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Bank Stability in Indonesia's Sustainable Finance Era: Green Finance, ESG Disclosure and Credit Risk

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Abstract

The implementation of sustainable finance through green financing and the disclosure of Environmental, Social, and Governance (ESG) is increasingly seen as a strategy to strengthen bank stability. This study aims to analyze the influence of Green Credit Ratio (GCR) and Bloomberg ESG Score on the stability of banks proxied using Accounting Z-score, by including Non-Performing Loans (NPL) as a credit risk indicator and Firm Size as a control variable. The study uses panel data of nine conventional commercial banks listed on the Indonesia Stock Exchange during the 2020–2024 period. The analysis was conducted using the Fixed Effects Model (FEM) with Panel Estimated Generalized Least Squares (EGLS) and White Cross-section Robust Standard Errors estimates to obtain more reliable inferences. The results showed that ESG disclosure had a positive and significant effect on bank stability, while Green Credit Ratio, Non-Performing Loans, and Firm Size did not show a significant influence. These findings indicate that strengthening sustainability transparency makes a more tangible contribution to bank stability than increasing the volume of green financing which is still in the transition stage of implementation. The novelty of this study lies in the development of an empirical model that integrates the Green Credit Ratio and Bloomberg ESG Score in explaining the stability of banks by considering the role of Non-Performing Loans as an internal risk mechanism and Firm Size as a control variable in the context of sustainable finance implementation in the Indonesian banking industry.

Keywords: Bank Stability, Green Finance, ESG Disclosure, Credit Risk, Z-score.

Introduction

The global paradigm shift towards decarbonization and low-carbon economies has forced the financial industry, particularly the banking sector, to place climate and environmental risks as an integral part of the financial stability framework (Nguyen et al., 2026). Contemporary phenomena suggest that determinants of stability are no longer limited to traditional monetary variables, but have instead been integrated with climate risk management that includes physical risk channels and transition risks (Korzeb et al., 2024). This reorientation forces the global banking sector to align their capital defense structures with the demands of capital markets that are increasingly oriented towards environmental aspects and sustainability ethics in order to maintain long-term financial resilience.

Indonesia, as one of the largest archipelagic countries in the world, faces the urgency of very high ecological financial resilience because it ranks second in the World Risk Index 2024 with a disaster risk score of 41.13 (Ruhr University Bochum, 2024). To mitigate this systemic vulnerability, the Financial Services Authority (OJK) together with Bank Indonesia (BI) are accelerating their commitment to a low-carbon transition through the issuance of mandatory regulations OJK Regulation No. 51/POJK.03/2017 (POJK 51/2017) and the launch of a green macroprudential policy mix (BI, 2025; OJK, 2017). These regulatory measures force the national banking sector to adopt sustainable governance to maintain financial resilience from the threat of ecological risks. In aggregate nominal terms, this implementation appears to have recorded extraordinary success, where the total sustainable finance portfolio of Indonesian banks jumped dramatically from Rp705.15 trillion in 2019 to reach Rp2,047.37 trillion by the end of 2024 (Financial Services Authority, 2025). However, behind the administratively reported positive growth trends, there are deep inconsistencies on the ground that show systemic anomalies in the implementation of sustainable finance in Indonesia (Kartika & Tinia, 2025).

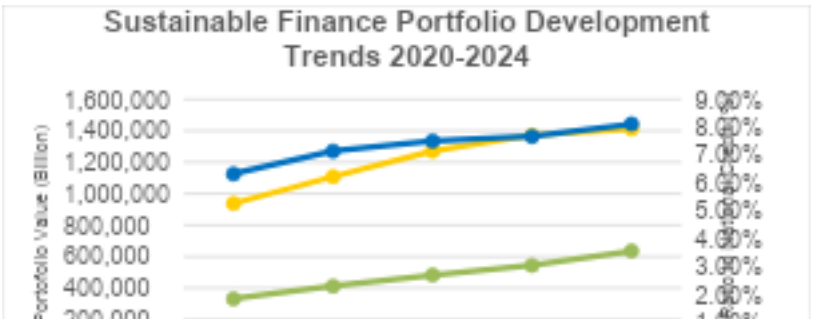


Figure 1. Sustainable Finance Portfolio Development Trends 2020-2024
Source: Financial Services Authority, 2025)

