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The Role of Green Credit in Bank Profitability and Stability: A Case Study on Green Banking in Indonesia

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Abstract: Green credits are one of the alternative bank loans to the traditional sector. In addition, this green credit supports sustainability and environmental issues. This paper analyzes the influence of green credits on bank profits and stability in Indonesia. This study analyzed banks in Indonesia that provided green credits. Of 140 banks, only 35 banks disbursed green credits starting in 2019. Our study examined all banks providing green credit from 2019 to 2022 using annual data. The results of the study showed that green credits have a positive effect on profits, but green credits have no effect on bank stability. Small banks benefit from green credits in encouraging profitability. In addition, the profitability and stability of banks in Indonesia are greatly influenced by strong bank fundamentals such as capital and efficiency. This study has important implications in both theoretical and practical aspects. Because green credit supports profitability, the bank must diversify the loans in both the traditional sector as well as new sectors that are related to environmental issues and development sustainability following the theory of loan diversification. For practical implication, the Indonesian Financial Service Authority as a policymaker requires each bank to provide financing related to green credits.

Keywords: green credit; fundamental banks; profitability; bank stability

JEL Classification: E00; F10; G21

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1. Introduction

Global environmental issues arise because ecological inequality has caused an increase in carbon dioxide (CO_2) and the greenhouse effect since the industrial era. The magnitude of the impact of disasters experienced by various countries such as floods, droughts, hurricanes, global warming, and other environmental deprecation and damage has motivated humans to tackle the problem seriously (Georgeson et al. 2017; Xia et al. 2023). The government, businesses, and industries as well as society in general all have a role to play in combating this environmental destruction and building a sustainable environment (Khan et al. 2022; Mengyao 2020; Chen et al. 2022a). Investors are also starting to consider their stake holdings in companies that have a bad image related to the environmental problems they create. Likewise, banking can also indirectly affect the consequences caused by companies that pollute the environment (Wang and Fan 2023).

Green credit is a new issue for the banking industry globally associated with environmental issues and development sustainability (Mirza et al. 2023; Song et al. 2019; Zhou et al. 2024). However, the green credit program requires a lot of money for human resource training at both the managerial and operational levels (Ranning 2022). Banks have to pay this fee because the green credit program is one of the new programs, so the mechanism for implementing green credit has not been widely implemented by developing countries. In addition, this cost is also necessary to prepare adequate technological infrastructure

(Altaira and Leon 2023; Wei and Lin 2023). Banks providing credit must be careful, so the provision of green credit also needs to be carried out carefully. Because green credit is a new object for banks, it is necessary to examine how it affects the profitability of funds and its impact on credit risk, ensuring that the green credit provided does not actually increase credit risk and reduce profitability.

Green credit in Indonesia's banking industry is also a new issue because not all banks have implemented and reported the development of their green credit (Pratiwi et al. 2023; Nugraheni and Muharan 2023). In recent years, Indonesia has tried to implement the concept of green banking as a form of commitment to improve financial practices (OJK 2018). This is marked by the issuance of guidelines for banks through Financial Services Authority Regulation No. 51/POJK.03/2017 concerning the implementation of sustainable finance for financial services institutions, issuers, and public companies. Following 2018, technical guidelines were issued for banks to implement the concept of green banking. Green credit is the provision of credit to individual customers or companies whose activities are oriented toward environmental conservation (He et al. 2019; Yasmin and Akhter 2021). Indeed, there are already several banks that have green credits that exceed the sustainable business loans given in the report.

Banks are profit-oriented businesses, so the green credit program is expected to also provide benefits for banks (Al-Qudah et al. 2023). Many empirical studies have examined the impact of green credit on bank performance, but the results are still mixed. Some studies show that green credit reduces bank profits (Ranning 2022; Jiang and Qian 2022; Wei and Lin 2023; Afifah et al. 2023; Zhou et al. 2024). However, several studies show that green credit increases bank profits (Gao and Guo 2022; Mirza et al. 2023; Song et al. 2019). Several research results show that green credit has a negative effect on credit risk because green credit is a new product for banks to use in support of the government's green economy program (Luo et al. 2021; Al-Qudah et al. 2023; Wei and Lin 2023; An et al. 2023). In contrast, other empirical studies document that green credit increases bank credit risk (Zhou et al. 2021).

