Islamic Bank Performance and Macroeconomic Variables During Economic Turbulence

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ABSTRACT
The study aims to analyze the effect of internal and external bank factors on the financial performance of Islamic banks during the Covid-19 pandemic. The external factors or macroeconomic factors consist of BI Rate and Inflation. The internal bank factors used are BOPO (Operating Expenses for Operating Income), CAR (Capital Adequacy Ratio), FDR (Financing to Deposit Ratio), NPF (Non-Performing Financing), and ROA (Return on Assets). A quantitative analysis is applied to assess the research construct by using a panel regression approach. The data used is sourced from Bank Indonesia and the Financial Services Authority for the observation period from 2019 - 2021. The findings show that external factors do not affect ROA in the long run and short run. Meanwhile, the internal factors BOPO and CAR significantly influence ROA, and NPF is having a significant impact only in the long run. The implications of this study show that Islamic banks need to strengthen operational efficiency, maintain capital adequacy, and implement good credit risk management in order to increase profitability sustainably, regardless of external fluctuations such as BI interest rates and inflation.

1. Introduction

The impact of the COVID-19 pandemic has caused the Indonesian economy to experience a significant contraction (Caraka et al., 2021; Malahayati et al., 2022). Restrictions on human activities (Gershuny et al., 2021) have also led to a decrease in production activities and capital flows, which has an impact on the weakening of the rupiah exchange rate (Hanjani et al., 2022). This has caused the financial sector to weaken, including the performance of the Islamic financial sector (Alabbad & Schertler, 2022; Mirzaei et al., 2024). The performance of Islamic banking in Indonesia can be influenced by various factors, namely bank internal and external factors. Bank internal factors consist of BOPO (Operating Expenses for Operating Income), CAR (Capital Adequacy Ratio), FDR (Financing to Deposit Ratio), NPF (Non-Performing Financing), and ROA (Return on Assets). External factors include BI rate and Inflation (Krušković, 2022).

One of the internal bank factors affecting Islamic banks' financial performance is the Capital Adequacy Ratio (CAR) (Hawaldar et al., 2022) and Non-Performing Financing (NPF) (Nasir et al., 2022). CAR is a variable that affected profitability and was highly important before the COVID-19

pandemic. However, during the pandemic, CAR still affects profitability with lower importance. Return on Assets (ROA) and Return on Equity (ROE) tend to decrease during the pandemic. Non-Performing Financing (NPF) has increased. This shows that Islamic banking in Indonesia is experiencing pressure on capital levels, but overall, it maintains an adequate capital adequacy level. Higher credit costs during the crisis affect the assessment of the capital adequacy ratio (Andersen & Juelsrud, 2024). In addition to internal factors, external factors can affect the ROA of Islamic banking, namely macroeconomic variables in the form of inflation (Borelli, 2022; Kismawadi, 2024). Simultaneously, the Inflation variable influences ROA. Uncontrolled inflation can lead to an economic crisis (Zubairu Surajo, 2022). In addition, the BI rate also has a relationship with banking ROA, but the relationship between the two depends on other factors and a limited period (Luu et al., 2023).

Based on research conducted previously, the macroeconomic variables of GDP, exchange rates, and inflation do not significantly affect the performance of Islamic banking in Indonesia (Azmat et al., 2020). Meanwhile, the internal factor variable BOPO negatively influences the Return on Assets (ROA) of all Islamic commercial banks (BUS) in Indonesia. CAR, FDR, and NPF have a positive influence on ROA. The macro variable Inflation has no significant effect on the performance of Islamic banks. During the COVID-19 pandemic, Islamic banking is expected to help the community and national economic recovery (Ascarya, 2022). Islamic banks may be able to assist in the National Economic Recovery Program (PEN) by offering capital products that suit the needs of the community (Azman et al., 2021). Islamic banking in Indonesia uses strategies to improve financial performance after the COVID-19 pandemic (Hassan et al., 2021) by issuing various regulations that accelerate digital transformation and synergy in the banking sector. Islamic banking must also implement innovation, including m-banking (Sudarsono et al., 2022), as a strategy to improve financial performance. For this reason, it is important for Islamic banking to optimize its performance by looking at the influence of macroeconomic factors to support the national economy. Several macro variables such as Inflation and BI Rate and internal factors in the form of BOPO (Operating Expenses for Operating Income), Capital Adequacy Ratio (CAR), Financing to Deposit Ratio (FDR), Non-Performing Financing (NPF) will illustrate how the condition of Islamic banking financial performance.

