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The Impact of Green Banking Disclosure and Financial Performance on the Profitability of Banks in Indonesia

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ABSTRACT

This research aims to examine the effect of green banking policies, capital adequacy, non-performing loans, bank operational efficiency, and bank liquidity on profitability. This study uses a quantitative method. Panel data regression is employed to achieve the research objectives by collecting data from 2020–2023 on banking sector companies listed on the IDX (Indonesia Stock Exchange). The results of this study reveal that green banking policy and bank liquidity have no significant influence on profitability. On the other hand, capital adequacy, non-performing loans, and bank operational efficiency demonstrate a significant influence on profitability. To showcase the novelty of the research, this study uses different objects and time periods compared to previous research.

Keywords: *Green Banking, Financial Performance, Profitability.*

ABSTRAK

Penelitian ini bertujuan untuk mengkaji pengaruh kebijakan *green banking*, kecukupan modal, kredit bermasalah, efisiensi operasional bank, dan likuiditas bank terhadap profitabilitas. Penelitian ini menggunakan metode kuantitatif. Regresi data panel digunakan untuk mencapai tujuan penelitian dengan mengumpulkan data tahun 2020–2023 tentang perusahaan sektor perbankan yang terdaftar di BEI (Bursa Efek Indonesia). Hasil penelitian ini mengungkapkan bahwa kebijakan perbankan hijau dan likuiditas perbankan tidak berpengaruh signifikan terhadap profitabilitas. Di sisi lain, kecukupan modal, kredit bermasalah, dan efisiensi operasional bank menunjukkan pengaruh yang signifikan terhadap profitabilitas. Untuk menunjukkan kebaruan penelitian, penelitian ini menggunakan objek dan periode waktu yang berbeda dibandingkan dengan penelitian sebelumnya.

Kata kunci: Perbankan Hijau, Kinerja Keuangan, Profitabilitas.

INTRODUCTION

The increasing environmental issues, such as global warming and CO_2 emissions, have raised concerns in society and drawn attention from various parties, including the banking sector. As financial institutions with a central role in economic activities, banks bear the responsibility of ensuring their financial performance remains optimal. Profitability becomes a crucial aspect in evaluating this performance, with Return on Assets (ROA) serving as the primary indicator of asset efficiency in generating profits. According to Bank Indonesia Circular Letter No. 13/24/DPNP dated October 25, 2011, the standard ROA set for banks in Indonesia is a minimum of 1.5% (Bank Indonesia, 2011). Thus, banks are required to optimize

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business strategies and risk management in order to achieve a healthy and sustainable profitability levels.

According to data presented by PT Bursa Efek Indonesia, there are several issues related to banking profitability. To understand the level of ROA (Return on Assets) of banks in Indonesia during 2020–2023, it is illustrated in the following graph:

