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How Efficiency, Capital, and Leverage Shape Islamic Bank Profitability: The Moderating Role of Asset Size

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Abstract

This study investigates the effects of operational efficiency (OER), capital adequacy (CAR), and leverage (DER) on the profitability (ROA) of Indonesian Islamic commercial banks, while examining the moderating role of bank asset size. Utilizing an unbalanced panel dataset of 43 bank-year observations across 12 Islamic commercial banks from 2021 to 2024, the empirical framework applies pooled regression and hierarchical Moderated Regression Analysis complemented by heteroskedasticity-robust HC3 standard errors. The methodology integrates an Indicator Saturation procedure to rigorously identify and treat nine specific extreme observations without discarding valid longitudinal bank series. The findings reveal that OER exerts a robust negative impact on ROA, demonstrating that escalating operating cost burdens directly erode bank profitability, whereas CAR and DER display no significant direct effects. Moderation analyses confirm that asset size significantly amplifies the adverse effect of leverage on profitability under the robust HC3 specification. These results imply that long-term financial sustainability in Islamic banking relies less on sheer balance-sheet expansion and more on strict cost containment, productive asset allocation, and disciplined funding structures, particularly for large institutions navigating leveraged operations.

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INTRODUCTION

Islamic banking has developed into an increasingly important component of the financial system because it combines the function of financial intermediation with compliance with Sharia principles (Aprillia & Nugroho, 2025; Nurpadmasari & Nugroho, 2025). Nevertheless, asset growth and the expansion of Islamic banking activities do not automatically translate into stronger profitability. Islamic banks are still required to convert their available resources into sustainable earnings while maintaining operational efficiency, adequate capital, and a prudent funding structure (Wulandari et al., 2026). Chowdhury & Haron (2021) demonstrate that efficiency remains fundamental to Islamic banks because inefficient utilization of resources

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can weaken their capacity to generate optimal output and profitability. More recent evidence also suggests that Islamic banks continue to encounter efficiency challenges during periods of economic disruption (Lassoued et al., 2025).

The 2021–2024 period provides an important setting for examining this issue. It represents a transition from the COVID-19 disruption toward economic normalization, forcing banks to reconsider operating costs, capitalization, financing strategies, and asset utilization. Le et al. (2022) document that the pandemic weakened Islamic banking performance, although appropriate diversification strategies could mitigate part of the adverse effect. Similarly, Luo et al. (2024) show that banking efficiency is sensitive to changing economic conditions and that the magnitude of such relationships may depend on moderating factors. These findings imply that Islamic bank profitability should not be assessed merely from revenue generation, but also from how effectively internal financial resources are managed.

One internal factor that deserves particular attention is the Operational Efficiency Ratio (OER), previously referred to in Indonesian banking practice as BOPO. OER reflects the proportion of operating expenses relative to operating income (Addury, 2023). A higher ratio indicates that a larger share of operating income is absorbed by operating costs and therefore signals weaker operational efficiency. The importance of efficiency is supported by Chowdhury & Haron (2021), who argue that efficient resource utilization allows Islamic banks to maximize output and profitability, while Lassoued et al. (2025) show that efficiency differences remain visible between Islamic and conventional banking models.

Profitability may also depend on the bank's capital policy. The Capital Adequacy Ratio (CAR) reflects the capacity of capital to absorb risk while supporting productive banking activities. Tok and Yesuf (2022) highlight the role of adequate capital in strengthening the resilience and sustainability of Islamic banks. Consistently, Junejo et al. (2023) find a positive and significant association between capital adequacy and Islamic bank profitability. However, the effect of capital is not necessarily uniform. Abbas et al. (2024) demonstrate that the capital–profitability relationship changes when interacting with contextual conditions, indicating that capitalization may generate heterogeneous performance consequences.

A similar concern applies to leverage, represented by the Debt-to-Equity Ratio (DER). Higher leverage may expand the resources available for productive activities, but excessive reliance on liabilities may simultaneously increase financial pressure and risk exposure (Füzes, 2019). Junejo et al. (2023) find that gearing is significantly related to Islamic banking performance, whereas the effect of bank size on profitability is negative and insignificant. Such findings indicate an empirical gap, because the effects of bank-specific financial characteristics on profitability are not consistently identical across institutions and research settings.

The inconsistency becomes particularly relevant when asset size is considered. Larger Islamic banks generally possess greater operating capacity, broader business networks, more diversified assets, and stronger technological resources. Nevertheless, larger assets do not always produce higher returns. Junejo et al. (2023) report an insignificant relationship between bank size and profitability, while Aledeimat & Bein (2025) show that bank size can influence the extent of financial risk because larger institutions possess a greater capacity to expand financing. Abbas et al. (2024) further demonstrate that bank characteristics may alter the relationship between capital and profitability. These findings suggest that asset size should not merely be treated as a control variable; it can potentially change the strength of the relationship between OER, CAR, DER, and ROA.

