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ESG performance and bank stability: the moderating role of board characteristics

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Abstract

The study examines the effect of ESG performance on bank stability and tests whether the relationship is moderated by board independence and board gender diversity. This study uses a quantitative method with panel data on a sample of 39 commercial banks listed on the Indonesia Stock Exchange in the period 2020-2024 with 195 observations of firms and years. Data were collected from annual reports and sustainability reports. The hypotheses were tested by panel regression analysis with board characteristics as moderating variables. The results reveal that ESG performance has a positive and significant impact on bank stability. Board independence has a positive direct effect on bank stability while board gender diversity has no significant direct effect. Nevertheless, both board independence and board gender diversity significantly strengthen the positive relationship between ESG performance and bank stability. The findings indicate that effective board governance plays a crucial role in enhancing the impact of ESG practices on bank stability. Additionally, this study adds to the literature on sustainable banking and corporate governance by demonstrating how board characteristics can strengthen the effectiveness of ESG implementation in enhancing bank stability.

Keywords: *ESG performance, bank stability, board independence, board gender diversity*

Introduction

The banking sector is an integral part of ensuring sustainable economic development and sustainability of financial stability at national and international levels. Banks, being financial intermediaries, do have an effective control over capital through their lending and investment decisions. They are therefore in a position to promote sustainable business practices. The financial sector has in recent years placed emphasis on the importance of Environmental, Social and Governance (ESG) performance, fuelled by growing awareness of sustainability issues such as social inequality, climate change and corporate governance failures. ESG is important to the decision-making processes of stakeholders, regulators and investors due to its inherent link to risk management, long-term performance and financial stability (Gregory, 2025). The importance of ESG has become increasingly relevant in the banking sector because banks are exposed not only to conventional financial risks but also to environmental, social, and governance-related risks through their lending and investment activities. At the same time, bank stability is critical because disruptions in the banking sector can affect credit provision, depositor confidence, and broader economic stability. Therefore, examining whether ESG performance contributes to bank stability is increasingly important for banks, regulators, investors, and other stakeholders.

A growing number of empirical studies have examined the relationship between ESG performance and corporate outcomes. Most studies report that ESG improves financial performance, firm value, and risk management by enhancing corporate reputation,

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reducing financing costs, and strengthening stakeholder relationships (Kolias & Arnis, 2019; Chau et al., 2025; Salem et al., 2025). However, the empirical evidence remains inconclusive. Some studies find insignificant or even negative effects due to increased compliance costs and differences in institutional environments (Bagh et al., 2024; Wang & Sonenshine, 2025). Similar inconsistencies are observed in banking studies, where the effect of ESG on bank stability varies across countries, regulatory systems, and governance structures.

This mixed result suggests that the effectiveness of ESG may depend on internal corporate governance mechanisms, rather than solely on ESG performance. Board characteristics have attracted increasing attention among the various governance mechanisms as the board of directors plays a central role in determining corporate strategy, monitoring management and overseeing ESG implementation. Wider perspectives, balanced decision making and better risk oversight is achieved by the gender diversity of the board. Better monitoring and lower agency conflict is achieved by the independence of the board. These governance features may enhance or diminish the capacity of ESG initiatives to improve bank stability. However, previous studies have tended to focus more on the direct impact of board characteristics on financial performance rather than on the moderating role of board characteristics in the relationship between ESG and bank stability, especially in the banking sector of emerging economies such as Indonesia.

Although previous studies have extensively examined the relationship between ESG performance and corporate outcomes, several important gaps remain. Most prior research focuses on corporate financial performance or firm value (Faizulayev, 2025; Habib et al., 2025; Batoun & Mahmood, 2026; Milenia & Halim, 2026; Mohammed Abubakr et al., 2026), whereas relatively limited attention has been given to bank stability as a measure of financial resilience. Furthermore, previous studies generally investigate the direct effects of board characteristics rather than their moderating roles in the relationship between ESG performance and bank stability. Considering the unique characteristics of the banking industry, including high regulatory oversight, systemic risk exposure, and the importance of prudent governance, further investigation is warranted. Alnabulsi & Khemiri (2025) provide closely related evidence on ESG, board characteristics, and bank stability. However, the present study extends this line of research by examining board independence and board gender diversity as moderating mechanisms in the ESG–bank stability relationship. In addition, this study focuses on commercial banks listed on the Indonesia Stock Exchange during 2020–2024, providing evidence from an emerging-market banking context.