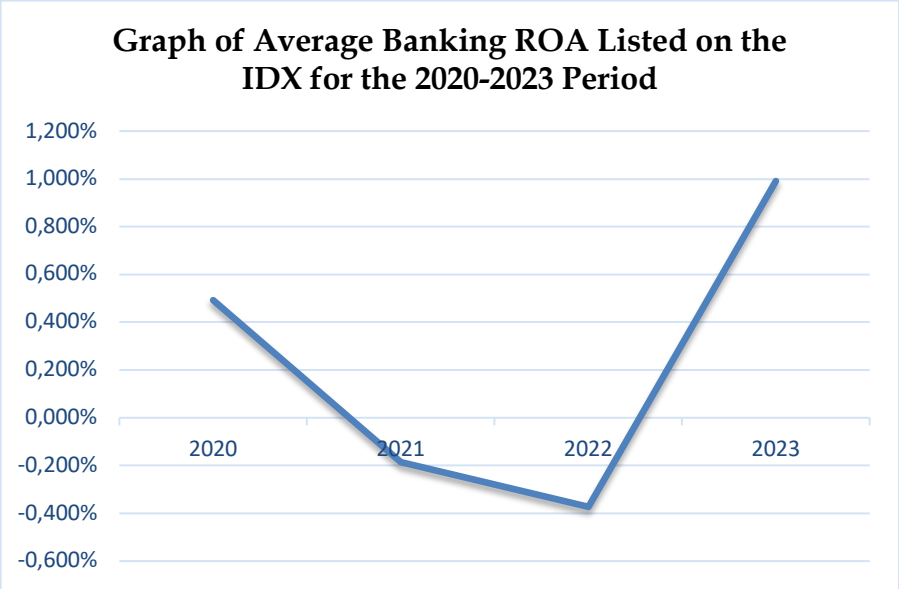

Figure 1. Average Banking ROA
Source: www.idx.co.id/id data processed.

Based on the graph above, it shows that the average ROA (Return on Assets) from 2020 to 2023 in banking companies experienced fluctuated, with ROA values still below the Bank Indonesia (BI) standard of 1.5%. An analysis from 2020 to 2023 reveals that in 2020, ROA was recorded at 0.4% before experiencing a significant decline to reach a negative value in 2021. This decline reflects major challenge in the bank profitability. Although there was a slight recovery in 2022, the ROA value still showed a low figure. In 2023, a significant jump was marked with ROA reaching around 1.2%. This indicates a considerable improvement in the banking sector's ROA, but it is still below the BI standard of 1.5%.

From this, it can be concluded that the increase in ROA indicates improved profitability, while the decrease in ROA reflects performance challenges faced by banks, which may be influenced by operational factors and market conditions. Bank profitability is critical to its operational sustainability and serves as an indicator of financial health. In general, bank profitability is influenced by two main factors: financial performance and environmental performance. The combination of these two factors largely determines the bank's ability to achieve the expected profitability standard or exceed BI's regulatory standard of 1.5%.

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Achieving profit is something all parties aim for. One of the ways banks can enhance profitability through environmental performance is by implementing the concept of green banking through social and environmental responsibility. Green banking is a long-term business strategy aimed at sustainable environmental preservation and improving bank profitability. Fundamentally, the concept of green banking goes beyond merely conducting "Go Green" activities. According to the World Bank, green banking is a financial institution that prioritizes sustainability in its business practices, where banks that implementing the green banking concept will produce corporate output, competitive advantage, good corporate identity, and a strong brand image in achieving the set corporate targets (Diah et al. 2019). Green banking focuses on eco-friendly investments and projects addressing sustainability.

Regulations related to sustainability are strengthened by PJOK Number 51/PJOK.03/2017, which encourages Financial Services Institutions to support sustainable development and establish a contributive and inclusive financial services system in provision funding for sustainable development (Peraturan Otoritas Jasa Keuangan, 2017). One of the important provisions in this regulation is the obligation for banks in Indonesia to prepare sustainability reports as a form of accountability for their performance in economic, social and environmental aspects. Attention to social and environmental concerns is a critical factor in attracting customers and investors, which in turn can enhance the company's profitability.

In Ratnasari et al. (2021) research there are four dimensions used to green banking practices: green banking practices related to employees, green banking daily operations, customer dimensions in green banking practices, and bank policies on green banking. This research only uses the dimension of green policy to represent eco-friendly banking practices which will later influence profitability. This dimension is analogous to banking awareness of the environment through the implementation of Corporate Social Responsibility (CSR). The results of studies by Ratnasari et al. (2021) and Utama et al. (2024) concluded a negative influence between CSR and ROA. Conversely, studies by Putri et al. (2022) and Rachman & Saudi (2021) indicate different findings, showing that CSR has a positive effect on ROA. However, studies by Asfahaliza & Anggraeni (2022), Siahaan et al. (2021), Diah et al. (2019), Friyanto & Yosar (2024), Kweeswara & Irawan (2023), and Yaqin et al. (2023) suggest that there is no effect of CSR on ROA.

