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Performance Analysis of Islamic Banks Using Error Correction Model

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Abstract

Introduction: The analysis of Islamic banking performance is a frequent subject of discussion in various literature. One factor that makes Islamic banks an exciting object of research is their role as Sharia-based intermediary institutions and their contribution to the effectiveness of monetary policy. This study aims to analyze the impact of CAR, NPF, FDR, and BOPO on the performance of Islamic banks measured by ROA and NOM. **Research Methods:** This quantitative research uses secondary data from Islamic Banking Statistics covering the period from January 2015 to December 2023. The data analysis technique employed is the Error Correction Model (ECM). **Results:** The results indicate that out of the four variables examined, only BOPO has a significant impact on the performance of Islamic banks. **Conclusion:** This finding suggests that efficiency in managing operational costs is a crucial factor in enhancing the financial performance of Islamic banks. The lower the BOPO, indicating higher cost efficiency, the better the performance of Islamic banks in terms of profitability as measured by ROA and NOM.

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INTRODUCTION

The analysis of Islamic banking performance is a frequent subject of discussion in various literature. One of the factors that make Islamic banks an interesting object of research is their role as Sharia-based intermediary institutions and their contribution to the effectiveness of monetary policy (Nuryakin & Warjiyo, 2006). The development of Islamic banking in Indonesia began with the establishment of Bank Muamalat Indonesia (BMI) in 1992. The emergence of the first Islamic bank in Indonesia spurred the creation of various regulations governing Islamic banking, such as Law No. 7 of 1992, Law No. 10 of 1998, and Law No. 21 of 2008. These regulations indicate that the Indonesian government fully supports the development of the Islamic finance industry in Indonesia.

However, as of 2024, the growth of Islamic banking has not shown significant progress. This is reflected in the market share of Islamic banking financing, which only reached 8.08% of the total national credit and banking financing of Rp 7,010.3 trillion as of January 2024. Meanwhile, Third-Party Funds (DPK) in Islamic Commercial Banks (BUS) and Sharia Business Units (UUS) in 2023 amounted to Rp 656.16 trillion, an increase of 8.97% compared to Rp 602.11 trillion in the previous year (keuangan.kontan.co.id). The slowdown in the growth of Islamic banks can be attributed to various factors such as low literacy regarding Islamic banking, low public interest and trust, and delays in specific regulations governing Islamic banking contribute to the slow growth of Islamic banks (Nadia et al., 2019). Despite this, the increase in Third-Party Funds (DPK) in BUS and UUS shows growing public confidence in Islamic banking services, which can serve as a foundation for further growth in the future.

Discussions about the development of Islamic banks cannot be separated from the assessment of bank performance. Profitability is the most accurate indicator for assessing bank performance (Syofyan, 2003). Profitability is measured using Return on Assets (ROA), which is a ratio used to assess how effectively a bank generates income from its operations (Mawardi, 2005). ROA is calculated by dividing pre-tax profit by total assets. The higher the ROA, the better the bank's financial performance, as it indicates a greater return. An increase in ROA signifies an increase in company profitability, ultimately increasing shareholder returns (Husnan, 1998). The performance of Islamic banks is often measured not only by profitability but also by other aspects such as operational efficiency, asset quality, and risk management. Operational efficiency measures how well a bank manages its operational costs to generate income, while asset quality relates to how well a bank manages its loan portfolio to minimize the risk of bad debts. Risk management involves the bank's strategies in identifying, measuring, and managing potential risks in daily operations. All these indicators, along with profitability, provide a comprehensive picture of the overall performance of Islamic banks.

Therefore, performance assessment in this study also uses the Net Operating Margin (NOM) ratio. This ratio is used to assess the bank's ability to generate profit from its core operations, namely financing and fundraising. By using NOM, the efficiency of the bank in managing its operational activities to achieve profitability can be observed. Evaluating bank

performance through ROA and NOM provides a comprehensive overview of the effectiveness of the bank's management in optimizing its assets and operations to achieve desired financial goals.

