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DOES BOARD STRUCTURE FOSTER ENVIRONMENTAL INITIATIVE AND MITIGATE FINANCIAL RISK?

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Abstract**:** *This study examines whether board structure serves as an effective governance mechanism in promoting environmental initiatives and mitigating financial risk among publicly listed firms in Indonesia. Drawing on Agency Theory and Stakeholder Theory, it explores how board independence, size, and gender diversity shape sustainability-oriented decisions and financial outcomes. A quantitative research design is employed using secondary panel data from 161 firm-year observations over the period 2013–2024. The study analyzes the impact of board characteristics on the adoption of emission-reduction initiatives and financial risk, proxied by leverage, using empirical regression. Results show that board independence and size are associated with greater emission reductions, suggesting that better governance enhances accountability. However, there is no clear, direct link between board traits and financial risk, implying that board structure alone does not drive stability. This study extends ESG research in emerging markets by showing that governance has different roles in environmental and financial matters. It suggests boards should be strengthened to support sustainability, while financial results may depend on broader factors.*

Keywords**:** Board Structure, Environmental Initiative, Financial Risk

INTRODUCTION

In recent years, environmental accountability has become a central concern in corporate governance, reshaping how firms balance profitability with sustainability. The growing urgency to address climate change and meet environmental, social, and governance (ESG) expectations has pushed companies to integrate emission reduction and environmental responsibility into their strategic and reporting frameworks. Within this evolving landscape, corporate boards play a pivotal role in determining whether firms merely comply with regulations or actively pursue sustainability initiatives that enhance long-term value and reduce risk (Klettner et al. 2022; Albitar et al. 2023). Board governance is increasingly recognized not only as a mechanism for financial oversight but also as a driver of environmental performance and strategic resilience.

The 2008 financial crisis and subsequent corporate scandals highlighted the global need for stronger governance to ensure transparency, accountability, and investor trust

(Aguilera et al. 2018). In emerging markets like Indonesia, where institutional enforcement and disclosure quality remain uneven, board effectiveness plays a vital role in mitigating financial and non-financial risks (Claessens & Yurtoglu 2013). Although the Indonesian Corporate Governance Manual (IFC 2014) promotes accountability, transparency, responsibility, and integrity, governance gaps persist due to concentrated ownership, weak board independence, and inconsistent environmental reporting (Moses et al. 2020; Sari & Wiryono 2021). As environmental performance increasingly shapes corporate legitimacy, firms that adopt emission-reduction programs enhance compliance, reputation, and capital access (Chikhaoui et al. 2025). Conversely, poor environmental governance heightens financial and reputational risks. This raises a critical question: Do effective boards drive environmental initiatives that strengthen financial stability? The existing literature provides fragmented insights. While prior studies confirm that board attributes such as size, independence, and gender diversity enhance strategic oversight and ethical decision-making (Fama & Jensen 1983; Adams & Ferreira 2009; García-Meca & Sánchez-Ballesta 2009), the link between governance and environmental performance remains underexplored in emerging markets. Some findings indicate that independent and diverse boards promote sustainability reporting and reduce environmental violations (Post et al. 2015; Liao et al. 2019), while others suggest that such effects depend on ownership concentration and institutional quality (Aziza & Aviola 2024). Similarly, although audit committees and Big 4 auditors reinforce compliance and transparency (Francis 2004), their impact on environmental initiatives and financial risk mitigation remains inconsistent across Indonesian firms.

This study empirically examines whether board structure promotes environmental initiatives and mitigates financial risk among Indonesian listed firms. Using the Emission Reduction Initiative (EMREINV) variable, the analysis extends the governance risk framework to include environmental compliance. It evaluates how board size, independence, diversity, audit quality, and committee oversight jointly influence environmental initiative adoption and financial risk reduction, measured by leverage and idiosyncratic volatility. This study contributes to the literature in three key ways. First, it integrates governance and environmental compliance perspectives, offering a novel examination of how board mechanisms affect firms' commitment to emission reduction. Second, it tests the dual impact of board structure on environmental initiative adoption and financial risk mitigation, providing a more holistic understanding of compliance-driven performance. Third, it contributes to the growing discourse on sustainable governance in emerging markets, particularly within Indonesia's regulatory and ownership context.