In addition to green credit, bank profitability and resilience are also affected by various factors such as credit risk (Hermuningsih et al. 2020; Siddique et al. 2022; Mehzabin et al. 2022), liquidity risk (Siddique et al. 2022; Ajayi and Lawal 2021), operational risks (Dao and Nguyen 2020; Syafi'i and Rusliati 2016), and capital (Siddique et al. 2022; Oyetayo et al. 2019; Sutrisno 2020). Siddique et al. (2022) and Oyetayo et al. (2019) found credit risk had a negative effect on profitability, but other studies found that credit risk had no effect on profitability (Ikpesu and Oke 2022). Dao and Nguyen (2020) and Kinanti and Purwohandoko (2017) found that liquidity risk had a positive effect on profitability, but other empirical studies documented that liquidity risk had no effect on profitability (Mehzabin et al. 2022; Bhattarai 2019). Mehzabin et al. (2022) and Siddique et al. (2022) found CAR positively influences profitability, but Mehzabin et al. (2022) found that CAR negatively affects profitability. Operational risk was found to have a negative impact on profitability in some studies (Dao and Nguyen 2020; Syafi'i and Rusliati 2016), but other empirical studies found that profitability is not associated with operational risk (Bhattarai 2019).

Previous empirical results indicate that the impact of green credit on bank performance still produces different conclusions. Therefore, other empirical results related to the impact of green credit on bank performance are still needed to fill the research gap. The purpose of this study is to analyze the effect of green credit on bank profits and stability. This study makes some contributions to enrich the existing empirical studies. First, research on the effect of green credit on bank performance in Indonesia is still rarely conducted. To the best of our knowledge, this study is a pioneer in analyzing the impact of green credit on banking profits and stability in Indonesia because green credit for banking was only implemented in 2017 through Financial Services Authority Regulation No. 51/POJK.03/2017 concerning the implementation of sustainable finance for financial service institutions, issuers, and public companies. Second, the study of green credit focuses more on its effect on profitability

(Danye 2020; Akhter et al. 2021; Chang 2021) and credit risk (Cui et al. 2018; Danye 2020; Zhou et al. 2020). Accordingly, the novelty of this study is that it tests more deeply the influence of green credit on banking resilience as measured by the Z-score.

2. Theoretical Background and Hypothesis Development

2.1. Green Banking

According to Mumtaz and Smith (2019), green banking or sustainable banking is a banking concept concerned with efforts to strengthen risk management in the context of restoring the natural environment so that the industry is socially responsible and green. United The United Nations Environmental Program (UNEP) states that green banking is a financial activity that can result in improvements in human welfare and social equality as well as a significant reduction in environmental risks and the creation of ecological relationships (Rehman et al. 2021).

Akhter et al. (2021) stated that green banking is a banking effort to apply environmentally friendly principles in all types of banking activities and prioritize its investment in environmentally friendly businesses and projects to reduce environmental impacts. Green banking can be used as a way to calm market competition while helping to preserve the environment because banks cannot live without an adequate environment (Altaira and Leon 2023).

The concept of green banking has affected the banking sector in Indonesia, especially since Bank Indonesia as a central bank requires all banks in Indonesia to implement green banking practices in their business. This supports and responds to Law No. 32 of 2009 concerning Environmental Protection and Management, which requires all economic activities to comply with encouraging environmental sustainability by providing sanctions, both criminal for the perpetrators and the revocation of environmental permits. If the banking sector does not implement this, it has the opportunity to increase legal risks and credit or financing risks and damage bank reputations (Khababa and Jalingo 2023).

Green banking can be done in various ways, such as online banking, internet banking, green checking accounts, green credit or green financing, mobile banking, electronic banking outlets, as well as saving energy use that contributes to environmental sustainability programs (Pratiwi et al. 2023). Through the initiation of green banking, the bank introduces the concept of paperless and information technology-based banking services to existing and prospective customers. In addition, green banking is an effort to promote the role of banks to become a company responsible for achieving sustainable development (Hamzah Nasution et al. 2024).

Green credit is a form of green banking, namely credit given to environmentally friendly companies or projects. Green credit is what a bank offers for environmental protection, energy conservation projects, and reducing environmental pollution, limiting the provision of credit to industries with high pollution (Choudhury et al. 2013; Dang and Dang 2021). In addition, the principle of green credit refers to the process of considering the social environment and environmental sustainability governance (ESG) when making investment decisions in the financial sector, and in the long term, it leads to increased investment in sustainable economic projects (Yasmin and Akhter 2021; Mumtaz and Smith (2019).

