

The Impact of Green Banking and Financial Performance on the Profitability of Islamic Commercial Banks in Indonesia in 2021-2024

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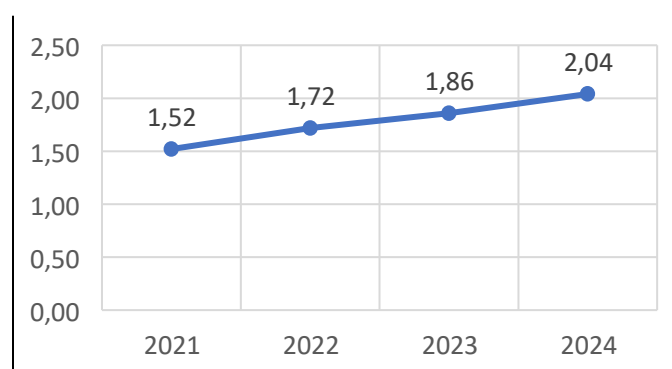
Article Info	Abstract
Article history: Received: Okt 10, 2025 Revised: Nov 1, 2025 Accepted : Nov 12 , 2025 Available online: Des 31, 2025 *Corresponding author email : ajengpipit@uinponorogo.ac.id Phone number: 085730471755 Keywords: Green Banking, Profitability, Green Banking Disclosure Index (GBDI)	Introduction: The profitability of Islamic Banks (BUS) in 2021-2024 experienced an increase in growth after the COVID-19 pandemic, supported by improved financial performance and Green Banking activities. The purpose of this study is to determine the effect of Green Banking, CAR, BOPO, FDR, and NPF on ROA, both partially and simultaneously. Research Methods: This study uses a quantitative method with Panel Data Regression data processing techniques with the FEM method. The sample used is 2021 to 2024. The hypothesis in this study is that the Panel Data Regression method with FEM has proven accurate in testing the influence between dependent and independent variables. Results: Partially, Green Banking and CAR have no effect, while BOPO, FDR, and NPF have an effect on ROA. Simultaneously, they have an effect on ROA. Conclusion: The results obtained can indicate that Islamic Banks must pay attention to the financial performance conditions of various sectors in order to achieve the desired profit target and are expected to continue to improve Green Banking so that operations are carried out more efficiently.

INTRODUCTION

Over time, many innovations and changes have occurred, including in the financial sector. Banks play a key role in supporting economic progress. In the banking sector, profitability is the primary benchmark for measuring bank performance. Bank profitability indicates its ability to generate profits over a specific period, taking into account the level of asset sales and share capital (Kumbirai & Webb, 2010).

By measuring profitability ratios, a company can determine the results of policies implemented by the company, including the results of increasing the effectiveness of company management. Profitability can be measured using the Return on Assets (ROA) ratio. ROA indicates a company's ability to use all owned assets to generate profit after tax (Sudana, 2009). The higher the bank's ROA, the higher the level of profit achieved by the bank and the better the position and utilization of the bank's assets (Dendawijaya, 2009). Increases and decreases in ROA can be caused by several internal and external factors of the bank (Mujaddid & Wulandari, 2017). Internal factors originate from the characteristics of the bank itself, which can be seen from financial ratios that cover several aspects, namely capital represented by the Capital Adequacy Ratio (CAR), asset quality represented by Non-Performing Financing (NPF) and Green Banking, liquidity represented by the Financing to Deposit Ratio (FDR), and operational efficiency represented by Operating Costs to Operating Income (BOPO). Meanwhile, external factors are influenced by inflation (Tamimah, 2020).

