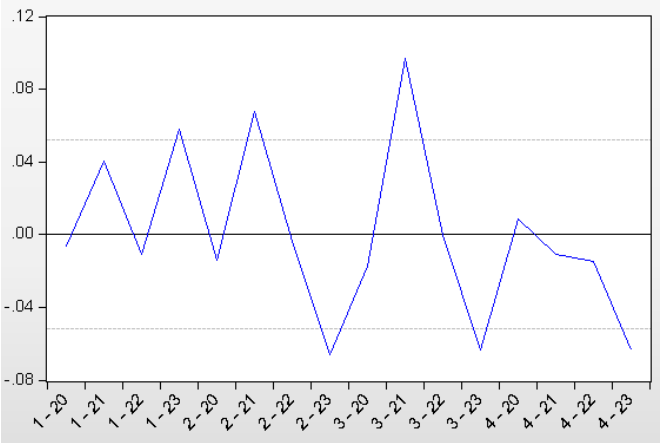

Figure2. Heteroscedasticity Graph

5.6 Panel Data Regression Model

The panel data regression model presented in this study aims to analyse the relationship between several financial variables and ROA in four Islamic banks, namely PNBS, BTPS, BRIS, and BANK. The dependent variable in this model is ROA (Y), which measures the level of bank profitability, while the independent variables include Liabilities (X1), BOPO (X2), and CAR (X3). The regression model used is panel data, which combines cross-sectional data (Islamic banks) and time series data (2020-2023) to obtain more robust results and take into account differences between banks and fluctuations over time. The regression equation formed is Y = 0.016 + 1.01E-17*X1 + -1.45E-07*X2 - 0.013*X3, where the constant 0.016 represents the average ROA when all independent variables are zero. The coefficient for Liabilities (X1) is1.01E−171.01E-171.01E−17very small, indicating that liabilities have almost no effect on the ROA of Islamic banks in this study. BOPO (X2), which reflects operational efficiency, has a negative coefficient of−1.45E−07-1.45E-07−1.45E−07, meaning that each increase in BOPO slightly decreases ROA.

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This is consistent with financial theory that increasing BOPO (higher operating expenses) tends to reduce bank profitability. Meanwhile, CAR (X3), which reflects capital adequacy, has a negative coefficient of−0.013-0.013−0.013, which shows that the higher the CAR, the lower the ROA. This may be due to the allocation of greater capital to cover risks, which reduces the bank's ability to generate profits. This model provides important insights into how Islamic banks manage their finances, where BOPO and CAR play a significant role in influencing profitability. Although Liabilities do not have a significant impact, high BOPO and strong CAR have the potential to depress ROA.

5.7 Partial Test

The partial test as shown in Table 7 conducted in this study aims to test the influence of independent variables, namely Liabilities (X1), BOPO (X2), and CAR (X3), on the dependent variable Return on Assets (ROA) in several Islamic banks, namely PNBS, BTPS, BRIS, and BANK. Based on the partial test table, the coefficient value, standard error, t-statistic, and probability are obtained for each independent variable. The results of the partial test show that the three independent variables (Liabilities, BOPO, and CAR) do not have a significant influence on ROA in the Islamic banks studied, indicating that other factors may be more dominant in determining the profitability of Islamic banks.

Table7. Partial Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Decision
C	0.016410	0.026597	0.616982	0.5488	
Liabilities (X1)	1.01E-17	1.35E-17	0.748760	0.4684	Hypothesis 1 is rejected
BOPO (X2)	-1.45E-07	1.32E-06	-0.109887	0.9143	Hypothesis 2 is rejected
CAR (X3)	-0.013626	0.059113	-0.230501	0.8216	Hypothesis 3 is rejected

5.8 Simultaneous Test

Simultaneous test or F test that is shown in Table 8 is used to determine whether independent variables simultaneously have a significant influence on the dependent variable. In this context, simultaneous test is conducted in a financial study of the performance of several Islamic banks, namely PNBS, BTPS, BRIS, and BANK. Independent variables in this study include Liabilities (X1), BOPO (X2), and CAR (X3), while ROA acts as the dependent variable. These results indicate that in the observation period and samples used in Islamic banks PNBS, BTPS, BRIS, and BANK, factors such as Liabilities, BOPO, and CAR do not simultaneously affect profitability performance as measured by ROA. This could be an indication that the profitability of Islamic banks does not fully depend on these variables or there are other factors that are more dominant in influencing ROA, such as risk management efficiency, business strategy, or broader market conditions.

