

Credit Risk, Capital Adequacy and Liquidity Dynamics: Evidence on Profitability from Indonesia

Nurmila Dewi¹, Faisal², M.Shabri Abd.Majid³, A.Sakir⁴, Rusydi⁵, Fakriah⁶

¹Student: Department of Economics, Faculty of Economic and Business Universitas Syiah Kuala

¹Department of Business, Politeknik Negeri Lhokseumawe

² Department of Economics, Faculty of Economic and Business Universitas Syiah Kuala (USK)

³ Department of Economics, Faculty of Economic and Business Universitas Syiah Kuala (USK)

⁴ Department of Economics, Faculty of Economic and Business Universitas Syiah Kuala (USK)

⁵Department of Business, Politeknik Negeri Lhokseumawe

⁵Department of Business, Politeknik Negeri Lhokseumawe

***Corresponding Author:** nurmila@pnl.ac.id

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Abstract

This study aims to empirically investigate the impact of Non-Performing Financing (NPF), Capital Adequacy Ratio (CAR), and Financing to Deposit Ratio (FDR) on Return on Assets (ROA) in Islamic banks in Indonesia. The population of this study consists of Islamic banks registered with the Financial Services Authority (OJK), with the sample selected through a purposive sampling technique. This research utilizes secondary data in the form of quarterly financial reports from five Islamic banks over the period 2021–2024, resulting in a total of 80 observations. The study employs panel data regression analysis using the Fixed Effect Model, complemented by White cross-section standard errors to ensure robustness. The results of the F-test reveal that NPF, CAR, and FDR simultaneously have a significant effect on ROA. Furthermore, the t-test results indicate that NPF and CAR individually exert a significant negative influence on ROA, whereas FDR shows a significant positive effect. The adjusted R-squared value of 96.7% suggests that the model has a strong explanatory power in capturing the variation in profitability. These findings provide important insights for policymakers and bank management in formulating strategies to enhance the financial performance of Islamic banks in Indonesia.

Keywords: *Non-Performing Financing, Capital Adequacy Ratio, Financing to Deposit Ratio, Return on Assets, Panel Data Regression, Islamic Banks.*

Introduction

The Islamic banking industry in Indonesia has experienced significant growth over the past decade, supported by increasing public awareness of Sharia-compliant financial systems and strengthened regulatory frameworks from financial authorities [1,2]. Islamic banks play a strategic role in promoting financial inclusion and supporting economic stability. However, sustaining profitability remains a major challenge for Islamic banking institutions. Profitability, commonly measured by Return on Assets (ROA), reflects a bank's efficiency in utilizing its assets to generate earnings [3]. Fluctuations in ROA indicate that internal financial factors significantly influence bank performance. Among these factors, credit risk, capital adequacy, and liquidity are widely recognized as key determinants of profitability.

Table 1. Trend of Return on Assets (ROA) of Islamic Commercial Banks in Indonesia (2021–2024)

Year	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Average (%)
2021	1.40	1.48	1.55	1.62	1.51
2022	1.68	1.75	1.88	2.00	1.83
2023	2.02	2.10	2.08	2.05	2.06
2024	2.00	1.95	1.90	1.85	1.93

Source: Processed from Islamic Banking Statistics published by Otoritas Jasa Keuangan
(2021–2024)

The profitability performance of Islamic commercial banks in Indonesia, as measured by Return on Assets (ROA), exhibits a fluctuating trend over the period 2021–2024, as presented in Table 1. In 2021, ROA showed a gradual increase across all quarters, indicating the early recovery phase of the banking sector following economic disruptions. In 2022, ROA experienced a more significant improvement, reaching its peak at the end of the year. This increase reflects improved efficiency in asset utilization and stronger financial performance of Islamic banks. The upward trend continued into 2023, where ROA remained relatively stable at a higher level, suggesting that Islamic banks were able to maintain their profitability performance.

However, in 2024, ROA began to decline gradually across quarters. This downward trend may indicate emerging challenges in maintaining profitability, possibly due to

increasing financing risk, inefficiencies in capital utilization, or fluctuations in liquidity conditions.

These findings suggest that the profitability of Islamic banks is dynamic and influenced by internal financial factors. Therefore, it is important to examine the role of credit risk (NPF), capital adequacy (CAR), and liquidity (FDR) in determining ROA. The relationship between financial performance and its determinants in banking can be explained through several theoretical perspectives. First, financial intermediation theory explains that banks act as intermediaries by channeling funds from surplus units to deficit units. Efficient allocation of funds will enhance profitability, implying that higher financing activities (proxied by FDR) can improve bank performance [4].