Figure 1. ROA Development Data at BUS in 2021-2024 in Percentage



Source: Data processed in 2025

Based on Figure 1 and Bank Indonesia Circular Letter No. 13/24/DPNP/2011, the Return on Assets (ROA) ratio continued to increase in 2021, but in 2023 and 2024, the CAR ratio decreased by 0.87% in 2023 and 0.11% in 2024. The decrease in the CAR ratio was caused by a decrease in profitability and bad loans. The BOPO value also increased by 78.97%, so it can be

concluded that in that year, operational costs increased, but ROA remained high. In 2024, the FDR ratio decreased by 0.17%. This was due to a decrease in the distribution of Third Party Funds (DPK), which resulted in a decrease in the ROA ratio. In 2024, the NPF ratio increased by 0.1% due to the high value of bad loans, but the value of profitability continued to increase.

Changing times always bring changes in various sectors. These changes can give rise to various problems, including those related to the economy and the environment. These problems impact the degradation of natural resources, energy resources, the environment, and non-renewable natural resources. This issue is of particular concern to various parties, including economic actors, who are required to behave ethically towards the environment and society while maintaining economic efficiency.

One effort undertaken by economic actors is the creation of a Green Banking policy. The concept of Green Banking refers to services characterized as non-polluting and all elements of its processes are characterized as environmentally friendly. Meanwhile, these services must protect the environment as a natural resource, and this type of banking can be referred to as Sustainable Banking. Furthermore, green banking plays a crucial role in financing green projects and green industries (Mehedi et al., 2017).

Green Banking is a financial institution that prioritizes sustainability in its business practices. Banks that implement the Green Banking concept will produce company output, competitive advantages, a strong corporate identity, and a strong brand image in achieving predetermined company targets. In Indonesia, Green Banking has been implemented since the issuance of OJK Regulation No. 51/POJK/2017 concerning the implementation of sustainable finance for financial services institutions, business entities, and public companies (SAL POJK 51, 2017).

Green banking implies that banks focus not only on generating profits for shareholders, as is the function of most organizations, but also on their responsibility to preserve the environment (planet) and are committed to improving the social welfare of society (people). Green banking is a long-term business strategy that, in addition to profit, also benefits environmental empowerment and preservation (Anggraini et al., 2020).

Green banking is defined as banking efforts to prioritize sustainability in financing distribution or operational activities. Banks are not directly classified as major contributors to environmental pollution. However, banks cannot be separated from the problem of increasing environmental degradation (Fitrianna & Widyaningrum, 2020).

Green Banking policy practices are based on research from the Green Banking Disclosure Index (GBDI) (Khan et al., 2021). The GBDI aims to provide stakeholders with insights into how banks contribute to sustainable development and promote environmentally friendly business practices. This is done to assist stakeholders in decision-making based on comprehensive social and environmental considerations and to encourage companies to integrate sustainable business practices more effectively into their activities (Bose et al., 2018).

In a study conducted by Ubaidillah on the analysis of factors affecting the profitability of Islamic banks in Indonesia, it was stated that CAR does not have a negative effect on ROA, NPF does not have a negative effect on ROA, BOPO has a significant negative effect on ROA, and FDR has a significant positive effect on ROA (Ubaidillah, 2016). In Ratnawaty's study on factors affecting the profitability of Islamic commercial banks in Indonesia, it was stated that CAR has a positive effect on ROA, BOPO has a negative effect on ROA, FDR has a positive effect on ROA, and NPF has a negative effect on ROA (Marginingsih, 2018).

Furthermore, Salma Nabila's research analyzed the effect of BOPO and Green Banking on ROA. The results showed that Green Banking had a negative and significant effect on BOPO, a positive and insignificant effect on ROA, and BOPO had a negative and significant effect on ROA (Mustika et al., 2023). Another study examined the effect of Green Banking, BOPO, and CAR on ROA. Majestine's research found that Green Banking had a positive effect on ROA, BOPO had a negative effect on ROA, and CAR had a negative effect on ROA. Meanwhile, Green Banking, BOPO, and CAR jointly had a positive effect (Shahnamirashella, 2023).