In Indonesia, the government supports green banking through the Financial Services Authority Regulation No. 51/POJK.03/2017 concerning the Implementation of Sustainable Finance for Financial Services, Issuers, and Public Companies. To help banks, the Financial Services Authority has set several 12 criteria for companies that are included in the green company group. The twelve criteria include renewable energy, energy efficiency, natural resource management, pollution prevention and control, biodiversity conservation, water and water waste management, environmentally friendly transportation, climate change adaptation, eco-efficient products, other sustainable activities, and financing for micro, small, and medium enterprises (MSMEs) (FSB 2017).

In its implementation, some adjustments are still needed for banks so that green credit can be developed better. To support the distribution of green credit, larger capital is needed than conventional credit (Zhang 2021; Birzhanova and Nurgaliyeva 2023). Green credit is still relatively new, so serious efforts are needed to develop it. Therefore, the cost of green credit will be greater for both product development costs, marketing costs, technology, and maintenance costs (Chen et al. 2022b). The need for funds for green credit purposes is very large, so it will be difficult for small- and medium-sized banks, but large banks will find it easier to implement it (Hossain 2020).

In addition, support from the owner is needed because green credit is a new product that is obviously expensive. Often, owners are reluctant to provide management support to develop new products including green credit because it is considered high-risk (Kapoor et al. 2016).

2.2. Hypothesis

2.2.1. Green Credit, Bank Stability, and Profitability

The provision of green credit by banks to projects or businesses that support environmental sustainability has recently started to become a trend in Indonesia (Nugraheni and Muharan 2023). Entrepreneurs' awareness of the importance of sustainability is driving an increasing demand for green credit. The government also provides incentives to companies that have low long-term risk (Andaiyani et al. 2023). Thus the increasing volume of green credit is expected to be able to increase the profitability of banks. Wei and Lin (2023) found that green credit has a positive effect on bank profitability in China, and Siauwijaya et al. (2023) also found that green credit increases the profitability of banks in Indonesia. One of the bank's goals is to be able to operate smoothly without experiencing disruption, so bank stability is very important (Ferhi 2018). Green credit is expected to receive support from the government, investors, and the public so that it will increase bank stability. Setiawan et al. (2021) indicated the amount of credit affects the bank's security. Thus, the hypothesis is as follows:

H1. *Green credit has a positive effect on bank profitability and stability.*

2.2.2. Bank Size, Bank Stability, and Profitability

The size of the bank is the scale of the business owned by the bank, which can be measured from the total assets. The larger the bank, the more trusted the public is, so it can mobilize customer funds well and can also distribute its credit well. In addition, the larger the bank's assets, the more opportunities it has to form a more diversified asset portfolio, making it possible to increase its profitability and increase bank stability. This is in accordance with studies from Al-Homaidi et al. (2018), Hamza (2017), and Laryea et al. (2016), who found that the size of the bank had a positive effect on profitability. My and Quoc (2022), Habib et al. (2022), and Adusei (2015) found that bank size has a positive effect on bank stability. Therefore, the hypothesis of this study is as follows:

H2. *Bank size has a positive effect on bank profitability and stability.*

2.2.3. Capital, Bank Stability, and Profitability

Capital is very important because bank capital functions as a backup to cover losses experienced by banks. Therefore, the Indonesian Financial Services Authority (OJK) regulates the bank capital measured by a capital adequacy ratio (CAR) at a minimum of 8%, following the Bank for International Settlement (BIS). The large capital leads to more public trusts, and bank capital can be used as a loan. Thus, the larger the bank's capital, the more trusted it will be by customers and can be used to increase the bank's profits and stability. This is in accordance with the empirical studies from Ikpesu and Oke (2022), Mir and Shah (2022), Hosen et al. (2021), and Derbali (2021), which found that bank capital has a positive effect on profitability. Meanwhile, the empirical research from Habib et al. (2022), Vu and

Ngo (2023), and Krisvian and Rokhim (2020) documented that bank capital has a positive effect on bank stability. Therefore, the proposed hypothesis is as follows:

H3. *Capital has a positive effect on bank profitability and stability.*

2.2.4. Operational Risk, Bank Stability, and Profitability

Banks must incur operating costs to earn bank income. The greater the operating cost, the higher the risk of the bank's operations, and it can be said that the bank is less efficient in operating. Thus, high operational risk will lower the profit rate and reduce the stability of the bank. The results show that higher operational risk causes low profitability (Siddique et al. 2022; Derbali 2021; Dao and Nguyen 2020). Meanwhile, the empirical research from Tran et al. (2022), Shahriar et al. (2023), and My and Quoc (2022) indicated a negative link between operational risk and bank stability. Thus, the next hypothesis in this study is as follows:

H4. *Operating risks negatively affect bank profitability and stability.*

2.2.5. Liquidity Risk, Bank Stability, and Profitability

Bank liquidity is the ability of banks to provide funds to meet fund withdrawals and credit commitments to their customers. Bank liquidity is measured by the loan-to-deposit ratio (LDR). A higher LDR suggests that a bank disburses higher loans. Banks with higher loans likely generate high-interest income (Abdelmagid 2020). Many empirical studies show that credit risk has a positive effect on profitability (Siddique et al. 2022; Mehzabin et al. 2022; Bhattarai 2019). Also, some studies suggest that credit risk also affects bank stability (Tran et al. 2022; Saputra et al. 2020). Thus, the next hypothesis of this study is as follows:

H5. *Liquidity risk has a positive effect on bank profitability and stability.*

2.2.6. Credit Risk, Bank Stability, and Profitability

The main source of a bank's income is the interest earned on the credit provided. However, banks encounter high credit risk if credit quality is not good; this may then increase the credit risk (Rahman et al. 2016). This credit risk will be written off so that it will reduce profitability. Accordingly, credit risk has a negative effect on profitability (Ekinci and Poyraz 2019; Saleh and Abu Afifa 2020; Supiyadi and Novita 2023). Other research suggests that credit risk can also reduce bank stability (Kaharuddin and Yusuf 2022; Chai et al. 2022; Saputra et al. 2020). Thus, the hypothesis is as follows:

H6. *Credit risk negatively affects bank profitability and stability.*

3. Research Method

3.1. Population, Sample, and Data

The population in this study is banks operating in Indonesia and registered with the Indonesia Stock Exchange (IDX) that provide green credit, namely those that had a Sustainable Business Credit (SBC) or Sustainable Business Activity Credit (SBAC) program from 2019 to 2022. The SBC/SBAC report was audited and published in the Annual Sustainability Report. Based on the criteria above, 35 banks were selected that reported the SBC/SBAC Report in full from 2019 to 2022, including state-owned banks, regional banks, and private banks. Because there were only 35 banks eligible for inclusion in the sample, all of these banks were be used as research objects.

3.2. Research Variables

In this study, there are two dependent variables, namely profitability (ROA) and bank resilience (Z-score). Our independent variables consist of green credit as the main

variable, bank size, bank capital, operating risk, liquidity risk, and credit liquidity risk. The definition and measurement of each variable are presented in Table 1.

Table 1. Variable and Measurement.

Variable	Code	Measurement	Source
Profitability	ROA	Earning After Tax/Total Assets	(Hosen et al. 2021)
Bank Stability	Z-score	(ROA + Equity/TA)/δ(DEP/TA)	(Cihak and Hesse 2008)
Green Credit	GCR	Green Credit/Total Loan	(Luo et al. 2021)
Bank Size	BSZ	Ln Total Assets	(Huong et al. 2021)
Bank capital	CAR	Equity/Assets-Weighted Risk	(Sutrisno and Widarjono 2024)
Operating risk	CIR	Operating Exp/Operating Income	(Dao and Nguyen 2020)
Liquidity risk	LDR	Total Loan/Third-party Fund	(Siddique et al. 2022)
Credit risk	NPL	Bad Debt/Total Loan	(Widarjono et al. 2023)

3.3. Empirical Method

This study employed panel regression to test the influence of green credit along with some bank-specific variables on profitability and credit risk. The use of panel data regression is because the data used are a combination of cross-section data and time series data. The cross-section data in this study include 35 banks, while the time series data are from 2019 to 2022. Since it uses two dependent variables, namely ROA and Z-score, the regression model of the panel data is as follows:

Model 1

$$ROA_{it} = \emptyset_0 + \emptyset_1 GCR_{it} + \emptyset_2 Lasset_{it} + \emptyset_3 CAR_t + \emptyset_4 CIR_t + \emptyset_3 LDR_t + \emptyset_3 NPL_t + e_{it} \quad (1)$$

Model 2

$$Zsocre_{it} = \sigma_0 + \sigma_1 GCR_{it} + \sigma_2 Lasset_{it} + \sigma_3 CAR_t + \sigma_4 CIR_t + \sigma_5 LDR_t + \sigma_6 NPL_t + e_{it} \quad (2)$$

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 presents an overview of data obtained from 35 banks with annual data for 2019–2022. The descriptive statistics of variables show that the profitability has a maximum value of 4.750% and a minimum of −14.750% with an average of 1.092% and a standard deviation of 2.435. These results indicate that some banks incur losses, but other banks experience large profits. Banks provide green credits, where green credits should be the alternative loans of banks. However, on average, green credits are 20.143%. More interestingly, some banks provide high green credits.