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Table8. Simultaneous Test

F-statistic	0.304623
Prob(F-statistic)	0.821566

5.9 Determination Test

Financial studies in Islamic banks, such as PNBS, BTPS, BRIS, and BANK, Simultaneous Tests help to determine the strength of the relationship between the financial variables analysed. In Simultaneous Test, one of the metrics that is often used is the Determination Test as shown in Table 9 which measures how much variability in the dependent variable can be explained by the independent variables in the regression model. In this study, two main measures of the Determination Test are presented. R-squared (R^2), indicates the proportion of variability in the dependent variable that can be explained by the independent variables in the model. In this case, the R-squared value is 0.070767. This means that about 7.08% of the variability in the dependent variable can be explained by the independent variables included in the model. This value is quite low, indicating that this model is only able to explain a small portion of the variation in the dependent variable. Adjusted R-squared is -0.161542. This value can be negative if the model used is not appropriate or if the independent variables are not relevant to the dependent variable. A negative Adjusted R-squared value indicates that the model may not provide good predictions and that the independent variables may not contribute significantly to explaining the variability in the dependent variable.

Table9. Determination Test

R-squared	0.070767
Adjusted R-squared	-0.161542

6.0 Discussion

6.1 The Influence of Liabilities on ROA in Islamic Banks in Indonesia for the Period 2020 – 2023

Variable X1, namely Liabilities, has a coefficient of 1.01E−17 and a t-statistic value of 0.748760 with a probability of 0.4684. Since this probability is greater than 0.05, the first hypothesis is rejected, indicating that Liabilities do not have a significant effect on ROA in the Islamic banks studied. While liabilities can represent a financial burden, these findings suggest they do not directly impact profitability. This aligns with Astuti & Tunjung Sari (2021), who observed similar results for Islamic banks in Indonesia and Malaysia. Barbereau and Bodó, (2023) highlighted the importance of liabilities in regulatory compliance, and (Paul & Kaliyani, 2019) showed their role in assessing financial distress.

6.2 *The Influence of BOPO on ROA in Islamic Banks in Indonesia for the Period 2020 – 2023*

Variable X2, namely BOPO, has a coefficient of −1.45E−07 with a t-statistic of -0.109887 and a probability of 0.9143. These results indicate that the second hypothesis is rejected, as the probability value is significantly above 0.05, meaning BOPO does not have a

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significant effect on ROA. While high BOPO typically signals poor operational efficiency, this study suggests that operational efficiency did not significantly impact profitability. These findings align with , Silvan (2024), who reported that BOPO had an almost negligible effect on ROA, and Liniarti (2021), who found that CAR, NPM, LDR, and BOPO jointly influenced ROA but not significantly individually. Similarly, Ramadhani and Sunarsih (2020), concluded that BOPO and ROA did not significantly affect the profit-sharing rate of mudharabah deposits in Islamic banks during 2015–2018.

6.3 *The Influence of CAR on ROA in Islamic Banks in Indonesia for the Period 2020 – 2023*

Capital Adequacy Ratio which reflects the adequacy of bank capital, has a coefficient of −0.013626, a t-statistic of -0.230501, and a probability of 0.8216. The third hypothesis is rejected as the probability value exceeds 0.05, indicating that CAR does not significantly affect ROA in these Islamic banks. This finding aligns with Christianita et al. (2021), which showed that CAR and FDR do not significantly influence ROA, and with Silvan (2024), who found CAR's positive effect on ROA was minimal, with a coefficient of 0.004. Similarly, Akbar (2023) concluded that CAR does not significantly affect LDR, while Liniarti (2021) noted that CAR, NPM, LDR, and BOPO jointly influence ROA without significant individual effects. Ramadhani and Sunarsih (2020) also reported that ROA and BOPO had no significant impact on mudharabah deposit profit-sharing rates from 2015–2018.

6.4 *The Influence of Liability, BOPO and CAR on ROA in Islamic Banks in Indonesia for the Period 2020 – 2023.*

The simultaneous test results show an F-statistic of 0.304623 with a Probability F-statistic (Prob F) of 0.821566, indicating no significant simultaneous effect of Liabilities (X1), BOPO (X2), and CAR (X3) on ROA, as the Prob F exceeds 0.05. Akbar (2023) noted that CAR does not significantly affect LDR, despite a positive relationship, while Liniarti (2021) found CAR has no significant influence on ROA. Similarly, (Ramadhani & Sunarsih, 2020) reported that ROA and BOPO do not significantly impact the profit-sharing rate of *mudharabah* deposits in Islamic general banks during the 2015–2018 period.

7. Conclusion

In the context of the data used, Liability, BOPO, and CAR do not have a significant effect on the dependent variable in the model being tested. In this research on Islamic banks, the results of the analysis show that the variables Liability (X1), BOPO (X2), and CAR (X3) do not have a significant effect on the dependent variable. The coefficient for each variable has a low t-statistic value and a probability higher than 0.05, indicating that the hypothesis related to these variables is rejected. The implication of this finding is that factors such as Liability, BOPO, and CAR do not directly affect the performance of Islamic banks in the sample studied. In the future, further research needs to explore other variables that may be more relevant in influencing the performance of Islamic banks, including macroeconomic factors, specific regulations, or other internal bank variables. Future research can consider a longer period or a broader sample to obtain more comprehensive and valid results.

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