

THE EFFECT OF CAPITAL ADEQUACY, OPERATIONAL EFFICIENCY, AND THIRD-PARTY FUNDS ON PROFITABILITY IN SHARIA COMMERCIAL BANKS IN INDONESIA

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Abstract

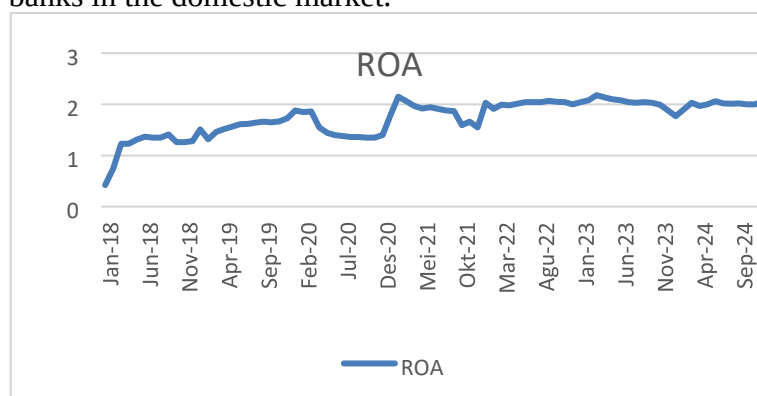
This study aims to analyze the effect of Capital Adequacy Ratio (CAR), Operating Costs to Operating Income (BOPO), and Third Party Funds (DPK) on Return on Assets (ROA) in Sharia Commercial Banks in Indonesia. This study uses an associative quantitative approach with secondary data on the monthly time series for the 2018–2024 period sourced from the Financial Services Authority (OJK). The analysis method used is the Vector Error Correction Model (VECM), with stages of testing stationery, optimal lag, VAR stability, Granger causality, and Johansen cointegration, and equipped with Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis. The results of the study showed that some variables were not stationary at the level level, but all variables were stationary at the first difference. The Johansen cointegration test showed that there was a long-term relationship between variables, so the VECM model was feasible. The estimated results show that CAR does not have a significant effect on ROA in the short term. BOPO has a negative and significant effect on ROA in the short term, while deposits also have a negative and significant effect on ROA. The IRF results show that the ROA response to shock is temporary, while the FEVD shows that the variation in ROA is more explained by the ROA shock itself. This finding indicates that the profitability of Sharia Commercial Banks is more influenced by operational efficiency and optimization of fund management than capital adequacy alone.

Keywords: CAR, BOPO, DPK, ROA, Sharia Commercial Bank

INTRODUCTION

The Islamic financial system has undergone rapid development in the last two decades and is now an integral part of the global financial system. Sharia principles that reject usury, gharar, and maysir offer a more ethical and sustainable alternative to the financial system. Based on a report by the (Muhajil& Azhar, 2024a) *Islamic Financial Services Board* (IFSB, 2024), the world's total Islamic financial assets will reach USD 4.7 trillion in 2024, an increase of 11.2% compared to the previous year. The growth not only shows an increase in economic scale, but also global confidence in financial instruments based on the values of fairness, transparency, and sustainability. This system is considered more resilient to economic turmoil because it is based on the concepts (Najib Azzamani, 2024;Readers-taxi2023) of *risk-sharing* and *asset-backing*, which prevents financial institutions from excessive speculative risk. Islamic finance is now not only thriving in Muslim-majority countries, but is also an important part of the financial ecosystem in the world's economic hubs such as London, Dubai, and Kuala Lumpur. This phenomenon confirms that the valuebased finance paradigm has become a global trend towards an inclusive and equitable economic system.(Ahmed 2021; Factory Oil, 2014;Meero , 2025) (Chowdhury & Haron, 2021)

In the national context, Indonesia occupies a strategic position as one of the largest Islamic financial markets in the world. Based on data from the *Financial Services Authority* (OJK, 2024), Indonesia's total Islamic banking assets will reach IDR 897 trillion by the end of 2024, with an annual growth rate of 13.6%. The surge is supported by increasing Islamic financial literacy, government policy encouragement through the *Indonesian Sharia Economic and Financial Masterplan (MEKSI) 2019–2024*, and the acceleration of digital innovation through *Islamic fintech* (Akttausyaniah & Hidayat ; Sopian 2023) platforms. However, in the midst of this impressive growth, the main challenge still faced is the low level of profitability of Islamic banks compared to conventional banks. Data shows that the average *Return on Assets (ROA)* of Islamic commercial banks is only 1.34% in 2024, while conventional banks reach 2.21% (OJK, 2024; Bank Indonesia, 2024). This disparity signals the need for a more effective strategy to improve the asset efficiency and competitiveness of Islamic banks in the domestic market.