Financial performance is the second factor influencing profitability. The RGEC method (Risk Profile, Good Corporate Governance, Earning, and Capital), introduced by Bank Indonesia on bank health, provides a comprehensive assessment of bank stability by using capital adequacy measured through the Capital Adequacy Ratio (CAR), non-performing loans (NPL), bank operational efficiency measured through the Operating Expenses to Operating Income (BOPO) ratio, and liquidity measured through the Loan to Deposit Ratio (LDR) as proxy indicators affecting profitability. Banks with good financial performance are predicted to achieve optimal profitability.

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Inconsistent results have been found in previous studies on the relationship between CAR, NPL, BOPO, and LDR ratios to ROA. Specifically, studies by Abbas et al. (2019), Dewi & Nusantara (2024), Friyanto & Yosar (2024), Putri et al. (2022), Ratnasari et al. (2021), and Utama et al. (2024) found that CAR positively impacts ROA, while the study by Yaqin et al. (2023) found a negative effect of CAR on ROA. Conversely, studies by Siahaan et al. (2021), Diah et al. (2019), Hasanah & Hariyono (2022), Kweeswara & Irawan (2023), Walzer et al. (2024), Widyastuti & Aini (2021), and Pedro & Yunanto (2018) stated that there is no effect of CAR on ROA. It is important to note that these findings are subject to interpretation and may not apply in all cases. Research conducted by Abbas et al. (2019), Putri et al. (2022), Utama et al. (2024), Widyastuti & Aini (2021), and Leviani & Wiyono (2023) found that NPL has a negative effect on ROA, while research conducted by Friyanto & Yosar (2024) and Pedro & Yunanto (2018) found that NPL has a positive effect on ROA. Meanwhile, research by Siahaan et al. (2021), Diah et al. (2019), Hasanah & Hariyono (2022), Kweeswara & Irawan (2023), Pasaribu & Riyadi (2022), Ratnasari et al. (2021) and Walzer et al. (2024) found that there is no influence between NPL and ROA. Research by Hasan et al. (2020), Leviani & Wiyono (2023), Soares & Yunanto (2018), Walzer et al. (2024), Pasaribu & Riyadi (2022), and Ratnasari et al. (2021) found a negative influence between BOPO on ROA. While research by Hasanah & Hariyono (2022) and Friyanto & Yosar (2024) stated a positive effect of BOPO on ROA. On the other hand, Friyanto & Yosar (2024), Ratnasari et al. (2021), Utama et al. (2024), and Walzer et al. (2024) found that LDR positively affects ROA, whereas Abbas et al. (2019), Putri et al. (2022), and Soares & Yunanto (2018) stated that LDR negatively affects ROA. Conversely, Widyastuti & Aini (2021), Pasaribu & Riyadi (2022), Diah et al. (2019), and Siahaan et al. (2021) found that LDR has no impact on ROA.

In Rehman et al. (2021) research, analysts and investors will have a better understanding of the adoption of sustainable green banking practices and how these practices affect bank performance in general. This research can be used to assess the adoption of green banking practices and financial performance in the future. It also aims to complement previous research due to inconsistency between green banking and financial performance on profitability, while helping banks in Indonesia to encourage and promote green banking to the public, customers, companies, and other stakeholders.

LITERATURE RIVIEW

Signaling Theory

Signaling Theory was first proposed by Michael Spence in 1973. Spence (1973) stated that by providing a signal, the information owner attempts to deliver information that can be utilized by the information receiver (Bergh et al., 2014). Signal theory explains the interaction between company management as a signal giver and investors as the signal receivers. Improved bank performance is considered a positive signal, reflecting the good condition of the company, while a decrease in performance

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is interpreted as a negative signal. In this context, the measurement of asset productivity in generating profits (profitability) become crucial to assessing bank performance

The implications of signaling theory in banking are used to attract investors to invest or to assist customers in considering the use of services offered by the bank and the benefits they will receive in the future. The signaling theory states that higher profitability provides a positive signal about the company's growth, thereby increasing the company's stock value.