This study contributes to the literature by highlighting how board characteristics can strengthen the stability benefits of ESG performance. The findings also provide practical implications for bank managers and regulators in strengthening governance and ESG practices to support financial resilience. Accordingly, this study examines whether board gender diversity and board independence strengthen the relationship between ESG performance and bank stability among Indonesian listed banks, contributing to the literature on sustainable banking and corporate governance.

Literature Review

Stakeholder Theory argues that organizations should create value not only for shareholders but also for a broad range of stakeholders, including customers, employees, regulators, investors, and society (Leung et al., 2019; Halim, 2024). In the banking industry, maintaining the interests of these stakeholders is particularly important because banks operate within a highly regulated environment and play a central role in preserving financial stability. ESG practices enhance corporate legitimacy, improve stakeholder trust, strengthen reputation, and reduce various business risks, thereby contributing to long-term organizational sustainability and bank stability.

Agency Theory provides an additional theoretical foundation for explaining the role of corporate governance in ESG implementation. (Jensen & Meckling, 1976) argue that conflicts of interest between managers and shareholders may lead managers to pursue personal objectives that are inconsistent with the long-term interests of the organization. Corporate governance mechanisms are therefore required to reduce agency problems through effective monitoring and oversight. Among these mechanisms, board characteristics play a critical role in supervising management decisions, ensuring accountability, and promoting the effective implementation of sustainability strategies (Gregory, 2025; Kusnadi & Halim, 2026). Consequently, board gender diversity and board independence are expected to strengthen governance quality and improve the effectiveness of ESG initiatives in enhancing bank stability.

Environmental, Social and Governance (ESG) performance and bank stability are gaining increasing attention as financial institutions face mounting pressure to integrate sustainability into their business strategies. The implementation of ESG is expected to make banks more resilient by better risk management, increased transparency, less information asymmetry and greater stakeholder confidence. Banks with better ESG performance are generally perceived to be more effective in managing environmental and social risks, thereby improving financial stability (Cabaleiro-Cerviño & Mendi, 2024). According to stakeholder theory, organizations that effectively address stakeholder interests are more likely to maintain organizational legitimacy and achieve sustainable competitive advantages (Dao & Phan, 2023). In the banking industry, effective ESG practices can also strengthen depositor confidence, improve regulatory compliance, and reduce exposure to ESG-related risks, thereby enhancing banks' ability to absorb unexpected shocks. Previous studies generally document a positive association between ESG performance and bank stability (Sendi et al., 2024; Liaqat et al., 2026; Zheng et al., 2026). Therefore, banks with stronger ESG performance are expected to demonstrate higher bank stability than those with weaker ESG practices.

H1: ESG performance positively affects bank stability.

Board independence is widely recognized as a fundamental corporate governance mechanism that enhances board effectiveness by strengthening monitoring functions and reducing agency conflicts between managers and shareholders. Independent directors provide objective oversight, improve transparency, and help align managerial decisions with the long-term interests of stakeholders (Emma et al., 2024). According to agency theory, greater board independence can limit managerial opportunism and information asymmetry, thereby improving governance quality. This mechanism is particularly important in the banking industry, where excessive risk-taking may undermine financial stability. Independent directors can encourage prudent lending, strengthen internal controls, and improve regulatory compliance, thereby enhancing banks' resilience (Nguyen

& Dang, 2022). Previous studies also suggest that board independence contributes positively to bank performance and risk management (Asare et al., 2022; Alnabulsi & Khemiri, 2025). A greater proportion of independent directors is expected to strengthen governance quality and improve bank stability.
H2: Board independence positively affects bank stability.