In several previous studies, found that internal variables of Islamic banks that significantly affect ROA and NOM include the Financing to Deposit Ratio (FDR) (Munandar, 2022). FDR, Operational Cost to Operational Income (BOPO) ratio, and Capital Adequacy Ratio (CAR) significantly affect ROA (Wibisono & Wahyuni, 2017). BOPO and inflation also significantly influence ROA (Raharjo et al., 2020). Another study found that BOPO has a significant impact on NOM (Zikri et al., 2021). Furthermore, Non-Performing Financing (NPF) ratio, as well as mudharabah and murabahah financing, significantly affect NOM (Munandar, 2020; Munandar et al., 2021).

The first factor used in this study is the Capital Adequacy Ratio (CAR). CAR is a ratio used to assess the adequacy of a bank's capital in facing potential losses. This ratio indicates the bank's ability to bear the risks of any credit or productive assets that carry risks. A high CAR indicates that the bank has a strong capacity to fund its operations and significantly contributes to profitability. A high CAR also indicates that all risky assets, such as loans, investments, securities, and receivables from other banks, are funded from the bank's own capital, thereby reducing the risks faced by the bank.

In addition to showing the bank's ability to bear risks, CAR is also an important indicator for banking regulators to ensure the stability and health of the overall banking system. Banks with adequate CAR are considered more stable and capable of facing economic shocks, which in turn increases depositor and investor confidence. In the context of Islamic banking, maintaining a high CAR is also important to ensure that Sharia principles in risk and capital management are met, thus maintaining integrity and trust in the Islamic financial system.

The second factor is Non-Performing Financing (NPF). NPF refers to problematic financing where the debtor fails to pay the principal and interest according to the agreed schedule. The inability of customers to make these payments leads to an increase in the NPF ratio. This situation can result in losses for the bank and threaten its financial stability. A high NPF ratio contributes to a decline in the bank's profits, which in turn affects the performance ratio of Islamic banks.

A high NPF not only impacts the bank's profitability but also affects investor and depositor confidence in the bank. In the case of Islamic banking, a high NPF ratio may indicate issues in risk management and credit assessment. To address this issue, Islamic banks need to strengthen risk management and conduct stricter assessments of debtor feasibility. Proactive measures such as financing restructuring and increased monitoring can help reduce NPF risk.

The third factor is the Financing to Deposit Ratio (FDR). FDR is a ratio that compares the amount of credit provided by the bank with funds collected from third parties. This ratio is used to assess the extent to which the bank expands in credit distribution. FDR is also a key indicator in assessing the effectiveness of the financial intermediation role played by the

bank. The higher the FDR value, the better the bank performs its intermediary role; conversely, if the FDR value is low, the effectiveness of the bank's intermediary function is also low.

A high FDR indicates that the bank can optimize the use of funds collected from customers to be re-distributed as credit, which can increase profits and support economic growth. However, a very high FDR may also indicate liquidity risks, as the bank may not have enough liquid funds to meet withdrawal demands from depositors. Therefore, banks need to maintain an optimal FDR balance to ensure liquidity and profitability are maintained.

The final factor is the Operational Cost to Operating Income Ratio (BOPO). This ratio is used to compare operational costs with the bank's operating income. Operational costs include all expenses incurred by the bank to conduct its main activities, such as interest costs, marketing costs, labour costs, and other operational costs. Conversely, operating income is the bank's main income obtained from lending and other operating income sources. The lower the BOPO ratio, the more efficient the bank is in conducting its operations. Healthy banks typically have a BOPO below one, while less healthy banks have a BOPO above one.

A low BOPO ratio indicates that the bank can manage its operational costs well compared to its income, reflecting high operational efficiency. This is important for banks because high operational efficiency can increase profitability. Conversely, a high BOPO ratio indicates that the bank's operational costs are greater than its operating income, which can signal problems in cost management and negatively impact the bank's profitability. Therefore, bank management needs to monitor the BOPO ratio regularly to ensure operational efficiency is maintained.

Based on the above presentation, this study aims to contribute to the study of Islamic banking performance by providing an analysis of ROA and NOM variables using the Error Correction Model (ECM), which is an appropriate model for non-stationary time series data and provides correction in long-term relationships (Widarjono, 2007).