Based on Figure 1, Indonesia's banking sustainable finance portfolio is extremely dominated by conventional financing for the Micro, Small, and Medium Enterprises (MSMEs) segment, which accounts for ranging from 68.97% to 73.88% of the total sustainable portfolio throughout the 2020–2024 period. In contrast, the portfolio actually allocated to purely green projects only ranges from 6.33% to 8.12% of the bank's total national credit. The dominance of green financing from the MSME sector shows the tendency of banks to meet regulatory demands through a symbolic compliance approach, thereby gaining legitimacy from stakeholders (Salsabila & Adhariani, 2023). This strategy is considered more efficient because MSME financing has a simpler due diligence process, relatively fast capital turnover, and more diversified portfolio risks (Sutanto et al., 2025). On the other hand, the expansion of financing for low-carbon projects is still constrained by various structural barriers, so that the proportion of total national credit has not increased significantly and is still at a relatively low level of less than 9%.

Discussions on the influence of sustainable finance implementation on banking stability still produce inconsistent findings. The distribution of green credit is considered to be able to increase banking stability because it can reduce exposure to physical risks and climate transition risks (Sari & Rangkuty, 2025). Furthermore, ESG disclosures are also seen as contributing to strengthening bank stability through reducing information asymmetry, improving corporate reputation, and strengthening investor confidence (Faqera et al., 2026). On the other hand, other research shows that green credit expansion actually weakens short-term stability due to information asymmetry, high operational technology adjustment costs, and low profit margins in the early phases (Sutrisno et al., 2024). In addition, the transition process of banks' green portfolios is also faced with credit risks reflected in the Non-Performing Loans (NPL) ratio, which has the potential to affect banking stability during the implementation of sustainable finance (Sutanto et al., 2025). In addition, bank size is used as a control variable because it reflects the bank's resource capacity and operational ability to absorb transition costs and manage the complexity of climate risks (Sutrisno & Furqan, 2023).

Based on the inconsistency of the empirical results, the study on the influence of sustainable finance implementation on banking stability still leaves a research gap, especially in the context of the Indonesian banking industry. Previous research generally still focuses on testing the influence of green credit and ESG disclosure separately, so it has not been able to comprehensively explain the relationship between these two aspects to banking stability. Due to these conditions, this study aims to develop an integrative model that simultaneously tests the influence of Green Credit Ratio (GCR) and Bloomberg ESG Score on bank stability proxied through Accounting Z-score, taking into account Non-Performing Loans (NPL) as an internal risk factor and Firm Size as a control variable. Based on Legitimacy Theory and Stakeholder Theory, this study is expected to provide empirical evidence on the effectiveness of sustainable finance implementation in strengthening Indonesian banking stability in the post-implementation era of POJK No. 51/POJK.03/2017.

Literature Review

Based on the perspective of Stakeholder Theory, the sustainability of the organization depends on its ability to meet the interests of stakeholders, not solely maximize shareholder value (Freeman, 2010). In the context of banking, such long-term value creation is achieved through active engagement with customers, investors, and regulators. (Rashid et al., 2020). Based on this perspective, the implementation of green finance is a strategy to build reputational capital and increase stakeholder confidence, which ultimately strengthens long-term financial stability.

