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Board governance in moderating the relationship between environmental performance and firm performance in Indonesia

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Abstract

The results regarding the relationship between environmental performance and company performance are still inconclusive. This condition is because there is still confusion regarding what influences this relationship. This study examines the role of board governance (board size, independent board, and gender diversity), which corporate decisions are highly dependent on their governance. The sample used in this study covers 117 companies in Indonesia from 2015 to 2023, using panel data regression analysis. The results obtained from this study indicate that companies in Indonesia negatively influence environmental performance and company performance. Furthermore, we found that independent board and gender diversity moderate this relationship. This evidence can be attributed to the role of board governance in producing strategic decisions in its activities. Evidence of this moderating role significantly contributes to environmental and corporate performance literature. Finally, this study offers knowledge to policymakers and practitioners regarding the importance of the role of corporate boards in monitoring the performance of their company's management to make good business decisions.

Keywords: Environmental; firm performance; board governance; sustainable; Indonesia

1. Introduction

In the past, companies still focused on traditional management methods that concentrated on financial performance, but in recent years, corporate management methods have added their focus on sustainability aspects (Chang and Lee, 2022). Information about corporate sustainability is crucial for investors and financial analysts (Adomako and Tran, 2022; Christensen *et al.*, 2022). According to the Global Sustainable Investment Alliance, assets directed to sustainable investments in five major markets reached $30.7 trillion in 2018 (GSIA, 2018). This change in sustainability practices aims to meet the expectations of stakeholders and society to carry out business practices that care about the environment and sustainability (Broadstock *et al.*, 2020).

One form of Indonesia's support for environmental responsibility and sustainability is its commitment to supporting green investment. This commitment is reflected in the strategic policy that sets a target of 23% renewable energy by 2025 and achieving net-zero emissions by 2060 (Kementerian Investasi dan Hilirisasi Indonesia, 2024). Several regulations from Indonesia also support this activity, such as the regulation of the Republic of Indonesia Law Number 40 of 2007 concerning Limited Liability Companies (UU No. 40/2007) and Financial Authority Regulation Number 51/POJK.03/2017 concerning Financial Sustainability for Financial Services Institutions, Issuers, and Public Companies (POJK No. 51/POJK.03/2017). The policy calls on banks to avoid providing loans to companies with environmental, social, and governance risks. Another policy the Indonesian Ministry of Environment and Forestry sets is the Pollution Control, Evaluation, and Rating

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Program (PROPER). This program provides a rating of company compliance in environmental responsibility, which aims to help each industry improve its environmental performance (Rahmaniati and Ekawati, 2024). With several regulations set by the Indonesian government, the growth of companies reporting their environmental scores continues to grow rapidly, evidenced by data from Refinitiv Eikon (see Figure 1).

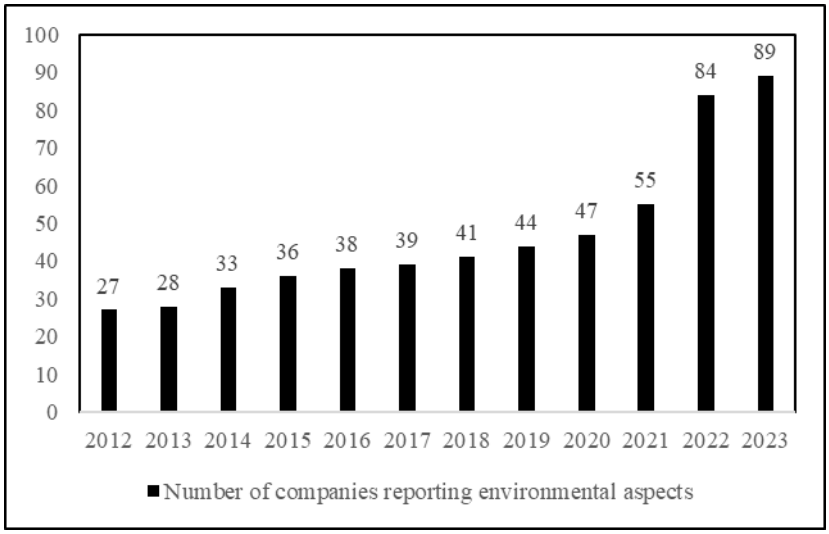

Figure 1. Increase in the number of companies with ESG scores in Indonesia. Source: Author's analysis based on Refinitiv Eikon data, 2024.