The description of the company's ability to generate profits from available resources (assets) or, known as the Return on Assets Ratio (ROA) is also called the earning power ratio. Return On Assets (ROA) is a ratio used to calculate banking performance. This ratio is the percentage of results obtained from banking assets in one year against total banking assets. ROA is used by bank management to see the size of its ability to earn profits as a whole, in other words, the greater the ROA, the better the financial performance shown. The main function of ROA is to evaluate the performance of Islamic banking by measuring the income earned from banking assets in one year against total banking assets. Factors such as DPK ratio, funding volume, CAR ratio, FDR ratio, NPF ratio, and BOPO ratio can affect ROA in Islamic banking in Indonesia. ROA can be expressed by the formula:

$$ROA = Net\ Income\ /\ Total\ Assets \dots\dots\dots\dots (1)$$

Operating Expenses to Operating Income (BOPO) is a variable that affects the performance of Islamic banking. In a related study, BOPO affects Islamic banking performance negatively and significantly. This variable is the relationship between proposed operating expenses and expected operating income in banking planning. If BOPO is high, then the performance of Islamic banking will decrease. The role of BOPO in the performance of Islamic banking in Indonesia is one factor affecting the efficiency of bank operations. A low BOPO indicates that the bank is more efficient in incurring costs and accumulating income, which will affect the profit sharing of savings for customers. BOPO is the relationship between proposed operating expenses and expected operating income in banking planning. How to calculate BOPO in Islamic banking is by using the following formula:

$$BOPO = (Operating\ Expenses\ /\ Operating\ Income)\ x\ 100\%\dots\dots\dots (2)$$

The BOPO variable significantly negatively affects ROA. BOPO significantly negatively affects ROA. CAR, LDR, and BOPO significantly influence ROA. BOPO has a significant negative effect, and its rather high value means that the bank has not performed its efficiency well. This previous research explains that any increase in BOPO will affect the profitability of the bank concerned.

Capital Adequacy Ratio (CAR) is a ratio that indicates that the bank has sufficient capital to meet all its foreseeable liabilities, including liabilities that may occur in the future. CAR is expressed as a relationship between the proposed capital and the capital required to fulfil the bank's liabilities, including liabilities that may occur in the future. CAR is also used to evaluate bank performance and monitor bank reliability. Increasing the quality of CAR will influence the increase in profits shown by ROA. In addition, CAR and LDR simultaneously significantly affect ROA. In line with the opinion that partially CAR has no significant positive impact on ROA, CAR, and LDR simultaneously significantly affect ROA. This partially contradicts the fact that CAR has no significant positive effect on ROA, and CAR and LDR simultaneously have a significant effect on ROA. CAR and BOPO variables negatively and significantly impact ROA. The level of capital adequacy (CAR) has a positive and significant effect on ROA, and the results simultaneously show that CAR, DPK, NPL, LDR, and Bank Size affect ROA.

Financing to Deposit Ratio (FDR) in Islamic banking is the ratio between capital used to invest (financing) and capital obtained from bank savings (deposits). How to calculate FDR in Islamic banking is by using the following formula:

$$FDR = Financing / Deposit \dots\dots\dots\dots\dots\dots\dots\dots\dots(3)$$

Here, financing refers to the capital used to invest, and Deposit refers to the capital obtained from savings. This FDR is a formula for calculating the ratio between capital used to fund and capital obtained from savings. FDR has no effect on ROA. This is in line with the opinion that Finance to Deposit Ratio (FDR) has no significant effect on ROA in Islamic commercial banks. FDR has no significant effect on ROA, while simultaneously, the variables CAR, NPF, BOPO, and FDR have a significant effect on ROA. Based on several tests that have been carried out, previous research shows that FDR does not have a significant impact on BOPO. This shows how much third-party funds are channeled for financing, which has no significant effect on profitability. FDR ratio partially does not affect Return on Asset, FDR ratio partially does not affect Return on Asset. Non-performing financing (NPF) in Islamic banking is capital used to invest (financing) that does not bring benefits or has no economic value. NPF does not significantly affect Return on Assets (ROA) in Islamic banking. How to calculate NPF in Islamic banking is by using the following formula:

$$NPF = Non\text{-}beneficial\ Financing / Total\ Financing \dots\dots\dots\dots\dots (4)$$

Here, Non-beneficial Financing refers to capital used to invest (financing) that does not bring benefits or has no economic value. Total financing refers to capital used to invest (financing) as a whole. NPF is a formula to calculate the ratio between the capital used to invest (financing) that does not bring benefits and the capital used to invest (financing) as a whole (Muhammad et al., 2020). NPF has a significant positive effect on ROA, meaning that the higher the NPF, the higher the ROA. This means that the greater the problematic financing, the greater the profit that appears. This contradicts the following opinions, which state that NPF and LDR have an effect on ROA but are not significant on the profitability of foreign exchange Islamic banks in Indonesia; Non-Performing Supporting (NPF) does not affect the ROA of Islamic banks listed on the Indonesian Stock Exchange in 2018-2022; Partially, NPF does not affect the ROA of Islamic banks listed on the Indonesian Stock Exchange in 2018-2022; Partially, CAR, NPF, and DPK growth have no significant effect on ROA, but CAR, FDR, NPF, BOPO, and DPK growth together have a significant effect on ROA. Non-Performing Financing (NPF) has a negative and insignificant impact on the profitability (ROA) of Islamic Public Banks. Non-performing financing (NPF) has a negative and insignificant effect on the profitability (ROA) of Islamic Public Banks. The results of previous research tests, which state that there is no significance of NPF on ROA, indicate that the financing provided is still not optimal, which is constrained in channeling funding to customers.

Inflation is the general growth of prices of goods and services in an economy. Inflation occurs due to several factors, such as higher demand than supply, rising prices of raw materials, or rising

production costs (Aguirre & Casares, 2024). Inflation can affect banking performance, such as in conventional and Islamic banks. Inflation affects Islamic banking performance differently, depending on the factors used in the analysis. Inflation did not significantly affect the performance of Islamic banking in several studies.