RESEARCH METHOD

This research is a field study using qualitative method. Research data comes from two categories, namely primary and secondary data (Sugiyono, 2019). Primary data was obtained from interviews with BMT staff, while secondary data was obtained from scientific articles, books, etc. The research location is BMT Hasanah which is located in Jabung Village, Ponorogo. Data collection was carried out through observation and semi-formal interviews with BMT Hasanah employees, as well as written data documentation.

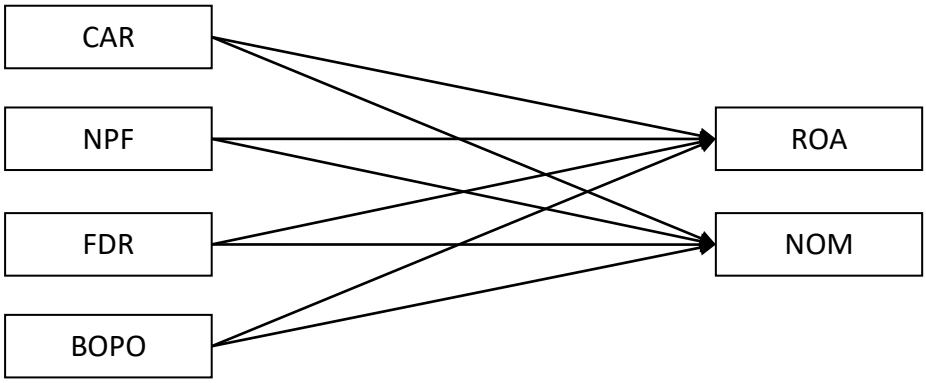
This study is quantitative research using secondary data. The research data utilizes Islamic Banking Statistics with an observation period from January 2015 to December 2023. The operational definitions of the variables used are shown in the following table:

Table 1. Operational Definitions of Variables

Variable	Definition	Measurement
ROA	A ratio that measures the profitability level of a bank by comparing the net income generated by the bank with its total assets	Percentage (%)
NOM	A ratio used to measure the bank's ability to generate profit from its main operations after deducting all operational costs	Percentage (%)
CAR	Capital adequacy ratio indicating the bank's ability to absorb potential losses by comparing the bank's core capital with certain risky assets	Percentage (%)
NPF	A ratio that measures the proportion of problematic bank financing, where the debtor cannot fulfill the payment obligations according to the agreed terms	Percentage (%)
FDR	A ratio indicating the extent of financing provided by the bank from funds received from third parties, such as customers or investors	Percentage (%)
BOPO	A ratio depicting the efficiency level of the bank by comparing the bank's total operational costs with its operational income	Percentage (%)

The framework used in this study is:

Figure 1. Conceptual Framework



This study will use the Error Correction Model (ECM) to analyze profitability in the banking sector. ECM has several advantages, such as flexibility in model specification that allows adjustments according to research needs. Additionally, this model enables the analysis of economic variable relationships both in the short term and long term and validates their consistency with economic theory. ECM is also useful as a dynamic model in handling non-stationary time series data, while also addressing issues of multicollinearity and spurious regression.

Other advantages of ECM include its ability to handle statistical issues such as multicollinearity and spurious regression, which often occur in empirical data analysis. With flexible model specifications, ECM allows researchers to adjust the model easily according to the characteristics of the research. Furthermore, ECM's ability to analyze economic variable relationships in both the short and long term can provide a deeper understanding of the

dynamics of the banking industry (Insukindro, 1999). The ECM testing requires several conditions, namely:

1. The data are non-stationary at the level stage, I(0).
2. The data become stationary at the first difference or have a degree of integration of one, I(1).
3. There is a long-term cointegration relationship among the variables.

With this methodology, the study aims to provide a comprehensive analysis of the performance of Islamic banking using the ECM approach, addressing both short-term and long-term dynamics.