However, environmental responsibility requires cost stability, which increases competitive burdens for companies (Barnett and Salomon, 2012). Companies must recognize the trade-off between costs and potential benefits (Fernández-Kranz and Santaló, 2010), raising an important question: "Can implementing environmental responsibility practices benefit the company?". This question also has various answers from several studies. For example, a study argues that if a company adopts environmental practices, it can improve financial performance (Siedschlag and Yan, 2023), which will later increase its value (Bhaskaran *et al.*, 2020). However, several studies have also observed that implementing aspects of environmental concern decreases the company's profit (Khurram *et al.* 2024). Companies will spend more expensive costs to meet their needs in environmental practices (Shin, 2024). Research also observes that environmental awareness practices do not affect company value (Aydoğmuş *et al.*, 2022). These inconsistencies in results are due to differences in samples, methodology, variables, and data in the adjusted studies (Iazzolino *et al.*, 2023).

The relationship between environmental aspects and company performance is still debatable, so this challenge has led researchers and academics to expand the analysis (Nguyen *et al.*, 2021). Research on the direct relationship between environmental aspects and company performance alone is insufficient (Dohrmann *et al.*, 2024). Moderating variables are needed to see the extent to which the relationship between environmental scores and company performance is influenced by other factors (Wu *et al.*, 2022). Moderating variables can identify under what conditions the independent and dependent variables are strengthened, weakened, and even changed direction (Baron and Kenny, 1986). This study identifies the variable of corporate board composition as a moderator in the relationship between environmental scores and company performance.

The company's board members determine corporate governance because they are the highest decision-making authority (Mohammadi *et al.*, 2021). Board governance is important because it can impact the company's process toward sustainability (Dohrmann *et al.*, 2024). The composition of the company's board has been recognized as a reflection of the practice of commitment to environmental initiatives (Lu, 2021; Nguyen *et al.*, 2021). The diversity of this board can encourage a broader perspective on decision-making. A board with a high awareness of non-financial decisions tends to be more proactive in implementing policies and strategies related to environmental aspects (Hollindale *et al.*, 2019). Supervision of the company's board also plays a role in controlling the actions of senior

management (Jo and Harjoto, 2011). Finally, the authority of the company's board in supervising and regulating organizational management is to maintain corporate governance and protect stakeholders (Saleh *et al.*, 2020). Thus, we assume that varying board composition can influence environmental performance decisions which ultimately impact firm value.

Several studies have been conducted in China Nguyen *et al.* (2021), America Lu (2021), and European countries Dohrmann *et al.* (2024). The results obtained in previous studies may not apply to Indonesia due to differences in regulations, policies, and governance practices. Countries with more advanced governance systems, such as America and Europe, tend to have consistent performance results compared to countries with less developed governance systems. The complexity of differences in legal systems, cultural differences, and levels of transparency are essential to consider. A comprehensive analysis is needed to observe the dependence of corporate board governance variables and their effects (Aguiera *et al.*, 2012). Therefore, our study includes three board variables simultaneously (board size, independent board, and board diversity) in the regression to determine their reciprocity, intended to obtain adequate clarity regarding the moderating effect of board governance on companies in Indonesia.

This study has several contributions to the literature. First, we observe the discourse on the role of environmental performance that can increase profitability. However, this study focuses on the scale of one country, namely Indonesia. We narrow our observations by considering previous findings that are more inclined to a broader region and several developed countries with different regulatory pressures and political policies. Second, is the moderating role of the company's board in the relationship between environmental and company performance. Unlike previous studies that focus on one board role in the company, we include three variables: board size, independent board, and board diversity as proxies for board governance.