Board gender diversity can enhance board effectiveness by bringing diverse perspectives, knowledge, and approaches to decision-making. From a stakeholder theory perspective, female directors may strengthen the board's attention to ethical conduct, stakeholder interests, and sustainability issues (Leung et al., 2019). These broader perspectives can improve monitoring and risk assessment, which are particularly important in the banking sector. (Asare et al., 2022) argue that the contribution of gender diversity is more pronounced when female directors actively participate in strategic decision-making and corporate governance. Similarly, previous studies indicate that gender-diverse boards can improve monitoring effectiveness and encourage a stronger long-term orientation (Elnahass et al., 2023; Ho et al., 2024). Considering the growing importance of diversity in corporate governance, banks with greater gender diversity on their boards are expected to exhibit stronger financial stability.
H3: Board gender diversity positively affects bank stability.

Board independence can strengthen the effectiveness of ESG performance in enhancing bank stability. According to agency theory, independent directors provide objective monitoring and oversight, reducing managerial opportunism and ensuring that ESG initiatives are implemented in accordance with the bank's long-term interests. Independent directors can also enhance accountability and transparency in the implementation of sustainability strategies (Amin et al., 2024; lnabulsi & Khemiri, 2025). Stakeholder theory argues that independent board members encourage greater transparency, accountability, and responsiveness to stakeholder expectations. They help ensure that ESG policies are implemented effectively and integrated into the bank's long-term strategy (Dao & Phan, 2023). Previous empirical studies argue that independent directors improve governance quality and reinforce the positive impact of ESG on organizational outcomes through more effective monitoring and strategic oversight (Karkowska & Acedański, 2020; Alnabulsi & Khemiri, 2025). Therefore, banks with a higher level of board independence are expected to gain stronger stability benefits from their ESG performance than banks with lower board independence.
H4: Board independence positively moderates the relationship between ESG performance and bank stability.

Board gender diversity may strengthen the effectiveness of ESG performance in enhancing bank stability by bringing diverse perspectives and improving board oversight. From an agency theory perspective, gender-diverse boards can enhance monitoring by introducing different viewpoints and reducing managerial opportunism (Najaf et al., 2025). Stakeholder theory explains that female directors are often associated with greater attention to ethical conduct, stakeholder interests, and sustainability, which can support the effective implementation of ESG practices (Owen & Temesvary, 2018). Previous studies generally report that board gender diversity enhances governance quality and strengthens organizational commitment to stability (Hordofa & Ionaşcu, 2025; Aureli et al., 2026). Consequently, board gender diversity is expected to strengthen the positive relationship between ESG performance and bank stability.

H5: Board gender diversity positively moderates the relationship between ESG performance and bank stability.

Based on the theoretical framework and the hypotheses developed, this study constructs a conceptual model to explain the direct effect of ESG performance on bank stability and the moderating roles of board gender diversity and board independence. To minimize potential bias arising from firm characteristics, firm size and loan-to-deposit ratio are included as control variables. Figure 1 presents the conceptual framework of the study.