Based on the problem explanation and existing literature, this study aims to discuss the background and reasons for the suboptimal influence of Green Banking and Financial Performance on the profitability of Islamic banks in Indonesia, as results vary from study to study. The results of this study will demonstrate the influence of Green Banking, the Operating Expense to Operating Income Ratio (BOPO), the Capital Adequacy Ratio (CAR), the Financing to Deposit Ratio (FDR), and Non-Performing Loans (NPF) on Return on Assets (ROA) in Islamic Commercial Banks in Indonesia. Therefore, this study is entitled **"The Effect of Green Banking and Financial Performance on the Profitability of Islamic Commercial Banks in Indonesia 2021-2024."**

METHOD

This research falls into the quantitative research category using a causal method, a type of research that aims to identify causal relationships between two or more variables. The population used in this study is National Private Sharia Banks in Indonesia registered with the Financial Services Authority (OJK) and have published sustainable finance reports from 2021 to 2024. A purposive sampling method was used to select the sample. Consequently, eight banks will be studied: Bank Muamalat Indonesia, Victoria Syariah, Bank Syariah Indonesia (BSI), Panin Dubai Syariah Tbk, Bukopin Syariah, BCA Syariah, BTPN Syariah, and Aladin Syariah. The sample size for this study is 32, drawn from financial reports for 2021-2024.

The data in this study were processed using panel data regression. Panel data regression combines time series and cross-sectional data. The data used in this study is secondary. The data sources for this study were obtained from annual financial reports and sustainable finance reports published on each bank's official website. Data processing and analysis were carried out using EViews version 13.

RESULT AND DISCUSSION

Descriptive Statistical Test Results

Table 1. Results of Descriptive Statistical Tests

	Y	X1	X2	X3	X4	X5
Mean	1.646774	1.230645	4483.710	10576.16	8434.452	1.236452
Median	1.100000	1.190000	2960.000	8480.000	8676.000	0.570000
Maximum	11.43000	1.670000	18928.00	35475.00	17327.00	4.660000
Minimum	-7.130000	0.860000	1879.000	5812.000	3833.000	0.000000

Source: Data processed using Eviews13, data processed 2025

The average value of variable Y is 1.646774, the mean value is 1.100000, the largest value is 11.43000, and the smallest value is -7.130000. The average value of variable X1 is 1.230645, the mean value is 1.190000, the largest value is 1.670000, and the smallest value is 0.860000. The average value of variable X2 is 4483.710, the mean value is 2960.000, the largest value is 18928.00, and the smallest value is 1879.000. The average value of variable X3 is 10576.16, the mean value is 8480.000, the largest value is 35475.00, and the smallest value is 5812.000. The average value of variable X4 is 8434.452, the middle value is 8676.000, the largest value is 17327.00, and the smallest value is 3833.000. The average value of variable X5 is 1.236452, the middle value is 0.570000, the largest value is 4.660000, and the smallest value is 0.000000.

Data Analysis Test

Chow Test Output Results

Table 2. Chow Test Results

Effects Test	Statistic	d.f.	Prob.
Cross-section F	9.220608	(7,18)	0.0001
Cross-section Chi-square	47.211849	7	0.0000

Source: Data processed using Eviews13, data processed 2025

The cross-sectional F-probability value is 0.0001 and the cross-sectional Chi-square value is 0.0000, or <0.05 , thus rejecting H_0 . Therefore, it can be concluded that the Fixed Effects Model is better for modeling the data than the General Effects Model. Next, a Hausman test was conducted to determine the best model between the Random Effects Model and the Fixed Effects Model.

Hausman Test Results

Table 3. Hausman Test Results

Correlated Random Effects – Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.940234	5	0.0008

Source: Data processed using Eviews13, data processed 2025

Based on Table 4.6, the Hausman Test results indicate that the random cross-sectional value has a probability of $0.0008 < 0.05$. Therefore, H02 is rejected. It can be concluded that the Fixed Effects Model better models the data than the Random Effects Model, thus eliminating the need for the Lagrange Multiplier (LM) Test.