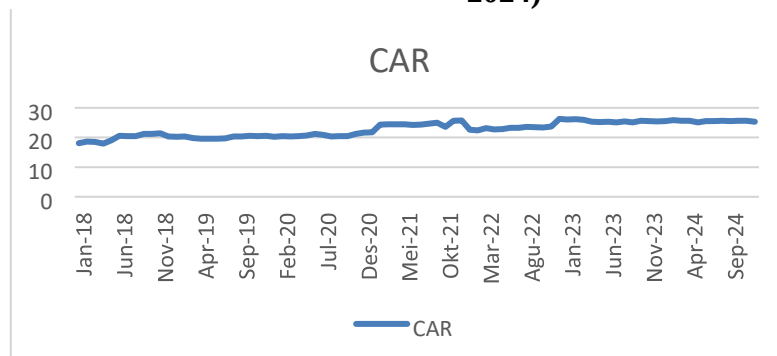
Source: Processed from Sharia Banking Statistics Report (OJK)

Figure 1. Return on Assets (ROA) of Sharia Commercial Banks (2018–2024)

The profitability performance of Islamic banks is greatly influenced by the strength of capital and the effectiveness of operational cost management. One important indicator is

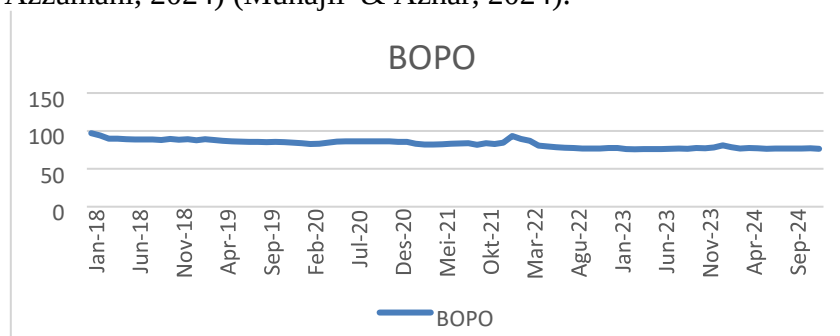
(Srairi , 2010) *the Capital Adequacy Ratio (CAR)*, which reflects a bank's ability to absorb potential risks and maintain public trust. During the 2018–2024 period, the CAR ratio of Sharia Commercial Banks showed a stable trend in the range of 20–22%, indicating a healthy capital structure and resilience to economic pressures. The high performance of the CAR also indicates the bank's ability to expand productive financing, although if it is too large, it can indicate inefficiency in capital utilization. Therefore, an optimal CAR rate is the key to a balance between financial stability and the achievement of sustainable profits.(Hosen, M. N& Rahmawati, R. (2014) (Sopian2023) (Mukti, R. I. 2025)

Figure 2. Capital Adequacy Ratio (CAR) Trends in Sharia Commercial Banks (2018–2024)



Source: Processed from Sharia Banking Statistics Report (OJK)

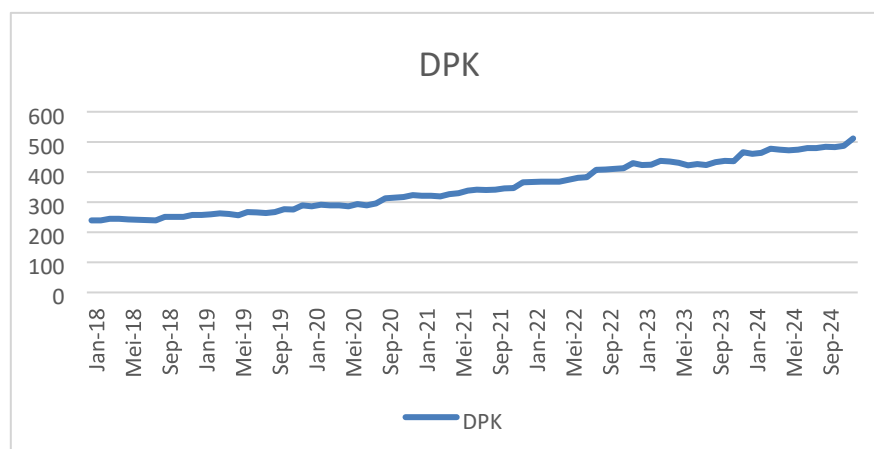
The next factor is operational efficiency as measured through the ratio of *Operating Costs to Operating Income (BOPO)*. BOPO reflects the extent to which the costs incurred by banks are proportional to the income generated. Over the past six years, the BOPO ratio of Sharia Commercial Banks has decreased from 90.1% in 2018 to around 77% in 2024, signaling a significant increase in efficiency after the merger of Bank Syariah Indonesia (BSI). The decline in BOPO is an indicator of the success of digital transformation, risk management integration, and branch and service optimization. The relationship between BOPO and ROA is negative: the more efficient the operating costs, the higher the level of profitability that can be achieved. In the context of the industry, efficiency is not only a financial aspect, but also shows the ability of the institution to adapt to changes in technology and customer behavior (Najib Azzamani, 2024) (Dona Pertiwi T, 2024; Faiza Khansa2023) (Najib Azzamani, 2024) (Muhajil & Azhar, 2024).



Source: Processed from Sharia Banking Statistics Report (OJK)

Figure 3. Operational Efficiency Ratio (BOPO) of Sharia Commercial Banks (2018–2024)

In addition to internal efficiency, the ability to raise public funds is the main external factor that determines the profitability of Islamic banks. *Third-Party Funds* (DPK) act as the main source of funds that allow banks to distribute financing to the productive sector. The growth of deposits also reflects the level of public trust in the Islamic financial system. In the 2018–2024 period, the total deposits of Islamic commercial banks increased from IDR 345 trillion to IDR 630 trillion, with an average annual growth of 10–12% (OJK, 2024). The composition of deposits is dominated by savings and mudharabah deposits, which are in accordance with the principle of profit sharing and strengthen the basis of national Islamic financial intermediation. This increase in deposits expands productive financing capacity, while affirming the increasing public trust in the Islamic banking system. (Muhajil & Azhar, 2024)