2. Methods

This research focuses on descriptive research using quantitative methods to test causal relationships. This research uses the Error Correction Model (ECM) method as an analysis method. This was chosen because the ECM method can analyze short-term and long-term economic phenomena and investigate whether the empirical model is consistent with economic theory. In addition, the data of this research are often non-stationary, which causes dubious regression results (also known as biased regression), so the Error Correction Model (ECM) method is used in this research.

In economic analysis, ECM economic resources can be used to explain why economic actors face disequilibrium. The trials carried out included:

1. Stationarity Test

   In econometric theory, stationarity is one of the main concepts. Statistically, a group of data is considered stationary if the mean and variance of the data remain constant over time and the covariance value between two time periods depends only on the distance or lag between the two time periods. In addition, average values usually appear in cases with a large amount of data during the observation period. This research uses the Augmented Dickey-Fuller Test (ADF) method to perform the stationarity test.

2. Co-integration Test

   Co-integration shows that in the long run, there is an equilibrium relationship between economic variables that are not stationary and the residuals from the linear combination, which must be stationary. This research uses the Engle-Granger co-integration test.

3. Error Correction Model (ECM) Estimation

   This study uses the Domowitz-El Badawi error correction estimation model. The Error Correction Term (ECT) component makes the ECM model different. This model shows that the ECM model can only be used if the sign of the ECT coefficient is positive and statistically significant.

Common ECM parameters are as follows:

$$\Delta_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 \Delta X_{t-1} + \beta_3 ECT \; \dots\dots\dots\dots\dots\dots\dots\dots\dots \; (5)$$

The ECT coefficient value in the model ranges between zero and one (no more than 1). The β_1 coefficient indicates the short-term coefficient of the extracellular matrix (ECM) equation. The ECM equation model in this research is:

$$\Delta ROA_t = \beta_0 + \beta_1 DBR_t + \beta_2 DBOPO_t + \beta_3 DCAR_t + \beta_4 DFDR_t + \beta_5 DNPF_t + \beta_6 DI_t + \beta_7 BR_{t-1} + \beta_8 BOPO_{t-1} + \beta_9 CAR_{t-1} + \beta_{10} FDR_{t-1} + \beta_{11} NPF_{t-1} + \beta_{12} I_{t-1} \beta_{13} ECT + \mu_t \; \dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Information:

ROA_t	:	Bank performance ratio in the t-th period	$DBOPO_t$	:	$BOPO_t - BOPO_{t-1}$
BR_t	:	BI Rate in the t-th period	$DCAR_t$	:	$CAR_t - CAR_{t-1}$
$BOPO_t$	:	Operational Costs in the t-th period	$DFDR_t$	:	$FDR_t - FDR_{t-1}$
CAR_t	:	Capital Ratio in period t	$DNPF_t$	:	$NPF_t - NPF_{t-1}$
FDR_t	:	Financing to Deposit Ratio in the t period	DI_t	:	$I_t - I_{t-1}$
NPF_t	:	Non-performing financing in the t period	ECT	:	Error Correction Term

I_t	:	Inflation in the t-th period	$\beta_1 - \beta_{13}$	:	The coefficient value of each independent variable
$DROA_t$	:	$ROA_t - ROA_{t-1}$	μ_t	:	Error in t-period
DBR_t	:	$BR_t - BR_{t-1}$			

Econometric models such as ECM are used in the estimation process, and ROA is used as a proxy to measure the performance of Sharia Commercial Banks. In contrast, seven variables, BI Rate, BOPO, CAR, FDR, NPF, Inflation, and ROA, are used as determinants of the performance of Sharia Commercial Banks in Indonesia. The data used in the research is secondary data sourced from the websites of Bank Indonesia (BI), Financial Services Authority (OJK), and Central Statistics Agency (BPS) and supplemented from other scientific literature and previous research journals.

Table.1 Variable Description

Variable	Symbol	Information	Unit
Dependent	ROA	Return on Assets	Per cent
Independent	BI Rate	Bank Indonesia Reference Interest Rate	Per cent
	BOPO	Operating Expenses Operating Income	Per cent
	CAR	Capital Adequacy Ratio	Per cent
	FDR	Financing to Deposit Ratio	Per cent
	NPF	Non Performing Financing	Per cent
	INFLATION	Inflation	Per cent

Source: data processed by the author, 2024

3. Results

Results should be clear and concise. The results should summarize (scientific) findings rather than provide data in great detail. Please highlight differences between your results or findings and the previous publications by other researchers. The discussion should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

Descriptive statistical tests are used to show a general picture of the dependent and independent variables. Table 2 shows descriptive statistics on the BI rate, BOPO, CAR, FDR NPF, inflation, and ROA. Table 2 shows that the Return on Assets (ROA) value is 1.32 per cent/month with a maximum of 2.15 per cent/month with an average Return on Assets (ROA) value of 1.6505 per cent. Std value. ROA deviation is 0.227784. The deviation of the ROA variable does not have the diversity of varying data because Std. Dev < mean. Then the BI Rate variable, the lowest value is 3.5 per cent/month, the highest value is 6 per cent/month, the mean is 4.465 per cent/month and the Std value. Deviation 0.9470 per cent. The BI Rate variable deviation does not have varying data diversity because of Std. Dev < mean.