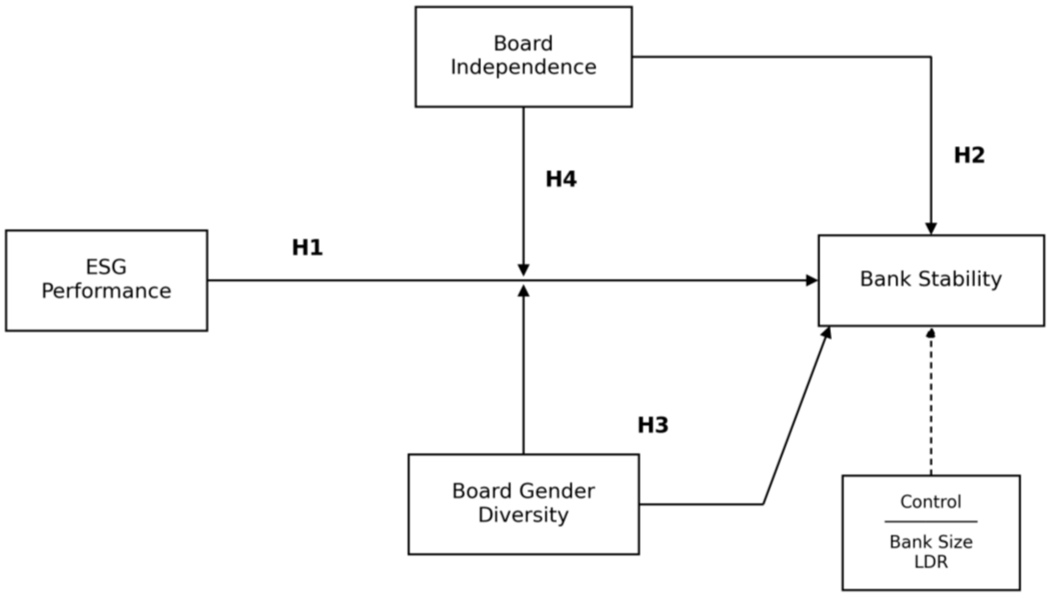

Figure 1. Conceptual Framework

Methods

This study adopts a quantitative research design using panel data to explore the relationship between ESG performance and bank stability, and to investigate the moderating effects of board gender diversity and board independence. The research population is the commercial bank listed on the Indonesia Stock Exchange (IDX) in the period of 2020-2024. The banks are selected by purposive sampling with the following criteria: (1) Banks are listed on the IDX continuously during the observation period; (2) Annual reports and sustainability reports are available to the public; (3) ESG, corporate governance, and financial data are fully disclosed; and (4) Banks with missing observations during the study period are excluded. The financial data was obtained from annual reports and the Indonesia Stock Exchange database, while the ESG data was obtained from sustainability reports and data on ESG disclosures.

Table 1 presents the proposed variable measurements for the study: ESG Performance, Board Characteristics, and Bank Stability.

Table 1. Variable Measurements

Variables	Definition	Formula	Data Source
Bank Stability (Z-Score)	Bank stability is measured using the Z-score, which captures the distance from insolvency.	(ROA + Equity/Total Assets) / SD(ROA)	Financial Statements
ESG Performance (ESG)	ESG performance is measured using an ESG disclosure index based on disclosed ESG items	Total ESG items disclosed / Total ESG items	Sustainability Report (GRI Standards)
Board Gender Diversity (BGD)	Proportion of female directors on the board.	Number of female directors / Total board members	Annual Reports
Board Independence	Proportion of independent commissioners on the board.	Number of independent commissioners / Total commissioners	Annual Reports
Bank Size (SIZE)	Bank size is measured by the natural logarithm of total assets.	ln(Total Assets)	Financial Statements
Loan-to-Deposit Ratio (LDR)	Ratio of loans provided by the bank to third-party funds/deposits.	Total Loans / Total Deposits	Financial Statements

To examine the effect of ESG performance on bank stability and to investigate whether board gender diversity and board independence moderate this relationship, the following panel regression models were estimated.

Model 1: $ZScore_{it} = \beta0 + \beta1\ ESG_{it} + \beta2\ Controls_{it} + \varepsilon_{it}$

Model 2: $ZScore_{it} = \beta0 + \beta1\ ESG_{it} + \beta2\ BI_{it} + \beta3\ Controls_{it} + \varepsilon_{it}$

Model 3: $ZScore_{it} = \beta0 + \beta1\ ESG_{it} + \beta2\ BGD_{it} + \beta3\ Controls_{it} + \varepsilon_{it}$

Model 4: $ZScore_{it} = \beta0 + \beta1\ ESG_{it} + \beta2\ BI_{it} + \beta3\ (ESG \times BI)_{it} + \beta4\ Controls_{it} + \varepsilon_{it}$

