

**ARE BANKING FINANCIAL PERFORMANCES AND GREEN BANKING DISCLOSURE ASSOCIATED WITH BANK PROFITABILITY?**

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**Abstract**

This study examines how banking financial performance and green banking disclosure influence profitability. Financial performance in this research consists of capital adequacy ratio, non-performing loans, efficiency ratio, and loan-to-savings ratio. The research sample consisted of 30 samples selected using a purposive sampling method from 6 banking sector companies listed on the Indonesia Stock Exchange in 2018-2022, which consistently reported their green banking practices and did not experience losses during the research period. The analytical method in this research is panel data regression analysis. The research results show that the capital adequacy ratio and efficiency ratio have a negative effect on profitability. On the other hand, non-performing loans and the loan-to-deposit ratio positively affect company profits. Furthermore, green banking disclosure has a negative and significant effect on profitability. Implementing Green Banking can cause a decrease in profitability due to additional costs associated with its implementation. This research provides additional literature related to the implementation of green banking in Indonesia.

**Keywords:** Green Banking; Capital Adequacy; Non-Performing Loan; Bank Efficiency; Bank Liquidity Level; Bank Profitability.

**Abstrak**

*Studi ini menguji bagaimana profitabilitas dipengaruhi oleh kinerja keuangan perbankan dan pengungkapan green banking. Kinerja keuangan dalam penelitian ini terdiri dari rasio kecukupan modal, kredit bermasalah, rasio efisiensi, dan rasio pinjaman terhadap simpanan. Sampel penelitian berjumlah 30 sampel yang dipilih dengan metode purposive sampling dari total 6 perusahaan sektor perbankan yang terdaftar di Bursa Efek Indonesia pada tahun 2018-2022, yang secara konsisten melaporkan praktik green banking-nya dan tidak mengalami kerugian selama periode penelitian. Metode analisis dalam penelitian ini adalah analisis regresi data panel. Hasil penelitian menunjukkan rasio kecukupan modal dan rasio efisiensi berpengaruh negatif terhadap profitabilitas. Sebaliknya, kredit bermasalah dan rasio pinjaman terhadap simpanan berpengaruh positif terhadap laba perusahaan. Selanjutnya, pengungkapan green banking berpengaruh negatif dan signifikan terhadap profitabilitas. Penerapan Green Banking dapat menyebabkan penurunan profitabilitas karena adanya tambahan biaya yang terkait dengan implementasinya. Penelitian ini menyediakan*

*literatur tambahan berkaitan dengan implementasi green banking di Indonesia.*

**Kata Kunci** Green Banking; Capital Adequacy; Non-Performing Loan; Bank Efficiency; Bank Liquidity Level; Bank Profitability.

## INTRODUCTION

The banking industry is undergoing a significant transformation in the digital age. To remain competitive and relevant, banks should adapt and innovate in response to digital transformation, the rise of cashless transactions, open banking, and stricter regulations. These phenomena present both opportunities and challenges for banks. Banks must act with confidence and decisiveness in navigating these changes. Banks can enhance operating efficiency, offer personalized services, and expand their market by leveraging digital technology. Cybersecurity risks, complex regulations, particularly those related to sustainability issues, and competition from fintech are challenges that banks must confront. However, by anticipating and managing these risks, banks can maintain their competitive edge and ensure long-term success. Declining operational performance in banking has negative effects, including reduced revenue, increased costs for service recovery, damage to the bank's reputation, and decreased customer confidence. More research must be done to understand how the banking industry evolves and the factors affecting operational performance in the digital age.

Inconsistent results have been found in previous research on the relationship between capital adequacy ratio (CAR), non-performing loan (NPL), loan-to-deposit ratio (LDR), bank efficiency (BOPO) and bank profitability (Return on Assets). In particular, Stevani & Sudirgo (2019) and Irman & Wulansari (2018) found that CAR had a negative effect on ROA, whereas a study by Syamsuddin (2013) suggested that CAR had a positive effect on ROA. It is important to note that these findings are subject to interpretation. They may not be applicable in all cases. Yogianta (2013), Yuhasril (2019), and Inggawati et al. (2018) found that NPLs had a negative effect on ROA, while Avrita & Pangestuti (2016) found a positive effect. Maria (2015) and Hutagalung et al. (2011) found a negative effect of operating expenses on ROA (BOPO), differing from Nanda et al. (2019) research, where BOPO has a positive effect on ROA. On the other hand, Amzy et al. (2019) and Inggawati et al. (2018) found that LDR has a negative effect on ROA, while Yogianta (2013) found that LDR has a significant positive effect on ROA.