Despite the growing literature on Islamic bank profitability, three distinct research gaps remain. First, an **empirical gap** arises from the inconsistent findings regarding the effects of operational efficiency, capital adequacy, leverage, and bank size on profitability. Previous

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studies have reported different magnitudes, directions, and levels of significance for these bank-specific determinants across institutional and national settings. Junejo et al. (2023), for example, document significant relationships between selected internal banking characteristics and profitability, whereas other studies indicate that the effects of capital, size, and other financial characteristics may be weak, insignificant, or conditional upon the surrounding context. These inconsistencies leave unresolved whether OER, CAR, and DER systematically explain the profitability of Indonesian Islamic commercial banks, particularly during the 2021–2024 post-pandemic adjustment period.

Second, a **methodological gap** concerns the treatment of bank asset size. Previous banking studies frequently incorporate SIZE as an independent or control variable, while moderation studies have more commonly examined external contextual factors. Consequently, limited evidence is available regarding whether internal organisational scale changes the effects of operational efficiency, capital adequacy, and leverage on profitability. This study addresses this methodological gap by specifying asset size both as a main-effect variable and as a moderator of the OER–ROA, CAR–ROA, and DER–ROA relationships. The continuous predictors are mean-centred before constructing the interaction terms to improve the interpretation of lower-order coefficients and reduce non-essential multicollinearity.

Third, a **theoretical gap** exists because the relationships among efficiency, capital, leverage, organisational scale, and profitability are predominantly interpreted through conventional financial performance and risk perspectives. Such approaches provide limited explanation of how financial resources should be transformed into responsible and beneficial outcomes within an Islamic epistemological framework. This study therefore employs the Tawhid String Relationship (TSR) perspective to interpret profitability as an outcome of the interaction between resources, knowledge, responsible implementation, and value creation. From this perspective, efficiency, capital, leverage, and asset scale are not valuable merely because they are accumulated; their significance depends on how effectively they are transformed into productive outcomes and ultimately contribute to sustainable *maslahah*.

Accordingly, this study contributes to the literature by simultaneously addressing empirical inconsistency in the determinants of Islamic bank profitability, a methodological limitation in the treatment of asset size, and a theoretical limitation in the interpretation of financial performance through an Islamic epistemological perspective.

Against this background, this study addresses six research questions: (1) Does OER affect the ROA of Islamic commercial banks? (2) Does CAR affect ROA? (3) Does DER affect ROA? (4) Does asset size moderate the relationship between OER and ROA? (5) Does asset size moderate the relationship between CAR and ROA? and (6) Does asset size moderate the relationship between DER and ROA?

Accordingly, this study aims to investigate the effects of operational efficiency, capital policy, and leverage on the profitability of Indonesian Islamic commercial banks during 2021–2024 and to determine whether asset size strengthens or weakens each relationship. By doing so, the study seeks to provide a more contextual explanation of why similar levels of efficiency, capitalization, or leverage may generate different profitability consequences across Islamic banks with different scales of assets.

The novelty lies in integrating OER, CAR, and DER into a single profitability model while positioning asset size as a moderating mechanism, rather than merely as an independent or control variable. Previous studies contained in the reviewed documents predominantly examine efficiency, capital, leverage, size, resilience, or profitability through direct relationships or employ external institutional factors as moderators (Abbas et al., 2024; Luo et al., 2024). This study extends that discussion by examining whether internal organizational scale determines how efficiently financial resources are transformed into profitability in

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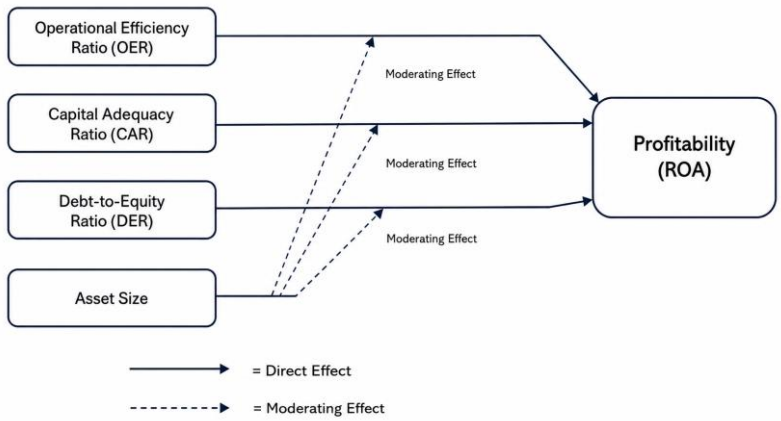
Indonesian Islamic commercial banks during the post-pandemic period. The use of Tawhid String Relationship (TSR) further differentiates this study by interpreting financial performance within an Islamic epistemological framework rather than solely through conventional profitability logic.