Classical Assumption Test

Normality Test Results

Table 4. Normality Test Results

Mean	3.08e-16
Median	0.140365
Maximum	2.101402
Minimum	-1.988524
Std.Dev	1.013036
Skewness	-0.203455
Kurtosis	2.515279
Jarque-Bera	0.517353
Probability	0.772073

Source: Data processed using Eviews13, data processed 2025

The results of the normality test indicate a probability value of 0.772073. Because the probability value of 0.772073 is greater than 0.05, the data is considered normally distributed.

Multicollinearity Test Results

Table 5. Multicollinearity Test Results

	X1	X2	X3	X4	X5
X1	1.000000	-0.297443	-0.428313	-0.301626	-0.460884
X2	-0.297443	1.000000	0.497834	0.524549	-0.338311
X3	-0.428313	0.497834	1.000000	0.619678	0.112607
X4	-0.301626	0.524549	0.619678	1.000000	-0.051052
X5	-0.460884	-0.338311	0.112607	-0.051052	1.000000

Source: Data processed using Eviews13, data processed 2025

Therefore, it can be concluded from the table that the coefficient values for all independent variables are below 0.90, indicating that the regression model is free from multicollinearity.

Autocorrelation Test Results

Table 6. Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.770281	Prob. F(2,23)	0.4745
Obs*R-squared	1.946061	Prob. Chi-Square(2)	0.3779

Source: Data processed using Eviews13, data processed 2025

Therefore, the table shows that the F-Prob. (2,23) value is 0.4745 and the Chi-Squared Prob. (2) value is 0.3779, indicating that the p-values (0.4745 and 0.3779) are > 0.05 , indicating the absence of autocorrelation in the model residuals up to the second lag.

Heteroscedasticity Test Results

Table 7. Heteroscedasticity Test Results

Heteroskedasticity Test: Harvey			
Null hypothesis: Homoskedasticity			
F-statistic	0.457806	Prob. F(5,25)	0.8037
Obs*R-squared	2.600312	Prob. Chi-Square(5)	0.7613
Scaled explained SS	2.476502	Prob. Chi-Square(5)	0.7800

Source: Data processed using Eviews13, data processed 2025

From the table, the value of Prob. Chi-square (5) is 0.7613 with a p value > 0.05 , which means H_0 is rejected and no heteroscedasticity occurs. Meanwhile, for Scaled explained SS, the value is 2.476502 with Prob. Chi-square (5) of 0.7800, indicating that the value is > 0.05 so that H_0 is rejected and nothing happens. So the conclusion is that there is no heteroscedasticity, with p values (0.8037, 0.7613, and 0.7800) > 0.05 .

Hypothesis Testing

Partial Test Results (t-Test)

Table 8. Partial Test Results (t-Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.39931	3.974207	-2.868323	0.0102
X1	-2.544483	3.122878	-0.814788	0.4258
X2	0.000215	0.000146	1.476622	0.1571
X3	-0.000635	0.000108	-5.889266	0.0000
X4	0.002397	0.000373	6.428783	0.0000
X5	1.386417	0.350911	3.950905	0.0009

Source: Data processed using Eviews13, data processed 2025

a. The Effect of Green Banking (X_1) on ROA (Y)

The results of the panel data regression analysis using the Fixed Effects Model above indicate that the probability value of Green Banking (X_1) is $0.4258 > 0.05$, therefore H_{01} is accepted and H_{a1} is rejected. Therefore, it can be concluded that Green Banking has a partial, insignificant positive effect on ROA.

b. The Effect of CAR (X_2) on ROA (Y)

The results of the FEM test above indicate that the probability value of CAR is $0.1571 > 0.05$, therefore H_{02} is accepted and H_{a2} is rejected. Therefore, it can be concluded that CAR has a partial, insignificant positive effect on ROA.

c. The Effect of BOPO (X_3) on ROA (Y)