Agency Theory

This study draws on Agency Theory (Jensen & Meckling 1976) and Stakeholder Theory (Freeman 1984) to explain how board governance influences environmental initiatives and financial stability. Agency Theory suggests that managers may pursue self-interest at the expense of shareholders, leading to excessive risk-taking and neglect of sustainability goals (Shan & McIver 2021). Governance mechanisms such as board independence, gender diversity, and oversight help align managerial actions with firm value and compliance (Adams & Ferreira 2009; Wicaksono 2024). Stakeholder Theory broadens this view, emphasizing that boards must balance the

interests of shareholders, employees, regulators, and society through transparency and environmental responsibility (Donaldson & Preston 1995; Liu et al. 2021). In contexts like Indonesia, where external enforcement is limited, internal governance mechanisms are crucial for sustaining legitimacy and reducing risk (Rahman et al. 2024). Together, these theories explain how effective and inclusive boards enhance ethical and sustainable decision-making.

Board Structure

The board of directors is the primary internal governance mechanism responsible for strategic oversight, compliance, and risk management. In this study, board structure is represented by three measurable dimensions: (1) board independence, (2) board size, and (3) gender diversity.

Board Independence

An Independent board is a board appointed without any relationship to the company, expected to provide high-level oversight without conflict of interest. Independent directors contribute impartiality, monitoring effectiveness, and accountability by reducing information asymmetry between management and shareholders (Fama & Jensen 1983; Coles et al. 2008). Their presence is associated with higher disclosure quality, stricter risk oversight, and better compliance with financial and environmental regulations (Post et al. 2015; Yustina et al., 2024). However, in developing countries, independence may be symbolic if directors lack expertise or are politically connected (Moses et al. 2020), creating an implementation gap.

Board Size

Board size reflects the firm's capacity to pool diverse expertise and perspectives in decision-making (Coles et al. 2008). Larger boards may enhance monitoring and resource access, particularly in complex environments that demand environmental compliance (Shan & McIver 2021). However, excessively large boards can dilute accountability and hinder timely decisions (Yermack 1996). Previous Indonesian studies show inconsistent results: some find that larger boards reduce risk (Aziza & Aviola 2024), while others report no significant relationship (Sari & Wiryono 2021), revealing an empirical gap regarding optimal board size. In Indonesia, there are two-tier boards: the board of commissioners and the board of directors.

Gender Diversity

Gender diversity enriches board deliberation through diverse cognitive and ethical perspectives (Adams & Ferreira 2009). Female directors often emphasize transparency, social responsibility, long-term sustainability and strengthen firm performance (Liao et al. 2019; García-Meca & Pucheta-Martínez 2018; Adnindya & Restuti 2025). In Indonesia, the inclusion of women in directorship remains limited, though research shows it positively affects environmental disclosure and governance quality (Ardillah 2022). However, whether gender diversity directly fosters environmental initiatives or indirectly reduces financial risk through enhanced compliance remains underexplored. Together, board independence, size, and diversity represent key governance levers that may jointly determine firms' commitment to environmental responsibility and their capacity to manage financial risk.

Emission Reduction Initiative

The Emission Reduction Initiative (EMREINV**)** serves as an indicator of corporate environmental responsibility. Following Albitar et al. (2023) and Chikhaoui et al. (2025). Emission reduction initiatives demonstrate compliance with environmental standards and voluntary alignment with sustainable development goals.

Firms that report such initiatives often enhance legitimacy, reduce regulatory risk, and attract investors seeking ESG-aligned portfolios (Klettner et al. 2022; Li et al., 2023). However, in Indonesia, the adoption of emission-reduction initiatives varies significantly across sectors due to differences in board effectiveness, ownership structures, and regulatory pressures (Rahman et al. 2024). This creates a research gap: which board configuration is most conducive to the adoption of environmental initiatives in emerging markets with weak institutional enforcement?