This study employs Tawhid String Relationship (TSR) as its theoretical foundation because Islamic banks are institutions whose business activities are expected to integrate financial objectives with Sharia values. Nugroho et al. (2020) conceptualize TSR as a continuous process in which the Qur'an and Hadith provide the principal sources of knowledge, followed by ijtihad, the development of knowledge, its practical implementation, and ultimately the achievement of *well-being* or *maslahah*. Thus, knowledge is not considered valuable merely because it exists, but because it is implemented to produce benefits.

This perspective is particularly relevant to banking performance. Nugroho & Mariyanti (2021) emphasize that Islamic bank performance should incorporate financial, spiritual, social, and environmental dimensions, while Nugroho et al. (2022) explain that Islamic banking activities should create economic and social value for stakeholders. Consequently, OER can be interpreted as the bank's ability to use resources responsibly and efficiently; CAR represents its capacity to preserve capital and financial sustainability; DER reflects management's prudence in structuring funding; and ROA represents the financial outcome generated from entrusted assets. Asset size, in turn, reflects the scale of resources available for transforming managerial knowledge into productive outcomes. TSR is therefore relevant because it connects resource management, knowledge implementation, accountability, and financial outcomes within the objective of creating *maslahah*.

The conceptual framework places ROA as the dependent variable, OER, CAR, and DER as independent variables, and asset size as the moderating variable can ilustrate as research conceptual framework as follows:

Figures 1. Research Conceptual Framework



Sources: From various sources that have been processed by researchers

Based on Figure 1, can be developof hyphotesis as Operational inefficiency increases the proportion of income consumed by operating expenses. Accordingly, higher OER is expected to reduce the capacity of assets to generate earnings. This reasoning is consistent with the importance of efficiency in improving Islamic bank performance documented by Chowdhury & Haron (2021). Therefore:

- H1: OER has a negative effect on the ROA of Islamic commercial banks.

Adequate capital enhances the ability of banks to absorb risks and sustain productive activities. Junejo et al. (2023) report a positive association between capital adequacy and

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Islamic banking profitability, while Tok and Yesuf (2022) emphasize the role of sound capitalization in bank resilience. Therefore:

- H2: CAR has a positive effect on the ROA of Islamic commercial banks.

Leverage provides additional resources but simultaneously increases exposure arising from liabilities relative to equity. Excessive leverage may consequently constrain financial flexibility and profitability. Therefore:

- H3: DER has a negative effect on the ROA of Islamic commercial banks.

Asset scale can determine the capacity of banks to absorb operating costs and exploit economies of scale. Larger banks may therefore experience a different OER–profitability relationship than smaller institutions. Hence:

- H4: Asset size moderates the effect of OER on the ROA of Islamic commercial banks.

Larger asset ownership can also increase a bank's capacity to deploy capital into productive financing and absorb financial risks. Consequently, the profitability effect of CAR may depend on the scale of assets managed by the bank. Hence:

- H5: Asset size moderates the effect of CAR on the ROA of Islamic commercial banks.

Finally, banks with different asset scales possess different capacities to manage liabilities, diversify financing, and withstand leverage-related risks. Thus, the profitability consequences of DER may vary according to asset size. Hence:

- H6: Asset size moderates the effect of DER on the ROA of Islamic commercial banks.

METHODS

Research Design and Approach

This study applies a quantitative approach with a causal-comparative research design to examine whether operational efficiency, capital adequacy, and leverage explain variations in the profitability of Indonesian Islamic commercial banks and whether asset size changes the strength of these relationships. Quantitative secondary-data approaches are appropriate for banking research because financial performance can be observed consistently through standardized accounting and prudential indicators reported across banks and periods. Similar approaches using bank-level secondary data, panel structures, and interaction models have been adopted in studies of Islamic banking performance and efficiency (Abbas et al., 2024; Bakhouche et al., 2022; Luo et al., 2024).

The observation period covers 2021–2024. The period is treated as a four-year longitudinal window in which information for each bank is combined with cross-sectional differences among banks. This structure makes panel-data analysis relevant because it allows variations between banking institutions and changes over time to be examined simultaneously. Luo et al. (2024), for example, employ pooled, fixed-effect, and random-effect approaches when analyzing Islamic and conventional banks, while Le et al. (2022) use longitudinal banking data to investigate determinants of Islamic banking performance.