Source: Processed from Sharia Banking Statistics Report (OJK)

Figure 4. Growth of Third Party Funds (DPK) in Sharia Commercial Banks (2018–2024)

However, a number of previous studies have shown varying results regarding the relationship between CAR, BOPO, and deposits on ROA. found that CAR has a significant positive effect on ROA, while in Indonesia it shows that BOPO has a significant negative effect on profitability. Deposits have also been shown to have a positive influence on ROA, but with considerable temporal variations. Most of the research is still partial and has not taken into account the post-COVID-19 pandemic dynamics, the merger of Bank Syariah Indonesia (BSI) in 2021, as well as changes in customer behavior due to the digitalization of services. Based on this gap, this study aims to analyze the effect of (Nugroho 2024) (Faiza Khansa, 2023) (Millah, 2025; Sopian, 2023) *Capital Adequacy Ratio* (CAR), *Operating Costs to Operating Income* (BOPO), and *Third Party Funds* (DPK) on *Return on Assets* (ROA) in Sharia Commercial Banks in Indonesia for the 2018–2024 period. The results of this study are expected to make an empirical contribution to the development of Islamic finance theory and become a strategic reference in improving the efficiency, competitiveness, and sustainability of the Islamic banking industry in Indonesia (Kurniawati, L. (2025); Millah 2025).

REVIEW OF LITERATURE

Research on capital adequacy (CAR) consistently shows that capital adequacy is an important pillar for the stability and profitability of banks, including Islamic banks. asserts that strong capital levels influence fundraising and financing disbursement behavior, while explaining that CAR has significant implications for banks' ability to bear risk. He also said that the capital framework of Islamic banks has special characteristics because of the profit-sharing scheme used, so that capital adequacy is not only related to regulations but also a determining factor in financial performance. reinforcing these findings by showing that banks with higher capital buffers tend to have more stable and profitable performance. Overall, the literature shows that CAR plays an important role in supporting financing expansion while increasing profitability (Abdul Karim 2014) (Louati 2015) (Muljawan, 2004) (Sutrisno & Widarjono, 2024).

In the context of operational efficiency, a number of researchers have shown that cost efficiency and the effectiveness of resource use are the main determinants of profitability. found that cost efficiency has a direct effect on the bank's ability to generate profits through optimization of operational activities. identify that Islamic banks in Southeast Asia, including Indonesia, generally experience variations in efficiency that impact profit performance. Masood and Zarrouk's research corroborates that the cost-to-income ratio and the quality of productive asset management are the indicators of efficiency that most affect profitability. The latest findings suggest that there is a dilemma between operational efficiency and financing expansion, where increased efficiency can sometimes reduce the flexibility of fund disbursements, raising an interesting trade-off for further analysis (Srivastava, 2010) (Chowdhury & Haron, 2021) (Zuhroh, 2025).

Meanwhile, Third-Party Funds (TPF) is one of the important variables that affect the profitability of Islamic banks. emphasized that the size of TPF determines the financing capacity and strengthens the bank's liquidity, which directly impacts the increase in profit margins. shows that the funding structure of Islamic banks, which is dominated by mudharabah and wadiah contracts, makes TPF very important in increasing funding stability and encouraging financing growth. found that TPF is closely related to financing margins and intermediation efficiency, so TPF is a key factor in supporting profitability, especially in Islamic banks that rely heavily on public funds as the main source of funding (Pradana 2022) (Mawardi, 2023) (Widarjono, 2018).

Overall, these studies show that the profitability of Islamic banks is determined by the synergy between capital adequacy, operational efficiency, and the strength of third-party funds. CAR ensures risk resilience and allows for financing expansion, operational efficiency improves banks' ability to manage costs and generate profits, while TPF provides a stable source of funds for intermediation activities. However, the literature also shows variations in influence between countries and between periods, indicating the existence of structural dynamics in the Islamic banking industry. This condition opens up room for further research, especially in Islamic commercial banks in Indonesia, to re-examine the power of the influence of these three variables with the latest data and a more comprehensive empirical model.

RESEARCH METHOD

This study uses a quantitative approach with an associative design to analyze the effect of Capital Adequacy Ratio (CAR), Operating Costs to Operating Income (BOPO), and Third Party Funds (DPK) on Return on Assets (ROA) in Sharia Commercial Banks in Indonesia. The data used is secondary data in the form of a monthly time series for the 2018–2024 period obtained from official publications of the Financial Services Authority (OJK).

The analysis methods used were Vector Autoregression (VAR) and Vector Error Correction Model (VECM). The model selection was based on the results of stationarity tests using Augmented Dickey-Fuller (ADF) and Johansen cointegration tests. If the variable is not stationary at the level level but stationary at the first difference and has a cointegration relationship, then the VECM model is used. On the other hand, if there is no cointegration, the VAR model is used. This analysis allows testing of short-term and long-term relationships between variables, as well as Granger causality tests. All data processing is carried out using EViews software.

The analysis stages include stationarity test, optimal lag determination using information criteria (AIC, SC, and HQ), model stability test, Johansen cointegration test, VAR/VECOM model estimation, Granger causality test, as well as Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analysis. IRF is used to look at a variable's dynamic response to shock, while FEVD is used to measure the relative contribution of each variable in explaining system variability. All variables are measured in the form of financial ratios that refer to OJK provisions, namely CAR as an indicator of capital adequacy, BOPO as an indicator of operational efficiency, deposits as an indicator of public fundraising, and ROA as an indicator of bank profitability.