Legitimacy Theory explains that organizational legitimacy depends on the alignment between the company's activities and societal norms, values, and expectations as a form of social contract (Suchman, 1995). In the context of banking, legitimacy is realized through the implementation of Environmental, Social, and Governance (ESG) practices as a form of responsibility for social and environmental aspects (Moshood et al., 2022). Legitimacy is a dynamic process to maintain a social license to operate through the fulfillment of stakeholder expectations. Thus, ESG implementation

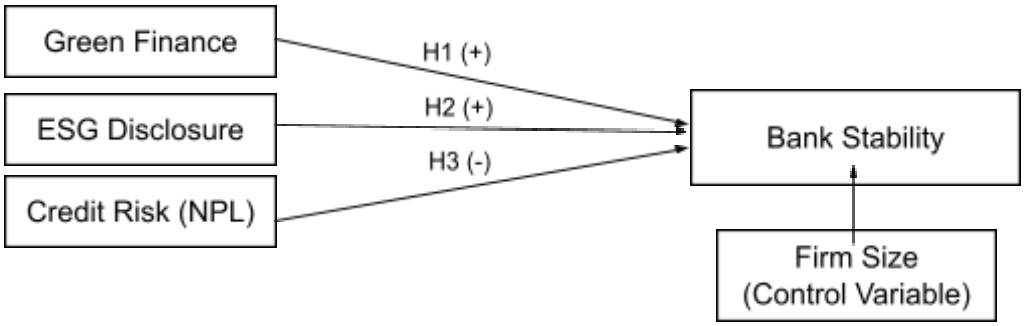
plays a role in strengthening public trust, maintaining access to resources, and supporting banking stability in the long term (Solikhah, 2026).

Banking stability reflects the bank's ability to maintain its intermediation function, meet financial obligations, and absorb various economic shocks and financial risks, including credit risk and transition risk during the implementation of sustainable finance. In empirical research, banking stability is proxied using Accounting Z-score because it is able to measure distance to default through a combination of profitability (ROA), capital adequacy, and profit volatility (World Bank, 2012). The higher the Z-score, the lower the probability of insolvency and the higher the level of banking stability (Jadoon et al., 2021).

Based on Legitimacy Theory, the implementation of green finance is a form of aligning banks with environmental norms and expectations to obtain and maintain legitimacy (Suchman, 1995). This legitimacy increases stakeholder trust (public trust) thereby strengthening access to funding sources, improving asset quality, and strengthening the financial resilience of banks. In this context, the distribution of green financing is expected to be able to reduce exposure to environmental risks and transition risks, thereby supporting profitability stability and strengthening bank stability. The implementation of green finance contributes positively to the stability of the financial system through improving asset quality and reducing risk (Nguyen, 2025). Thus, the higher the implementation of green finance, the higher the stability of the banking proxied using Accounting Z-score (Jadoon et al., 2021).
H1: Green Finance has a positive effect on Banking Stability.

Based on Legitimacy Theory, quality ESG disclosure strengthens public trust, increases reputational capital, and encourages more effective risk management to support banking stability. Strong ESG commitments correlate with reduced probability of default through strengthening governance and risk management (Fakhrunnas et al., 2025). Therefore, the higher the quality of ESG disclosures, the higher the stability of the banking proxied using Accounting Z-score.
H2: ESG disclosures have a positive effect on Banking Stability.

Based on Stakeholder Theory, banks have a responsibility to safeguard the interests of stakeholders through effective risk management. The increase in Non-Performing Loans (NPLs) reflects deteriorating asset quality and banks' failure to carry out their intermediation functions optimally, potentially lowering public trust, increasing reserve costs, and weakening profitability and capital adequacy. This condition ultimately reduces bank resilience and increases the risk of insolvency. Increased credit risk has a negative effect on banking stability because it reduces profit efficiency and increases the risk of bank failure (Salsabilla & Jaya, 2024). Therefore, the higher the NPL ratio, the lower the stability of the banking proxied using Accounting Z-score.
H3: Credit Risk (NPL) has a negative effect on Banking Stability.



Method

This study uses an explanatory quantitative research design to examine the causal relationship between green finance, ESG disclosure, credit risk, and bank stability. Data analysis was carried out using Eviews12 software with panel data to test the hypotheses proposed based on the research framework (Baltagi, 2021).