Population, Sample, Research Object, and Variable Operationalization

The population consists of Islamic commercial banks operating in Indonesia during 2021–2024. The initial population comprised 14 banks. A *purposive sampling* procedure was applied by requiring a bank to operate during the research period, publish accessible annual financial statements, and provide complete information required to calculate operational

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efficiency, capital adequacy, leverage, total assets, and ROA. Thirteen Islamic commercial banks satisfied these criteria, resulting in an initial dataset of 52 bank-year observations.

The initial sample comprised Bank Syariah Indonesia, Bank Muamalat Indonesia, Bank Victoria Syariah, Bank Panin Dubai Syariah, BTPN Syariah, Bank Mega Syariah, Bank Aladin Syariah, Bank Jabar Banten Syariah, Bank KB Bukopin Syariah, BCA Syariah, Bank Aceh Syariah, BPD Riau Kepri Syariah, and Bank NTB Syariah. Following data-screening and outlier treatment, the final regression output used 36 observations representing nine cross-sections over four annual periods.

Furthermore, the variables are operationalized in this research as follows:

Table 1. Operational Variables

Variable	Role	Measurement	Interpretation
Profitability (ROA)	Dependent	**ROA = Net Income / Total Assets × 100%**	Measures the bank's ability to generate earnings from assets under management. ROA is widely employed as an accounting-based banking profitability indicator (Abbas et al., 2024; Le et al., 2022).
Operational Efficiency Ratio (OER)	Independent	**OER = Operating Expenses / Operating Income × 100%**	Represents the BOPO concept used in the original dataset. A lower OER indicates that operating income is generated with relatively lower operating costs. Cost-to-income measures are commonly used to capture banking efficiency (Chowdhury & Haron, 2021; Le et al., 2022).
Capital Adequacy Ratio (CAR)	Independent	**CAR = Total Regulatory Capital / Risk-Weighted Assets × 100%**	Reflects the capacity of bank capital to absorb risks arising from banking activities. Capital ratios are commonly employed to evaluate bank resilience and financial strength (Aledeimat & Bein, 2025; Tok & Yesuf, 2022).
Leverage (DER)	Independent	**DER = Third-Party Funds (DPK) / Total Equity × 100%**	For this banking setting, leverage is interpreted as external funding relative to shareholders' equity. Unlike non-financial corporations, Islamic banks obtain a substantial portion of operating funds from customers' third-party funds; therefore, this study uses DPK as the banking funding component in the DER proxy. Banking institutions fundamentally operate by collecting deposits and channeling those resources into financing and other productive assets (Aledeimat & Bein, 2025).
Asset Size (SIZE)	Moderator	**SIZE = Ln (Total Assets)**	Captures differences in the economic scale of Islamic banks. The natural logarithm transformation reduces scale disparities across institutions and is widely applied as a measure of bank size (Abbas et al., 2024;

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Variable	Role	Measurement	Interpretation
			Bakhouche et al., 2022; Luo et al., 2024).

Sources: From various sources that have been processed by researchers

According to Table 1. the treatment of DER requires a banking-specific interpretation. In a non-financial company, conventional DER normally compares total debt with shareholders' equity. In an Islamic bank, however, external funding is not appropriately interpreted merely as interest-bearing corporate debt because the bank's intermediation model relies heavily on funds collected from customers. Accordingly, this study operationally treats third-party funds relative to equity as the banking leverage proxy. This specification should remain consistent throughout the data table, empirical model, results, and discussion so that DER does not alternate between total liabilities/equity and DPK/equity.

Research Instrument and Data Collection

The study does not employ questionnaires or perception-based instruments because all variables are derived from published financial information. The research instrument is a structured financial-data extraction sheet prepared according to the operational definitions of ROA, OER, CAR, DER, and SIZE. Each annual observation is recorded using the same measurement criteria to maintain comparability across banks and years.

Data collection is conducted through documentation and content analysis. Annual reports and financial statements for 2021–2024 are collected from the official websites of the respective Islamic commercial banks and official financial-information sources, including the Financial Services Authority and, where applicable, the Indonesia Stock Exchange. The required figures are then identified, classified, and transferred into the research dataset before the financial ratios are calculated. The use of annual reports and structured documentary analysis is also found in Islamic banking studies examining performance, efficiency, capitalization, and resilience (Chowdhury & Haron, 2021; Tok & Yesuf, 2022).

Data Analysis Technique

Data analysis is conducted using EViews 13. The procedure begins with descriptive statistics consisting of the number of observations, mean, minimum, maximum, and standard deviation to provide an overview of the distribution and dispersion of each variable.