Aside from that, today, every organization must behave ethically to meet pressure from external parties such as the environment and society. One form of ethical conduct practiced by organizations is to not only focus on making a profit but also to pay attention to environmental and social aspects to maintain long-term sustainability. Banks, as financial sector institutions, also cannot escape the pressure to behave ethically to run an environmentally friendly business venture, so it is necessary to manage environmental and social risks, which is called green banking. Green banking is a term that refers to banking and financial practices that integrate environmental considerations into their business decisions. It includes providing loans, investments, and other services that support environmentally friendly practices, promote clean energy development, and reduce negative impacts on nature. Various ways can be adopted in green banking, such as online banking, internet banking, green checking accounts, green loans, mobile banking, electronic banking outlets and energy saving, which contribute to environmental sustainability programs (Gupta, 2015).

In addition to aiming to increase environmental awareness and change business patterns to be more environmentally friendly (Ragupathi & Sujatha, 2015), adopting green banking is inseparable from the challenges in its implementation. Gupta (2015) identified the implementation of green banking as having challenges related to customer acceptance,

technology use, data protection, costs and team member capabilities. As a new concept, green banking will require high-cost allocation for new technology, data protection, renewable energy, and recycling issues. Customers also need time to adapt to this new concept and improve bank employees' ability to adopt green banking practices through environmental education and training.

Some interesting and insightful points and opinions have emerged from previous studies. Therefore, implementing these green banking practices can increase bank profitability, as supported by the studies of Tia et al. (2023) and Siahaan et al. (2021). In contrast, studies conducted by Kim & Lyon (2015), Karyani & Obrien (2020), Buallay et al. (2021), Bessong & Tapang (2012), and Ratnasari et al. (2021) found that implementation of green banking practices had no positive effect upon bank profitability.

The initiation of banks to adopt green banking practices in Indonesia is inseparable from issuing relevant regulations that encourage implementing environmentally sound banks. Bank Indonesia Regulation (PBI) Number 14/15/PBI/2012 has included an assessment of environmental management by the debtor in the lending requirements. Green banking has also been launched as an MOU between Bank Indonesia and the Ministry of Environment (MOE) in 2011-2013 through activities such as training environmental analysts to assess the feasibility of lending to debtors such as AMDAL. The latest regulation relevant to green banking practices is issuing Financial Services Authority Regulation (POJK) number 51/POJK.03/2017 regarding sustainable finance. Through this regulation, Financial Services Institutions (FSIs), issuers, and public companies are encouraged to provide adequate sources of funding for sustainable development and climate change-related funding. Through social and environmental risk management, financial companies are expected to be able to compete and survive in running a financial business. This regulation aims to reduce social inequality, prevent environmental damage, maintain biodiversity, and encourage efficient use of energy and natural resources (Moh. Nadir, 2017).

In summary, the financial services industry, particularly banking, has the potential to be a driver of economic development and an enabler of environmental stewardship. Ethical banking practices prioritize profit, environmental, and corporate social responsibility and thus promote sustainable financing. Green banking not only benefits the environment. It also reduces banks' legal, credit, and reputational risk (Budiantoro, 2014). Kumari et al. (2016) conducted a study on Indian banks and found that green banking may offer both opportunities and challenges in terms of profitability for banks. Profitability is a critical factor in assessing a bank's overall performance, and a decline in profitability can impact the bank's ability to operate and undermine public confidence. For this reason, ROA is an important measure of profitability in the banking sector. Higher ROAs indicate greater profitability and a stronger position regarding asset utilization (Tenriola, 2019).

The study highlights the fluctuations in ROA, which were influenced by factors such as the COVID-19 pandemic, the increase in the distribution of loans, and the quality of loans (Dendawijaya, 2015). Banks that adopt green banking practices can reduce their exposure to legal, credit, and reputational risks. The RGEC method introduced by Bank Indonesia provides a thorough assessment of the stability of a bank using NPL, LDR, BOPO, and CAR as proxy measures that affect profitability (Pramana & Artini, 2016).

The current research differs from previous studies in several ways. Firstly, it focuses on banks with the largest assets in the last quarter of the research year. Secondly, it considers banks that have been implementing green banking for a long time. Finally, it examines a more recent period of green banking implementation. As discussed earlier, banks adapt and innovate to remain operational and profitable, and green banking is no exception. According to research by Siahaan et al. (2021), banks that implement green banking positively impact profitability. Similarly, the application of green banking to increase bank profitability is

supported by research by Hanif et al. (2020). Green banking is believed to increase performance efficiency, attract customers, and create a positive image for the bank.

This study investigates the impact of capital adequacy ratio, non-performing loans, efficiency ratio, loan-to-savings ratio, and green banking on the profitability of banking sector companies listed on the Indonesia Stock Exchange from 2018-2022. The benefits of this study include providing insights for investors to evaluate the performance of companies, serving as a reference for the academic understanding of green banking and profitability factors, and helping companies gain insights into the industry and increase their profitability. However, it is expected that the government, as a policy maker, recognizes the positive impact of green banking on the sustainability of future generations. The OJK, as a government agency, can implement alternative policies that support this application and ensure harmony with all economic sectors. Thus, a balance between government responsibility and bank involvement can be achieved.