The population of this study includes all commercial banks listed on the Indonesia Stock Exchange (IDX) (www.idx.co.id) during the 2020–2024 period. The sample was determined using purposive sampling techniques based on certain criteria, namely: (1) banks were consistently listed on the IDX during the study period; (2) publish the complete annual report and sustainability report; (3) have Green Credit and Bloomberg ESG Score data available on an ongoing basis; and (4) excluding Islamic banks and digital banks.

Table 1. Research Sample Selection Process

No	Sample Selection Criteria	Quantity
1	Commercial banks listed on the IDX for the 2020-2024 period	47
2	Does not have complete Green Credit data	(21)
3	It does not have Bloomberg ESG Score data	(16)
4	Islamic banks	(1)
Number of Samples		9
Total Observations (9 banks x 5 years)		45

Based on the selection process, 9 banks were obtained that met all the research criteria. The list of sample banks is presented in table 2.

Table 2. List of Research Sample Banks

No	Code	Bank Name
1	BNGA	PT Bank CIMB Niaga Tbk
2	BBNI	PT Bank Negara Indonesia (Persero) Tbk
3	BBCA	PT Bank Central Asia Tbk
4	BBRI	PT Bank Rakyat Indonesia (Persero) Tbk
5	BDMN	PT Bank Danamon Indonesia Tbk
6	BNII	PT Bank Maybank Indonesia Tbk
7	PNBN	PT Bank Pan Indonesia Tbk
8	BTPN	PT Bank SMBC Indonesia Tbk
9	MEGA	PT Bank Mega Tbk

This study uses one dependent variable, namely banking stability (Z-score). Then three independent variables include green finance, ESG disclosure, and credit risk. As well as one control variable, namely firm size. The definition and measurement of each variable is presented in table 3.

Table 3. Variables and Measurement

Variable	Proxy	Measurement	Source
Bank Stability	Ln Accounting Z-score	$Z - score = \frac{ROA+\left(\frac{Equity}{Total\ Assets}\right)}{\sigma ROA}$	(Jadoon et al., 2021; World Bank, 2012)
Green Finance	Green Credit Ratio	$GCR = \frac{Green\ Credit}{Total\ Credit}$	(Sutrisno et al., 2024)
ESG Disclosure	Bloomberg ESG Score	ESG Score (0-100)	(Irawan & Yunanto, 2024; Pulino et al., 2022)
Credit Risk	Non Performing Loan Gross	$NPL = \frac{Non\ Performing\ Loans}{Total\ Loans}$	(Nguyen, 2025)
Firm Size	Ln Total Assets	$SIZE = ln(Total\ Assets)$	(Azad et al., 2026)

This study uses panel data regression to analyze the influence of Green Finance, ESG Disclosure, Credit Risk, and Firm Size on banking stability. Model estimation is carried out through three

approaches, namely Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Furthermore, the selection of the best model is determined in stages using the Chow Test, Hausman Test, and Lagrange Multiplier Test (Baltagi, 2021).

The panel data regression equation used is formulated as follows:

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

Description:

Y_{it} = Banking Stability in the Bank in the Year it
X_{1it} = Green Finance in banks in the year it
X_{2it} = ESG disclosure of banks in 2010 it
X_{3it} = Credit Risk in the bank in the year it
X_{4it} = Firm Size (control variable) on the bank in the year it
α = Intersep (constant)
β_1, β_2, β_3, β_4 = Regression coefficient
e_{it} = Other factors outside the model

After the best model is determined through model selection testing, parameter estimation is performed using the selected model. If indications of violations of certain classical assumptions are found, parameter estimation is adjusted using a more robust estimation method to produce consistent and efficient coefficient estimation (Wooldridge, 2010).

The researcher conducted a statistical validity test to ensure that the estimation results met the criteria of the Best Linear Unbiased Estimator (BLUE) (Gujarati & Porter, 2009):

Using the Jarque-Bera test to evaluate whether the residual model has a normal distribution (P> 0.05). This test is crucial to ensure the validity of statistical inference and the accuracy of parameter estimation in regression (Baltagi, 2021).