The empirical model in this study is formulated in the form of a VAR equation system as follows:

$$\begin{aligned} \text{CAR}_t &= \alpha_1 + \sum_{i=1 \rightarrow k} \beta_{11,i} \text{CAR}_{t-i} + \sum \beta_{12,i} \text{BOPO}_{t-i} + \sum \beta_{13,i} \text{DPK}_{t-i} + \sum \beta_{14,i} \text{ROA}_{t-i} + \mu_{1t} \\ \text{BOPO}_t &= \alpha_2 + \sum_{i=1 \rightarrow k} \beta_{21,i} \text{CAR}_{t-i} + \sum \beta_{22,i} \text{BOPO}_{t-i} + \sum \beta_{23,i} \text{DPK}_{t-i} + \sum \beta_{24,i} \text{ROA}_{t-i} + \mu_{2t} \\ \text{DPK}_t &= \alpha_3 + \sum_{i=1 \rightarrow k} \beta_{31,i} \text{CAR}_{t-i} + \sum \beta_{32,i} \text{BOPO}_{t-i} + \sum \beta_{33,i} \text{DPK}_{t-i} + \sum \beta_{34,i} \text{ROA}_{t-i} + \mu_{3t} \\ \text{ROA}_t &= \alpha_4 + \sum_{i=1 \rightarrow k} \beta_{41,i} \text{CAR}_{t-i} + \sum \beta_{42,i} \text{BOPO}_{t-i} + \sum \beta_{43,i} \text{DPK}_{t-i} + \sum \beta_{44,i} \text{ROA}_{t-i} + \mu_{4t} \end{aligned}$$

Description: CAR = Capital Adequacy Ratio
BOPO = Operating Costs to Operating Income
DPK = Third Party Funds
ROA = Return on Assets
 μ_t = term error = optimal lag length

RESULTS AND DISCUSSION

Stationary Test

The results of the stationary test in Table 1 were evaluated based on the criteria of a probability value of less than 0.05. Initial testing is performed at the level level for each variable. The test results showed that the variables ROA, CAR, and BOPO had a probability value of 0.9962 each; 0.3671; and 0.0958, which is greater than 0.05. This indicates that the three variables are not stationary at the level level, so further testing at the first difference level is needed.

Table 1.
Stationary Test Results

	Level	First Difference	Information
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Variabel	Prob.	Prob.	
LONG	0.9962	0.0001	Stasions
MOBILE	0.3671	0.0000	Stasions
BOPO	0.0958	0.0000	Stasions
DPK	0.0015	0.0000	Stasions

Source: data processed with Eviews 13.2025

On the other hand, the DPK variable has a probability value of 0.0015 at the level level, which is smaller than 0.05, so it can be concluded that the DPK variable is stationary at the level level and does not require a differentiation process. After testing at the first difference level, all variables showed a probability value below 0.05, which was 0.0000 to 0.0001, which indicates that all variables were stationary. Thus, the variables ROA, CAR, and BOPO need to be transformed into the form of first differences, namely D(ROA), D(CAR), and D(BOPO), before being used in advanced analysis such as VAR or VECM models. This transformation aims to avoid the occurrence of pseudo-regression (spurious regression) and ensure the validity and reliability of the estimation results.

Optimal Lag Test

The determination of the optimal lag length is carried out using several information criteria, namely the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ). The optimal lag is determined based on the value of the smallest (minimum) information criterion, because the lag with the lowest value is considered to be able to provide the most efficient and stable model estimation.

Table 2.
Optimal Lag Test Results

Slowness	AIC	SC	Head Office
1.	38.70812*	38.83079*	38.75714*
2.	38.77923	39.39258	39.02436
3.	38.91235	40.01638	39.35357
4.	38.82733	40.42204	39.46465
5.	39.01444	41.09983	39.84786
6.	39.43822	41.81242	40.26587
7.	39.43822	42.50498	40.66385
8.	39.55952	43.11695	40.98124

Source: data processed with Eviews 13.2025

Based on the results of the optimal lag test in Table 2, it is known that lag 1 has the lowest value in all information criteria, namely AIC of 38.70812, SC of 38.83079, and HQ of 38.75714, each of which is marked with an asterisk (*). The lag further indicates a greater

value of the information criterion than lag 1. Thus, it can be concluded that lag 1 is the optimal lag used in this research model. Based on the Akaike Information Criterion (AIC) criteria, the best lag for the VAR/VECM model is lag 1. This shows that all the variables in the model affect each other with a time gap of one period.

Var Stability Test

The results of the VAR stability test show that the analyzed system has met the stability requirements, where the entire modulus value of the characteristic roots is below one. Based on Table 3, the modulus values obtained are 0.256589, 0.256589, 0.224346, and 0.000246, respectively. The highest modulus value is 0.256589, while the other value is well below the limit of one. This condition indicates that the system's response to shock will subside over time, allowing the system to return to long-term equilibrium without experiencing explosive symptoms or divergence. Thus, the results of this stability test confirm that the VAR/VECM model used in this study is stable and feasible to analyze the dynamic relationships between variables in the research model.