Table 2. Summary Statistics.

Variable	Mean	Std. Dev.	Min	Max
Roa	1.092	2.432	−14.750	4.750
Zscore	105.398	106.693	0.721	505.058
GCR	20.143	14.591	0.293	65.718
Asset	2279.962	4278.141	34.525	19,925.450
CAR	27.871	13.321	9.010	106.410
CIR	89.345	27.432	46.540	287.860
LDR	84.402	24.245	29.670	220.310
NPL	3.447	2.456	0.670	22.270

Table 3 shows the coefficient of correlation among independent variables. Overall, the coefficients of correlation are less than 0.50. The correlation between ROA and CIR is −0.944, but it is a relationship between the dependent and independent variables. The

results suggest that multicollinearity problems do exist, so all explanatory variables can be employed to obtain robust estimators.

Table 3. Correlation matrix.

	ROA	Zscore	GCR	Lasset	CAR	CIR	LDR
ROA	1						
Zscore	0.128	1					
GCR	0.106	−0.205	1				
Lasset	0.327	−0.189	0.017	1			
CAR	−0.094	0.260	0.199	−0.476	1		
CIR	−0.944	−0.141	−0.066	−0.388	0.141	1	
LDR	0.137	−0.084	0.067	−0.068	0.048	0.033	1
NPL	−0.362	−0.200	−0.084	−0.280	0.081	0.473	0.061

4.2. Green Credits and Profitability

Now, we discuss the impact of green credits on profitability. Three methods are widely used for estimating static panel regression, consisting of common effect (CE), fixed effect (FE), and random effect (FE). Also, there are three statistical tests for selecting the best method of static panel regression. First, the F-test selects between CE and FE. Second, the Bruesch–Pagan (BP) test checks between CE and RE. Third, the Hausman test chooses between FE and RE. The estimation findings of the static panel regression are presented in Table 4. Our results do not report the common effect to converse space. The bottom part of Table 4 presents all diagnostic tests. According to the F-test, BP test, and Hausman tests, the fixed effect (FE) is the best model for this static panel regression. Model 1 includes regression without COVID, and model 2 incorporates COVID.

Table 4. Green credit and profitability.

Variable	Model 1		Model 2	
	FE	RE	FE	RE
GC	0.012 **	0.008 *	0.012 **	0.008 **
	(0.035)	(0.078)	(0.021)	(0.045)
Lasset	−0.661 ***	−0.025	−0.638 ***	−0.024
	(0.002)	(0.640)	(0.003)	(0.661)
CAR	0.014 ***	0.007	0.014 ***	0.007
	(0.003)	(0.149)	(0.003)	(0.130)
CIR	−0.083 ***	−0.084 ***	−0.083 ***	−0.084 ***
	(0.000)	(0.000)	(0.000)	(0.000)
LDR	0.026 ***	0.023 ***	0.027 ***	0.023 ***
	(0.000)	(0.000)	(0.000)	(0.000)
NPL	0.000	0.044 *	−0.005	0.041
	(0.989)	(0.083)	(0.859)	(0.114)
COVID	-	-	0.063	0.067
	-	-	(0.459)	(0.485)
Constant	26.591 ***	7.003 ***	25.857 ***	6.937 ***
	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.951	0.922	0.701	0.921
No. of banks	35	35	35	35
No. of observation	140	140	140	140
F	6.92 ***		6.91 ***	
LM	28.96 ***		29.12 ***	
Hausman	103.24 ***		102.65 ***	

The *p*-values are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

The coefficient of green credits (GCR) is positive and statistically significant. This study accepts the first hypothesis. The coefficient of assets is negative and significant, so we reject our second hypothesis. CAR is positive and significant, confirming our third

hypothesis. CIR is negative and significant, supporting the fourth hypothesis. LDR is positive and significant, affirming the fifth hypothesis. NPL is negative but not significant. COVID is positive but not significant.