The models used in this study are:

$ROA_t = \beta_0 + \beta 1DCARt + \beta 2DNPFt + \beta_3 DFDRt + \beta_4 DBOPOt + \Psi ECT_{t-1} + e_t$

$NOM_t = \beta_0 + \beta 1DCARt + \beta 2DNPFt + \beta_3 DFDRt + \beta_4 DBOPOt + \Psi ECT_{t-1} + e_t$

Explanation of Variables:

CAR : *Capital Adequacy Ratio*
NPF : *Non Performing Financing*
FDR : *Financing to Deposit Ratio*
BOPO : Operational Cost to Operating Income
β_0 : Constant
β_{1-4} : Coefficients
e_t : Residual term
t : Time period
ECT : *Error Correction Term*

RESULT AND DISCUSSION

Descriptive Statistics

Table 2. Descriptive Statistics

	ROA	NOM	CAR	NPF	FDR	BOPO
Mean	1,373	1,593	20,046	3,820	80,589	87,447
Median	1,400	1,520	20,390	3,440	79,570	86,760
Maximum	2,180	3,040	26,280	6,170	92,560	99,040
Minimum	0,160	0,170	14,090	2,100	70,090	75,780
Std. Dev.	0,557	0,741	3,792	1,098	5,249	6,886
Observations	107	107	107	107	107	107

Source: Processed Data (2024)

From Table 2, all variables used in this study have a good data distribution since the standard deviation values are below the mean values. Smaller standard deviation values indicate that the data used is closer to the mean (Sekaran & Bougie, 2016).

Stationarity Test

Stationarity is a crucial prerequisite in time series econometrics. Stationary data means the mean, variance, and autocovariance (at various lags) remain the same over time.

Non-stationary data can result in spurious regression, where high R-squared values do not indicate meaningful relationships between variables (Basuki & Prawoto, 2019). The stationarity test in this study uses the Augmented Dickey Fuller (ADF) test:

Table 3. Stationarity Test

Variabel	Level		1st Difference	
	ADF	Prob	ADF	Prob
ROA	-1,516	0,521	-12,194	0,000
NOM	-0,977	0,759	-13,000	0,000
CAR	-0,303	0,920	-11,031	0,000
NPF	-0,832	0,806	-4,965	0,000
FDR	-1,728	0,414	-10,863	0,000
BOPO	-1,049	0,733	-9,976	0,000

Source: Processed Data (2024)

Based on Table 3, it is evident that all variables are non-stationary at the level. Therefore, the first difference test is conducted, and the results show that most variables become stationary at the first difference level.

Cointegration Test

After establishing that some variables are stationary at the first difference level, the next step is to test for cointegration to determine if there is a long-term relationship between the variables used in this study. The cointegration test involves forming residuals obtained by regressing the independent variables against the dependent variable using the OLS method. These residuals must be stationary at the level to confirm cointegration.

Table 4. Cointegration Test

Variables	Level	
	ADF	Prob
ROA	-4,966	0,000
NOM	-5,293	0,000

Source: Processed Data (2024)

Table 4 shows that the residuals are stationary at the level, meaning that this study can proceed with ECM analysis.

ECM Analysis

ECM analysis includes the Error Correction Term (ECT), which indicates equilibrium (Insukindro, 1991). If ECT is negative and significant, the model specification is valid. From Table 5, the R-squared value in the OLS analysis is 0.931 (93.1%), raising suspicions of spurious regression since only two variables are significant. In ECM analysis, the R-squared value is 0.640 (64%), which is quite good as it shows that 64% of the variation in the dependent variable is explained by the independent variables. The ECT coefficient is negative and significant, indicating the ECM model on ROA corrects long-term errors.

Table 5. OLS and ECM Analysis on ROA

Variables	OLS		ECM	
	Coefficient	Prob.	Coefficient	Prob.
D(CAR)	-0.003	0.813	0.014	0.388
D(NPF)	-0.039	0.370	-0.005	0.890
D(FDR)	-0.019	0.000	-0.009	0.250
D(BOPO)	-0.063	0.000	-0.093	0.000
ECT(-1)			-0.393	0.000
C	8.619	0.000	-0.015	0.134
R-squared	0.934		0.657	
Adjusted R-squared	0.931		0.640	
S.E. of regression	0.146		0.095	
Sum squared resid	2.178		0.889	
Log likelihood	56.530		101.517	
F-statistic	358.984		37.985	
Prob(F-statistic)	0.000		0.000	