## LITERATURE REVIEW

Capital Adequacy Ratio (CAR) is a bank's key performance indicator. It measures the adequacy of capital to back high-risk assets. The Capital Adequacy Ratio (Chowdhury & Hossain, 2017) reflects a bank's ability to absorb losses and maintain solvency by expressing its available capital concerning its risk-weighted assets. The higher the CAR, the better the bank's performance. According to Bank Indonesia's Regulation No. 15/12/PBI/2013, banks must maintain a minimum capital of 8 percent of their risk-weighted assets (RWA). Previous studies by Putrianingsih & Yulianto (2016), Stevani & Sudirgo (2019), and Suwandi & Oetomo (2017) found that increasing CAR leads to decreasing ROA and vice versa.

The relationship between the Capital Adequacy Ratio (CAR) and the Return on Assets (ROA) is complex, and no definitive conclusion can be drawn. Higher CARs suggest that banks have stronger financial buffers and can expand their lending activities, improving investor confidence, potentially lowering borrowing costs, and boosting earnings. However, it can be costly to raise capital to increase the CAR. The issuance of new equity dilutes existing shareholders' ownership interest, while debt issuance increases interest expense. These factors can put downward pressure on ROA. While maintaining a strong capital base can benefit profitability, it is not a guaranteed path to a higher return on assets (ROA). Banks need to strike a balance between the maintenance of capital adequacy and the efficient use of their resources. Nevertheless, it is important to consider the size of the effect to determine whether CAR influences ROA. Based on the theory above, the first hypothesis proposed is:  
***H<sub>1</sub>: Capital adequacy ratio has a negative effect on banking profitability***

Non-Performing Loan (NPL) refers to a loan categorized as bad or non-performing because it does not generate interest income for banks due to debtors having difficulty or failing to pay their loan installments. The causes of NPLs include unstable macroeconomic conditions, errors in credit analysis, or unexpected changes in the debtor's financial condition. Non-performing loans (NPLs) could measure a bank's ability to cover the risk of loans being repaid (Buchory, 2015). Globally, non-performing loans are loans in which the borrowers have failed to meet their repayment obligations for a certain period, usually classified as loans that are 90 days or more past due. Under Bank Indonesia's Regulation No. 13/24/2011 DPNP, a bank's NPL ratio must not exceed 5% to be considered acceptable, while a ratio between 2% and 5% indicates that the bank is in good condition. Some studies, like Dwi Indah Putrianingsih & Arief Yulianto (2016) and Setyowati & Budiwinarto (2017), found that NPLs negatively affect profitability.

Non-performing loans (NPLs) typically have a negative impact on Return on Assets

(ROA) due to a reduction in interest income, an increase in provisioning costs and an increase in credit risk. In some cases, however, NPLs can positively impact ROA, but these instances are usually temporary and require specific actions such as NPL asset sales, loan recoveries, active sales strategies and government support. The extent to which NPLs impact ROA is also influenced by the level of risk involved in their management. Although positive, it is important to note that the impact is typically temporary and unsustainable. Banks need effective non-performing loan (NPL) management and strategic planning to maximize profits and minimize the risks associated with NPLs.

***H<sub>2</sub>: Non-performing loans have a negative effect on banking profitability***

Bank Operating Profit Organization (BOPO) is a profitability ratio used to measure the efficiency with which a company manages its operating expenses concerning its operating income. A low BOPO value indicates higher revenues at lower operating costs, while a high BOPO value indicates inefficiency or lack of profitability. BOPO could refer to a financial institution's ability to utilize its resources effectively, generate maximum output relative to the input, minimize costs, and maintain quality service (Berger & Humphrey, 1997). If the bank's efficiency increases, it means that the cost of the operational activities undertaken by the bank decreases, which leads to an increase in the bank's profitability. The BOPO ratio is commonly known as the efficiency ratio. It measures the ability of bank management to control operating expenses concerning operating income. The BOPO value is inversely proportional to the ROA, based on previous research by A. S. Dewi (2018) and Hanafia & Karim (2020). As the company's efficiency increases, so does the company's ROA value.

There is often an inverse relationship between BOPO and ROA. A lower BOPO, which indicates efficient cost management, tends to lead to a higher ROA, which indicates a better return on assets. However, it is important to remember that BOPO is only one factor that influences ROA, and other factors, such as revenue growth, asset efficiency, and different cost structures in different industries, also play a role. Therefore, analyzing BOPO with other financial metrics and industry benchmarks provides a more complete picture. The analysis of BOPO provides valuable insights into a company's operational efficiency. When analyzed with return on assets (ROA) and other financial metrics, it is a useful indicator of a company's financial health and profitability.