Table 2: Data Descriptive Statistics

Descriptive Statistics	BI Rate	BOPO	CAR	FDR	NPF	INFLATION	ROA
Mean	4,465278	84,87222	21,72639	77,63028	3,285833	2,208333	1,650556
Median	4,125000	85,38000	20,56500	77,85500	3,305000	1,915000	1,630000
Maximum	6,000000	89,09000	25,71000	82,01000	3,580000	3,49000	2,150000
Minimum	3,500000	81,86000	19,56000	70,12000	2,640000	1,320000	1,320000
Std. Dev	0,947087	1,783901	2,027064	2,609388	0,192255	0,745947	0,227784
Sum	160,7500	3055,400	782,1500	2794,690	118,2900	79,50000	59,42000
Observations	36	36	36	36	36	36	36

Source: data processed by the author, 2024

The total number of observations in this study was 36. In the BI Rate variable, the lowest value is 3.5 per cent/month, the highest value is 6 per cent/month, the mean is 4.46 per cent/month, the Std. The deviation is 0.94 percent and the Sum value is 160.75. The BI rate variable does not have varying data diversity because of Std. Dev < mean. In the BOPO variable, the lowest value is 81.86 per cent/month, the highest value is 89.09 per cent/month, the mean is 84.87 per cent/month, the Std. The deviation is 1.783 percent and the Sum value is 3055.400. The BOPO variable does not have varying data diversity because Std. Dev < mean. The lowest value for the CAR variable is 19.56 per cent/month, and the highest value is 25.71 per cent/month. The mean is 21.72 per cent/month, the Std value. The deviation is 2.027 per cent, and the Sum value is 782.15. CAR does not have diversity in varying data because Std. Dev < mean.

Then the FDR variable, the lowest value is 70.12 per cent/month, the highest value is 82.01 per cent/month, the mean is 77.63 per cent/month, the Std value. The deviation is 2.609 percent and the Sum value is 2794.69. The FDR variable does not have varying data diversity because Std. Dev < mean. In the NPF variable, the lowest value is 2.64 per cent/month, the highest value is 3.58 per cent/month, the mean is 3.28 per cent/month, the Std. The deviation is 0.192 percent and the Sum value is 118.29. The NPF variable does not have varying data diversity because of Std. Dev < mean. The lowest value for the inflation variable is 1.32 per cent/month, the highest value is 3.49 per cent/month, and the mean is 2.20 per cent/month. The Std. The deviation is 0.74 percent and the Sum value is 79.5. The Inflation variable does not have a variety of data variations because Std. Dev < mean. In the ROA variable, the lowest value is 1.32 per cent/month, the highest value is 2.15 per cent/month, the mean is 1.65 per cent/month, the Std. The deviation is 0.22 percent and the Sum value is 59.42. The ROA variable does not have varying data diversity because Std. Dev < mean.
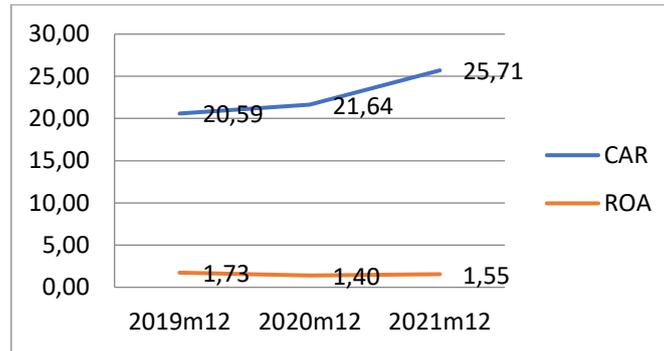
Figure.2 BOPO to ROA
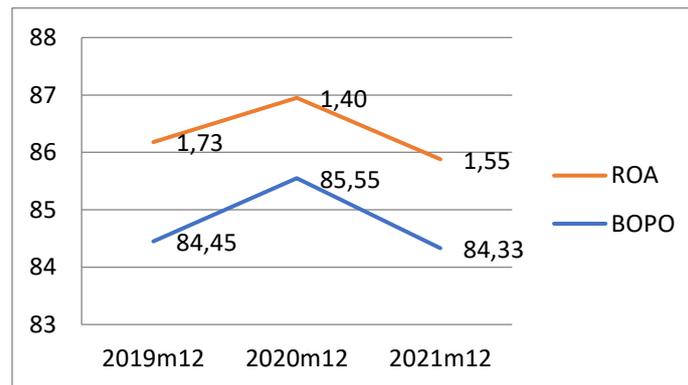
Source: Bank Indonesia (data processed by the author), 2024

BOPO (Operating Costs to Operating Income) in December 2019 was 84.45% and ROA (Return on Assets) in December 2019 was 1.73%. This information indicates that the bank's operational costs comprise around 84.45% of its operating income, while ROA only reaches 1.73%. BOPO (Operating Costs to Operating Income) in December 2020 was 85.55% and ROA (Return on Assets) in December 2020 was 1.40%. This indicates that the bank's operational costs account for around 85.55% of its operational income, while ROA only reaches 1.40%. BOPO (Operating Costs to Operating Income) in December 2021 was 84.33% and ROA (Return on Assets) in December 2021 was 1.55%. This indicates that the bank's operational costs account for around 84.33% of its operating income, while ROA only reaches 1.55%.