The results of the FEM test above indicate that the probability value of BOPO is $0.0000 < 0.05$, therefore H_{03} is rejected and H_{a3} is accepted. Therefore, it can be concluded that BOPO has a highly significant effect on ROA partially.

d. Effect of FDR (X_4) on ROA (Y)

The FEM test results above indicate that the FDR probability value is $0.0000 < 0.05$, so H_{04} is rejected and H_{a4} is accepted. Therefore, it can be concluded that FDR has a highly significant effect on ROA partially.

e. Effect of NPF (X_5) on ROA (Y)

The FEM test results above indicate that the NPF probability value is $0.0009 < 0.05$, so H_{05} is rejected and H_{a5} is accepted. Therefore, it can be concluded that NPF has a significant positive effect on ROA partially.

Simultaneous Test Results (F-Test)

Table 9. Simultaneous Test Results (F-Test)

R-squared	0.942926	Mean dependent var	1.646774
Adjusted R-squared	0.904877	S.D. dependent var	4.240400
S.E. of regression	1.307824	Akaike info criterion	3.669701
Sum squared resid	30.78729	Schwarz criterion	4.271051
Log likelihood	-43.88037	Hannan-Quinn criter.	3.865726
F-statistic	24.78177	Durbin-Watson stat	1.904621
Prob(F-statistic)	0.000000		

Source: Data processed using Eviews13, data processed 2025

From the table, it can be seen that the value of Prob(F-statistic) is 0.000000, so the value of Prob(F-statistic) < 0.05 , so H_{06} is rejected and H_{a6} is accepted. Therefore, it can be concluded that the variables GB, CAR, BOPO, FDR, and NPF simultaneously influence ROA.

Persamaan

Based on the results of the panel data regression analysis above, the following equation is obtained:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + e_{it}$$

$$Y_{it} = (-11.39931) + (-2.544483)X_1 + (0.000215)X_2 + (-0.000635)X_3 + (0.0002397)X_4 + (1.386417)X_5$$

Information :

β : Konstanta

- Y : *Return On Assets (ROA)*
X1 : *Green Banking*
X2 : *Capital Adequacy Ratio (CAR)*
X3 : *Beban Operasional Pendapatan Operasional (X₃)*
X4 : *Non Performing Financing (X₄)*
X5 : *Financing to Deposit Ratio (X₅)*
I : *Cross section*
T : *Time series*

CONCLUSION

Based on the data analysis and discussion outlined above regarding the partial and simultaneous effects of Green Banking, the Capital Adequacy Ratio (CAR), Operating Expenses to Operating Income (BOPO), the Financing to Deposit Ratio (FDR), and Non-Performing Financing (NPF) on Return on Assets (ROA), the researchers concluded the following:

- a. Green Banking had no partial effect on ROA. This is because, during the study period, many banks had not yet implemented sustainable economic values (Green Banking), as reflected in their sustainability financial statements. This could impact assessments and lower profitability due to a lack of efficiency and implementation of Green Banking values.
- b. The Capital Adequacy Ratio (CAR) had no effect on ROA. This was because, during this period, banks were not maximizing their capital and using it effectively and efficiently. Consequently, when CAR increased, profits decreased due to inadequate capital allocation.
- c. Operating Expenses and Operating Income (BOPO) had a partial effect on ROA. This occurs because BOPO and ROA are inversely related. When BOPO increases, ROA decreases. If BOPO decreases or efficiency increases, ROA increases. This is because increased operational costs can reduce bank profits.
- d. The Financing to Deposit Ratio (FDR) partially affects ROA. This is because the more efficiently financing is carried out, the higher the profits generated, thus creating a direct relationship between FDR and ROA.
- e. Non-Performing Loans (NPF) partially affects ROA. This is because an increased risk of financing failure or non-performing loans (NPF) can affect bank profitability. Therefore, NPF and ROA are inversely related; an increase in NPF will decrease ROA, and vice versa.
- f. Green Banking: CAR, BOPO, FDR, and NPF simultaneously affect ROA. Each plays a role in increasing profitability. Green Banking, with its efficient sustainable banking concept, utilizes CAR with maximum capital adequacy, BOPO with operational efficiency, FDR with increased financing, and NPF with minimal risk of financing failure. Therefore, it can be concluded that 91% of the ROA variable can be explained by Green Banking, Capital Adequacy Ratio (CAR),