Table 3.
Var Stability Test

Up to	Modulus	Information
0.256589	0.256589	Stable
0.256589	0.256589	Stable
0.224346	0.224346	Stable
0.000246	0.000246	Stable

Source: data processed with Eviews 13.2025

Granger Quality Test Results

The results of the Granger causality test in Table 4 show several important findings related to the dynamic relationship between banking financial ratios, namely CAR, BOPO, DPK, and banking performance proxied by ROA. First, the test results showed that the hypothesis that BOPO does not affect CAR could not be rejected, with an F-statistical value of 3.52453 and a probability of 0.0641 (>0.05). On the other hand, CAR has also not been proven to affect BOPO with a probability value of 0.8912. This indicates that there is no causal relationship between BOPO and CAR. Furthermore, in the relationship between deposits and CAR, the test results showed that deposits had no effect on CAR with a probability of 0.0790 (>0.05). But on the contrary, CAR was shown to significantly affect deposits with an Fstatistic value of 5.66831 and a probability of 0.0197 (<0.05). These findings show a oneway causality relationship from CAR to deposits, indicating that the adequacy of bank capital plays a role in influencing the ability of third-party fundraising.

On the relationship between ROA and CAR, the results of Granger's test showed that ROA significantly affected CAR with an F-statistic value of 5.18447 and a probability of 0.0255 (<0.05). In contrast, CAR has not been shown to affect ROA with a probability of 0.4393. This shows the existence of a one-way causality relationship from ROA to CAR, which indicates that the bank's profitability performance contributes to the strengthening of capital structure. Furthermore, the test results between DPK and BOPO showed that DPK significantly affected BOPO with a probability value of 0.0172 (<0.05), while BOPO was

not proven to affect DPK with a probability of 0.2069. These findings show a one-way causality relationship from deposits to BOPO, which indicates that an increase in third-party funds can affect the level of operational efficiency of banks.

In addition, the test results showed that ROA had a very significant influence on BOPO with an F-statistic value of 9.41238 and a probability of 0.0029 (<0.05). In contrast, BOPO has not been proven to affect ROA with a probability of 0.3005. This shows that the bank's profitability performance plays an important role in driving operational efficiency. Finally, the test results showed that ROA significantly affected deposits with a statistical F-value of 9.58657 and a probability of 0.0027 (<0.05), while deposits were not proven to affect ROA with a probability of 0.9256. These findings show a one-way causal relationship from ROA to deposits, which indicates that increasing bank profitability can increase public confidence in raising third-party funds.

Overall, the results of Granger's causality test show that most of the relationships between variables are one-way, especially from ROA and CAR to other variables. This indicates that the bank's performance and capital have a more dominant role in influencing operational efficiency and fundraising, compared to the opposite relationship. These findings reinforce the importance of profitability and capital management in maintaining banking performance and stability.

Table 4.
Granger Quality Test Results

Hypothesis nol:	obs	F-Statistics	Prob.
BOPO does not Granger Cause CAR	83	3.52453	0.0641
CAR is not Granger Causes BOPO		0.01884	0.8912
Deposits are not Granger Causes CAR	83	3.16491	0.0790
CAR is not Granger Causes Deposits		5.66831	0.0197
ROA is not Granger Causes CARS	83	5.18447	0.0255
CAR does not Granger Cause ROA		0.60409	0.4393
Deposits are not Granger Causes BOPO	83	5.92220	0.0172
BOPO does not Granger Cause Deposits		1.61902	0.2069
ROA is not Granger Causes BOPO	83	9.41238	0.0029
ROA is not Granger Causes BOPO		1.08592	0.3005
ROA is not Granger Causes Deposits	83	9.58657	0.0027
DPK not Granger Causes ROA		0.00877	0.9256

Source: data processed with Eviews 13.2025

Cointegration test

In this study, cointegration testing was carried out using the Johansen Test approach, which is by comparing the trace statistical value with the critical value at a significance level of 5 percent. An equation system is said to have a cointegration relationship or long-term relationship if the trace statistic value is greater than the critical value. Based on the results of the Johansen Cointegration Test presented in the table, it is known that in *None's* hypothesis, the trace statistic value of 167.8658 is greater than the critical value of 47.85613 with a probability of 0.0000 (<0.05). Similar results are also shown in the hypotheses *At most 1*, *At most 2*, and *At most 3*, where all trace statistical values are 107.6705; 62.16946; and 26.24043 are also greater than the critical value at the significance level of 5 percent, with a probability of 0.0000.

These findings indicate that all variables in the model have a cointegration relationship, which means that there is a balance of long-term relationships between variables. With the cointegration, the right model to be used in this study is the Vector Error Correction Model (VECM), because it is able to capture short-term dynamics as well as adjustments towards long-term equilibrium.

Table 5.
Johansen Cointegration Test

Hipotesis from CE	Nope. Self-esteem	Footprint Statistics	0.05 Critical Values	Prob.** Critical Values
None *	0.524387	167.8658	47.85613	0.0000
Most 1 *	0.429785	107.6705	29.79707	0.0000
Maximum 2*	0.358258	62.16946	15.49471	0.0000
Maximum 3*	0.276718	26.24043	3.841465	0.0000

Source: data processed with Eviews 13.2025

VECM Estimation Results

The analysis using the Vector Error Correction Model (VECM) aims to identify the shortterm and long-term relationships between the variables studied, namely Capital Adequacy Ratio (CAR), operational efficiency (BOPO), Third-Party Funds (DPK), and banking performance proxied by Return on Assets (ROA). The table of VECM estimation results presents the influence of each variable both in the long and short term.