Model 5: $ZScore_{it} = \beta0 + \beta1\ ESG_{it} + \beta2\ BGD_{it} + \beta3\ (ESG \times BGD)_{it} + \beta4\ Controls_{it} + \varepsilon_{it}$

The dependent variable in these models is the ZScore, a proxy for bank stability. The ESG disclosure index is an indicator of the evaluation of the ESG performance. Board gender diversity (BGD) is measured by the ratio of female directors on the board. Board independence (BI) is measured by the ratio of independent commissioners on the board. Various control variables were included following prior works in banking to mitigate bias due to omitted variables. The variables include loan-to-deposit ratio (LDR) and bank size (SIZE) measured by the natural logarithm of total assets. Panel data regression is employed to account for unobservable bank-specific effects and both cross-sectional and temporal variations. The appropriate estimation technique is determined using the Chow and Hausman tests. The Chow test determines whether the pooled ordinary least squares (POLS) or fixed effects model (FEM) is more appropriate, while the Hausman test determines whether FEM or the random effects model (REM) is preferred. The test results indicate that the FEM is the appropriate estimation technique for the analysis.

Result and Discussions

Table 2 presents the descriptive statistics for the variables used in this study based on 195 firm-year observations. The results indicate considerable variation in financial stability, ESG performance, governance characteristics, firm size, and lending activities across the sampled banks.

Table 2. Descriptive Statistics

Variables	Obs	Mean	Std Dev	Min	Max
ZSCORE	195	38.2865	23.3932	10.0065	98.9374
ESG	195	0.8991	0.1285	0.4667	1.000
BI	195	0.5812	0.1176	0.3333	1.000
BGD	195	0.2424	0.1225	0.0909	0.7500
SIZE	195	32.3535	2.1979	28.4103	37.3472
LDR	195	0.8244	0.2428	0.0803	1.6081

Source: Stata Results (2026)

The mean Z-score is 38.2865, ranging from 10.0065 to 98.9374, suggesting substantial differences in bank stability. The average ESG score is 0.8991 which indicates the vast majority of banks have a relatively high ESG performance. Board independence (BI) has an average of 58.12 percent and board gender diversity (BGD) has an average of 24.24 percent. This shows the differences in the governance structure in the sampled banks.

Firm size (SIZE) has a mean value of 32.3535 showing differences in the scale of banking operations. The average loan-to-deposit ratio (LDR) is 0.8244 with the range of 0.0803 to 1.6081, indicating heterogeneous lending and liquidity management practices across banks. The descriptive statistics indicate enough variation among the variables to provide a firm base for further regression analysis. These descriptive statistics provide an overview of the variation in ESG performance, bank stability, and board characteristics across the sampled banks, which is relevant for examining the proposed relationships and moderating effects in the regression analysis.

Table 3. Correlations Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) ZSCORE	1.000					
(2) ESG	0.246***	1.000				
(3) BI	0.149**	0.127*	1.000			
(4) BGD	0.094	0.135*	0.063	1.000		
(5) SIZE	0.069	0.063	0.042	0.127*	1.000	
(6) LDR	-0.129*	-0.169**	-0.118*	-0.163**	-0.118*	1.000

Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively
Source: Stata Results (2026)

Table 3 shows the Pearson correlation coefficients between the study variables. The correlation coefficients are generally low, which suggests no major multicollinearity problems. The highest correlation coefficient is ESG and ZSCORE at 0.246 which is far below the commonly accepted threshold of 0.80. ZSCORE is positively and significantly correlated with ESG, with a correlation coefficient of 0.246 that is significant at the 1 percent level. Likewise, ZSCORE is positively and significantly correlated with board independence, with a correlation coefficient of 0.149 that is significant at the 5 percent level. The results suggest that banks with higher levels of ESG performance and a greater proportion of independent directors are more stable. However, loan to deposit ratio has a negative correlation with ZSCORE where the correlation coefficient is statistically significant at 10% level of significance with a value of −0.129. This means that banks can be destabilised by aggressive lending practices.