BOPO is a ratio that shows the percentage of bank operational costs obtained from operating income (ROA). A lower ROA indicates that the bank's operational costs are too high or less efficient. In this case, a high BOPO and low ROA may suggest that the bank's high operational costs reduce the profits that can be achieved from operating income. Banks can increase their asset ratio (ROA) by lowering operational costs, improving operational efficiency, or earning more revenue from operations. Increasing ROA can increase the value of profits and the value of bank shares.
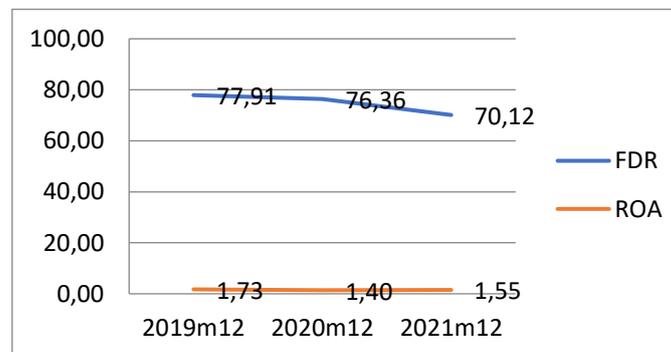
Figure 3. CAR to ROA

Source: Bank Indonesia (data processed by the author), 2024

CAR (Capital Adequacy Ratio) in December 2019 was 20.59% and ROA (Return on Assets) in December 2019 was 1.73%. Indicates that the percentage of bank assets required to fulfil financial requirements as assets having a value greater than or equal to the value of the credit provided is 20.59%, while ROA only reaches 1.73%. CAR (Capital Adequacy Ratio) in December 2020 was 21.64% and ROA (Return on Assets) was 1.40%. Indicates that the percentage of bank assets required to fulfil financial requirements as assets having a value greater than or equal to the value of the credit provided is 21.64%, while ROA only reaches 1.40%. CAR (Capital Adequacy Ratio) in December 2021 was 25.71% and ROA (Return on Assets) was 1.55%. Indicates that the percentage of bank assets required to fulfil financial requirements as assets having a value greater than or equal to the value of the credit provided is 25.71%, while ROA only reaches 1.55%

CAR is a ratio that shows the percentage of bank assets needed to meet financial requirements as assets with a value greater than or equal to the credit provided. A lower ROA indicates that the bank is less efficient in using the assets it owns. In this case, a high CAR and low ROA may suggest that the bank is less efficient in using the assets it owns. Banks can increase their asset ratio (ROA) by reducing operational costs, improving operational efficiency, or earning more income from operations. Increasing ROA can increase the value of profits and the value of bank shares.
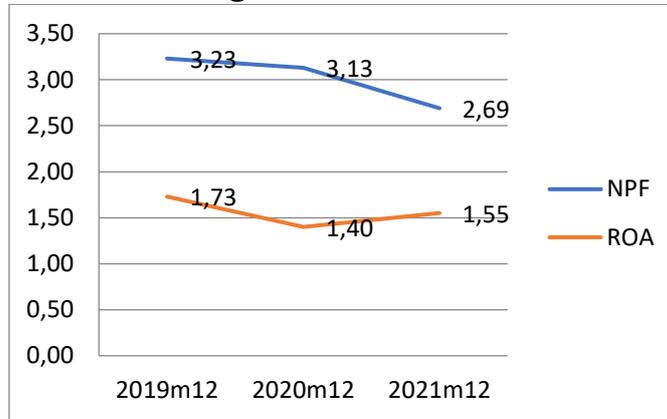
Figure 4. FDR to ROA

Source: Bank Indonesia (data processed by the author), 2024

FDR (Financing to Deposit Ratio) in December 2019 was 77.91% and ROA (Return on Assets) was 1.73%. Indicates that the percentage of bank deposits used to finance bank assets is 77.91%, while ROA only reaches 1.73%. FDR (Financing to Deposit Ratio) in December 2020 was 76.36% and ROA (Return on Assets) was 1.40%. Indicates that the percentage of bank deposits used to finance bank assets is 76.36%, while ROA only reaches 1.40%. FDR (Financing to Deposit Ratio) in December 2021 was 70.12% and ROA (Return on Assets) was 1.55%. Indicates that the percentage of bank deposits used to finance bank assets is 70.12%, while ROA only reaches 1.55%.