The multicollinearity test was performed using the Correlation Matrix to identify high linear relationships between independent variables. The model is declared free of multicollinearity if the correlation coefficient between independent variables is less than 0.80 (Gujarati & Porter, 2009).

The heteroscedasticity test was performed using the Glejser method to detect whether residual variance is constant in the regression model. The test is carried out by regressing the residual absolute value to an independent variable. The model is declared free of heteroscedasticity if the probability value (p-value) of each variable is greater than 0.05 (Gujarati & Porter, 2009).

It is carried out through the observation of Durbin-Watson (DW) statistical values to detect correlations between residual time series. A good panel regression model should be at an autocorrelation free range to guarantee estimator efficiency (Gujarati & Porter, 2009).

The test was carried out through a statistical test t (partial) to test the significance of the individual influence of each independent variable on banking stability with a P-Value significance criterion of < 0.05. In addition, a statistical test of F (simultaneous) was carried out to test the significance of the influence of independent variables together, as well as the analysis of the determination coefficient (R^2) to measure the apparent power of the model.

Results and Discussion

Table 4. Descriptive Statistic

Variable	Mean	Minimum	Maximum	Std. Dev.
Z-score	3.6727	2.6400	4.6600	0.5645
GCR	0.0969	0.0061	0.3834	0.0820
ESG Score	51.5544	29.8500	66.4800	10.5597
NPL	0.0252	0.0112	0.0430	0.0084
SIZE	19.7533	18.5358	21.4129	0.9409

Source: Data processed, 2026

In table 4 descriptive statistics, it is known that this study uses data from 45 observations (N=45). The bank stability variable has an average of 3.6727 with a standard deviation of 0.5645, indicating a high and homogeneous level of financial resilience among the sample banks. On the other hand, the realization of green credit is relatively low with an average of 0.0969 and shows an asymmetric distribution due to a wide inequality between the minimum value of 0.0061 and the maximum value of 0.3834. The low average GCR indicates the possibility of symbolic compliance by some banks for the administrative fulfillment of POJK 51/2017 without substantive business reorientation. Further, ESG disclosures were at a moderate level with an average of 51.5544, reflecting management's gradual commitment to mitigating information asymmetry for stakeholders. Traditional credit risk management has proven to be very healthy with an average NPL of 0.0252 (2.52%) which is well below the maximum limit of regulatory supervision (5.00%), confirming the bank's compliance with prudential banking principles. Finally, the company size variable recorded an average of 19.7533, proving that the adoption of sustainable finance in Indonesia is currently still dominated by large-scale banks that have infrastructure readiness and capital capacity flexibility in absorbing energy transition costs.

Based on table 5, the probability value of cross-section F and cross-section Chi-square is 0.0000 (< 0.05), so that the Fixed Effects Model (FEM) is chosen as a more suitable model than the Common Effects Model (CEM). These results show significant individual effects (bank-specific effects) on each bank.

Table 5. Chow Test Results

Effect Test	Statistic	d.f.	Prob.
Cross-section F	189.280618	(8,32)	0.0000
Cross-section Chi-square	174.503194	8	0.0000

Source: Data processed, 2026

Based on table 6, the probability value of the Hausman Test is 0.0394 (< 0.05), so the Fixed Effects Model (FEM) is chosen as the most suitable estimation model compared to the Random Effects Model (REM).

Table 6. Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.061503	4	0.0394

Source: Data processed, 2026

Based on table 7, the probability value of the Breusch-Pagan Lagrange Multiplier (LM) Test at the cross-section dimension is 0.0000 (< 0.05), so the Random Effects Model (REM) is more appropriate than the Common Effects Model (CEM).