Table 6.
VECM Estimation Results

Variabel	Coeficin	Statistics T	Information
Long-term			
D (MOBILE (-1))	1.000000	-	-
D (BOPO(-1))	-0.110338	[-1.87344]	Insignificant

D(DPK(-1))	-302.8436	[-4.18911]	Signifikan
D (ROA(-1))	0.017193	[1.03652]	Insignificant
Short-term			
D (CAR (-1))	0.153372	1.29481	No effect
D (BOPO(-1))	-0.465157	-5.00137	Significant effects
D(DPK(-1))	-0.416707	-4.16746	Significant effects
D (ROA(-1))	-0.598154	-6.09828	Significant effects

Source: data processed with Eviews 13.2025

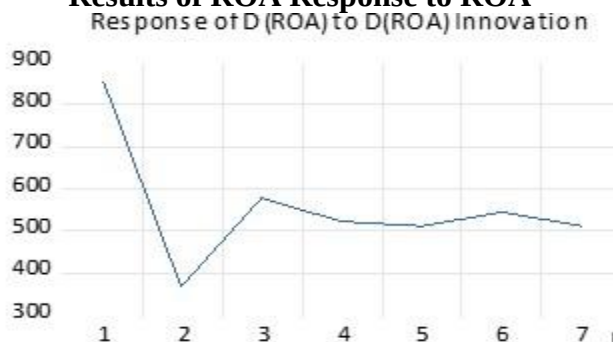
Based on the results of long-term estimation, the BOPO and ROA variables did not show a significant influence on CAR, which was shown by the t-statistical values of -1.87344 and 1.03652, respectively. In contrast, the deposit variable has a negative and significant influence on CAR in the long term, with a coefficient value of -302.8436 and a t-statistic of -4.18911. This indicates that an increase in third-party funds in the long term has the potential to reduce the bank's capital adequacy ratio.

Meanwhile, in short-term estimation, the variables of BOPO, DPK, and ROA were proven to have a significant influence on CAR. BOPO and DPK had a significant negative effect with a t-statistical value of -5.00137 and -4.16746, respectively, while ROA also showed a significant negative influence with a t-statistical value of -6.09828. In contrast, the previous CAR lag did not show a significant effect on the CAR in the current period. Overall, the results of the VECM estimate show that in the short term, operational efficiency, third-party fundraising, and bank profitability have a significant role in influencing the movement of CAR.

However, in the long term, only deposits were shown to have a significant influence on CAR, while BOPO and ROA did not show a significant long-term relationship. These findings indicate that short-term dynamics are more dominant in explaining changes in the bank's capital adequacy, while in the long term, funding structure is a more decisive factor. Impulse Response Function (IRF) analysis is used to see the dynamic response of a variable to shocks in the system. Figure 1 shows the response of D(ROA) to the shock D(ROA) itself.

Figure 5.

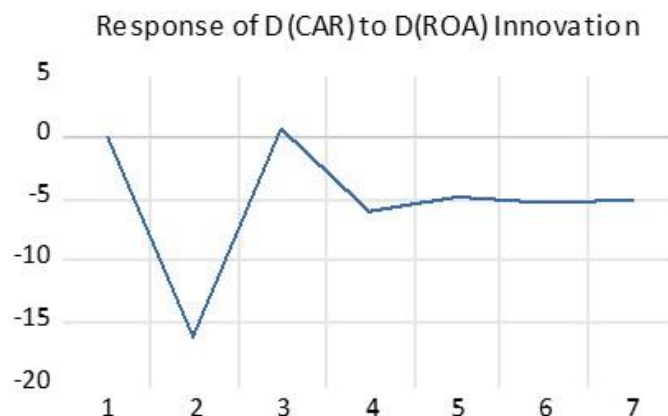
Results of ROA Response to ROA



Source: data processed with Eviews 13.2025

The results of the IRF showed that D(ROA) responded positively and was quite strong in the initial period. However, in the following period, the response decreased and then moved relatively steadily. This pattern indicates that the shock to D(ROA) is temporary and does not have a permanent impact, so the change in profitability tends to return to equilibrium in the medium term. This reflects the existence of an internal adjustment mechanism to the bank's profitability performance.

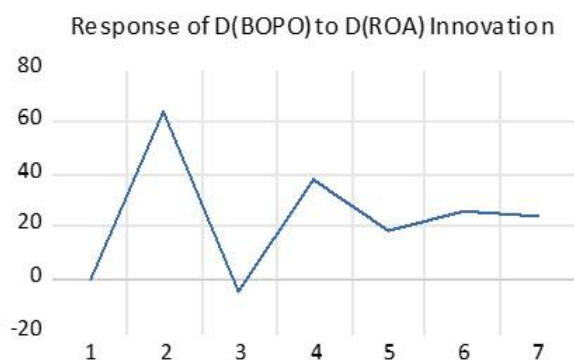
Figure 6.
CAR Response to ROA Results



Source: data processed with Eviews 13.2025

The CAR's response to the ROA shock showed a fairly sharp decline in the initial period, before increasing in the subsequent period and then moving relatively steadily. The decline in CAR due to the ROA shock indicates that changes in profitability may affect the bank's capital adequacy in the short term. However, over time, the response weakens and tends to stabilize, which suggests that the impact of ROA shock on CAR is not permanent.