***H<sub>3</sub>: Bank efficiency ratio has a negative effect on banking profitability***

Loan-to-deposit ratio, or LDR, is a key measure in banking analysis, reflecting the balance between loans extended and deposits received. According to Wibowo & Aumeboonsuke (2020), the LDR measures the ratio between the amount of loans extended and the amount of public funds and bank capital employed. The International Journal of Economics and Financial Issues (IJEFI) defines the LDR as a measure of the capacity of a bank to lend concerning the deposits it has received. It reflects the ability of the bank to maintain a balance between its lending activities and the maintenance of sufficient liquidity. To maintain liquidity, Bank Indonesia sets the LDR standard at 78-92 percent in Bank Indonesia Regulation No. 15/15/PBI/2013. If the LDR falls within this range, the bank is considered healthy. For liquidity maintenance, Bank Indonesia sets the LDR standard at 78-92 percent in Bank Indonesia Regulation No. 15/15/PBI/2013. If the LDR falls within this range, the bank is considered healthy. N. K. V. C. Dewi et al. (2015) and A. S. Dewi (2018) found that an increase in bank risk-taking leads to an increase in the LDR value. It is suggested that this increase in risk-taking leads to an improvement in the ROA value of the firm as it becomes more active in the provision of loans and less conservative.

The relationship between the loan-to-deposit ratio (LDR) and the return on assets (ROA) is not simple. Higher LDR ratios indicate that a bank is lending more money relative to its

deposits. This can potentially increase profits through interest earned on loans. However, this also increases the risk of defaulting and reduces liquidity. Banks must balance lending with maintaining adequate reserves. A high loan-to-deposit ratio (LDR) can result in a lower return on assets (ROA) if the loan defaults. The management strategy influences the impact of the LDR on the ROA, the risk management practices and the economic conditions.  
***H<sub>4</sub>: Loan-to-deposit ratio has a positive effect on banking profitability***

Green banking is a new paradigm that has developed in international banking organizations over the past decade. Kumar & Prakash (2019) defined green banking as integrating environmental and social considerations into banking practices and products, promoting sustainable development while ensuring financial viability. On the other hand, Zhelyazkova & Kitanov (2015) state that banking in all its business aspects (deposit collection, credit disbursement, trade finance, leasing activities, investment funds custody services, etc.) is oriented towards preserving the environment. Although banking is not directly related to activities that destroy nature, such as the plantation sector, mining, and other sectors, banking cannot be separated from the cases of increasing environmental problems (Cahyadi, 2021). In addition, Tia et al. (2023) and Siahaan et al. (2021) found that green banking positively affects ROA when the green banking impact is significant.

Advocates of green banking argue that it can enhance profitability in several ways. Firstly, it can attract new customers who prioritize sustainability. Secondly, it can help manage risks by avoiding financing environmentally damaging projects. Finally, it can potentially lead to cost savings through energy-efficient operations. However, some argue that green banking practices may not directly translate into a higher return on assets (ROA). In the short term, the initial costs of implementing green initiatives may outweigh the benefits.

Additionally, some green loans may carry higher risk or lower interest rates. However, it is evident that green banking is gaining importance for banks as environmental and social responsibility become more prominent. Banks that adopt green practices will likely be better positioned for the future.

***H<sub>5</sub>: Green banking disclosure has a positive effect on banking profitability***

## METHODS

This study adopts a quantitative approach using secondary data sources from the official websites of the Indonesia Financial Services Authority (OJK). The research samples are obtained from the conventional commercial bank publication report on the Indonesia Stock Exchange (IDX) from 2018-2022. The research utilized data from the previous five years to preserve relevance to the current situation. The data can be accessed through the company's website and relevant literature.

This study's population comprises all conventional commercial banks operating in Indonesia from 2018 to 2022. The sample was selected through purposive sampling based on the following criteria: the bank has the largest assets, has consistently reported its green banking practices (implemented green banking), is known by the public, and has not suffered losses over the duration of the study (positive ROA). This study employed a purposive sampling method. According to Sugiyono (2019), purposive sampling is a sampling method for data sources that consider certain characteristics in line with the desired criteria to decide the number of samples to be analyzed. Thus, six banks were sampled via purposive sampling, resulting in 30 observation data (6 banks and 5 years of research time).

Return on Asset (ROA), which serves as a stand-in for profitability, is the dependent variable in this study. On the other hand, the independent variables consist of capital adequacy

ratio (CAR), non-performing loans (NPL), efficiency ratio, loan-to-deposit ratio (LDR), and green banking disclosure. The ability of management to produce profits overall is assessed using ROA (Edi, 2022). One statistic used to evaluate financial success is the profitability ratio, and ROA is a generalized version of this metric (Utari et al., 2014). The higher the ROA, the more profit the business may generate and the better positioned to utilize its assets. This will enhance the company's attractiveness to investors. The formula of ROA can be by Van Horne & Wachowicz (2021):

$$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$$

The formula used to calculate CAR is capital divided by risk-weighted assets. According to regulation No. 15/12/PBI/2013 of Bank Indonesia, banks must provide a minimum capital of 8% of risk-weight assets (RWA). The CAR ratio can be stated as follows (P. P. Rahmi et al., 2022):

$$CAR = \frac{\text{Its Owned Capital}}{\text{Risk Weighted Asset}} \times 100 \%$$