The following discussion of this paper is divided into several sections. Section 2 is about the literature review and hypotheses. Section 3 explains the methodology. Section 4 discusses the empirical findings of the effect of environmental performance on company performance and the moderating role of board governance on the relationship. Section 5 presents an analysis of the robustness test results. Finally, section 6 provides the study's conclusions, implications, and limitations.

2. Literature review

Agency theory and dependency theory are evidence of the importance of corporate management supervision (Akram and Haq, 2022). Agency theory is a relevant explanation in this study. This theory arises when the principal and agent show differences in risk preferences and corporate goals (Jensen and Meckling, 1976). The problems that occur are caused by managers prioritizing their own interests over shareholders (Dohrmann *et al.*, 2024). This problem can be overcome by monitoring the board's governance well because it can help align the interests of the principal and agent (Fama and Jensen, 1983). The corporate board can provide supervision and make strategic decisions so that the corporate board has the power to direct the company's involvement in environmental practices.

Furthermore, Mitchell *et al.* (1997) said that organizations try to diversify their internal resources to reduce external risks, called dependency theory. A company's success in competing depends on its resources, capabilities, and skills (Saleh and Maigoshi, 2024). Resource dependency theory states that directors are a resource that can generate ideas and skills relevant to the company's strategic decisions, which can positively impact the company's value (Akram and Haq, 2022). Improving environmental performance results from the board's process of considering their various experiences and perspectives (Al-Jaifi *et al.*, 2023).

Environmental performance and firm performance

In recent years, no agreement has been made that environmental performance can increase company performance (Dohrmann *et al.*, 2024). The relationship between environmental performance and company performance is an issue that is not yet certain. The financial and non-financial aspects measure a company's success in achieving its business performance goals. In contrast, environmental performance is more specific to non-financial aspects. Therefore, several previous studies have shown two different views on the impact of environmental performance on company performance.

The first result is a positive relationship, meaning that environmental practices can improve company performance (Dohrmann *et al.*, 2024; Liang and Renneboong, 2020; Siedschlag and Yan, 2023b). This impact is based on the company's encouragement to disclose social responsibility based on community values and norms (Bhattacharjee and Han, 2014; Nurhayati *et al.*, 2016). In addition, adopting green innovation can improve sustainable long-term development and economic performance (Zhang *et al.*, 2019).

The second opinion states that companies involved in sustainability and environmental investments regulated by specific regulations will increase company costs (Brouwers *et al.*, 2014; Saktiawan *et al.*, 2025). This environmental investment can pose unexpected risks, which decrease company profitability (King and Lenox, 2001). A similar relationship was obtained from the research of Li and Li (2024), which revealed that the costs incurred must be consistent with the benefits received by the company. Similar findings were also shown by Chen *et al.* (2023), who stated that financial and operational performance can be disrupted if the company's core activities are diverted to actions related to environmental initiatives. Therefore, we set hypothesis 1 as follows.

H1: Environmental Performance reduces company performance.

The role of board governance

Environmental strategy has become an important indicator of corporate success following the recent increase in environmental issues. One of the driving factors of corporate commitment to implementing environmental practices is the involvement of the corporate board in corporate governance (Mohammadi *et al.*, 2021). These two mechanisms (corporate governance and performance) can be understood as interrelated things that influence each other (Dohrmann *et al.*, 2024). Previous studies have shown that environmental performance is strengthened by corporate boards because of their contributions to corporate governance (Aydoğmuş *et al.*, 2022; Chen *et al.*, 2023; Husted and Sousa-Filho, 2019). However, there are still limitations in previous studies that include the variable of board governance, which moderates environmental and corporate performance (Lu, 2021; Nguyen *et al.*, 2021). Therefore, it still raises the question of whether boards in companies that pay more attention to environmental standards will improve their performance.

Board Size

The size of the board containing experienced directors will affect the company's decision-making due to their skills in carrying out supervision and governance by contributing various perspectives and knowledge, including sustainability issues (Shahbaz *et al.*, 2020; Yilmaz *et al.*, 2023). Interest theory also states that the level of effectiveness in monitoring managerial actions is due to the large size of the board because it contains experts in specific issues (Kumar *et al.*, 2022). The dependency theory perspective states that larger boards have expertise and broader access to information that can be useful in addressing environmental issues (Dohrmann *et al.*, 2024). Therefore, we hypothesize 2 as follows.