The green credit as our main independent variable positively affects profitability. These findings show that as green credit increases, profits will increase, while as green credit decreases, profits will also decrease. This finding is in line with previous empirical studies (Gao and Guo 2022; Song et al. 2019; Wei and Lin 2023; Siauwijaya et al. 2023). Two factors cause green credit to have a positive effect on profits. First, green credits are loans given to sectors such as renewable energy, clean energy, and the low-carbon economy. This type of credit is outside the traditional sector, so it can reduce dependence on the traditional sector. This green credit helps banks reduce the concentration of risk in one industry, thereby reducing the risk of bad loans of banks (Luo et al. 2021). Second, currently, the public is concerned about sustainability and environmental issues, so banks can improve their reputation by providing a larger proportion of green credit. An improved reputation will attract more deposits and investment, which will improve profitability (Mirza et al. 2023).

The assets negatively influence profitability. This finding indicates that as the bank size increases, the profit decreases and vice versa; as the bank size decreases, the profit increases. Large banks often face credit mismanagement problems due to a lack of supervision, resulting in increased credit risk and decreased profits. These results support the theory of "too big to fail", and they are consistent with the findings of previous research (Adusei 2015; My and Quoc 2022; Habib et al. 2022). CAR positively influences profitability, indicating that higher capital generates higher profit. Banks with large capital represent the bank's stability and gain the trust of customers. This large capital can then be used by banks to distribute more credit and increase profits. This study confirms previous research from Ikpesu and Oke (2022), Mir and Shah (2022), and Widarjono et al. (2023). The LDR positively affects profitability, which shows that a high LDR leads to higher loans, so it will produce high-interest income. The findings confirm previous research in which LDR had a positive effect on profitability (Siddique et al. 2022; Mehzabin et al. 2022).

4.3. Green Credits and Stability

We now discuss the impact of green credits on stability. The estimation results of the static panel regression are presented in Table 5. The bottom part of Table 5 presents all diagnostic tests. The F-test, BP test, and Hausman tests suggest that the fixed effect (FE) is the best model for this static panel regression.

The coefficient of green credits (GCR) is positive but not statistically significant. This study rejects this first hypothesis. The coefficient of assets is positive but insignificant, so we reject our second hypothesis. CAR is positive and significant, supporting our third hypothesis. CIR is positive and significant, supporting the fourth hypothesis. LDR is negative and significant, rejecting the fifth hypothesis. NPL is positive but not significant. COVID is negative but insignificant.

We begin with the variable green credit as the main variable in this study. The GCR does not affect the bank's stability. CAR positively influences a bank's stability, meaning that a bank with larger capital boosts the bank's stability. Banks with large capital can cover the losses incurred so that bank stability can be maintained. This finding is in line with previous research from Krisvian and Rokhim (2020), Habib et al. (2022), and Vu and Ngo (2023). The CIR negatively influences a bank's stability, indicating that a bank with less efficiency lowers the stability of the bank. A less efficient bank lowers its profitability because the bank must charge higher prices, which finally reduces the bank's stability. This finding confirms previous empirical studies such as those by Tran et al. (2022), Shahriar et al. (2023), and My and Quoc (2022). The LDR negatively affects a bank's stability. This finding suggests that high financing will reduce bank stability. High financing will increase impaired loans, and then bad high loans will reduce bank profits and stability. Evidence shows that non-performing loans (NPL) in Indonesian banking are still high, averaging

3.447 % 3,447%. The results of this study are in line with previous studies on the case of Islamic banks in Indonesia (Widarjono et al. 2022).

Table 5. Green credit and stability.

Variable	Model 1		Model 2	
	FE	RE	FE	RE
GCR	0.172	0.046	0.193	0.067
	(0.516)	(0.862)	(0.467)	(0.801)
Lasset	7.486	3.481	6.191	2.849
	(0.428)	(0.613)	(0.517)	(0.681)
CAR	3.328 ***	3.338 ***	3.309 ***	3.315 ***
	(0.000)	(0.000)	(0.000)	(0.000)
CIR	−0.146 *	−0.165 *	−0.143 *	−0.162 **
	(0.057)	(0.076)	(0.061)	(0.041)
LDR	−0.482 ***	−0.486 **	−0.494 ***	−0.495 ***
	(0.000)	(0.000)	(0.000)	(0.000)
NPL	1.567	1.191	1.822	1.433
	(0.200)	(0.331)	(0.147)	(0.255)
COVID	-	-	−3.624	−3.453
	-	-	(0.356)	(0.384)
Constant	−179.758	−47.242	−137.823	−26.414
	(0.552)	(0.832)	(0.652)	(0.906)
R-squared			0.753	0.017
No. of banks	35	35	35	35
No. of observations	140	140	140	140
F	95.39 ***		95.26 ***	
LM	159.10 ***		159.14 ***	
Hausman	110.61 ***		195.49 ***	

The *p*-values are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.01$.