It can be concluded that profitability levels influence signaling theory, this indicates that high profitability provides information to investors and creditors that the company has good long-term prospects and stable performance. Therefore, strong profitability is considered to enhance the company's value through prudent investment decisions, reflecting sustainable growth potential (Hasanah & Hariyono, 2022).

Profitability

Profitability is the ability of an investment to generate returns from its use. The profitability ratio serves as an evaluation tool that supports managerial decision-making and strategy. Therefore, various studies have analyzed the effect of profitability ratios on various variables, given their crucial role in corporate sustainability, growth, market capitalization, and other factors. This research highlights the Return on Assets (ROA) ratio as a key indicator of (Kadioglu et al. 2017)

Green Banking on Profitability

Green banking is a banking concept that contributes to the environmental sustainability of a country. Conventional banks can transform into green banks by adjusting their core operations to support environmental sustainability (Mozib Lalon, 2015). Green banking has become a global focus as a key to achieving environmental sustainability. This practice integrates the principles of sustainability as well as environmental and social responsibility in banking operations. Through green banking policies, banks take strategic steps to minimize negative environmental impacts by adopting CSR principles in every operational and investment activities (Kweeswara & Irawan, 2023).

In signaling theory, the implementation of CSR programs in the form of sustainable and eco-friendly practices acts as a signal of the bank's commitment to social and environmental issues. CSR implementation can have a positive impact on bank profits. Companies that disclose CSR can enhance their reputation and thus encourage increased revenue. Moreover, CSR practices focused on sustainability and social care can reduce operational risks and improve long-term cost efficiency. Hence, banks that consistently implement CSR have the potential to experience increased profitability. This is supported by Putri et al. (2022) and Rachman & Saudi (2021) which explains that CSR positively impact profitability. Thus, the first hypothesis in this study is:

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H1: Green Baking policy has a positive effect on profitability

Financial Performance to Profitability

Signaling Theory provides important information for investors to assess and decide on stock investment in a company. Financial performance is one of the indicators that can be evaluated through various aspects, such as capital adequacy, non-performing loans, operational efficiency, and bank liquidity. This financial performance reflects the effective and efficient management of resources within a specific period and demonstrates the extent to which the company achieves its financial goals.

Capital adequacy reflects the bank's ability to bear risks related to its assets, measured by the CAR ratio Siahaan et al. (2021). According to signaling theory, a high CAR gives a positive signal to investors and customers about the bank's stability and resilience to potential losses. Higher capital adequacy indicates that the bank has sufficient capital. A bank with better capital adequacy can more freely carry out business activities, both from investment activities and credit provision, thus giving a positive signal to investors or other parties, ultimately increasing bank profitability. This is supported by previous studies conducted by Abbas et al. (2019), Dewi & Nusantara (2024), Friyanto & Yosar (2024), Putri et al. (2022), and Ratnasari et al. (2021) which states that CAR has a positive effect on profitability. Thus fore, the second hypothesis in this study is:

H2: Capital adequacy has a positive effect on profitability

Non-performing loans (NPL) represent the total of substandard, doubtful, and bad loans to total loans disbursed. In this study, it is measured by the NPL ratio (Diah et al. 2019). According to signal theory, high NPLs send negative signal to stakeholders regarding the quality of the bank's credit portfolio. This indicates high risk and reduced income due to loan repayment disruptions. The higher the NPL ratio, the higher the level of bad debts, which will erode bank profitability. This theory aligns with previous studies conducted by Leviani & Wiyono (2023), Widyastuti & Aini (2021), and Abbas et al. (2019) whose results indicate that NPL negatively affects profitability. Thus, the third hypothesis in this study is:

H3: Non-performing loans negatively affect profitability

Bank operational efficiency reflects the ability of banks to minimize operational costs to achieve profitability (Walzer et al. 2024). In this study, operational efficiency is measured by the BOPO ratio. Signaling theory states that BOPO levels can be considered an indicator of a bank’s operational efficiency. High BOPO levels indicate inefficiencies in banking operations, affecting profitability and reducing trust from investors and customers. This will negatively impact bank profitability. Research by Hasan et al. (2020), Ratnasari et al. (2021), Kweeswara & Irawan (2023), and Walzer et al. (2024) supports the notion that BOPO negatively impacts profitability. Thus, the fourth hypothesis in this study is:

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H4: Bank operational efficiency negatively affects profitability

Bank liquidity is measured by the LDR ratio. High LDR indicates that the bank has more liquid funds ready to be disbursed as loans or investments, potentially increasing profitability (Abbas et al. 2019). Based on signaling theory, a high LDR sends a positive signal to stakeholders, such as investors and customers, indicating the bank's ability to distribute funds effectively. This shows significant funding allocated by the bank to the community in the form of investments or loans. Consequently, the returns received by the bank increase, potentially enhancing profitability. This aligns with research conducted by Ratnasari et al. (2021), Friyanto & Yosar (2024), Utama et al. (2024), and Walzer et al. (2024) which states that LDR has a positive effect on profitability. Thus, the fifth hypothesis in this study is:

H5: Bank liquidity has a positive effect on profitability

METHODS

This research is a quantitative study using secondary data. The secondary data used in this research consists of financial reports of each banking sector company published on the Indonesia Stock Exchange (IDX) for the period of 2020–2023, accessed through the official website www.idx.co.id. The population in this study includes banking sector companies listed on the IDX from 2020 to 2023. This research employs a purposive sampling method, using criteria for companies that have published complete financial reports, including CSR percentage information, net profit, total credit, and other necessary information for the research, while applying the green banking concept. Based on these criteria, the study obtained a sample of 18 banking sector companies listed on the IDX. With a research period of 4 years, there are 72 data points.

The hypotheses in this study are tested using Panel Data Regression Analysis to gain an overall understanding of the relationships between the variables. The formulation is as follows:

$$ROA = \alpha + \beta_1.KGB_1\ it + \beta_2.CAR it + \beta_3.NPL it + \beta_4.BOPO it + \beta_5.LDR it + \varepsilon$$

Description:

Profitability (ROA)	= Net income divided by total assets, multiplied by 100% (Ratnasari et al. 2021).
Green Banking Policy (CSR)	= The amount of disclosed CSR item divided 79 indexes. Total disclosure score (Xij), where 1 = if the item is disclosed and 0 = if the item is not disclosed, divided by the total number of disclosure items (Nj) (Ratnasari et al. 2021).
Capital Adequacy (CAR)	= Bank capital divided by Risk-Weighted Assets (RWA) multiplied by 100% (Siahaan et al. 2021).

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	Noted: Risk Weighted Assets (RWA) are calculated as the sum of Risk-Weighted Assets (RWA) for Credit Risk, Operational Risk, and Market Risk.
Non Perfomance Loan (NPL)	= Total non-performing loans divided by total loans, multiplied by 100% (Diah et al. 2019). Noted: Total non-performing loans include substandard loans, doubtful loans, and bad loans.
Bank Operating Efficiency (BOPO)	= Bank operating expenses divided by operating income, multiplied by 100% (Walzer et al. 2024).
Bank Liquidity (LDR)	= Total loans divided by total third-party funds, multiplied by 100% (Abbas et al. 2019).
i	= Entity for period *i*
t	= Period t
α	= Constanta
β	= Regression Coefficient
ε	= Standard Error