Table 7. LM Test Results

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	47.78217	0.170972	47.95314
	(0.0000)	(0.6792)	(0.0000)

Source: Data processed, 2026

Based on figure 3, the results of the normality test show a Jarque-Bera value of 4.521085, with a probability of 0.104294 (> 0.05). Therefore, the residual in this research model is declared to be normally distributed. Based on figure 3, the results of the normality test show a Jarque-Bera value of 4.521085, with a probability of 0.104294 (> 0.05). Therefore, the residual in this research model is declared to be normally distributed.

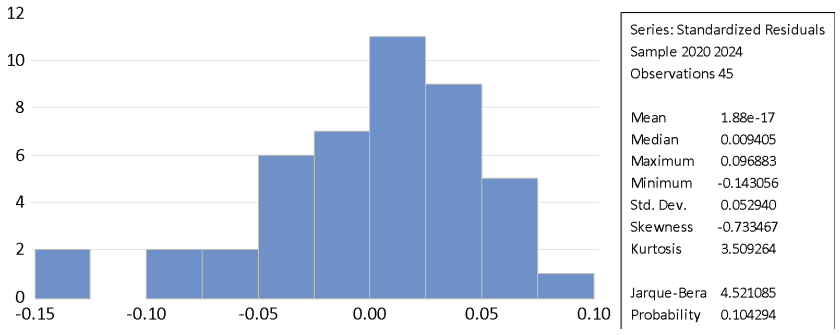


Figure 3. Normality Test Results

Source: Data processed, 2026

Based on table 8, there is no correlation coefficient between independent variables exceeding 0.80, so the model meets the assumption of multicollinearity free and all independent variables are suitable for use in regression analysis.

Table 8. Matrix Correlation

Variabel	GCR	ESG Score	NPL	SIZE
GCR	1.0000	-0.1313	-0.3423	-0.1902
ESG Score	-0.1313	1.0000	0.2073	0.6425
NPL	-0.3423	0.2073	1.0000	0.1382
SIZE	-0.1902	0.6425	0.1382	1.0000

Source: Data processed, 2026

Based on table 9, all independent variables have a probability value above 0.05, so that the regression model does not experience symptoms of heteroscedasticity. Thus, the homoskedasticity assumption is fulfilled and the model is feasible to use for hypothesis testing.

Table 9. Heteroscedasticity Test Results (Glejser Test)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.7536	1.6066	-0.4691	0.6422
GCR	-0.1360	0.1858	-0.7321	0.4694
ESG Score	0.0002	0.0017	0.1583	0.8752
NPL	1.0405	1.2962	0.8027	0.4281
SIZE	0.0388	0.0830	0.4675	0.6433

Source: Data processed, 2026

Based on table 10, the Durbin-Watson statistical value of 1.5378 is in the range $d_L(1,3357) < d(1,5378) < d_U(1,7200)$, so the test results are in the inconclusive region. So that the results of the autocorrelation test cannot be concluded conclusively whether or not there is autocorrelation. Because the results of the autocorrelation test were in an inconclusive area, parameter estimation and hypothesis testing were carried out using the Panel Estimated Generalized Least Squares (EGLS) method with a cross-section weights approach and adjustment of the covariance matrix through the White period (cross-section cluster) robust standard errors & covariance (Wooldridge, 2010).

Table 10. Autocorrelation Test Results (Durbin-Watson)

Model	Durbin-Watson Stat.	dL Value	dU Value	Conclusion
Fixed Effects Model (FEM)	1.5378	1.3357	1.7200	Inconclusive

Source: Data processed, 2026

The results of the Panel Estimated Generalized Least Squares (EGLS) model estimation with the Cross-section Weights and White period (cross-section cluster) approach robust standard errors & covariance were used as the basis for hypothesis testing. The results of the model estimation are presented in the following table.