The second stage estimates panel-data models. Three alternative specifications are considered: the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Model selection is conducted using the Chow test to distinguish CEM from FEM, the Hausman test when a choice between FEM and REM is required, and the Breusch–Pagan Lagrange Multiplier test to distinguish CEM from REM. This panel-model selection procedure is consistent with banking research that evaluates pooled, fixed-effect, and random-effect alternatives before interpreting regression coefficients (Luo et al., 2024).

Before hypothesis testing, model diagnostics are conducted. Residual normality is evaluated using the Jarque–Bera test, multicollinearity is examined through the Variance Inflation Factor (VIF), autocorrelation is assessed using the Durbin–Watson statistic, and heteroskedasticity is evaluated using the Harvey test. Statistical decisions are made at a 5% significance level. Moreover, the direct-effect model is specified as:

$$ROA_it = \alpha + \beta_1 OER_it + \beta_2 CAR_it + \beta_3 DER_it + \varepsilon_it \quad (1)$$

where *i* denotes the Islamic bank and *t* denotes the observation year.

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To examine whether asset size changes the relationship between the three explanatory variables and profitability, the study employs Moderated Regression Analysis using multiplicative interaction terms. Interaction-based specifications are commonly used to identify whether the impact of an explanatory variable varies according to another characteristic (Abbas et al., 2024; Bakhouche et al., 2022; Luo et al., 2024). Following the model specified in the source study, the moderation equation is:

$$ROA_it = \alpha + \beta_1 OER_it + \beta_2 CAR_it + \beta_3 DER_it + \beta_4 (OER \times SIZE)_it + \beta_5 (CAR \times SIZE)_it + \beta_6 (DER \times SIZE)_it + \varepsilon_it \quad (2)$$

The coefficients β_4, β_5, and β_6 capture the moderating role of asset size. A statistically significant interaction coefficient indicates that the relationship between the corresponding independent variable and ROA varies according to bank asset size. Hypotheses are evaluated using the partial t-test at $\alpha = 0.05$, while the F-statistic evaluates overall model significance. The explanatory capacity of each model is assessed through R^2 and adjusted R^2. This combination of bank-level financial ratios, panel estimation, and interaction analysis enables the study to distinguish direct profitability effects from effects that depend on differences in bank scale.

RESULT AND DISCUSSION

Results

The descriptive analysis initially included 52 observations of Indonesian Islamic commercial banks during the bank year during 2021–2024 shown in Table 2. Further, profitability, measured by Return on Assets (ROA), showed substantial variation across the sample, including observations in which banks recorded losses. The Operational Efficiency Ratio (OER), referred to as BOPO in the original dataset, also showed considerable dispersion, indicating that the capacity of Islamic banks to balance operating expenses and operating income differed substantially across institutions. CAR, leverage, and asset size similarly varied, reflecting heterogeneous capital strength, funding structures, and operating scales among Islamic commercial banks.

Table 2. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
ROA	52	-0.09	0.11	0.0071	0.03548
OER/BOPO	52	0.35	4.34	0.9863	0.66379
CAR	52	0.16	3.91	0.4275	0.58188
DER	52	0.23	11.84	3.8034	3.21753
Asset Size	52	6.22	13.49	7.7473	1.36192

Source: Research data processed with EViews 13.

After data screening and outlier treatment, the regression estimation was based on 36 balanced observations covering nine Islamic commercial banks over four years. Diagnostic testing indicated that the final model met the relevant regression assumptions. The residuals followed a normal distribution, the centered VIF values were close to one, the Durbin–Watson statistic indicated no problematic serial correlation, and the Harvey test did not detect heteroskedasticity. The direct-effect regression model was statistically significant as a whole and explained approximately 73.10% of the variation in ROA (Table 4). Among the three explanatory variables, OER was the only variable with a statistically significant direct

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relationship with profitability. CAR and DER both showed positive coefficients, but neither relationship was statistically significant (Tabel 3).

Table 3. Hypothesis Testing Results

Variable	Coefficient	t-Statistic	Probability (p-value)	Decision
Constant	0.114132	10.42421	0.0000	—
OER/BOPO	0.053847	8.793901	0.0000	H1 Supported
CAR	0.002523	0.703485	0.4868	H2 Not Supported
DER	0.0000406	0.172879	0.8638	H3 Not Supported

Source: Research data processed with EViews 13.

Table 4. Model Goodness-of-Fit Results

Indicator	Value
R-squared	0.730959
Adjusted R-squared	0.705736
F-statistic	28.98026
Prob. (F-statistic)	0.000000

Source: Research data processed with EViews 13.