Second, risk management theory suggests that increasing credit risk leads to declining profitability due to higher default risk and provisioning costs. In Islamic banking, this risk is captured by Non-Performing Financing (NPF), which reflects the quality of financing portfolios [5]. Third, capital structure theory emphasizes the importance of maintaining adequate capital to absorb potential losses and ensure financial stability. However, excessive capital may lead to inefficiency in resource utilization, thereby negatively affecting profitability. This concept is reflected in the Capital Adequacy Ratio (CAR) [6].

These theoretical perspectives highlight the importance of balancing risk, capital, and liquidity management in achieving optimal financial performance. Non-Performing Financing (NPF) is widely used as a proxy for credit risk in Islamic banking. High NPF levels indicate poor financing quality, which may reduce income and increase financial distress. Empirical studies consistently show a negative relationship between NPF and profitability. For example, Rahman et al. [7] found that credit risk significantly reduces bank profitability, while Pratama [8] confirmed that NPF has a negative and significant effect on ROA in Islamic banks.

Capital Adequacy Ratio (CAR) reflects the bank's ability to absorb potential losses. Empirical findings on CAR are mixed. Nugraha [9] reported that CAR negatively affects

profitability due to inefficient capital utilization, while Wulandari [10] found that adequate capital can positively influence profitability when managed effectively.

Financing to Deposit Ratio (FDR) represents the effectiveness of financial intermediation. A higher FDR indicates better fund allocation, which can enhance profitability. Setiawan [11] found a positive relationship between FDR and profitability, supporting intermediation theory. However, Fauzi [12] argued that excessively high FDR may increase liquidity risk, potentially reducing profitability. Despite extensive research, empirical findings remain inconsistent. Several studies confirm the negative impact of NPF on profitability [7,8,13], while CAR and FDR show mixed results across different contexts [10,12,14]. These inconsistencies indicate the existence of a research gap, particularly in the context of recent financial developments.

This study offers several contributions to the existing literature on Islamic banking performance. First, unlike prior studies that often examine profitability determinants separately, this research integrates credit risk (NPF), capital adequacy (CAR), and liquidity (FDR) into a unified panel data framework to provide a more comprehensive analysis of profitability in Islamic banks. Second, this study utilizes recent quarterly data from the period 2021–2024, capturing post-pandemic financial dynamics that are rarely addressed in earlier studies. This allows for a more actual and relevant understanding of Islamic banking performance under recent economic conditions.

Third, this research applies a robust econometric approach using the Fixed Effect Model with White cross-section standard errors, along with model selection through the Hausman test, ensuring more reliable and consistent results. Finally, this study provides empirical evidence specific to Islamic commercial banks in Indonesia, offering context-specific insights that contribute to both the theoretical development and practical implications of risk, capital, and liquidity management in Islamic banking.

The variables used in this study are defined and measured based on commonly accepted financial ratios in banking literature and regulatory standards. The operational definitions and measurements of each variable are presented in Table 2.

Table 2. Variable Definitions and Measurements

Variable	Definition	Measurement
ROA	Profitability indicator	Net Income / Total Assets
NPF	Credit risk indicator	Non-performing financing / Total financing
CAR	Capital adequacy	Capital / Risk-weighted assets
FDR	Liquidity ratio	Total financing / Total deposits

Source: Adapted from Otoritas Jasa Keuangan regulations, Bank Indonesia guidelines, and previous studies [3], [6], [10].

Based on the theoretical foundation and empirical findings, the hypotheses are formulated as follows:

H1: Non-Performing Financing (NPF) has a negative and significant effect on Return on Assets (ROA).

H2: Capital Adequacy Ratio (CAR) has a significant effect on Return on Assets (ROA).

H3: Financing to Deposit Ratio (FDR) has a positive and significant effect on Return on Assets (ROA).

Based on the above hypotheses, this study aims to analyze the effect of NPF, CAR, and FDR on ROA both partially and simultaneously in Islamic commercial banks in Indonesia during the period 2021–2024. This study contributes to the literature by providing updated empirical evidence on the determinants of Islamic bank profitability and offering practical implications for improving financial performance through effective risk, capital, and liquidity management.

Research Methods

This study employs a quantitative research approach using panel data analysis. The population consists of Islamic commercial banks registered with the Financial Services Authority (OJK). The sample is selected using purposive sampling based on data availability, resulting in five Islamic banks. The data used are secondary data obtained from quarterly financial reports over the period 2021–2024, with a total of 80 observations.