Operating Expenses to Operating Income (BOPO), Financing to Deposits Ratio (FDR), and Non-Performing Loans (NPF). The remaining 9% is explained by other variables outside the study.

Recommendations

Further research is recommended to add the following: This study only used five variables: Green Banking, Capital Adequacy Ratio (CAR), Operating Expenses to Operating Income (BOPO), Financing to Deposits Ratio (FDR), and Non-Performing Loans (NPF) to Return on Assets (ROA). Therefore, further research is expected to be further developed by adding intermediary variables.

REFERENCES

Journal

- Anggraini, D., Aryani, D., & Prasetyo, I. B. (2020). Analisis Implementasi Green Banking Dan Kinerja Keuangan Terhadap Profitabilitas Bank Di Indonesia (2016-2019). *JBMI (Jurnal Bisnis, Manajemen, dan Informatika)*, 17(2), 141–161. <https://doi.org/10.26487/jbmi.v17i2.11264>
- Bose, Khan, Rashid, & Islam. (2018). What drives green banking disclosure? An institutional and corporate governance perspective. *Asia Pacific Journal of Management*, 35, 501–527.
- Fitrianna, N., & Widyaningrum, R. A. (2020). Analisis Penerapan Green Banking Pada BRI Syariah Kantor Cabang Madiun. *ACTIVA: Jurnal Ekonomi Syariah*, 3(1), 55–71.
- Khan, Bose, Sheehy, & Quanzzy. (2021). Green banking disclosure, firm value and the moderating role of a contextual factor: Evidence from a distinctive regulatory setting. *Business Strategy and the Environment*.
- Kumbirai, M., & Webb, R. (2010). *A financial Ratio Analysis of Commercial Bank Performance in South Africa*. 2(10).
- Marginingsih, R. (2018). *Faktor-Faktor yang Mempengaruhi Profitabilitas Bank Umum Syariah di Indonesia*. 2(1).
- Mehedi, S., Kuddus, A., & Maniruzzaman. (2017). The identification of bankers' perception toward indicators for the adoption of green banking in Bangladeshi scheduled commercial banks. *Journal of Internet Banking and Commerce*, 22(2).
- Mujaddid, F., & Wulandari, S. (2017). *Analisis Faktor Internal Dan Eksternal Terhadap Rentabilitas Bank Syariah Di Indonesia*. 8.
- Mustika, S. N., Kristianingsih, K., Triuspitorini, F. A., & Djuwarsa, T. (2023). Analisis Pengaruh Penerapan Green Banking dan Efisiensi Biaya Operasional terhadap Profitabilitas Bank Umum Syariah di Indonesia. *Journal of Applied Islamic Economics and Finance*, 3(2), 436–443. <https://doi.org/10.35313/jaief.v3i2.3861>
- Tamimah, T. (2020). Faktor Yang Mempengaruhi Profitabilitas Perbankan Syariah Di Indonesia. *Jurnal Syarikah*, 6, 104–113.
- Ubaidillah. (2016). *Analisis Faktor-Faktor yang Mempengaruhi Profitabilitas Bank Syariah di Indonesia*. 4.

Books

Dendawijaya, L. (2009). *Manajemen Perbankan*. Ghalia Indonesia.

Sudana, I. M. (2009). *Manajemen Keuangan Teori dan Praktik*. Airlangga University Press.

Whitney, E., & Rolfes, S. (2011). *Understanding nutrition* (12th ed.). Australia: Wadsworth Cengage Learning