LDR is negatively correlated with ESG, BI, BGD and SIZE, while ESG is positively correlated with BI and board gender diversity (BGD). The overall lack of evidence of collinearity from the correlation matrix supports the validity of the following regression analysis. These correlation results provide preliminary evidence of the relationships among ESG performance, bank stability, and board characteristics, supporting the subsequent analysis of the proposed relationships and moderating effects.

Table 4. Multicollinearity Test

Variable	VIF	1/VIF
SIZE	1.22	0.8197
BGD	1.16	0.8639
ESG	1.15	0.8696
LDR	1.13	0.8719
BI	1.06	0.9411
Mean VIF	1.15	

Source: Stata Results (2026)

The multicollinearity test results with Variance Inflation Factor (VIF) are shown in Table 4. The results show that all VIF values are from 1.06 to 1.22 with an average VIF of 1.15. These values are much lower than the commonly accepted threshold of 10 and hence multicollinearity is not a problem in this study. Moreover, the tolerance values (1/VIF) are between 0.8197 and 0.9411 which are all more than the least value of 0.10. The results generally show that the independent variables are not highly correlated with each other, which supports the reliability of the regression estimates. These results confirm that multicollinearity is not a concern and provide support for the reliability of the subsequent regression analysis testing the proposed hypotheses.

Table 5 presents the regression results used to test the effects of ESG performance on bank stability and the moderating roles of board independence and board gender diversity. The results provide empirical evidence for evaluating the proposed hypotheses and determining whether board characteristics strengthen the relationship between ESG performance and bank stability.

In all models, LDR is consistently negative and statistically significant, suggesting that bank stability decreases as lending intensity increases. Firm size (SIZE) on the other hand is not statistically significant in any specification. This suggests that bank size does not have any material impact on stability when controlling for ESG and governance variables. Adding interaction terms also help improve the explanatory power of the models, as shown by the increase in R2 from 0.280 in Model 1 to 0.307 in Model 5. This suggests that board characteristics have explanatory power for changes in bank stability in the model.

Model 1 results show that the coefficient of ESG is positive with a value of 0.0250 and statistically significant at the 1% level, supporting H1. This finding suggests that stronger ESG practices are associated with greater bank resilience, consistent with stakeholder theory, which emphasizes that responsible engagement with stakeholders strengthens trust, legitimacy, and long-term sustainability. ESG practices may also improve transparency and accountability, thereby reducing information asymmetry and managerial opportunism and supporting more effective risk management, as suggested by agency theory. The findings are consistent with previous studies demonstrating that ESG enhances bank stability. Prior studies by (Sendi et al., 2024), (Liaqat et al., 2026), and (Zheng et al., 2026) have shown that ESG improves the resilience and risk management of the organization and also leads to the long-term stability of banks. The findings of the study indicate that ESG performance can serve as a strategic mechanism for enhancing bank stability.

Table 5. Regression Analysis

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
ESG	0.0250***	0.0078***	0.0587***	0.0282**	0.0368***
	(0.0039)	(0.00205)	(0.0210)	(0.0120)	(0.00310)
BI		0.219*		0.161**	
		(0.129)		(0.0629)	
BGD			0.230		0.106
			(0.317)		(0.409)
ESG_BI				0.310**	
				(0.131)	
ESG_BGD					0.0076**
					(0.0039)
SIZE	0.0389	0.0323	0.0774	0.0151	0.0823
	(0.0999)	(0.0575)	(0.0857)	(0.0129)	(0.0778)
LDR	-0.0573**	-0.0927***	-0.0792**	-0.0616**	-0.0487**
	(0.0274)	(0.0131)	(0.0309)	(0.0263)	(0.0199)
Constant	5.142***	4.684***	5.232***	3.233***	5.187***
	(0.689)	(0.420)	(0.860)	(0.0983)	(0.891)
Obs.	195	195	195	195	195
R-squared	0.280	0.286	0.246	0.301	0.307

Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively
Source: Stata Results (2026)