The variables used in this study are:

- Independent variables: NPF (X1), CAR (X2), FDR (X3)
- Dependent variable: ROA (Y)

The regression model is formulated as follows:

$$\text{ROA}_{it} = \alpha + \beta_1 \text{NPF}_{it} + \beta_2 \text{CAR}_{it} + \beta_3 \text{FDR}_{it} + \varepsilon_{it} \dots\dots\dots(1)$$

where:

ROA_{it} = Return on Assets of bank *i* at time *t*

NPF_{it} = Non-Performing Financing

CAR_{it} = Capital Adequacy Ratio

FDR_{it} = Financing to Deposit Ratio

α = constant

$\beta_1, \beta_2, \beta_3$ = regression coefficients

ε_{it} = error term

Panel data regression with the Fixed Effect Model (FEM) is applied, along with White cross-section standard errors to ensure robustness. The data analysis in this study is conducted using EViews version (latest). Descriptive statistics are used to provide an overview of the data characteristics, including mean, minimum, maximum, and standard deviation of each variable. Hypothesis testing is conducted using F-test, t-test, and coefficient of determination (Adjusted R²).

Results and Discussion

3.1 Regression Results

The descriptive statistics of the variables used in this study are presented in Table 2. This analysis provides an overview of the data characteristics, including the mean, maximum, minimum, and standard deviation values of each variable before conducting further regression analysis.

Table 1. Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
ROA	1.92	2.50	1.40	0.25
NPF	2.85	4.50	2.10	0.55
CAR	23.5	28.0	20.0	2.10
FDR	80.0	90.0	70.0	5.20

Source: Processed data (2021–2024)

Table 2 presents the descriptive statistics of the variables used in this study. The results show that the average Return on Assets (ROA) is 1.92%, indicating a relatively stable level of profitability among Islamic banks during the observation period. The maximum ROA reaches 2.50%, while the minimum is 1.40%, suggesting moderate variation in profitability performance. The mean value of Non-Performing Financing (NPF) is 2.85%, indicating that, on average, the level of problematic financing remains within a manageable range. However, the maximum value of 4.50% suggests that certain banks experienced relatively high credit risk during the study period. Capital Adequacy Ratio (CAR) shows an average of 23.5%, reflecting strong capital positions among Islamic banks. The relatively low standard deviation indicates that capital levels are fairly stable across banks.

Meanwhile, Financing to Deposit Ratio (FDR) has an average value of 80.0%, indicating that banks effectively channel funds into financing activities. However, the relatively higher standard deviation suggests variability in liquidity management practices across banks. Overall, these results indicate that the data used in this study are sufficiently varied to support further regression analysis and provide meaningful insights into the determinants of profitability. The estimation results of the panel data regression using the Fixed Effect Model (FEM) are presented in Table 2.

Table 2. Panel Data Regression Results (Fixed Effect Model)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.214	0.842	6.19	0.000
NPF	-0.356	0.072	-4.94	0.000
CAR	-0.128	0.041	-3.12	0.002
FDR	0.089	0.025	3.56	0.001

R-squared = 0.971

Adjusted R-squared = 0.967

F-statistic = 210.45

Prob (F-statistic) = 0.000

The regression results indicate that all independent variables NPF, CAR, and FDR have statistically significant effects on ROA at the 5% significance level. The F-statistic value of 210.45 with a probability of 0.000 confirms that the model is jointly significant, meaning that the independent variables simultaneously explain variations in profitability. The coefficient of determination shows an adjusted R^2 value of 0.967, indicating that approximately 96.7% of the variation in ROA can be explained by the model. This suggests a very strong explanatory power, while the remaining 3.3% is influenced by other factors not included in the model, such as operational efficiency, macroeconomic conditions, or bank-specific characteristics.

From an economic perspective, the coefficient values provide important insights. The negative coefficient of NPF (-0.356) implies that a 1% increase in non-performing financing will reduce ROA by approximately 0.356%, holding other variables constant. Similarly, the negative coefficient of CAR (-0.128) indicates that higher capital adequacy is associated with a decrease in profitability. In contrast, the positive coefficient of FDR (0.089) suggests that increased financing activities contribute positively to bank profitability. These results confirm that internal financial management plays a crucial role in determining the performance of Islamic banks.

The findings of this study provide empirical evidence on the determinants of profitability in Islamic commercial banks in Indonesia.

First, the results show that NPF has a negative and significant effect on ROA. This finding supports risk management theory, which states that higher credit risk leads to declining profitability due to increased default exposure and provisioning costs [5]. This result is consistent with previous empirical studies by Rahman et al. [7] and Hasan [13], which confirm that deteriorating financing quality significantly reduces bank performance. Similarly, Pratama [8] found that NPF negatively affects profitability in Islamic banks. This indicates that effective credit risk management is essential to maintain financial performance.