Financial Risk

Financial risk reflects a firm's exposure to default, insolvency, or return volatility, commonly proxied by leverage the ratio of total debt to total assets (Sayari 2018; Aziza & Aviola 2024). High leverage increases the likelihood of distress, while lower leverage indicates conservative financing. Governance mechanisms help manage this risk through board oversight. Independent boards promote prudent capital structures and limit excessive debt (Al-Matari & Al-Swidi 2022), whereas gender-diverse boards tend to adopt more risk-averse strategies (García-Meca & Pucheta-Martínez 2018). However, evidence remains mixed: while some studies find that board independence reduces leverage (Rahman et al. 2024), others show no effect under family-dominated ownership (Utama & Utama 2019). This study extends prior research by introducing environmental initiative adoption as a mediating link between board structure and financial risk.

Linking Board Structure to Environmental Initiatives

Board composition plays a vital role in shaping a firm's sustainability strategy. From the Agency Theory perspective, independent and diverse boards restrain managerial opportunism and foster long-term environmental value (Adams & Ferreira 2009; Wicaksono 2024). Stakeholder Theory likewise highlights the board's role in balancing stakeholder interests through proactive environmental initiatives such as emission reduction (Freeman 1984; Donaldson & Preston 1995). Independent directors strengthen oversight, enhance legitimacy, and promote compliance even at the expense of short-term gains (Post et al. 2015). In Indonesia, where governance systems continue to mature, board independence remains crucial for embedding environmental responsibility into corporate decisions (Ningsih et al. 2023). Therefore, firms with higher board independence are more likely to disclose emission reduction initiatives.

H_1: ***Board independence is positively associated with the likelihood of adopting emission reduction initiatives (EMREINV).***

The relationship between board size and environmental initiatives is dual. Larger boards bring a broader range of knowledge, skills, and perspectives, enhancing a firm's capacity to address complex sustainability challenges (Coles et al. 2008; Shan & McIver 2021). They are more likely to include members with expertise in environmental management, engineering, or regulatory affairs, thereby improving strategic decision-making regarding emission-reduction investments. However, excessively large boards can suffer from coordination problems, diluting accountability and slowing down consensus (Yermack 1996). In Indonesia, where firms face increasing ESG reporting expectations, optimal board size may determine how effectively environmental strategies are translated into operational initiatives (Dhiba et al. 2025). Hence, a moderately larger board is expected to facilitate emission-reduction initiatives by leveraging diversified expertise and collective oversight capacity, in line with stakeholder theory.

H_2: ***Board size is positively associated with the likelihood of adopting emission reduction initiatives (EMREINV).***

Gender diversity contributes to ethical awareness, long-term orientation, and inclusivity in decision-making. Female directors tend to emphasize social and environmental responsibility, stakeholder well-being, and transparent disclosure (García-Meca & Pucheta-Martínez 2018; Liao et al. 2019). Empirical studies show that boards with a higher percentage of women are more likely to adopt sustainability policies and participate in climate-related initiatives (Terjesen et al. 2016; Ardillah 2022). In Indonesia, however, women remain under-represented in corporate boards, and their influence on environmental performance has not been systematically examined. The existing gap lies in determining whether gender diversity translates into tangible environmental actions, rather than symbolic disclosure. Accordingly, firms with greater female representation on boards are expected to demonstrate stronger commitment to environmental initiatives, including emission reduction efforts, this is aligned with stakeholder theory.

H_3: ***Gender diversity on the board is positively associated with the likelihood of adopting emission reduction initiatives (EMREINV).***

Linking Board Structure to Financial Risk

Board structure plays a critical role in mitigating financial risk by ensuring prudent financial policies, balanced leverage, and long-term resilience. Financial risk, proxied by leverage, reflects a firm's exposure to debt pressure and the likelihood of financial distress. Through effective monitoring and diverse perspectives, the board influences managerial choices about financing strategies and investment allocation. Independent directors strengthen oversight and reduce managerial discretion over financing decisions. Their objectivity and accountability promote conservative leverage policies, minimizing exposure to bankruptcy and reputational risk (Fama & Jensen 1983; Rahman et al. 2024). Empirical evidence indicates that firms with more independent boards exhibit lower debt ratios and greater solvency (Limantara 2020). In Indonesia's emerging market, where political and familial ownership can weaken oversight, independence serves as an essential internal safeguard. Therefore, a higher proportion of independent directors is expected to lower leverage, indicating reduced financial risk that support the function on board as stakeholder theory.