FDR is a ratio that shows the percentage of bank deposits used to finance bank assets. A lower ROA indicates that the bank is less efficient in using the assets it owns. In this case, a high FDR and low ROA may suggest that the bank is less efficient in using its bank deposits. Banks can increase their asset ratio (ROA) by reducing operational costs, improving operational efficiency, or earning more income from operations. Increasing ROA can increase the value of profits and the value of bank shares.
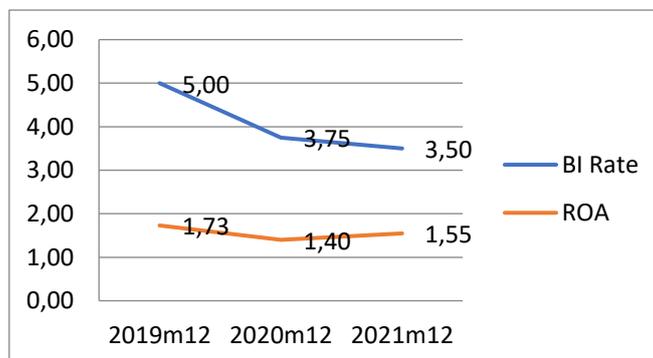
Figure.5 NPF to ROA

Source: Bank Indonesia (data processed by the author), 2024

NPF (Non-Performing Financing) in December 2019 was 3.23% and ROA (Return on Assets) was 1.73%. Indicates that the percentage of non-performing bank financing that cannot be accepted for payment is 3.23%, while ROA only reaches 1.73%. NPF (Non-Performing Financing) in December 2020 was 3.13% and ROA (Return on Assets) was 1.40%. This indicates that the percentage of non-performing bank financing that is unacceptable for payment is 3.13%, while ROA only reaches 1.40%. NPF (Non-Performing Financing) in December 2021 was 2.69% and ROA (Return on Assets) was 1.55%. This indicates that the percentage of non-performing bank financing unacceptable for payment is 2.69%, while ROA only reaches 1.55%.

The NPF ratio is the percentage of a bank's non-performing loans that are unacceptable for repayment. A lower ROA indicates that the bank is less efficient in using the assets it owns. In this case, a low NPF and ROA may suggest that the bank is less efficient in managing its non-performing loans. Banks can reduce operational costs, increase efficiency, or earn more operating income by increasing ROA. Increasing ROA will increase the bank's profit value and can increase the value of its shares. To increase NPF, banks can reduce non-performing funding and reduce unacceptable expenses.

**Figure 6. BI Rate to ROA**

Source: Bank Indonesia (data processed by the author), 2024

Based on available information, the BI Rate in December 2019 was 5% and ROA (Return on Assets) was 1.73%. Indicates that the interest rate set by Bank Indonesia is 5%, while ROA only

reaches 1.73%. The BI Rate in December 2020 was 3.75% and ROA (Return on Assets) was 1.40%. This information indicates that the interest rate set by Bank Indonesia is 3.75%, while ROA only reaches 1.55%. Then, the BI Rate in December 2021 was 3.50% and ROA (Return on Assets) was 1.55%. This information indicates that the interest rate set by Bank Indonesia is 3.50%, while ROA only reaches 1.55%.

The interest cost rate (BI Rate) is the rate set by Bank Indonesia to regulate the level of interest costs banks receive from financing. A lower ROA indicates that the bank is using assets less efficiently, so a high BI Rate and low ROA may indicate that the bank is less efficient in managing interest costs set by Bank Indonesia.

Figure 7. Inflation to ROA
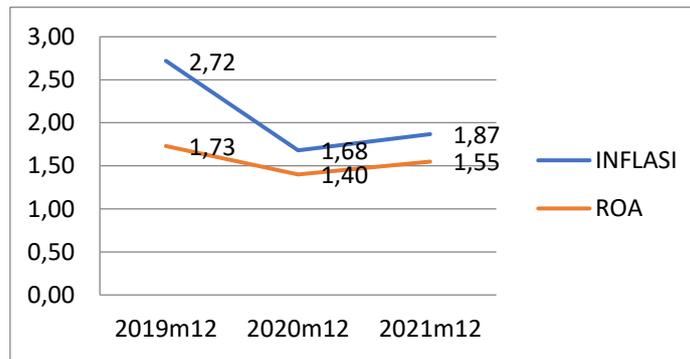
Source: Bank Indonesia (data processed by the author), 2024

Figure 7 shows that Inflation in December 2019 was 2.72% and ROA (Return on Assets) was 1.73%. Then, in December 2020, inflation was 1.68%, and ROA (Return on assets) was 1.40%. Inflation in December 2021 was 1.87% and ROA (Return on Assets) was 1.55%. While return on assets (ROA) is a ratio that shows how effectively bank assets are used to generate profits, inflation is the rate of increase in prices as indicated by the Consumer Price Index (CPI). Due to rising prices of commodities such as primary and junior high schools, which are significant contributors to inflation, banks' value of assets (ROA) may change. This is because rising commodity prices can increase bank operational costs, reducing the profits achieved from operating income. Banks can increase their asset ratio (ROA) by reducing operational costs, increasing operational efficiency, or earning more income from operations. Increasing ROA can increase the value of profits and the value of bank shares.

Table 3 determines the significance level of stationarity of the observed variables. The seven variables are stationary and are at the 1st difference stationary level, with the significance of each variable being less than 0.05.