Based on regulation No. 13/24/2011 DPNP extracted from the Bank Indonesia, Bank Indonesia has set a maximum NPL ratio of 5% when evaluating a bank, while an NPL ratio of 2% to 5% indicates that the bank is in good shape. The bad credit ratio was calculated by the formula of Non-Performing Loans as below (Ismail, 2018):

$$NPL = \frac{\text{Bad Debt}}{\text{Total Credit}} \times 100\%$$

The BOPO ratio is commonly known as the efficiency ratio. It measures the ability of bank management to control operating expenses concerning operating income. The Bank efficiency ratio was calculated by the formula BOPO as below:

$$BOPO = \frac{\text{Operating Expense}}{\text{Operating Income}} \times 100\%$$

The LDR ratio is calculated by comparing credit to third-party funds where the maximum LDR is limited to 110%. The LDR ratio is determined by comparing credit to third-party funds, with the credit used is the entire amount of credit given to third parties and excluding credit given to other parties, where demand deposits, savings accounts, and time deposits, which are not exchange funds, are the components of third-party funds:

$$LDR = \frac{\text{Credit given to the customer}}{\text{Total Deposit from Third Party}} \times 100\%$$

The green banking disclosure is measured in this study using the green banking disclosure index (GBDI) as the independent variable. Shaumya & Arulrajah (2016) developed this indicator model to identify and describe green banking issues reported by state-owned banks in their annual reports. Measurement GBDI uses content analysis to identify and explain green banking practices based on 16 green banking disclosure items, and the annual report and the published sustainability report on banking will be analyzed. Using a dichotomous scale, a score of 1 (one) will be assigned if the financial report or sustainability report has green reporting indicators for banking and a score of 0 (zero) will be assigned if there is no disclosure indicator. The following formula is used to compute each bank's Green Banking Disclosure Index for each bank:

Table 1 List of Green Banking Disclosure Index (GBDI)

Number of Items	Categories
1	Training and education on environmental awareness
2	Environmental performance evaluation

3	Environment-based reward system
4	Paper usage savings
5	Use of energy-efficient equipment
6	Waste treatment/recycling
7	Eco-friendly bank
8	Green loan
9	Green project finance
10	Green enterprise facility
11	Environment-based credit evaluation
12	Green branch management
13	Environment-based policy
14	Neighbourhood-based partnerships
15	Environment-based strategic planning
16	Green procurement

Source: Shaumya & Arulrajah (2016)

$$GDBI = \frac{\sum_{i=1}^n di}{16}$$

note:

GDBI : Disclosure of green banking bank *i* year *t*

*di* : 1 if reporting, 0 otherwise

*n* : Number of expected green banking indicator disclosures

The research methodology used in this study is quantitative, with a specific focus on hypothesis testing. To test the hypothesis, this study uses panel data regression analysis, which is shown by the following equation:

$$ROA_{it} = \beta + \beta_1 CAR_{it} + \beta_2 NPL_{it} + \beta_3 BOPO_{it} + \beta_4 LDR_{it} + \beta_5 GDBI_{it} + \epsilon_{it}$$

Where:

- ROA : Return on Assets
- CAR : Capital Adequacy Ratio
- NPL : Non-Performing Loan
- BOPO : Bank Efficiency Coefficient
- LDR : Loan to Deposit Ratio
- GDBI : Green Banking Disclosures

## RESULT AND DISCUSSION

Descriptive statistics are used to highlight or define the data to analyze it. The outcomes of the descriptive statistical analysis for each of the research variables are shown in the following table.

Table 2 Descriptive Statistics

	ROA	CAR	NPL	BOPO	LDR	GDBI
Mean	2.3653	22.7873	0.8477	73.7390	82.3540	0.6979
Median	2.4400	21.4300	0.7650	73.7300	83.0700	0.7500
Maximum	4.0200	35.6800	1.7300	93.3600	97.6400	0.8750
Minimum	0.5400	16.7800	0.2600	46.5400	61.9600	0.2500
Std. Dev.	1.0933	4.7043	0.3694	12.1775	9.5574	0.1549
Observations	30	30	30	30	30	30

Source: Processed Data (2024)

This study presents key statistics for variables such as Return on Assets (ROA), Green Banking Disclosure Index (GDBI), Capital Adequacy Ratio (CAR), Non-Performing Loans (NPL), Bank Operating Performance Ratio (BOPO), and Loan to Deposit Ratio (LDR). These statistics provide insights into the financial and environmental practices of the research sample, as shown by 30 observations. The following is a descriptive analysis obtained from



the table:

Return on Assets (ROA) as a dependent variable has a minimum value of 0.5400 owned by BBNI, while the maximum value is 4.0200 owned by BBKA. The average ROA is 2.3653 with a standard deviation of 1.0933, meaning there are variations in data for several objects, but no banks were found to have experienced losses on the objects taken. The ROA value was also found, on average, higher than the standard deviation.