4.4. Further Analysis

In the next analysis, we divided large and small banks based on their assets. Table 6 presents the results for large banks, while Table 7 shows the results for small banks. Green credits do not affect profits and stability for large banks. In addition, the CIR negatively affects profitability, and LDR positively influences profitability. Asset and CAR have a positive impact on a bank's stability. On the other hand, the results indicate that green credits positively affect profits for small banks, but green credits do not affect stability for small banks. Furthermore, the profitability of the small bank is positively associated with CAR and LDR, but it is negatively related to assets and CIR. A small bank's stability is positively influenced by CAR but negatively affected by LDR.

Table 6. Large Banks.

Variable	Model 1		Model 2	
	ROA	Z-Score	ROA	Z-Score
GCR	−0.015	0.048	−0.015	0.027
	(0.127)	(0.827)	(0.127)	(0.903)
Lasset	−0.528	19.021 *	−0.528	19.039 *
	(0.211)	(0.054)	(0.217)	(0.056)
CAR	0.011	3.826 ***	0.012	3.839 ***
	(0.542)	(0.000)	(0.539)	(0.000)
CIR	−0.078 ***	0.161	−0.076 ***	0.267
	(0.000)	(0.456)	(0.000)	(0.343)
LDR	0.015 **	0.172	0.014 ***	0.134
	(0.022)	(0.239)	(0.047)	(0.406)

Table 6. *Cont.*

Variable	Model 1		Model 2	
	ROA	**Z-Score**	**ROA**	**Z-Score**
NPL	−0.079	0.361	−0.089	−0.198
	(0.482)	(0.888)	(0.461)	(0.943)
COVID	-	-	−0.030	−1.637
	-	-	(0.804)	(0.550)
Constant	24.662 *	−649.334 *	24.598	−652.890 *
	(0.095)	(0.057)	(0.100)	(0.058)
R-squared	0.393	0.266	0.379	0.254
No. of banks	14	14	14	14
No. of observations	56	56	56	56
F	5.12 ***	818.39 ***	4.97 ***	771.99 ***
LM	5.29 ***	49.30 ***	5.36 ***	50.73 ***
Hausman	67.56 ***	45.36 ***	96.57 ***	35.24 ***

The *p*-values are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 7. Small banks.

Variable	Model 1		Model 2	
	ROA	**Z-Score**	**ROA**	**Z-Score**
GCR	0.016 **	0.254	0.016 **	0.314
	(0.030)	(0.490)	(0.037)	(0.404)
Lasset	−0.672 **	9.885	−0.665 **	8.582
	(0.013)	(0.447)	(0.015)	(0.512)
CAR	0.014 **	3.329 ***	0.014 **	3.290 ***
	(0.017)	(0.000)	(0.018)	(0.000)
CIR	−0.083 ***	−0.155	−0.083 ***	−0.158
	(0.000)	(0.194)	(0.000)	(0.187)
LDR	0.027 ***	−0.560 ***	0.027 ***	−0.571 ***
	(0.000)	(0.001)	(0.000)	(0.001)
NPL	−0.003	1.889	−0.005	2.265
	(0.917)	(0.237)	(0.873)	(0.173)
COVID	-	-	0.031	−5.777
	-	-	(0.819)	(0.381)
Constant	26.058 ***	−250.182	25.840 ***	−209.204
	(0.002)	(0.531)	(0.003)	(0.604)
R-squared	0.826	0.177	0.827	0.172
No. of banks	84	84	84	84
No. of observations	21	21	21	21
F	7.00 **	40.15 ***	6.88 ***	40.02 ***
LM	16.97 **	65.20 ***	16.90 ***	65.25 ***
Hausman	70.51 ***	77.80 ***	74.50 ***	112.30 ***

The *p*-values are presented in parentheses. *** $p < 0.01$ and ** $p < 0.05$.

4.5. Robustness Test

This study conducted a robustness test to check whether the results we produced were consistent. In the first measurement, green credits were measured by the ratio of green credits divided by total financing. For the robustness test, the study measured green credits with the ratio of green credits to total assets. The robustness results are shown in Tables 7 and 8. Based on diagnostic tests, the fixed-effect method is better than the common-effect and random-effect methods.