RESULTS AND DISCUSSION

Table 1. Descriptive Statistics

	ROA	CSR	CAR	NPL	BOPO	LDR
Mean	0.016667	0.535278	0.250556	0.026528	0.729444	0.824444
Median	0.010000	0.540000	0.235000	0.030000	0.750000	0.835000
Maximum	0.080000	0.700000	0.580000	0.050000	1.190000	1.450000
Minimum	-0.010000	0.330000	0.110000	0.010000	0.380000	0.470000
Std. Dev.	0.015474	0.079025	0.085972	0.010368	0.158549	0.180772

Source: E-Views processed data, 2025

Based on the table above, it is known that the total sample used in this study is 72. The research data consists of financial reports from banking sector companies listed on the Indonesia Stock Exchange (IDX) during the period from 2020 to 2023. The descriptive statistics processed show that ROA has a minimum value of -0.0100, a maximum value of 0.0800, an average value of 0.0166, and a standard deviation of 0.0154. CSR has a minimum value of 0.3300, a maximum value of 0.7000, an average value of 0.5352, and a standard deviation of 0.0790. CAR has a minimum value of 0.1100, a maximum value of 0.5800, an average value of 0.2505, and a standard deviation of 0.0859. NPL has a minimum value of 0.0100, a maximum value of 0.0500, an average value of 0.0265, and a standard deviation of 0.0103. BOPO has a minimum value of 0.3800, a maximum value of 1.1900, an average value of 0.7294, and a standard deviation of 0.1585. LDR a minimum value of 0.4700, a maximum value of 1.4500, an average value of 0.8244, and a standard deviation of 0.1807

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Table 2. Coefficient of Determination Test Results

R-squared	0.684408	Mean dependent var	0.004245
Adjusted R-squared	0.660500	S.D. dependent var	0.007008
S.E. of regression	0.004084	Sum squared resid	0.001101
F-statistic	28.62619	Durbin-Watson stat	1.776753
Prob(F-statistic)	0.000000		

Source: E-Views processed data, 2025

Based on the table above, it can be seen that the adjusted R Squared value is 0.66 (66%), which means that the proportion of green banking policies, capital adequacy, non-performing loans, bank operational efficiency, and bank liquidity is able to influence the profitability variable by 66%, the remaining 34% is influenced by other variables outside the model. And based on the table above, it can be seen that the probability value is 0.000000 which means f <0.05, meaning that the variables of green banking policies, capital adequacy, non-performing loans, bank operational efficiency, and bank liquidity are able to influence bank profitability.

Table 3. Hypothesis Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Conclusion
C	0.044497	0.011861	3.751562	0.0004	
CSR	-0.012822	0.010745	-1.193228	0.2371	H_0 is accepted and Ha is rejected
CAR	0.085582	0.019389	4.413973	0.0000	H_0 is rejected and Ha is accepted
NPL	0.217112	0.099200	2.188629	0.0322	H_0 is rejected and Ha is accepted
BOPO	-0.067817	0.007438	-9.117526	0.0000	H_0 is rejected and Ha is accepted
LDR	0.001575	0.007340	0.214574	0.8308	H_0 is accepted and Ha is rejected

Source: E-Views processed data, 2025

The above equation can be interpreted as follows: the constant value of 0.044497 indicates that when the variables of green banking policy, capital adequacy, non-performing loans, operational efficiency, and bank liquidity are held constant, the profitability variable is valued at 0.044497.

Effect of Green Banking Policy on Profitability

The research results show that the Green Banking Policy measured by CSR does not affect profitability. This is evidenced by a significance value of 0.2371 > 0.05 and a t-statistic value of -1.193228, which means CSR has a negative value and does not significantly affect ROA. This result does not align with the Signaling Theory concept as suggested by Bergh et al. (2014), which assumes that CSR disclosure indicates a signal that improves the bank's reputation and positive image, thus increasing the number of investors and profits. This finding is consistent with studies by Asfahaliza & Anggraeni (2022), Diah et al. (2019), and Friyanto & Yosar (2024),

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which concluded that green banking policies do not influence ROA. It suggests that disclosing green banking policies through CSR does not enhance profitability. Moreover, sustainability practices in Indonesia have been relatively slow, as the concept's implementation was still voluntary between 2012 and 2017.