Figure 7.
Results of BOPO's Response to ROA

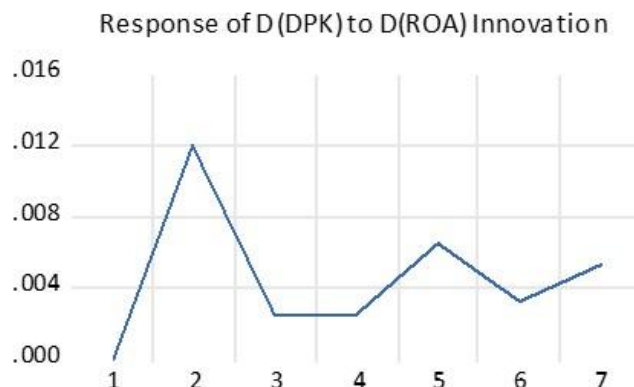


Source: data processed with Eviews 13.2025

BOPO's response to ROA shocks tends to fluctuate in the initial periods, both positively and negatively, before finally moving towards stability. This fluctuating pattern shows that changes in profitability affect the level of operational efficiency of banks in the short term.

However, over time, the influence weakened, so that BOPO returned to its equilibrium condition in the long term.

Figure 8.
Results of DPK Response to ROA

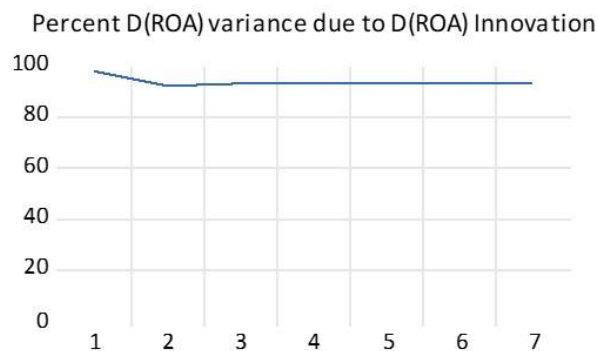


Source: data processed with Eviews 13.2025

The DPK's response to the ROA shock showed an increase in the initial period, then decreased and fluctuated in the next period before finally moving relatively stable. This pattern indicates that changes in profitability affect third-party fundraising in the short term. However, over time, the influence weakens, so deposits tend to return to equilibrium in the long term.

Forecast Error Variance Decomposition (FEVD) analysis is used to decipher the proportion of variance in forecast error of a variable caused by shocks from the variable itself and other variables in the system. This analysis provides an overview of the relative contribution of each variable in explaining the dynamics of variable change, both in the short and long term.

Figure 9.
Results of ROA Analysis on ROA

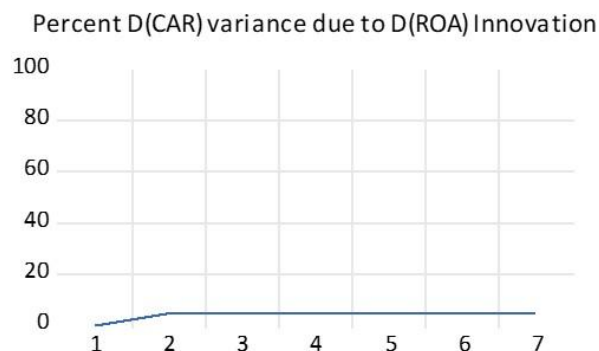


Source: data processed with Eviews 13.2025

Figure 4 shows the results of FEVD ROA analysis of ROA shocks. The results of the analysis show that the variation in ROA is largely explained by the ROA shock itself. In the initial period to the later period, the contribution of ROA to ROA variance remained very dominant and relatively stable. This indicates that changes in bank profitability are more influenced by the internal dynamics of ROA than by other variables in the model.

Forecast Error Variance Decomposition (FEVD) analysis is used to determine the proportion of variance in forecasting errors of a variable caused by shocks from other variables in the system.

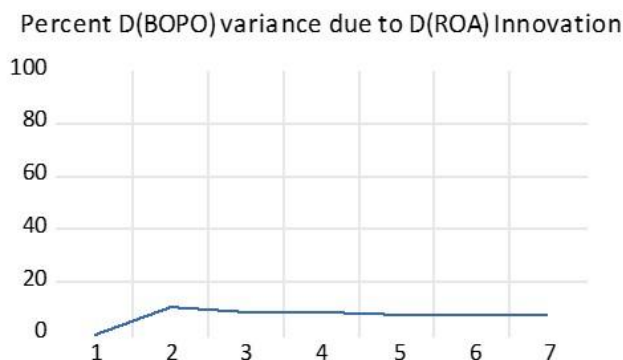
Figure 10.
Results of CAR Analysis on ROA



Source: data processed with Eviews 13.2025

The results of the FEVD analysis showed that the contribution of ROA shock to CAR variation was relatively small in the initial and subsequent periods. Despite the increase in contribution in the early period, the influence of ROA on CAR variance remains low and tends to be stable. This indicates that changes in the capital adequacy of Islamic banks are not much influenced by fluctuations in profitability, but rather determined by internal factors of the CAR itself or other variables in the model.