Table 11. EGLS Panel Regression Estimation Results (Cross-section weights)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.0182	3.3518	0.6021	0.5638
GCR	-0.0859	0.3313	-0.2594	0.8019
ESG Score	0.0070	0.0018	3.9632	0.0042
NPL	-2.6521	2.8156	-0.9419	0.3738
SIZE	0.0693	0.1658	0.4180	0.6870
Diagnostic Statistics				
R-squared	0.9946	Durbin-Watson Stat.	1.6351	
Adj. R-squared	0.9925	F-statistic	487.9996	
Prob(F-statistic)	0.0000			

Source: Data processed, 2026

Based on the results of the robust Partial Test (t-test) in table 11, the hypothesis testing of this study is explained as follows:

The GCR coefficient is negative but statistically insignificant (β = −0.0859; p = 0.8019). Therefore, this study does not find statistically significant evidence of an association between GCR and the log-transformed bank stability measure, and H1 is not supported. This finding is in line with previous research that proves that the portion of banks' green credit in Indonesia has not had a real impact on financial stability in the short term (Sutrisno et al., 2024).

This condition reflects that the national banking industry is still in a structural transition phase (Sutanto et al., 2025). There are structural challenges where the green portfolio of national banking is still dominated by symbolic compliance in the MSME segment, coupled with the high investment costs of the clean energy technology transition that weigh on banks' profitability at the beginning of the adjustment cycle (Sutrisno & Furqan, 2023). These initial investments act as a capital burden that depresses the bank's short-term profitability before energy efficiency and climate transition risk mitigation can result in substantive economic returns (Xia, 2026).

The ESG Score variable has a significance value (p-value) of 0.0042 (< 0.05), with a positive regression coefficient of 0.0070 and a t-statistical value of 3.9632. This proves that ESG disclosure has a positive and significant effect on banking stability, so that H2 accepted. These empirical results support Legitimacy Theory and Stakeholder Theory, which affirm that high-quality ESG information disclosure is able to build a strong reputation (reputational capital), reduce information asymmetry in the market, and strengthen investor and customer trust which in turn stabilizes the bank's funding structure (Djasuli et al., 2025). These findings reinforce previous research that has stated that the integration of ESG disclosures in the banking system acts as an anchor of long-term stability, as well as in line with global empirical evidence that social-governance embedding significantly reduces banking risk default (Djasuli et al., 2025; Kazyte & Sapkauskiene, 2025).

The NPL coefficient is negative, consistent with the hypothesized direction, but statistically insignificant (β = −2.6521; p = 0.3738). Thus, the study does not find statistically significant evidence of an association between NPL and bank stability, and H3 is not supported. These findings are not in line with previous research that stated that higher credit risk tends to weaken bank stability because it reduces banks' ability to generate profits efficiently while increasing the risk of bankruptcy (Salsabilla & Jaya, 2024).

The very high average capital adequacy rate of Indonesian banks, which is above 20%, has proven to be very effective in absorbing the shock of credit risk default internally before it is able to erode the bank's core capital (Sari et al., 2025). Credit risk (NPL) in Indonesia within safe limits as well as strict prudential regulations and thick capital cushions are no longer the main determinants that directly shake the systemic stability of banking (Kurniawan et al., 2025).

Firm Size has a positive but statistically insignificant coefficient (β = 0.0693; p = 0.6870). Accordingly, the study does not find statistically significant evidence that changes in firm size within the same bank over time are associated with bank stability during the observation period. This finding may indicate that bank stability is more closely related to other internal characteristics, such as governance quality, operational efficiency, and risk-management capacity (Handriani, 2025). However, these possible explanations were not directly tested in the present model.

Simultaneous testing through the F-statistic test, based on table 11 yielded a value of 487.9996 with a significance value Prob(F-statistic) of 0.0000 (<0.05). Although these simultaneous results are mathematically significant, empirical facts in the field prove the existence of anomalous conditions in which these simultaneous relationships are dominated and driven entirely by a single variable, namely ESG (X2) disclosures. The ininfluence of the variables Green Finance (X1), Credit Risk (X3), and Company Size (X4) partially makes it clear that the high explanatory power of this model rests solely on the contribution of the bank's sustainability disclosure.