H_4: ***Board independence is negatively associated with financial risk (measured by leverage).***

Board size also shapes a firm's financial stability. Larger boards bring broader expertise—particularly financial and strategic knowledge—that can improve debt-management decisions and ensure compliance with regulatory thresholds (Coles et al. 2008; Shan & McIver 2021). Such diversity of skill enhances the board's capacity to scrutinize borrowing policies and anticipate liquidity constraints. Nevertheless, overly large boards may suffer from coordination problems that weaken timely responses to financial challenges (Yermack 1996). Thus, moderately larger boards are expected to manage leverage more conservatively, reducing firm-level financial risk, which align with stakeholder theory.

H_5: ***Board size is negatively associated with financial risk (measured by leverage).***

Gender diversity introduces heterogeneity in perspectives and leadership styles, which affects strategic and financial decision-making. Female directors are often associated with greater ethical sensitivity, long-term orientation, and cautious risk-taking behavior (Adams & Ferreira 2009; Terjesen et al. 2016). Empirical studies suggest that gender-diverse boards are less likely to approve aggressive debt policies, leading to lower leverage and enhanced financial resilience

(García-Meca & Pucheta-Martínez 2018; Liao et al. 2019). From a Stakeholder Theory perspective, women directors tend to prioritize stakeholder confidence and corporate reputation, thereby motivating sound financial governance and conservative funding practices. In Indonesia, however, female representation on boards remains limited, and its direct effect on financial risk has yet to be thoroughly examined. Prior research has mostly addressed gender diversity's role in sustainability disclosure or earnings management rather than its impact on leverage (Ardillah 2022; Sari & Wiryono 2021). Accordingly, boards with greater female representation are expected to adopt more prudent financing policies, leading to reduced leverage and lower financial risk.

H_6: *Gender diversity on the board is negatively associated with financial risk (measured by leverage).*]

METHOD

This study employs a quantitative design using secondary data to examine the relationships among board structure, environmental initiative adoption, and financial risk among Indonesian listed firms. Quantitative methods are widely used in governance and sustainability research for systematic measurement and generalization (Larcker and Rusticus 2010). This approach provides objective and replicable evidence on how board composition affects environmental and financial outcomes, consistent with prior studies in emerging markets (Rahman et al. 2024; Ningsih et al. 2023).

Sampling and Research Context

The target population consists of all non-financial firms listed on the Indonesia Stock Exchange (IDX) between 2013 and 2024 with available Emission Reduction Initiative data. The sample was determined using a purposive sampling technique, selecting firms that consistently published annual reports and sustainability disclosures containing governance and environmental information. After excluding financial institutions and firms with incomplete data, the final sample includes 161 firm-year observations across multiple sectors, providing a representative view of Indonesia's corporate governance environment.

Data Collection and Sources

Data were collected from Bloomberg, IDX official filings, and the company's annual and sustainability reports. Governance variables board size, board independence, and gender diversity were extracted from corporate governance disclosures. The Emission Reduction Initiative (EMREINV) variable was coded as a dummy, taking the value **1** if a firm reported implementing or disclosing emission-reduction programs, and **0** otherwise (following Albitar et al. 2023; Chikhaoui et al. 2025). Financial data, including total assets, total debt, profitability, and growth, was obtained from Bloomberg's financial database to ensure data accuracy and consistency.

Variable Measurement and Model Specification

All variables were operationalized according to established definitions in the governance and sustainability literature (see Table 1). The dependent variable, financial risk (FINRISK), is proxied by the leverage ratio, computed as total debt divided by total assets, while environmental initiative adoption (EMREINV**)** represents the adoption of environmental initiatives. The key independent variables include board independence (BIND), board size (BSIZE), and gender diversity (GDIV). Control variables include firm size (SIZE), profitability (ROA), and number of auditor meetings (AUDMEET) to account for firm heterogeneity. Variables definition shown in Table 1.