Nevertheless, the moderation analysis provides a different perspective (Table 5). Asset size significantly moderated the relationship between OER and profitability, with a negative interaction coefficient. Asset size also significantly moderated the relationship between CAR and profitability, again with a negative interaction coefficient. These results indicate a weakening moderation effect. By contrast, the interaction between DER and asset size was not statistically significant. The moderation model explained approximately 49.42% of the observed variation in profitability (Table 6).

Table 5. Moderating Effect Results

Interaction Term	Coefficient	t-Statistic	Probability (p-value)	Moderating Effect
OER × SIZE	-0.003664	-5.032359	0.0000	Significant; Weakening Effect
CAR × SIZE	-0.001661	-2.138407	0.0402	Significant; Weakening Effect
DER × SIZE	0.0000255	0.691991	0.4939	Not Significant

Source: Research data processed with EViews 13.

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Table 6. Model Goodness-of-Fit Results

Indicator	Value
R-squared	0.494224
Adjusted R-squared	0.446808
F-statistic	10.42305
Prob. (F-statistic)	0.000061

Source: Research data processed with EViews 13.

The principal findings can therefore be summarized as follows: operational efficiency is directly associated with Islamic bank profitability; capital adequacy and leverage do not independently explain changes in ROA; asset size changes the OER–ROA and CAR–ROA relationships by weakening them; and differences in asset size do not materially change the leverage–profitability relationship. These findings reproduce the empirical conclusions reported in the source study.

Discussion

Operational Efficiency Ratio and Profitability

The first research question examines whether operational efficiency affects the profitability of Islamic commercial banks. The empirical evidence confirms that OER has a meaningful relationship with ROA. Interestingly, its estimated direction is positive. This result deserves careful interpretation because the conventional interpretation of the operating-expense-to-operating-income ratio usually associates a higher ratio with weaker efficiency (Badawi et al., 2023). Therefore, the finding should not be understood as an argument that Islamic banks can increase profitability simply by allowing operating costs to rise.

A more contextual interpretation is that, during the observation period, changes in operating expenditure may have occurred together with activities intended to expand revenue-generating capacity. Islamic banks were operating through a period of post-pandemic adjustment in which expenditure on digital services, risk management, technology, service development, and organizational capacity could rise alongside expanding commercial activities. The source study itself emphasizes that higher operating expenditure during such expansion does not necessarily represent unproductive spending when it accompanies activities capable of generating operating income.

The importance of operational efficiency is supported by the international Islamic banking literature contained in the uploaded documents. Chowdhury & Haron (2021) regard efficient resource utilization as essential to Islamic banks' ability to maximize output and profitability. Junejo et al. (2023) likewise find operating efficiency to be significantly associated with ROA, although their estimated direction differs from the present finding. Such differences indicate that efficiency is not merely a mechanical question of reducing expenditure; its profitability consequence may depend on what the expenditure is used for and the stage of development of the institution. Lassoued et al. (2025) further show that banking efficiency changes under crisis conditions, demonstrating that efficiency outcomes are sensitive to the operating environment.

From the Tawhid String Relationship (TSR) perspective, this finding can be understood through the interaction between knowledge, implementation, and outcomes. TSR does not view resources as productive merely because they are available; resources need to be combined with

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appropriate knowledge and implemented constructively to create maslahah (Nugroho et al., 2020). Operational expenditure is therefore justified when it represents the effective implementation of knowledge—for example through better systems, competent employees, risk controls, and customer services—rather than uncontrolled cost growth.

The managerial implication is that Islamic bank management should avoid a simplistic "cost cutting at all costs" strategy. What matters is productive efficiency: distinguishing expenditure that creates sustainable operating capacity from expenditure that merely increases administrative burden. Management should link major operating expenses with measurable productivity, service quality, financing performance, and ultimately sustainable profitability.

Capital Adequacy Ratio and Profitability

The second research question asks whether CAR influences profitability. The findings indicate that capital adequacy does not independently produce a meaningful change in ROA. Adequate capital is clearly important for bank safety, but holding more capital does not automatically mean that the bank is able to convert that capital into productive earnings.

This distinction between capital strength and capital productivity is important. Tok and Yesuf (2022) show that stronger capital positions contribute to the resilience and soundness of Islamic banks. Capital can therefore serve primarily as a buffer against losses and financial shocks rather than as a direct engine of short-term profitability. Abbas et al. (2024) similarly show that the capital–profitability relationship is conditional and may change when contextual factors are introduced. The effect of capital is therefore not uniform across different institutional and economic environments.

The result differs from Junejo et al. (2023), who report a significant positive relationship between capital adequacy and profitability in Pakistani Islamic banks. Rather than creating a contradiction, the difference reinforces the empirical gap: capital can support profitability when successfully deployed into productive financing, but its existence alone may not increase earnings.