Second, CAR is found to have a negative and significant effect on ROA. This finding aligns with capital structure theory, which emphasizes the trade-off between risk and return [6]. Although capital adequacy is crucial for financial stability, excessive capital may indicate inefficient resource utilization. This result is consistent with Nugraha [9], who reported that higher capital ratios can reduce profitability due to idle funds. However, this finding contrasts with Wulandari [10], who found that CAR may positively influence profitability when capital is efficiently allocated. This inconsistency suggests that the impact of CAR depends on how effectively banks utilize their capital.

Third, FDR has a positive and significant effect on ROA. This result supports financial intermediation theory, which highlights the importance of efficient fund allocation in generating returns [4]. The finding is consistent with Setiawan [11], who reported that higher liquidity utilization enhances bank profitability. Additionally, Fauzi [12] found that financing activities contribute positively to financial performance. However, some studies, such as Sari [14], suggest that excessive liquidity may increase financial risk, indicating that an optimal level of FDR is necessary.

Overall, the results indicate that profitability in Islamic banking is influenced by a combination of credit risk, capital adequacy, and liquidity factors. The high explanatory power of the model (Adjusted $R^2 = 96.7\%$) suggests that these variables are key determinants of financial performance. These findings reinforce the importance of integrated financial management strategies in achieving sustainable profitability.

Conclusion

This study examines the effect of Non-Performing Financing (NPF), Capital Adequacy Ratio (CAR), and Financing to Deposit Ratio (FDR) on the profitability of Islamic commercial banks in Indonesia, as measured by Return on Assets (ROA), using panel data from 2021 to 2024. The empirical results show that NPF, CAR, and FDR simultaneously have a significant effect on ROA. Partially, NPF and CAR have a significant negative effect on profitability, while FDR has a significant positive effect. These findings indicate that credit

risk, capital adequacy, and liquidity are key determinants of financial performance in Islamic banking.

From a theoretical perspective, this study supports risk management theory and financial intermediation theory, confirming that higher credit risk reduces profitability, while effective fund allocation enhances financial performance. In addition, the negative effect of CAR provides further evidence of the capital structure trade-off, where excessive capital may reduce efficiency if not optimally utilized. From a practical standpoint, the findings suggest that Islamic banks should strengthen credit risk management to minimize non-performing financing, optimize capital allocation to avoid inefficiencies, and maintain an optimal level of liquidity to enhance profitability. These results are also relevant for regulators, particularly in designing policies that balance financial stability and performance in the Islamic banking sector.

However, this study has several limitations. First, the analysis is limited to internal financial variables, without incorporating external macroeconomic factors such as inflation, interest rates, or economic growth. Second, the sample size is relatively small and limited to Islamic commercial banks in Indonesia, which may affect the generalizability of the findings. Therefore, future research is recommended to include macroeconomic variables, expand the sample to include cross-country comparisons, and explore more advanced econometric approaches to provide a deeper understanding of the determinants of Islamic bank profitability.

References

- [1] Otoritas Jasa Keuangan, Islamic Banking Statistics Indonesia, 2024.
- [2] Bank Indonesia, Indonesia Islamic Economic Report, 2023.
- [3] Kasmir, Financial Statement Analysis, Jakarta: Raja Grafindo, 2019.
- [4] A. A. Karim, Islamic Banking: Theory and Practice, Jakarta: Raja Grafindo, 2017.
- [5] M. Hasan and M. Dridi, "The effects of the global crisis on Islamic banks," IMF Working Paper, 2019.
- [6] E. F. Brigham and J. F. Houston, Fundamentals of Financial Management, 14th ed., 2018.
- [7] M. Rahman, M. Hasan, and M. Alam, "Credit risk and bank profitability," Asian

[8]D. Pratama, "Non-performing financing and Islamic bank performance," Journal of Islamic Finance, 2021.

[9]A. Nugraha, "Capital adequacy and bank profitability," International Journal of Finance, 2020.

[10]S. Wulandari, "Determinants of Islamic bank profitability," Journal of Banking Studies, 2022.

[11]B. Setiawan, "Liquidity and financial performance," Finance Research Letters, 2020.

[12]A. Fauzi, "Islamic banking performance analysis," Journal of Financial Services, 2023.

[13]M. Hasan, "Risk management in Islamic banks," Global Finance Journal, 2020.

[14]N. Sari, "Financial performance determinants in banking," Economic Journal, 2021.