The relationships among these variables are estimated using a panel data regression model with firm fixed effects to control for unobserved heterogeneity. The baseline models are as follows:

$$EMREINV_{it}=\alpha+\beta 1BIND_{it}+\beta 2BSIZE_{it}+\beta 3GDIV_{it}+\beta 4SIZE_{it}+\beta 5ROA_{it}+\beta 6AUDMEET_{it}+\mu_i+\varepsilon_{it} \quad (1)$$

Table 1. Variables Definition

Variable Type	Variable Name	Symbol	Operational Definition / Measurement	Expected Sign	References
Dependent Variable	Financial Risk	FINRISK	Firm-specific volatility (standard deviation of residuals from market-model returns) and leverage (Total Debt / Total Assets). High values reflect greater exposure to market and solvency risk.	–	Limantara (2020)
	Emission Reduction Initiative	EMREINV	Dummy variable, 1 if there is emission reduction initiate, 0 otherwise		Albitar et al. (2023)
Independent Variables (Board Structure)	Board Independence	BIND	Ratio of independent commissioners to total board members. Indicates the extent of independent oversight.	–	Ardillah 2022; Wicaksono (2024)
	Board Size	BSIZE	Number of board directors and board of commisioner.	–	Coles et al. (2008); Limantara (2020)
	Gender Diversity	GDIV	Proportion of female board members to total board members.	–	García-Meca & Pucheta-Martínez (2018); Limantara (2020)
Control Variables	Audit Committee Activity	AUDMEET	Frequency of audit-committee meetings per year.	–	Li et al. (2023)
	Firm Size	SIZE	Natural logarithm of total assets. Larger firms have more stable earnings and lower default probability.	–	Sayari (2018); Al-Matari & Al-Swidi (2022)
	Profitability	ROA	Net Income / Total Assets. Measures operational efficiency.	–	Ningsih et al. (2023)

Table 2. Purposive Sampling

No	Description	Number of Sample
1	Number of population: firms with Emission Reduction Initiative	36
2	Number of firm year observation from 2013-2024	384
3	Incomplete firm-year observation	223
4	Total number of sampe	161

$$FINRISK_{it}=\alpha 0+\beta 1BIND_{it}+\beta 2BSIZE_{it}+\beta 3GDIV_{it}+\beta 4SIZE_{it}+\beta 5ROA_{it}+\beta 6AUDMEET_{it}+\mu i+\varepsilon it \quad (2)$$

where i denotes the firm, t the year, μi the firm-specific fixed effect, and εit the idiosyncratic error term.

Table 2 explain the number of samples used in this paper. Table 3 present the descriptive statistics of variables used in this paper

Table 4 presents the correlation matrix among the variables used in this study. Overall, most correlation coefficients are relatively low to moderate, indicating that the variables generally capture different aspects of financial risk, environmental investment, corporate governance, and firm characteristics. Financial risk (FINRISK) is negatively correlated with emission reduction investment (EMREDINV), board size, firm size, and profitability, with coefficients of -0.1703, -0.1158, -0.1981, and -0.0522, respectively. These results suggest that firms with stronger environmental engagement, larger boards, larger firm size, and higher profitability tend to have lower financial risk, although the strength of these relationships is relatively weak. Among these variables, firm size shows the strongest negative association with financial risk, implying that larger firms may have better capacity to manage financial exposure due to stronger resources, better access to financing, and more diversified operations.

Table 4 shows the correlation matrix between variables used in this paper.

The matrix also shows that investment in emission reduction is positively associated with board independence (0.2799), board size (0.1546), gender diversity (0.0990), firm size (0.0713), and profitability (0.2313). These findings provide preliminary evidence that firms with stronger governance structures and better financial performance are more likely to engage in emission reduction initiatives. In particular, the positive correlation between board independence and investment in emission reduction suggests that independent directors may support greater environmental accountability and long-term sustainability decisions. Similarly, the positive relationship between profitability and investment in emission reduction indicates that financially stronger firms may have more resources to allocate to environmental initiatives.