The finding is also compatible with TSR. In the TSR framework, financial resources must move from knowledge to implementation before producing well-being and value creation (Nugroho et al., 2020). A large capital buffer without productive implementation remains a resource rather than an outcome. Moreover, Islamic bank performance based on TSR cannot be reduced exclusively to financial return, Nugroho & Mariyanti (2021) identify financial performance as only one of four interrelated pillars alongside spiritual, social, and environmental dimensions.

The practical implication is that management should not treat a high CAR as an end in itself. After meeting prudential requirements, the strategic question becomes how available capital can support high-quality Sharia-compliant financing, innovation, risk absorption, and productive asset growth. Regulators should likewise distinguish between capital adequacy and the efficiency with which excess capital is transformed into sustainable intermediation.

Leverage and Profitability

The third research question concerns leverage. The study finds that DER does not materially explain ROA during the observation period. This suggests that differences in funding structure alone are insufficient to explain why some Islamic banks produce higher returns than others.

In Islamic banking, this result is particularly relevant because bank funding differs from the financing structure of ordinary non-financial corporations. The operational model is centered on mobilizing funds and channeling them into Sharia-compliant financing and

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productive assets. Consequently, the profitability impact depends less on the nominal amount of external funding and more on how effectively mobilized funds are allocated.

Junejo et al. (2023) find that gearing can significantly influence profitability, which differs from the present evidence. Such variation implies that leverage effects are sensitive to portfolio quality, financing allocation, and institutional structure. Le et al. (2022) similarly demonstrate that the performance of Islamic banking systems depends on how funds are diversified and allocated across income-producing activities, particularly during periods of disruption.

TSR adds an important normative dimension. Funding entrusted to an Islamic bank constitutes a resource that carries responsibility. It must be transformed through knowledge and Sharia-compliant implementation into productive activities that contribute to stakeholder welfare. Nugroho et al. (2022) emphasize that Islamic banking value creation should generate benefits beyond profit alone. Thus, merely increasing leverage or collected funds without improving financing quality does not guarantee stronger profitability or *maslahah*.

The managerial implication is that Islamic banks should focus on fund utilization rather than funding volume. Management should evaluate the productivity, quality, maturity structure, and risk profile of assets financed by external funds. Expansion of third-party funding will create value only when those funds can be channeled efficiently into viable and responsible financing.

Moderating Role of Asset Size in the OER–Profitability Relationship

The fourth research question investigates whether asset size changes the impact of operational efficiency on profitability. The results confirm a significant moderating role, but the moderation weakens the relationship. In other words, as Islamic banks become larger, the direct relationship between operational efficiency and profitability becomes less pronounced.

This result is plausible because larger banks operate through more complex organizational systems. Greater asset size may require broader technological infrastructure, stronger internal control systems, more sophisticated risk-management mechanisms, and larger service networks. As complexity rises, a change in the operating-cost ratio may no longer translate into profitability as directly as it does in a smaller institution.

Chowdhury & Haron (2021) distinguish between technical, pure technical, and scale efficiency, illustrating that bank efficiency is partly related to organizational scale. Luo et al. (2024) also demonstrate more generally that the relationship between determinants and bank efficiency can change in the presence of a moderating condition. Thus, the present finding extends the broader moderation logic into the internal characteristic of asset scale.

Under TSR, greater assets imply greater organizational capacity but also greater responsibility. Knowledge, resources, and active participation must interact effectively if scale is to produce value (Nugroho et al., 2020). A large balance sheet therefore does not automatically represent superior performance. If increased scale adds complexity faster than it creates productive value, its ability to enhance efficiency-related profitability may diminish.

The implication is that larger Islamic banks require scale-adjusted efficiency management. Cost controls used for smaller banks cannot simply be replicated without adjustment. Management should monitor unit costs, digital productivity, branch productivity, process automation, and revenue generated per operating resource rather than relying on aggregate operating expenditure alone.

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Moderating Role of Asset Size in the CAR–Profitability Relationship

The fifth research question examines whether asset size moderates the relationship between capital adequacy and profitability. The findings confirm that it does, but the interaction weakens the relationship. Hence, in banks with larger asset bases, additional capital adequacy becomes less strongly associated with profitability.

This result suggests diminishing direct profitability benefits from capital as banks become larger. Large banks must allocate part of their capital to regulatory buffers, risk coverage, operational continuity, infrastructure, and increasingly complex portfolios. Consequently, a greater stock of assets does not ensure that additional capital will immediately produce a proportionate increase in ROA.

Junejo et al. (2023) report that bank size itself had no meaningful positive effect on profitability even when capital adequacy was important. Abbas et al. (2024) provide further support for a conditional interpretation by showing that the capital–profitability relationship changes when a moderating environment is introduced. These studies strengthen the argument that the profitability value of bank capital depends on context rather than on capital quantity alone.