The variable Capital Adequacy Ratio (CAR) has a minimum value of CAR of 16.7800 obtained from BBNI, while the maximum value of CAR is 35.6800 obtained from BNLI. The average CAR is 22.7873, with a standard deviation of 4.7043. Data on CAR shows that each company sampled is a healthy company and is ready to withstand the risks of the company's operations.

Variable Non-Performing Loan (NPL) has a minimum value of 0.2600 owned by BMRI, while the maximum value is 1.7300 obtained from BNLI. The average NPL is 0.8476, with a standard deviation of 0.3694. Data on NPL shows that each company sampled can handle problem loans.

Bank Efficiency (BOPO) has a minimum value of 46.5400 obtained from BBKA, while the maximum of BOPO is 93.3600 obtained from BNLI. The average BOPO is 73.7390, with a standard deviation of 12.1775.

The variable Deposit Ratio has a minimum value of LDR 61.9600, owned by BBKA, while the maximum value of LDR is 97.6400, obtained from BNGA. The average LDR is 82.3540, with a standard deviation of 9.5575. With the average LDR value, LDR indicates a bank's ability to return depositors' funds.

The Green Banking Disclosure Index has a minimum value of GBDI of 0.2500, owned by BNLI, while the maximum value of GBDI is 0.8750 obtained from BBKA & BNGA. The average GBDI is 0.6979, with a standard deviation of 0.1549. GBDI data shows that each sample company has successfully implemented GBDI to carry out its operations.

Furthermore, Chow test is used to select between the Fixed Effect Model (FEM) and the Common Effect Model (CEM).

Table 3 Chow Test

<b>Chow Test</b>	<b>Value</b>	<b>Results</b>
H0: Common Effect Model (CEM) > 0.05	0.0000	FEM
Ha: Fixed Effect Model (FEM) < 0.05		

Source: Processed Data (2024)

With a Chi-square Cross-sectional probability of  $0.0000 < 0.05$ , the table shows that Ha is accepted and H0 is rejected. Thus, it is recommended to use the Fixed Effect Model (FEM) rather than the Common Effect Model (CEM).

The Chow test results were used because the Hausman test could not be performed due to insufficient observation data. Furthermore, since there is no propensity to establish whether it is CEM or REM, the Lagrange Multiplier test does not need to be performed. Furthermore, the regression analysis results as follows:

Table 4 Regression Test Results

<b>Variable</b>	<b>Coeff.</b>	<b>Stat.</b>	<b>Prob.</b>	<b>Hypothesis</b>
C	14.6634	5.6624	0.0000	-
CAR	-0.0039	-0.2345	0.8174	H <sub>1</sub> accepted
NPL	2.1448	2.0472	0.0564	H <sub>2</sub> rejected
BOPO	-0.2129	-4.9503	0.0001	H <sub>3</sub> accepted
LDR	0.0191	2.7845	0.0127	H <sub>4</sub> is accepted

GBDI	-10.0977	-3.6068	0.0022	H <sub>5</sub> is rejected
F Test		100.7341	0.0000	
Adj. R <sup>2</sup>	0.9763			

Source: Processed Data (2024)

### DISCUSSION

As a result of the research, the coefficient of CAR has a negative value of -0.003967. These results indicate that as the value of CAR rises, the propensity of the company to increase ROA falls, and as the value of CAR falls, the propensity of the company to increase ROA rises. However, with a probability value of 0.8174, this study did not find any significant influence of CAR on ROA. The results of this study are consistent with the findings of Stevani & Sudirgo (2019) and Irman & Wulansari (2018). Banking regulations, which require a minimum provision of 8% for CAR, are responsible for the insignificance of CAR. Unless there is a balance between good investment and disbursement of funds, a high CAR will have little impact on profitability. A satisfactory CAR ratio should exceed the minimum requirement of 8 percent. However, banks should also avoid situations where the CAR ratio is set at a level that is too high. For example, a CAR of 100% indicates that the bank does not rotate funds from other parties. Banks that do not rotate their funds are going to get hurt. A high CAR indicates that the bank's capital is too high, which may indicate that it is less efficient in the disbursement of its funds. Bank Indonesia should review and update the regulations on CAR to provide banks with a clear benchmark on the ideal maximum CAR level.

Based on the research, the value of the NPL coefficient is 2.144815, which is a positive value. This study also found that NPL has significance on profitability as evidenced by a probability value of 0.0564. From these results, the company's tendency to increase ROA increases as NPL increases. On the other hand, as the NPL value decreases, the tendency of the company to decrease ROA increases. The results of this study agree with those found by Avrita & Pangestuti (2016). It is worth noting that the current level of NPLs in banking companies is still relatively low. In certain circumstances, NPLs may have a tangential positive effect on ROA (Return on Assets), but this should not be considered an ideal strategy. Banks can sell non-performing loans (NPLs) to other institutions at a discounted price. This allows them to remove the bad loan from their books but also results in receiving less money than the original loan value. In the short term, this can cause a faster decrease in the bank's total assets (due to the absence of the loan) than in equity (from selling at a discount). As ROA is calculated by dividing net income by total assets, a temporary increase in ROA may occur. However, this approach is not recommended. The temporary positive impact would not reflect the bank's underlying financial health on ROA.