Table 3: Augmented Dickey Stationarity Test Results

Variable	Significance (1st Difference)	Information
BOPO	0,0096	Stationary 1st Difference
CAR	0,0000	Stationary 1st Difference
FDR	0,0000	Stationary 1st Difference
NPF	0,0000	Stationary 1st Difference
INFLASI	0,0035	Stationary 1st Difference
BI Rate	0,0023	Stationary 1st Difference
ROA	0,0010	Stationary 1st Difference

Source: data processed by the author, 2024

The results of the residual stationary test shown in Table 4 show that the residual model shows stability at the level with a value of 0.0003. This indicates that integrated variables, to the same degree, have an equilibrium relationship in the long run. This is achieved through co-integration tests. This also shows that the BI Rate, BOPO, CAR, FDR, NPF, INFLATION, and ROA variables are in long-term balance. Over short-term periods, each variable tends to adjust to achieve long-term equilibrium.

Table 4: Residual Stationarity Test Results

Variable	Significance (1st Difference)	Information
RES (-1)	0,0003	Stationary 1st Difference

Source: data processed by the author, 2024

Error Correction Model (ECM) Test Results

The Error Correction Model method was used in this research. Error correction modeling is one way to find relationships between non-stationary variables. This is valid as long as there is co-integration in a group of non-stationary variables.

Table 5: Long-Term Estimation Results

Variable	Coefficient	Prob.
C	8,430351	0,0012**
BOPO	-0,113836	0,0000***
CAR	0,055616	0,0132**
FDR	-0,005233	0,6893*
NPF	0,493234	0,0047***
BI RATE	0,120904	0,0538*
INFLATION	-0,036647	0,5516*
R-squared	0,843084	
Prob(F-statistic)	0,000000	

*Note : Significant Level p>|t| : *** <1% (0,01); **<5%(0,05); *<10%(0,10).*
Estimated from Error Correction Model (ECM).
Source: data processed by the author, 2024

4. Discussion

The performance of Islamic banking in Indonesia can be influenced by various factors, namely bank internal and external factors (Suwito et al., 2022). The value of the constant coefficient in the long term is 8.430351 and has a positive sign, indicating that without the influence of the independent variable, ROA would be 6.4303 percent. Meanwhile, in the short term, the constant coefficient has a negative sign with a value of -0.009689, indicating that for every one percent decrease, ROA will decrease by 0.009%. Furthermore, based on the test results, the following findings were obtained,

a) The effect of BI Rate on ROA

The long-term test results show that the BI rate does not significantly affect ROA, with a coefficient of 0.1209 and a significance of 0.053. This means that in the long term, for every 1 percent increase in the BI rate, ROA will increase by 0.12 percent. The analysis results show that the BI rate does not affect Sharia banking profits (ROA) from 2019 to 2021. Because Sharia customers usually adhere to Islamic principles or rules (Rabbani et al., 2021), banks are prohibited from collecting or borrowing with interest or usury. It also prohibits investment in businesses considered haram, which the conventional banking system cannot guarantee. Changes usually follow changes in the BI rate in loan and savings interest rates (Krušković, 2022). If the BI rate rises, savings interest rates will increase within a certain period. If savings interest rates rise, third-party funds from Sharia banks will decrease, transferring funds from Sharia banks to conventional banks. When

savings interest rates rise, customers prefer to place their funds in conventional banks because the interest rate is greater than the profit-sharing rate they receive in Sharia banks. As a result, Sharia Bank's profits will decrease due to the decrease in deposits. In the short term, it shows that the BI rate has no significant effect on ROA, with a coefficient of 0.025841 and a significance of 0.8752. As a result, the BI rate does not impact Islamic banking profits (ROA) because customers do not expect profits when saving but prioritize Islamic Sharia principles over profits. Sharia banks obtain earnings from various sources, including buying and selling foreign exchange (Sharf), loans for urgent customer needs (Qardh), transferring debts and receivables to obtain cash capital from customers (Hiwalah), buying and selling property with developers and selling it to customers (Murabahah), rental financing (Ijarah), and document administration services.

b) The effect of BOPO on ROA

The long-term test results show that BOPO has a significant negative effect on ROA with a coefficient of -0.113836 with a significance of 0.0000, meaning that every 1 per cent increase in BOPO will reduce the ROA value by 0.113836 per cent. This shows that when operational funds increase, the costs incurred result in a lack of profit before tax, which can reduce bank profits. In term of operational costs to operational income affect ROA. In the short term, it shows that BOPO has a significant negative effect on ROA with a coefficient of -0.93627 with a significance of 0.0001. it implies that BOPO has a significant negative impact on the return on assets (ROA) of Islamic banks. The lower the ratio of operational costs to operating income, the more efficient the operational costs incurred by the bank. Any increase in the cost of income will result in a decrease in profit before tax, ultimately reducing the bank's profitability (ROA). Logically, the smaller the ratio of Operating Costs to Operating Income, the more efficient the operational costs incurred by banks, which allows them to increase company profits.

c) The effect of CAR on ROA

The long-term test results show that CAR has a significantly positive effect on ROA with a coefficient of 0.055616 with a significance of 0.0132, meaning that every 1 per cent increase in CAR will increase the ROA value by 0.055616 per cent. This shows that if a bank's CAR is high, then the bank can support higher risks to increase bank performance or ROA. Previous study about Islamic commercial banks in Indonesia using annual published financial report data for eight years from 2012 to 2019, showing that the CAR variable has a significant positive effect on ROA. In the short term, it indicates that CAR has no significant impact on ROA, with a coefficient of 0.039190 and a significance of 0.2365. This is in line with previous research that in Islamic commercial banks in Indonesia using annual financial report data for the 2015-2019 period or short-term variables CAR, NPF, FDR, BOPO, NOM did not have a significant effect on ROA value of Islamic commercial banks. However, in the long term, CAR can significantly impact ROA due to capital availability, financial availability, banking performance, regulatory supervision and operational performance (Hawaldar et al., 2022).