Effect of Capital Adequacy on Profitability

The research results demonstrate that capital adequacy measured by CAR significantly affects ROA, with a significance value of 0.0000 < 0.05 and a t-statistic value of 4.413973. This means that CAR has a positive and significant effect on ROA. Resource-Based Theory supports this finding, which states that a company's competitive advantage depends on the quality of its resources. Bank financial statements highlight whether these resources have been well-utilized. CAR, as a banking financial ratio, reflects this utilization. This result is consistent with studies by Ratnasari et al. (2021), Friyanto & Yosar (2024), Utama et al. (2024), Dewi & Nusantara (2024), Abbas et al. (2019), and Putri et al. (2022) which found a positive relationship between CAR and ROA.

The Effect of Non-Performing Loans on Profitability

The research findings indicate that non-performing loans, measured by NPL, significantly and positively affect ROA, with a significance value of 0.0322 < 0.05 and a t-statistic value of 2.188629. Thus, it can be concluded that NPL has a positive and significant effect on ROA, meaning that these results indicate that the third hypothesis is rejected. This is supported by research Friyanto & Yosar (2024) and Pedro & Yunanto (2018) where the results show that NPL has a positive effect on ROA. It implies that a lower NPL value reflects the bank's effectiveness in lending, which subsequently improves the cash flow and profitability.

Effect of Bank Operational Efficiency on Profitability

The findings reveal that bank operational efficiency, measured by BOPO, has a significant and negative impact on ROA, as indicated by a significance value of 0.0000 < 0.05 and a t-statistic value of -9.117526. This suggests that an increase in BOPO leads to a decrease in profitability. Efficient operational cost management enables banks to minimize losses due to inefficiencies. Improved bank performance boosts public trust in the institution, potentially increasing savings and the use of bank services like loans or credit. Higher public contributions to banking products are expected to enhance profitability. Bank Indonesia has set an ideal BOPO ratio below 85%. A BOPO ratio exceeding 85% to nearly 100% categorizes the bank as inefficient in its operations. This finding aligns with studies by Kweeswara & Irawan (2023), Ratnasari et al. (2021), Siahaan et al. 2021), Diah et al. (2019), Leviani & Wiyono (2023), and Hasan et al. (2020).

Effect of Bank Liquidity on Profitability

The research results show that bank liquidity, measured by LDR, does not significantly and positively affect ROA, as evidenced by a significance value of 0.8308

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> 0.05 and a t-statistic value of 0.214574. The lack of effect may be due to the large asset ownership or the shift in bank revenues, which now rely not only on interest income from loans but also on commission-based income. Studies by Diah et al. (2019), Christy Siahaan et al. (2021), Pasaribu & Riyadi (2022), and Widyastuti & Aini (2021) also support these findings, suggesting that LDR does not influence profit growth or ROA. Higher credit risk in lending to third parties correlates with a greater risk of non-performing loans.

CONCLUSION

Based on the results of data analysis and hypothesis testing, the following conclusions can be drawn: green banking policies have not yet had an impact on banking profitability, as the implementation of green banking disclosures in the banking sector only began after the issuance of OJK Regulation No. 51 of 2017 concerning the Implementation of Sustainable finance for Financial Services Institutions, Issuers and Public Companies to clarify the application of sustainable finance in Indonesia, as well as the liquidity variable has no effect on bank profitability. On the other hand, the variables of capital adequacy, non-performing loans, and bank operational efficiency have a significant effect on bank profitability.

SUGGESTION

Future researchers are advised to conduct more comprehensive analysis by including other variables that may influence profitability and extending the analysis period to gain a more accurate picture of the impact of green banking policies on financial performance. It is also recommended that studies explore different types of banks and other geographical contexts to broaden the generalization of the findings.

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