H2: Board size moderates the relationship between environmental performance and firm performance.

Independent Board

Planning, strategic decisions, and even performance evaluations are influenced by the pending decisions of the independent board (Boivie *et al.*, 2021). The more effective the board monitoring reflects the high concentration of independent directors in it (Kock *et al.*, 2012). The effectiveness of this board monitoring increases investor confidence because one of them can minimize deviations in the company's financial statements (Rachmadi and Saktiawan, 2024). In line with agency theory, independent directors' control and tight monitoring can balance the desires of management and shareholders, thereby reducing conflict between them (Al-Jaifi *et al.*, 2023). Furthermore, it is also in line with the resource dependence theory, which states that the expertise possessed by external directors can build better relationships with stakeholders (Nguyen *et al.*, 2021). The public will feel accountable, so the presence of these independent directors will have a good impact on the company's long-term goals. Therefore, the hypothesis we propose is as follows.

H3: The Independent Board moderates the relationship between environmental and company performance.

Gender Diversity

Increasing innovation and effectiveness of corporate decision-making is directed by the ability of directors to access knowledge, diversity of perspectives, and broad capabilities (Saleh *et al.*, 2020). Directors with high diversity obtain this to improve decision-making (Cordeiro *et al.*, 2020). The relationship between environmental and company performance also depends on their governance (Akram and Haq, 2022). According to stakeholder theory, companies must consider all aspects, including ethical and social involvement (Freeman, 1994). Based on agency theory, increased board independence caused by high gender diversity will increase attention to environmental performance (Hillman and Dalziel, 2003). Based on the nature of women who tend to pay attention to ethics and other non-financial aspects (Hollindale *et al.*, 2019). In short, sustainable problems can be overcome by gender diversity because it can facilitate the evaluation of various stakeholder preferences (Jo and Harjoto, 2011). Therefore, we hypothesize three as follows.

H4: Gender diversity moderates the relationship between environmental performance and firm performance.

3. Method

Data and variable

We collected companies' annual financial data and environmental scores from the Thomson Reuters database. We used data from 117 companies in Indonesia from 2015 to 2023. The reason is that, in 2015, there was a Paris Climate Agreement that aimed to reduce the impact of global warming on the world (Dohrmann *et al.*, 2024). With the Paris Climate Agreement, companies worldwide, including Indonesia, have straightened their strategies to practice environmentally friendly business models.

Table 1. Variable of Research

Variable	Formula/Description	Sources(s)
Dependent Variable		
Tobin's Q	(Market capitalization + Long-term debt)/Total assets	Thomson Reuters, author calculation
ROA	Net income/total asset	Thomson Reuters, author calculation
ROE	Net income/total equity	Thomson Reuters, author calculation
ROS	Net income/revenue	Thomson Reuters, author calculation
Independent Variable		
Environmental	Environmental score of the company	Thomson Reuters, author calculation
Moderating Variable		
Board Size	Total number of board members	Thomson Reuters, author calculation
Indep. Board	The proportion of outside (independent) directors relative to total board members	Thomson Reuters, author calculation
Gend. Diversity	Percentage of females on the board	Thomson Reuters, author calculation
Control Variable		
Leverage	Total debt/total asset	Thomson Reuters, author calculation
Size	logarithm of total assets	Thomson Reuters, author calculation
Growth	growth in total revenue	Thomson Reuters, author calculation

This study uses Torbin's Q variable as a proxy for company performance following (Dohrmann *et al.*, 2024; Saktiawan *et al.*, 2025). Market dynamics and corporate governance can be seen in this variable. However, to strengthen the results, we use other variables such as ROA (Return

on Asset), ROE (Return on Asset), and ROS (Return on Solvability). In addition, the proxy we use to measure environmental performance is the Environmental Score ESG of each company. This environmental score variable shows the extent to which the company's initiative implements environmentally friendly business practices, assessed on a score of 0-100. The higher score obtained by the company indicates that they have implemented environmentally friendly business practices well, or vice versa.