Model 2 shows the positive effect of board independence on bank stability with a coefficient of 0.219 which is statistically significant at the ten percent level, supporting H2. This finding suggests that greater board independence is associated with stronger bank stability, as independent directors can enhance monitoring and managerial accountability while reducing agency conflicts. From a stakeholder perspective, independent oversight may also improve transparency and strengthen confidence in the bank. The finding is consistent with previous studies showing that board independence contributes to stronger governance, sustainability practices, and bank resilience (Asare et al., 2022). Likewise, (Alnabulsi & Khemiri, 2025) also found that independent directors promote better sustainability practices and improve the banks' resilience to risk. The results indicate that board independence is a significant governance mechanism that improves the effectiveness of ESG in fostering stability in banks.

Model 3 shows that the coefficient of board gender diversity is positive, with a value of 0.230, indicating that H3 is not supported. This result suggests that female representation on the board alone may not be sufficient to improve bank stability, particularly when its influence on strategic and risk-related decisions is limited. Consistent with agency theory, gender diversity may enhance board oversight through broader perspectives, but its effectiveness depends on the extent to which diverse directors participate in governance and monitoring. From a stakeholder perspective, gender diversity may also support greater attention to sustainability and stakeholder interests without necessarily translating into an immediate improvement in financial stability. The results are in line with earlier studies that showed that bank stability is not always impacted by gender diversity on boards. (Kumar & Sharma, 2026) show that the impact of female representation on the boards influences organizational performance which is a result of corporate and institutional governance. Similar results were also obtained by (Sbai & Ed-Dafali, 2023) where gender diversity in boards improves governance and sustainability measures, however, such improvements do not automatically result in an immediate positive impact on financial performance.

Model 4 shows that the interaction term between ESG and board independence is positive and statistically significant at the five percent level with a coefficient of 0.310, supporting H4. This result indicates that board independence strengthens the positive effect of ESG performance on bank stability. Independent directors can enhance the effectiveness of ESG initiatives through stronger monitoring, oversight, and accountability, allowing ESG practices to contribute more effectively to bank resilience.

This result is consistent with agency theory that independent directors play an important monitoring role in reducing agency conflicts and ensuring that managers effectively implement ESG initiatives. According to stakeholder theory, the presence of independent directors who safeguard the interests of different stakeholders and foster increased accountability strengthens the legitimacy of ESG practices. Bank stakeholders' confidence in the bank has been enhanced, resulting in improved financial stability. The findings are consistent with previous studies. (Karkowska & Acedański, 2020) and (Alnabulsi & Khemiri, 2025) reported that board independence strengthens the effectiveness of ESG implementation through improved governance and monitoring mechanisms. Stronger corporate governance, particularly board independence, reinforces the positive contribution of ESG to financial performance and organizational stability.

Model 5 shows that the interaction term of ESG and board gender diversity is statistically significant and positive with the coefficient of 0.0076 at the five percent level, supporting H5. The finding indicates that the more women are on the board, the more the positive impact of ESG on bank stability is reinforced. According to agency theory, a diverse board brings in different perspectives to board oversight, which improves the effectiveness of monitoring and reduces managerial opportunism. Based on stakeholder theory, gender-diverse boards are more responsive to the interests of different stakeholders and more oriented towards ethical behavior, sustainability and corporate accountability. The findings are consistent with Hordofa & Ionașcu (2025) and Aureli et al. (2026) reported that female directors strengthen sustainability practices and improve governance quality within banks. Board gender diversity enhances board effectiveness, particularly in organizations with strong governance systems. These findings indicate that board gender diversity functions as an important governance mechanism that amplifies the positive impact of ESG on bank stability.

Table 6 reports the robustness test results using σROA as an alternative measure of bank stability. Following Dutta & Saha (2021), σROA is measured as the standard deviation of ROA based on a three-year rolling window. A lower σROA indicates lower volatility in bank profitability and, consequently, greater bank stability. Therefore, a negative relationship with σROA indicates an improvement in bank stability.