It should be noted that the bank is still losing money on the loan. The bank should prioritize making sound loans and generating healthy interest income. Non-performing loans (NPLs) indicate issues within the loan portfolio, and simply selling them off does not address the root cause. Therefore, managing non-performing loans (NPLs) is crucial for banks. They employ various strategies to mitigate this risk, such as conducting stricter creditworthiness assessments during loan approvals, closely monitoring loans, and implementing efficient debt collection processes. In addition, some banks may offer workout programs to help borrowers who are struggling to repay them, to get them back on track and ultimately recover the loan. By taking a proactive approach to managing non-performing loans (NPLs), banks can help protect their financial health and ensure the smooth functioning of the financial system.

According to the research findings, the bank efficiency coefficient has a negative value of -0.08675, and the bank efficiency has a significant value of 0.0001. It indicates that as a company's efficiency increases, its tendency to increase ROA decreases, and as its efficiency

decreases, its tendency to increase ROA increases. The negative effect of bank efficiency implies that an increase in bank efficiency, indicating a decrease in efficiency, leads to a decrease in ROA. The study's findings align with the research conducted by Maria (2015) and Hutagalung et al. (2011). A bank's efficiency is directly correlated to its performance.

A low bank efficiency ratio indicates a well-managed bank that effectively controls its expenses, leaving more room for profit. On the other hand, a high bank efficiency ratio suggests that the bank is spending a significant portion of its income on running its business, which can squeeze profits and hinder its ability to invest in growth initiatives. The bank's improved performance is expected to increase public confidence, which can lead to an increase in deposits and usage of bank services such as loans or credit. The bank's improved performance is expected to increase public confidence, which can increase deposits and use of bank services such as loans or credit. It, in turn, is expected to increase profitability. Banks need to maintain public trust to attract and retain customers. Bank Indonesia has set the optimal bank efficiency ratio at less than 85% because if it is higher than 85% and approaches 100%, the bank may be considered inefficient in conducting its operations. Thus, bank efficiency is a critical indicator for banks. It reflects their efficiency in managing costs, ability to generate profits, and overall financial health. Banks can position themselves for sustainable growth and attract investment by controlling efficiency.

Based on the research carried out, the coefficient of the LDR has a positive value of 0.019112 and a significant value of 0.0127. The results of this research are consistent with the work of Yogiarta (2013). This indicates that banking profitability, seen through ROA, increases when LDR increases. Conversely, if the LDR level decreases, the ROA level will also decrease. The Loan-to-Deposit Ratio (LDR) is a crucial metric reflecting a bank's risk profile and ability to manage liquidity. They are calculated by dividing the aggregate amount of credit extended by the aggregate amount of customer deposits. LDR plays a significant role in a bank's health, impacting profitability, risk exposure, and overall financial stability. The Loan to Deposit Ratio (LDR) measures how much a bank lends compared to its deposits. Bank Indonesia set the loan-to-deposit ratio (LDR) floor at 78% while the tolerable ceiling at 92%. A higher LDR indicates that a bank has lent out more of the deposits it holds to borrowers. This ratio assesses the bank's liquidity position and ability to meet customer demand to borrow. A higher LDR may indicate that the bank takes more risk because it relies more on borrowed funds to support its lending activity.

On the other hand, lower LDRs may indicate that a bank is more conservative with its lending activities and is less exposed to risk. This may result in a lower level of profitability if the bank is not actively engaged in lending and earning interest income. By maintaining a healthy LDR range, banks can ensure they have sufficient capital to meet loan demands while maintaining enough liquidity to cover withdrawal needs. This helps them navigate economic cycles, operate profitably, and contribute to a stable financial system.

The adoption of green banking has a negative and significant impact on bank profitability, which is indicated by a coefficient of -10.09771 and a probability of 0.0022. The findings of this study are consistent with previous research by Kim & Lyon (2015), Karyani & O'Brien (2020), Buallay et al. (2021), Bessong & Tapang (2012), and Ratnasari et al. (2021). However, this result contradicts the findings of Tia et al. (2023) and Siahaan et al. (2021), demonstrating a positive impact of green banking practices on ROA. When green banking practices are in place, they can have a negative impact on the bank's return on assets. This suggests that adopting green banking is not a driver of bank profitability and that other economic factors are drivers of profitability.