Source: Processed Data (2024)

Table 6. OLS and ECM Analysis on NOM

Variables	OLS		ECM	
	Coefficient	Prob.	Coefficient	Prob.
D(CAR)	0.012	0.549	0.014	0.524
D(NPF)	-0.036	0.562	0.006	0.914
D(FDR)	-0.003	0.624	-0.004	0.722
D(BOPO)	-0.090	0.000	-0.117	0.000
ECT(-1)			-0.374	0.000
C	9.649	0.000	-0.017	0.184
R-squared	0.923		0.596	
Adjusted R-squared	0.920		0.576	
S.E. of regression	0.210		0.124	
Sum squared resid	4.500		1.528	
Log likelihood	17.698		73.071	
F-statistic	304.375		29.269	
Prob(F-statistic)	0.000		0.000	

Source: Processed Data (2024)

From Table 6, the R-squared value in the OLS analysis is 0.923 (92.3%), suggesting potential spurious regression as only one variable is significant. In ECM analysis, the R-squared value is 0.576 (57.6%), which is quite good as it shows that 57.6% of the variation in the dependent variable is explained by the independent variables. The ECT coefficient is negative and significant, indicating the ECM model on NOM corrects long-term errors.

Based on the test results, factors such as Capital Adequacy Ratio (CAR), Non-Performing Financing (NPF), and Financing to Deposit Ratio (FDR) do not have a significant

effect on Return on Assets (ROA) and Net Operating Margin (NOM). This indicates that these factors may not be the focus in determining the bank's profitability and operational margin in this study.

However, the variable Operating Expenses to Operating Income (BOPO) shows a significant and negative effect on ROA and NOM. This indicates that the more efficient the bank is in managing its operating expenses, the greater the potential profit it can obtain. In this context, banks with lower BOPO indicators will be more able to optimize their profitability by minimizing the operating expenses incurred.

Previous research supports this finding (Hutagalung & Ratnawati, 2013; Purnamasari, 2012; Sabir et al., 2012). In their research, higher operational efficiency can improve the overall performance of the bank. Therefore, managing operating expenses is a key factor in improving the bank's financial performance. Banks need to continuously implement strategies to reduce their operating expenses to increase their profitability and overall operational performance.

BOPO is the ratio between operating expenses and operating income. This ratio measures the proportion of operating expenses incurred by the bank in relation to its operating income. These operating expenses include various expenditures required by the bank to carry out its core activities, including interest expenses, marketing expenses, labour costs, and various other operating expenses. Operating income includes the main income earned by the bank, such as income from lending and other operating income.

The lower the BOPO ratio, the more efficient the bank is in managing its operational activities. In general, banks that have a BOPO ratio below one is considered healthier because it indicates that their operating expenses are relatively lower compared to their operating income. On the other hand, banks with a BOPO ratio above one tends to be considered less healthy because their operating expenses exceed their operating income, which can indicate an imbalance or inefficiency in managing their resources.

CONCLUSION

This research aims to analyse the effects of CAR, NPF, FDR, and BOPO on the performance of Islamic banks measured by ROA and NOM. The findings indicate that only BOPO significantly influences the performance of Islamic banks measured by ROA and NOM. This suggests that the more efficient Islamic banking is in managing costs in its operational activities, the better the performance of Islamic banks in pursuing profitability.

The study makes several important contributions to the field of Islamic banking studies. First, it highlights the importance of operational cost efficiency (BOPO) in determining the financial performance of Islamic banks, providing new insights for bank managers and researchers regarding the factors that most influence profitability. Second, the study adds to the empirical literature on the factors influencing the performance of Islamic banks in Indonesia, offering useful empirical evidence for future research. Third, the research findings can serve as a basis for Shariah bank management in formulating more effective policies to enhance cost efficiency and profitability. Fourth, the analytical methods

used in this study can serve as a reference for other researchers interested in examining the relationships between similar variables in different contexts or time periods. Thus, this research not only provides a better understanding of the dynamics affecting the performance of Islamic banks but also offers practical guidance for Shariah bank management in managing cost efficiency to improve profitability.

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