A notable result is the high correlation between board independence and board size, with a coefficient of 0.8083. This indicates that firms with larger boards also tend to have higher board independence, which may raise a potential multicollinearity concern if both variables are included in the same regression model. Therefore, further diagnostic testing, such as the Variance Inflation Factor (VIF), is necessary before interpreting the regression results. Apart from this relationship, the remaining correlations are not excessively high, suggesting that serious multicollinearity is unlikely among most variables. Overall, the correlation matrix provides useful preliminary insights, but the direction, magnitude, and statistical significance of these relationships should be confirmed through regression analysis.

Table 3. Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
FINRISK	161	0.5177877	0.239415	0.1001	0.9873
EMREDINV	161	0.80142422	0.4003104	0	1
BIND	161	2.149068	0.7682055	1	4
BoardSize	161	5.037267	1.9839641	2	11
GDIV	161	0.111307	0.3171696	0	1
SIZE	161	9.322878	0.9619862	6.718095	13.06337
ROA	161	7.361491	5.431623	-8.55	19.69
AUDMEET	161	8.136646	7.68155	1	60

RESULTS

Table 5 shows the regression results indicate that board structure variables independence, size, and gender diversity are negatively related to financial risk, although none are statistically significant. This pattern suggests that well-structured boards may encourage more prudent leverage management, but their influence in the Indonesian market remains limited. The findings are consistent with Wicaksono (2024) and Limantara (2020), who found that governance mechanisms reduce risk tendencies but often lack strong statistical power in emerging markets due to ownership concentration and weak enforcement. Among the control variables, firm size consistently shows a significant negative association with financial risk, suggesting that larger firms are financially more stable, consistent with Rahman et al. (2024). In contrast, profitability and audit meeting frequency do not significantly affect leverage, aligning with Al-Matari and Al-Swidi (2022), who argued that firm fundamentals and governance activities often exert indirect rather than direct effects on leverage decision.

Board Structure and Environmental Initiative

The regression results on table 6 reveal that board independence, board size, and gender diversity all show positive associations with firms' adoption of emission reduction initiatives, aligning with the expectation that more effective boards foster stronger environmental governance. Board independence (BIND) exhibits a strong and significant positive relationship ($p < 0.01$), consistent with Agency Theory (Jensen & Meckling 1976), which posits that independent directors mitigate managerial opportunism and encourage long-term value creation through sustainability initiatives. This finding supports prior evidence from Wicaksono (2024) and Rahman et al. (2024) that independent boards in Indonesia enhance compliance and environmental responsibility. Board size (BOARDSIZE) also positively affects emission reduction engagement ($p < 0.05$), suggesting that larger boards, with more diverse expertise and perspectives, can better integrate ESG issues into strategic oversight—a result consistent with Stakeholder Theory (Freeman 1984) and findings by Coles et al. (2008). Meanwhile, gender diversity (GDIV) shows a weaker but positive relationship, significant only at the 10% level, echoing Liao et al. (2019) and Terjesen et al. (2016), who found that women directors often promote sustainability orientation though their impact may be limited in male-dominated governance environments.

Table 4. Correlation Matrix

	FINRISK	EMREDINV	BIND	BoardSize	GDIV	SIZE	ROA	AUDMEET
FINRISK	1.0000							
EMREDINV	-0.1703	1.0000						
BIND	0.0798	0.2799	1.0000					
BoardSize	-0.1158	0.1546	0.8083	1.0000				
GDIV	0.1901	0.0990	0.1090	0.4696	1.0000			
SIZE	-0.1981	0.0713	0.0713	0.2393	0.0483	1.0000		
ROA	-0.0522	0.2313	-0.0336	-0.0360	-0.0855	0.2566	1.0000	
AUDMEET	0.0679	-0.0826	-0.0289	-0.0729	-0.0660	-0.1901	0.1779	1.0000