d) The effect of FDR on ROA

The long-term test results show that FDR has no significant effect on ROA, with a coefficient of -0.005233 with a significance of 0.6893. This is supported by a study that found that in Islamic commercial banks in Indonesia, FDR does not significantly influence ROA in the long term. FDR has an important function in banking because it shows the availability of capital for customers. A bank with a high FDR can improve performance and reduce bank risk. In the short term, it shows that FDR also has no significant effect on ROA with a coefficient of -0.004539 with a significance of 0.7370. This is in line with previous research that FDR does not significantly influence ROA in the short term. The short term is important in this research because it helps determine the variables' direct and current impact on FDR and ROA in Islamic commercial banks in Indonesia. However, the effects of FDR on ROA are not significant in the short term.

e) The effect of NPF on ROA
The long-term test results show that NPF significantly affects ROA with a coefficient of 0.493234 and a significance of 0.0047. This indicates that in the long term, NPF has a positive and significant effect on ROA. This means that for every 1% increase in NPF in the long term, there will be an increase in ROA of 0.49%. The rise in NPF, classified as non-performing loans, means that it will align with the increase in ROA in Islamic commercial banks in 2019-2021. However, this is contrary to research which shows that increasing costs incurred by Islamic banks if financing problems occur will reduce income because the cost of providing the required productive asset reserves will be higher. In the short term, the test results show that NPF does not affect ROA. NPF was proven to not affect the ROA of general sharia banks in Indonesia during 2019-2021 with a coefficient of 0.263851 and a probability of 0.1186. This shows that in the long term, the influence of NPF is positive but not significant on ROA. NPF, classified as a non-performing credit, will not affect the profitability of Islamic banks in Indonesia from 2019 to 2021. The higher the NPF value (above 5%), the bank is declared unhealthy (Bank Indonesia Regulation Number 6/10/PBI/2004 dated 12 April 2004). This supports research results, which show that the higher the bank's NPF ratio, the lower the profitability or profit (ROA) of Sharia commercial banks.

f) The effect of Inflation on ROA
The long-term test results show that inflation does not significantly affect ROA, as indicated by a significance or probability value of 0.5516 and a coefficient that shows a negative value of -0.036647. This can mean inflation, likely at risk of fluctuation, will not affect the increase or decrease in profitability (ROA) in Islamic commercial banks. In the short term, the test results show that inflation is negative and insignificant or has no effect on ROA, as indicated by a probability figure of 0.4006 and a coefficient of -0.067846. Both in the long term and short term, inflation does not affect the ROA of Sharia commercial banks. in Indonesia in 2019-2021. This is in line with previous research which show that partially the inflation rate does not affect the ROA profitability of Islamic banks (Nasir et al., 2022). In the short term, the test results show that inflation is negative and insignificant or has no effect on ROA, as indicated by a probability figure of 0.4006 and a coefficient of -0.067846.

5. Conclusion
The following conclusions can be drawn based on the results of the data analysis carried out in the previous section. In the long run, the BI rate does not significantly affect ROA, with a coefficient of 0.1209 and a significance of 0.053. This means that with every increase in BI rate by 1 per cent, ROA will increase by 0.12 per cent. In the short term, it shows that the BI rate has no significant effect on ROA, with a coefficient of 0.025841 and a significance of 0.8752. In the long term, it indicates that BOPO has a significant negative impact on ROA with a coefficient of -0.113836 with a significance of 0.0000, meaning that every 1 per cent increase in BOPO will reduce the value of ROA by 0.113836 per cent. In the short term, it shows that BOPO has a significant negative effect on ROA with a coefficient of -0.93627 with a significance of 0.0001.

In the long run, CAR has a significant positive effect on ROA with a coefficient of 0.055616 and a significance of 0.0132, meaning that every 1 per cent increase in CAR will increase the value of ROA by 0.055616 per cent. In the short term, it shows that CAR has no significant effect on ROA, with a coefficient of 0.039190 and a significance of 0.2365. In the long term, it indicates that FDR has no significant impact on ROA, with a coefficient of -0.005233 and a significance of 0.6893. In the short term, it shows that FDR also has no significant effect on ROA, with a coefficient of -0.004539 and a significance of 0.7370.

In the long term, NPF has a significant positive effect on ROA with a coefficient of 0.493234 and a significance of 0.0047. This shows that in the long run, NPF positively and significantly impacts ROA. While in the short term, the test results show that NPF does not affect ROA. In the long run, it shows that inflation has no significant effect on ROA, indicated by a significance or probability value of 0.5516 and a coefficient that shows a negative angle of -0.036647. In the short

term, the test results show that inflation is negative and insignificant or has no effect on ROA, indicated by a probability of 0.4006 and a coefficient of -0.067846.

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