Table 8 shows that green credits have a positive impact on profits. This result is consistent with the previous findings in Table 4. The impacts of control variables such as Lasset, CAR, CIR, and LRD on profitability are consistent with previous results as well. Table 9 presents the impact of green credits on stability. Green credit is positive but not

significant. These results are consistent with previous findings. The effects of control variables such as CAR, CIR, and LRD are also consistent with previous findings.

Table 8. Green credits and profitability: Ratio of green credits to total assets.

Variable	Model 1		Model 2	
	FE	RE	FE	RE
GCR	0.025 **	0.014 *	0.025 **	0.014 **
	(0.011)	(0.083)	(0.013)	(0.047)
Lasset	−0.609 ***	−0.024	−0.585 ***	−0.022 ***
	(0.004)	(0.663)	(0.006)	(0.685)
CAR	0.016 ***	0.008 *	0.016 ***	0.008 ***
	(0.001)	(0.074)	(0.001)	(0.064)
CIR	−0.083 ***	−0.084 ***	−0.083 ***	−0.084 ***
	(0.000)	(0.000)	(0.000)	(0.000)
LDR	0.025 ***	0.022 ***	0.025 ***	0.023 ***
	(0.000)	(0.000)	(0.000)	(0.000)
NPL	0.001	0.043 *	−0.004	0.040
	(0.971)	(0.091)	(0.887)	(0.126)
COVID	-	-	0.069	0.071
	-	-	(0.417)	(0.452)
Constant	24.913 ***	6.947 ***	24.123 ***	6.877 ***
	(0.000)	(0.000)	(0.000)	(0.000)
R-squared	0.952	0.903	0.952	0.902
No. of banks	35	35	35	35
No. of observations	140	140	140	140
F	7.24 ***		7.23 ***	
LM	29.75 ***		29.97 ***	
Hausman	145.51 ***		145.94 ***	

The *p*-values are presented in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

Table 9. Green credits and stability: Ratio of green credits to total assets.

Variable	FE	RE	FE	RE
GCR	0.457	0.227	0.477	0.250
	(0.317)	(0.615)	(0.298)	(0.581)
Lasset	8.529	3.853	7.267	3.219
	(0.370)	(0.578)	(0.450)	(0.644)
CAR	3.355 ***	3.349 ***	3.339 ***	3.329 ***
	(0.000)	(0.000)	(0.000)	(0.000)
CIR	−0.135 *	−0.158 *	−0.132 *	−0.155 *
	(0.073)	(0.092)	(0.078)	(0.050)
LDR	−0.505 ***	−0.500 ***	−0.518 ***	−0.510 ***
	(0.000)	(0.000)	(0.000)	(0.000)
NPL	1.600	1.221	1.851	1.465
	(0.190)	(0.318)	(0.140)	(0.243)
COVID	-	-	−3.568	−3.490
	-	-	(0.361)	(0.376)
Constant	−214.602	−60.670	−173.530	−39.653
	(0.481)	(0.786)	(0.573)	(0.860)
R-squared	0.752	0.014	0.754	0.014
No. of banks	35	35	35	35
No. of observations	140	140	140	140
F	97.29 ***		97.15 ***	
LM	160.76 ***		160.77 ***	
Hausman	42.87 ***		49.07 ***	

The *p*-values are presented in parentheses. *** $p < 0.01$ and * $p < 0.1$.

5. Conclusions

This study analyzed the influence of green credits on banking profits and stability in Indonesia. The number of banks studied was 35 in the 2019–2022 period. The results of the study document that green credits have a positive effect on profits, while green credits have no impact on bank stability. Control variables show that strong bank fundamentals have a positive effect on bank profits and stability.

The results of this study are expected to be important information in both theoretical and practical aspects. For theoretical implication, since green credit positively affects profits, banks should diversify the loans in many sectors, both the traditional sector and the new sector associated with environmental issues and development sustainability, following the theory of diversification loans. For practical implications, banks and policymakers must support green credits and sustainability and environmental concerns in formulating banking policies. Policymakers should require every bank to provide financing related to green credits. There are two reasons for this. First, not all banks provide green credit volumes. Of a sample of 140 banks, both conventional and sharia, there were only 35 banks that provided green credit financing. Second, green credit financing is also still low, with an average of 20.143%.

Our study has some limitations that involve some consideration. First, although our sample includes all banks that provide green credit in Indonesia, our sample was relatively small, including only 35 banks. Second, our period of study was too short, lasting only 4 years, due to data availability. Accordingly, further study must include a longer period to better capture the impact of green credit on banks' profitability and stability.

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