This result is consistent with TSR because TSR rejects a purely accumulation-oriented interpretation of resources. A larger resource base only creates value when knowledge, implementation, and stakeholder participation convert it into beneficial outcomes. Nugroho & Mariyanti (2021) likewise stress that Islamic bank performance encompasses financial, social, spiritual, and environmental pillars. Thus, a larger Islamic bank may legitimately hold capital for resilience and stakeholder protection even when doing so does not maximize short-term ROA.

The practical implication is that managers of large Islamic banks should evaluate capital allocation efficiency, not simply capital adequacy. Greater emphasis should be placed on risk-adjusted returns, productive financing, asset quality, and the ability of capital to support sustainable growth without compromising prudential resilience.

Moderating Role of Asset Size in the DER–Profitability Relationship

The sixth research question tests whether asset size changes the leverage–profitability relationship. The evidence does not support such a moderating role. Larger assets therefore do not appear to make leverage either more or less relevant to profitability in a systematic way.

One explanation is that the impact of external funding depends more on the quality of asset deployment than on the absolute scale of the bank. A large Islamic bank can hold substantial assets while still experiencing weak returns if collected funds are not allocated effectively (Saba et al., 2015). Conversely, a smaller institution may generate stronger returns when its financing portfolio is well selected and efficiently managed.

The finding is compatible with Junejo et al. (2023), who show that bank size itself is not a strong profitability determinant, even though other internal banking factors matter. Aledeimat & Bein (2025) also demonstrate that bank size can alter risk exposure, but greater size does not necessarily imply superior financial outcomes. This distinction reinforces the idea that scale and funding structure should not be treated as automatic sources of profitability.

From the TSR perspective, neither asset accumulation nor greater access to funds has intrinsic value in isolation. What matters is the interaction between resources, knowledge, implementation, and beneficial outcomes. Nugroho et al. (2022) emphasize that an Islamic banking business model should create economic and social value rather than focusing exclusively on financial expansion. Therefore, the absence of moderation indicates that larger scale by itself cannot transform leverage into profitability.

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The implication for practitioners is that growth strategies should not be centered solely on expanding assets or mobilizing more third-party funds. Management should instead ensure that asset growth, funding growth, and financing quality move together. For regulators, the result suggests that assessments of Islamic bank performance should incorporate the productive use of funds, risk quality, and efficiency rather than relying exclusively on balance-sheet size.

CONCLUSION AND RECOMMENDATIONS

This study examines how operational efficiency, capital adequacy, and leverage shape the profitability of Indonesian Islamic commercial banks during 2021–2024, while considering asset size as a moderating factor. The findings show that the Operational Efficiency Ratio (OER) has a significant relationship with profitability, indicating that changes in operating cost structure are closely associated with the ability of Islamic banks to generate returns from their assets. In contrast, Capital Adequacy Ratio (CAR) and leverage measured by DER do not independently explain profitability. These results suggest that maintaining strong capital and expanding external funding are not sufficient to improve financial performance unless these resources are managed and allocated productively.

The moderating analysis provides an additional contribution. Asset size significantly changes the relationship between OER and profitability and between CAR and profitability, with both interactions indicating a weakening effect. This means that as Islamic banks become larger, increases in scale do not automatically strengthen the profitability benefits derived from operational efficiency or capital adequacy. Conversely, asset size does not significantly moderate the relationship between leverage and profitability. Therefore, larger balance sheets should not be interpreted as an automatic source of financial advantage.

These findings answer the six research questions and reinforce the central argument of the study: Islamic bank profitability depends more on the quality of resource management than on the mere accumulation of capital, funding, or assets. Conceptually, the study contributes by integrating OER, CAR, DER, and asset size within a single moderated framework and interpreting the results through the Tawhid String Relationship perspective. In this view, financial resources create value only when they are supported by appropriate knowledge, responsible implementation, and outcomes that contribute to sustainable maslahah.

For practitioners, Islamic banks should prioritize productive efficiency rather than indiscriminate cost reduction, strengthen the allocation of capital toward high-quality Sharia-compliant financing, and ensure that third-party funds are converted into productive assets with appropriate risk control. Larger Islamic banks should also adopt scale-sensitive efficiency and capital-management strategies because greater asset size may introduce organizational complexity that reduces the direct profitability benefit of efficiency and capitalization.

Future research may extend the observation period, employ alternative profitability measures, and examine additional bank-specific factors such as financing quality, income diversification, and risk management. Further studies may also compare large and small Islamic banks or apply more advanced dynamic panel and robust estimation techniques to determine whether the moderating role of asset size remains consistent across different economic conditions and institutional settings.

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