To further assess the explanatory power of the fixed-effects specification, two models were estimated using the same 45 observations. The first model includes only bank-specific fixed effects (FE-only benchmark), while the second model additionally incorporates Green Credit Ratio (GCR), ESG Score,

Non-Performing Loans (NPL), and Firm Size (Full FE model) (Baltagi, 2021). The results are presented in table 12.

Table 12. Fixed-Effects Model Explanatory Power Decomposition

Measure	FE-Only Benchmark	Full FE Specification
Overall R-squared	0.986211	0.991204
Adj. R-squared	0.983146	0.987905
Within R-squared	-	0.362109
Between R-squared	-	0.344564
Incremental R-squared	-	0.004993

Source: Data processed, 2026

The FE-only benchmark reports an R-squared of 0.986211 and an adjusted R-squared of 0.983146, indicating that bank-specific fixed effects account for a substantial portion of the model fit. After the four explanatory variables were added, the R-squared increased to 0.991204 and the adjusted R-squared to 0.987905. Thus, the addition of GCR, ESG Score, NPL, and Firm Size increased the R-squared by only 0.004993, equivalent to 0.4993 percentage points. This indicates that the high explanatory power of the full fixed-effects model is largely associated with bank-specific fixed effects, while the four explanatory variables provide only a relatively small additional contribution to the model's explanatory power.

The within R-squared of 0.362109 indicates that GCR, ESG Score, NPL, and Firm Size jointly explain 36.21% of the variation in bank stability within the same bank over time. Meanwhile, the between R-squared of 0.344564 indicates that the model explains 34.46% of the variation in average bank stability across the sampled banks. Overall, these results show that the explanatory power of the fixed-effects model should not be attributed solely to the four principal explanatory variables, as a substantial proportion of the model fit is captured by bank-specific fixed effects.

Conclusion

This study concludes that Environmental, Social, and Governance (ESG) disclosure is the only variable that has a positive and significant effect on bank stability in Indonesia during the 2020–2024 period. These findings show that improving the quality of sustainability transparency can strengthen stakeholder trust and support banks' resilience in facing risk dynamics in the transition era to sustainable finance. In contrast, Green Credit Ratio (GCR) and Non-Performing Loans (NPLs) have not shown a significant influence on bank stability. These results indicate that the implementation of green financing in Indonesia is still in the transition stage so that its benefits to bank stability have not been fully internalized. In addition, Firm Size as a control variable also did not show a significant influence on bank stability.

Theoretically, these findings strengthen Legitimacy Theory and Stakeholder Theory which place sustainability transparency as an important mechanism in building organizational legitimacy and increasing stakeholder trust. From a practical point of view, the results of this study indicate that the Financial Services Authority not only needs to encourage an increase in the volume of green financing, but also strengthen the quality of ESG implementation and disclosure through risk-based supervision. For bank management, the integration of ESG principles into governance, risk management, and business strategies is important to increase the credibility of sustainable finance implementation while strengthening the bank's long-term stability.

This research has several limitations. First, the number of samples is still limited to nine conventional commercial banks listed on the Indonesia Stock Exchange during the 2020–2024 period, so the results of the study cannot be generalized to the entire banking industry in Indonesia. Second, bank stability is only proxied using Accounting Z-score which is accounting-based so that it is not able to represent market risk perception directly. Third, this study has not considered the heterogeneity of bank characteristics, such as differences in ownership and type of bank, which have the potential to produce different responses to the implementation of sustainable finance.

Based on these limitations, the next study is recommended to expand the scope of the sample by involving Sharia Commercial Banks, Regional Development Banks, and bank groups based on ownership structure, as well as extend the observation period to be able to capture the dynamics of sustainable finance implementation in the long term (Sutanto et al., 2025). In addition, future research

can combine accounting-based stability indicators with market-based measures, such as Distance to Default or other market risk indicators, to provide a more comprehensive picture of banks' resilience in the face of risks transitioning to a sustainable economy (Kazyte & Sapkauskiene, 2025).

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