Table 6. Robustness Test Results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
ESG	-0.0013**	-0.0020***	-0.0013**	-0.0025***	-0.0019***
	(0.0005)	(0.0006)	(0.0005)	(0.0006)	(0.0006)
BI		0.0006***		-0.0007***	
		(0.0002)		(0.0002)	
BGD			0.0076**		-0.0073
			(0.0039)		(0.0282)
ESG_BI				-0.0070***	
				(0.0020)	
ESG_BGD					-0.0075**
					(0.0031)
SIZE	-0.0074***	-0.0073***	-0.0074***	-0.0010	-0.0071***
	(0.0016)	(0.0016)	(0.0016)	(0.0024)	(0.0016)
LDR	0.0033	0.0045	0.0044	0.0079	0.0073
	(0.0062)	(0.0061)	(0.0069)	(0.0062)	(0.0064)
Constant	0.245***	0.240***	0.248***	0.335***	0.446***
	(0.0502)	(0.0493)	(0.0508)	(0.0682)	(0.167)
Obs.	195	195	195	195	195
R-squared	0.157	0.193	0.158	0.252	0.202

Significance at the 10%, 5%, and 1% levels is indicated by *, **, and ***, respectively
Source: Stata Results (2026)

The results provide further support for the main findings. ESG performance is negatively and significantly associated with σROA across all models, indicating that higher ESG performance is associated with lower volatility in bank profitability and greater bank stability. This finding is consistent with the positive relationship between ESG performance and bank stability reported in the main analysis using the Z-Score measure.

The robustness results also support the moderating effects of board characteristics. The interaction between ESG performance and board independence is negative and statistically significant, indicating that board independence strengthens the ability of ESG performance to reduce profitability volatility and enhance bank stability. Similarly, the interaction between ESG performance and board gender diversity is negative and statistically significant, suggesting that greater board gender diversity strengthens the stabilizing effect of ESG performance by reducing the volatility of bank profitability.

Overall, the results using σROA as an alternative measure of bank stability are consistent with the main findings. Although σROA captures bank stability from the perspective of profitability volatility rather than the direct stability measure represented by the Z-Score, the substantive interpretation of the findings remains unchanged. ESG performance contributes to greater bank stability, while board independence and board gender diversity strengthen this relationship. These results confirm that the main findings are robust to an alternative measure of bank stability.

Conclusion

This study investigated the association between ESG performance and bank stability, and the moderating roles of board independence and board gender diversity on this association, using data for 39 commercial banks listed on the Indonesia Stock Exchange from 2020 to 2024. The sample included 195 firm-year observations. Results show that ESG performance has a positive and significant impact on bank stability, meaning that banks with better ESG practices are more financially stable. The direct effect of board independence on bank stability is positive, while the direct effect of board gender diversity on bank stability is insignificant. Nevertheless, board independence and board gender diversity positively moderate the association between ESG and bank stability. This implies that good board characteristics enhance the contribution of ESG practices to financial stability.

This research adds to the growing literature on sustainable banking by extending the application of agency theory and stakeholder theory to explain how corporate governance mechanisms improve the effectiveness of ESG initiatives in enhancing bank stability. Moreover, the findings have practical implications for regulators and bank managers, highlighting the importance of enhancing board independence and fostering gender diversity to maximize the gains from ESG execution and to maintain long-term financial resilience. However, the present study has limitations. First, the analysis is limited to commercial banks listed on the Indonesia Stock Exchange during 2020–2024, which may limit the generalizability of the findings to other countries or banking contexts. Second, the study focuses only on board independence and board gender diversity as governance mechanisms and uses a single measure of bank stability and ESG performance. Future research could therefore extend the sample to banks in other countries, examine longer observation periods, and employ alternative measures of bank stability and ESG performance. Future studies could also consider other governance characteristics, such as board expertise, board meetings, audit committee effectiveness, and ownership structure, to provide a broader understanding of the mechanisms through which ESG contributes to bank stability.

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