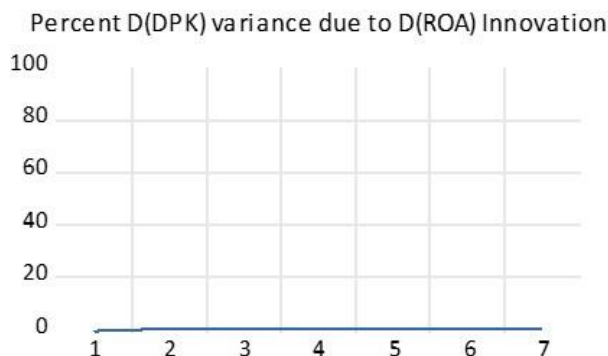
Figure 11.
Results of BOPO's Analysis of ROA



Source: data processed with Eviews 13.2025

The results of the analysis showed that the contribution of shock (ROA) to variance (BOPO) was relatively small. In the initial period, there was an increase in contribution (ROA), but in the later period the contribution tended to decrease and stabilize at a low level. This indicates that BOPO changes are more influenced by BOPO shocks itself or other factors outside the ROA, so that the bank's operational efficiency performance is not too sensitive to changes in profitability over the analysis period.

Figure 12.
Results of Deposit Analysis on ROA



Source: data processed with Eviews 13.2025

The results of the analysis showed that the contribution of ROA shock to deposit variance was very small and close to zero over the entire observation period. Both in the initial and subsequent periods, the influence of ROA on the variability of deposits remained relatively unchanged and remained low. This indicates that changes in third-party funds are more influenced by factors outside of bank profitability, such as customer confidence, macroeconomic conditions, and fundraising policies, than by changes in ROA.

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

The test results showed that there was a long-term relationship between variables as evidenced by the Johansen cointegration test, so the model used was the Vector Error Correction Model (VECM). However, based on the results of the VECM estimate, the Capital Adequacy Ratio (CAR) variable did not show a significant influence on the Return on Assets (ROA). In the short term, CAR has a t-statistic value of 1.29481, which is smaller than the critical value (± 1.96), so it has no significant effect on ROA. This shows that changes in capital adequacy have not been able to directly increase the bank's profitability in a short period.

This finding can be explained through the Risk-Based Capital Theory, which states that bank capital functions primarily as a *risk buffer* to maintain the stability of the financial system, not as the main source of profit. In the context of Islamic banking, capital adequacy is more directed to anticipate profit-sharing-based financing risks that have higher uncertainty. Therefore, increasing CAR does not directly increase profitability, because high capital tends to be *idle* if not optimized through productive financing distribution. Thus, the results of this study confirm that the role of CAR is more dominant in maintaining stability than as a direct determinant of profitability, so optimizing the use of capital is needed in order to contribute to increasing ROA.

The Effect of Operating Costs on Operating Income (BOPO) on ROA

The results of the VECM estimation show that the variable Operating Costs to Operating Income (BOPO) has a negative and significant influence on Return on Assets (ROA) in the short term, with a t-statistical value of -5.00137 ($> \pm 1.96$). This shows that increasing BOPO will reduce ROA, so that operational efficiency is a key factor in determining the profitability of Islamic banks. However, in the long term, BOPO did not show a significant effect on ROA, with a t-statistic value of -1.87344 ($< \pm 1.96$). This indicates that the influence of operational efficiency is more pronounced in the short term than in the long term.

These findings are in line with Efficiency Theory, which states that banks' ability to efficiently manage operational costs will improve profitability performance. The lower the BOPO ratio, the higher the bank's efficiency in generating income from the assets it owns. On the contrary, the high BOPO reflects operational inefficiencies that directly reduce profits. In the context of Islamic banking, efficiency is increasingly important due to the relatively higher complexity of contracts and financing management. Therefore, these results confirm that operational efficiency is the main determinant in increasing the profitability of Islamic banks, especially in the short term.

The Influence of Third Party Funds (DPK) on ROA

The results show that Third Party Funds (DPK) have a negative and significant influence on Return on Assets (ROA) in the short term, with a t-statistical value of -4.16746 ($> \pm 1.96$). This indicates that an increase in deposits in the short term can actually suppress bank profitability. This condition can occur if the funds collected cannot be immediately channeled to the productive financing sector, thus causing the burden of profit-sharing costs and reducing efficiency.

However, in the long term, the results of the VECM estimation show that deposits have a significant influence on the system, but not directly on the ROA in the model used. This shows that the role of deposits in the long term is more indirect, through intermediary mechanisms and other variables in the banking system.

This finding can be explained through the Intermediation Theory, which states that banks function as an intermediary institution that collects funds from the public (DPK) and redistributes them in the form of financing. Increasing funds does not automatically increase profitability if it is not balanced with effective and quality financing distribution. In the context of Islamic banking, high deposits can increase the burden of profit-sharing costs if they are not immediately allocated to the productive sector, thus negatively impacting profitability performance.

These results are also reinforced by Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) analyses, which suggest that ROA variation is more explained by the ROA shock itself. This indicates that the internal factors of bank management have a more dominant role in determining profitability compared to the factor of raising funds.

CONCLUSION

This study analyzes the effect of the Capital Adequacy Ratio (CAR), Operating Costs to Operating Income (BOPO), and Third Party Funds (DPK) on Return on Assets (ROA) in Sharia Commercial Banks in Indonesia for the period 2018–2024 using the Vector Error Correction Model (VECM) approach. The results of the study showed that in the short term, BOPO and DPK had a negative and significant effect on ROA, while CAR had no significant effect. In the long term, there is a balance relationship between variables, but not all variables have a direct effect on ROA. The IRF analysis showed that the ROA response to shocks was temporary, while the FEVD showed that the variation in ROA was more explained by the ROA shock itself, which confirmed the dominance of internal factors in determining profitability. Thus, increasing the profitability of Islamic banks is more effectively achieved through increasing operational efficiency and optimizing fund management rather than relying solely on capital adequacy.

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