The results also indicate that the role of board structure is more visible in environmental initiatives than in financial risk management. While board independence, board size, and gender diversity are negatively associated with financial risk, their effects are not statistically significant. This may suggest that board characteristics alone are not sufficient to directly influence leverage decisions in Indonesian firms. In practice, financial risk is often shaped by broader factors such as controlling ownership, access to bank financing, industry conditions, and management's financing preferences. Therefore, even when firms have more independent or diverse boards, their ability to reduce financial risk may still depend on how much authority the board has in strategic financial decisions. This condition is common in emerging markets, where corporate governance mechanisms may exist formally, but their practical influence can be constrained by concentrated ownership and weaker investor protection.

Table 5. Board Structure and Financial Risk

	Financial Risk					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constanta	0.958***	1.418***	0.981***	1.421***	0.888***	1.404***
	(3.87)	(4.63)	(4.02)	(4.63)	(3.77)	(4.58)
BIND	-0.0235	-0.00408				
	(-0.96)	(-0.16)				
BOARDSIZE			-0.0133	-0.00230		
			(-1.40)	(-0.22)		
GDIV					-0.188	-0.110
					(-1.29)	(-0.73)
Control Variables						
SIZE		-0.0499**		-0.0497**		-0.0505**
		(-2.33)		(-2.18)		(-2.50)
ROA		-0.00544		-0.00554		-0.00476
		(-1.49)		(-1.51)		(-1.25)
AUDMEET		0.00129		0.00108		0.000900

	Financial Risk					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
		(0.51)		(0.43)		(0.36)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-Square	0.0376	0.0588	0.0404	0.0571	0.0385	0.0602
N	161	161	161	161	161	161

*t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01*

In contrast, the positive and significant relationship between board structure and environmental initiatives suggests that boards may have a stronger influence in areas related to sustainability disclosure, compliance, and corporate reputation. Environmental initiatives, such as emission reduction programs, are often more visible to external stakeholders, including regulators, investors, customers, and the public. Because of this visibility, boards may be more motivated to support environmental actions as part of legitimacy building and long-term corporate image. Independent directors can encourage firms to respond more seriously to sustainability expectations, while larger boards may provide broader knowledge, professional networks, and experience in managing ESG-related issues. Gender diversity may also contribute to a more stakeholder-oriented perspective, although its weaker significance suggests that the presence of women directors may need to reach a stronger level of representation before it can produce a more consistent effect.

The inclusion of year fixed effects is an important robustness check in this study because it controls for unobserved time-specific factors that may influence firms' financial risk and environmental initiatives across the observation period. Yearly macroeconomic conditions, regulatory changes, capital market fluctuations, inflationary pressure, interest rate movements, and changes in sustainability-related expectations may affect all firms simultaneously, regardless of their internal board structure. By incorporating year fixed effects, the regression model reduces the possibility that the estimated coefficients are driven by common annual shocks rather than by the explanatory variables of interest. Therefore, the results become more robust because the relationship between board structure and the dependent variables is estimated after accounting for systematic differences across years. In this context, the consistent use of year fixed effects across all model specifications strengthens the reliability of the findings and suggests that the observed patterns are not merely the result of period-specific economic or institutional conditions.

Table 6. Board Structure and Environmental Initiative

	Emission Reduction Initiative					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constantan	0.574	0.150	0.752*	0.299	1**	0.247
	(1.41)	(0.30)	(1.85)	(0.60)	(2.54)	(0.49)
BIND	0.142***	0.138***				
	(3.53)	(3.34)				
BoardSize			0.0355**	0.0314*		
			(2.25)	(1.81)		

	Emission Reduction Initiative					
	(1)	(2)	(3)	(4)	(5)	(6)
GDIV					0.423*	0.140
					(1.73)	(0.56)
SIZE		0.0204		0.0256		0.0553*
		(0.60)		(0.69)		(1.67)
ROA		0.0229***		0.0227***		0.0225***
		(3.90)		(3.81)		(3.58)
AUDMEET		-0.00412		-0.00407		-0.00380
		(-1.02)		(-1.00)		(-0.92)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-Square	0.0730	0.1437	0.0378	0.1071	0.0248	0.0889
N	161	161	161	161	161	161