Green banking may negatively impact return on assets (ROA) due to higher costs associated with investing in new technology and infrastructure to support green project financings, such as purchasing project-specific equipment and labor. In addition, green banking

can increase risk for banks because green projects are often more complex and riskier than traditional projects, particularly in emerging green sectors, which may have a higher risk profile. Banks may need to reflect this risk by charging higher interest rates or imposing stricter loan terms. This could reduce the attractiveness of loans and impact profitability. Since the risk is higher than usual, this places restrictions on banks and limits the opportunities for green lending. Restricting financing to environmentally friendly projects may result in a smaller pool of loan applicants for banks. This could lead to a reduction in the overall lending volume and a possible reduction in return on assets. Several factors, including the specific green initiatives undertaken, the bank's risk management strategies, and the overall market demand for sustainable financial products, will determine the impact of green banking on ROA. While there may be challenges in the short term, the long-term outlook for green banking and profitability appears to be positive.

## CONCLUSION

The study examines the impact of Green Banking Policy (GDBI), Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Efficiency Ratio (BOPO), and Loan to Deposit Ratio (LDR) on the Return on Asset (ROA) variable in conventional commercial banking listed on the Indonesia Stock Exchange from 2018 to 2022. Implementing Green Banking can lead to a decrease in Return on Assets due to its additional costs. These costs include purchasing environmentally friendly tools, employee training to increase awareness and ability, and providing credit for environmental renewal projects. These costs are both short-term and long-term, ultimately contributing to the decrease in Return on Assets. Furthermore, other variables such as Capital Adequacy Ratio (CAR) and Efficiency Ratio (BOPO) negatively affect company profits. Conversely, non-performing loans (NPL) and loan-to-deposit ratios (LDR) positively affect firm profits.

This study examines the extent of the impact of the implementation of green banking on both the performance and the profitability of banks. We conclude that implementing green banking can indirectly reduce the return on assets (ROA) due to certain costs associated with its implementation. These costs include purchasing environmentally friendly equipment, training employees to improve their skills and environmental awareness, and providing certain loans for projects based on environmental renewal. These incurred costs indirectly impact both the short-term and the long-term return on assets (ROA). In addition, other variables such as capital adequacy ratios (CAR) and profitability ratios (BOPO) also have a negative impact on the company's earnings. In contrast, non-performing loans (NPL) and loan/deposit ratios (LDR) positively impact the company's earnings.

This study does have limitations that must be taken into account in the interpretation of the research results. The generalizability of the findings to a larger population is limited by the small sample size (6 banks over 5 years). In addition, the validity and reliability of the results may be affected by limited and less accurate access to data. Next, the research methodology has limitations, such as the data preventing the research from carrying out the Hausman Test. Also, the study's scope and data analysis depth are limited by time and cost constraints. Finally, the researcher's expertise in public-sector accounting may affect the perspective and interpretation of the results. To obtain more comprehensive, in-depth, and multidimensional results, further research with a larger sample size, access to more complete and accurate data, a more appropriate methodology, adequate time and cost, and the involvement of researchers from different disciplines is recommended.

Despite the results mentioned above in the current study, we acknowledge some limitations of this study. First, this study has not considered the possibility that this disclosure of green banking implementation may provide more future benefits. We did not examine the

effects of the implementation of green banking in the long run. Moreover, understanding the quality of disclosure will remain an important research issue in the future. Furthermore, it is important to note that the sample size used in this study is relatively small compared to the vast number of banks in Indonesia. Furthermore, the sample size used in this study is limited, given the large number of banks in Indonesia. It is because only a few banks have made green banking a primary or supporting business activity, and even fewer have made standardized disclosures and been audited by qualified independent parties. Finally, the generalizability of our findings is limited to only those industries that generate a lower level of environmental pollution, such as the banking industry.

The authors suggest that future researchers examine additional variables likely to influence green banking disclosure, including institutional ownership, the proportion of independent directors, and the presence of a sustainability committee. This statement encourages further research on green banking using a wider range of samples; for example, separate green banking index measures outside the overall green banking index could be considered. The study recommends that companies improve their monitoring capabilities by implementing green banking practices and using advanced technology in day-to-day operations, potentially increasing profitability. Incorporating control variables such as CAR, NPL, BOPO, and LDR provides a more nuanced understanding of the relationship between green banking and profitability, providing valuable insights for academic and industry stakeholders.

For future studies, using a larger sample size could be a way to determine whether green banking practices positively impact banks. In addition, other researchers could explore different approaches to analyzing these practices, such as investigating the effects of institutional ownership, the proportion of independent directors, and the existence of a sustainability committee on the disclosure of green banking practices. The reason is that few banks disclose their green banking practices. The Financial Services Authority (OJK) should encourage all banks in Indonesia to implement green banking practices. Together with Bank Indonesia, it supports them in their environmental protection and management role by implementing green banking practices in the distribution of finance. The use of top-down regulations is expected to accelerate the implementation of green banking practices, which is particularly important in Indonesia, where the environment is in a critical state, and there are concerns that it may not be able to support development towards prosperity in the next decade.

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