*t statistics in parentheses, * p<0.10, ** p<0.05, *** p<0.01*

CONCLUSION

This study examined whether board structure, reflected through board independence, board size, and gender diversity, contributes to stronger environmental initiatives and lower financial risk among Indonesian publicly listed firms. The empirical findings show that board independence and board size significantly increase firms' adoption of emission reduction initiatives. This suggests that boards with stronger oversight capacity and broader expertise are more likely to encourage companies to respond to environmental issues in a more structured and accountable manner. These findings support Agency Theory, which argues that independent board members help monitor management and align corporate decisions with the firm's long-term interests. They also support Stakeholder Theory, which emphasizes that firms are not only responsible to shareholders but also to wider stakeholders, including regulators, communities, investors, and the natural environment.

However, the results also show that although board independence, board size, and gender diversity are negatively associated with financial risk, their effects are not statistically significant. This indicates that board structure alone may not be strong enough to directly reduce leverage-related risk in the Indonesian market. Financial risk is likely influenced by broader firm-specific and institutional factors, such as ownership concentration, access to external financing, industry characteristics, managerial risk preference, and macroeconomic conditions. Among the control variables, firm size appears to be a significant determinant of financial stability, suggesting that larger firms may have better access to capital, stronger bargaining power, and more resources to manage debt obligations. Overall, the findings indicate that board governance mechanisms are more effective in promoting environmental responsibility than in directly reducing financial risk.

Theoretically, this study contributes to the corporate governance and sustainability literature by showing that the influence of board structure may differ across types of corporate outcomes. The significant effect of board independence and board size on environmental initiatives confirms that governance mechanisms can play an important role in shaping sustainability-oriented decisions.

However, the insignificant relationship between board structure and financial risk suggests that governance effectiveness is not uniform across all areas of corporate decision-making. In emerging markets such as Indonesia, formal governance structures may improve sustainability engagement, but their ability to influence financial policy may still be constrained by concentrated ownership, institutional weaknesses, or dominant managerial control. Therefore, this study extends Agency Theory and Stakeholder Theory by showing that board governance may have stronger explanatory power for non-financial strategic outcomes than for financial risk outcomes.

From a practical perspective, the findings provide useful insights for companies, regulators, and investors. For companies, strengthening board independence and ensuring that board members have diverse expertise can improve environmental engagement and support the implementation of emission reduction programs. For regulators, the results suggest that corporate governance reforms should not only focus on formal board composition, but also on the actual effectiveness of board oversight, board competence, and accountability in sustainability governance. For investors, especially those with ESG-oriented investment preferences, board independence and board size may serve as important indicators of a firm's commitment to environmental responsibility. However, investors should be careful not to assume that stronger board structure automatically means lower financial risk, because leverage decisions may depend on other financial and institutional conditions.

This study has several limitations. First, it relies on secondary data from Indonesian publicly listed firms, which may limit the generalizability of the findings to other countries or institutional environments. Second, the study focuses on static board characteristics, such as independence, size, and gender diversity, while board effectiveness may also depend on behavioral and qualitative factors, including board expertise, meeting quality, leadership style, director experience, and the actual involvement of board members in strategic decision-making. Third, the measurement of environmental initiatives is limited to available indicators, which may not fully capture the depth, quality, or long-term impact of firms' sustainability practices.

Future research may extend this study by using longitudinal and cross-country comparisons to examine whether the relationship between board structure, environmental initiatives, and financial risk differs across institutional settings. Future studies may also integrate more advanced ESG metrics, such as carbon intensity, environmental performance scores, sustainability assurance, or climate-related disclosure quality. In addition, combining quantitative analysis with qualitative methods, such as interviews with directors, managers, or sustainability officers, could provide deeper insight into how board members actually influence environmental strategy and financial decision-making. Such an approach would help explain not only whether board governance matters, but also how and under what conditions it can effectively strengthen environmental responsibility and financial resilience in emerging markets.

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