Meanwhile, in the moderation analysis, we use three proxies to describe board governance, namely Board Size (Number of board members), Independent Board (Proportion of external boards to the number of boards), and Gend Diversity (Percentage of women on the board). In addition, we also use company control variables that function to reduce the specification errors of our model. The variables in question are leverage (total debt to total assets), Size (natural logarithm of total assets), and Growth (Revenue growth). More details can be seen in Table 1.

Econometrics modelling

To examine the effect of environmental performance on company performance, we use the following regression model equation.

$$Torbin's\ Q_{it} = \alpha_i + \beta_1\, Environmental_{it} + \varphi\, X_{it} + \varepsilon_{it} \ldots(1)$$

Where i indicates the company index and t is the year, Torbin's Q is a proxy that describes the company's value, which means its performance in carrying out its activities. The high value of Torbin's Q indicates a high company value, and vice versa.

Next, we use the independent environmental variable that indicates the company's annual environmental performance. This proxy is calculated using a 0-100 scale index by estimating three categories, namely Resource Use, Emissions, and Innovation (Al-Jaifi *et al.*, 2023; Dohrmann *et al.*, 2024; Nguyen *et al.*, 2021; Saktiawan *et al.*, 2025). Environmental is assessed on a scale of 0–100.

We use control variables to minimize the estimation error symbolized proxied by X. We use the variables Leverage, Size, and Growth (Boulhaga *et al.*, 2023; Dohrmann *et al.*, 2024). The control variables we use indicate the company's specifications and impact their performance, so using these variables strengthens our results.

Next, we examine the moderating role of board governance (Board size, Independent Board, and Gend Diversity) on the relationship between environmental performance and company performance. The following is the estimation model we use.

$$Torbin's\ Q_{it} = \alpha_i + \beta_1\, Environmental_{it} + \beta_2\, Board\ Size_{it}\ x\ Environmental_{it} + \varphi\, X_{it} + \varepsilon_{it} \ldots(2)$$

$$Torbin's\ Q_{it} = \alpha_i + \beta_1\, Environmental_{it} + \beta_2\, Indep.\ Board_{it}\ x\ Environmental_{it} + \varphi\, X_{it} + \varepsilon_{it} \ldots(3)$$

$$Torbin's\ Q_{it} = \alpha_i + \beta_1\, Environmental_{it} + \beta_2\, Gend.\ Diversity_{it}\ x\ Environmental_{it} + \varphi\, X_{it} + \varepsilon_{it} \ldots(4)$$

The interaction terms used in this equation test the moderating effects on firm performance. We separate these moderating roles to see the extent of the specific impact of each aspect of board governance.

Model estimator

We use fixed effect unbalanced panel data estimation in this study. This estimation can control heterogeneity between units that do not change over time or are fixed (Cooper and Hedges, 1993). Therefore, this study allows us to analyze the consideration of board governance moderating variables that can vary in the same company but at different times. Finally, the model is not affected by constant company-specific factors.

4. Results and discussion

Descriptive statistics

In descriptive statistics, we obtain data with various observations, depending on the available data. The average company value data proxied by Torbin's Q is 2,170. This result shows that the company, as a value expected by investors, has the potential to grow. In this study, we also use alternative variables as proxies for company performance, such as ROA, ROE, and ROS, each with an average value of 0.6%, 13.2%, and 10.9%. Each variable is used to ensure that our research results are robust.

Furthermore, the environmental variable has an average score of 38,983. This result shows that the environmental score of companies in Indonesia is still below 50%, which means that this score is still relatively low even though it increases yearly based on its growth.

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Torbin's Q	967	2.170	4.491	0.094	35.512
ROA	1020	0.060	0.088	-0.193	0.404
ROE	1020	0.132	0.285	-1.349	1.342
ROS	812	0.109	0.193	-1.113	0.553
Environmental	561	38.983	25.242	0	91.644
Board Size	560	6.404	2.394	2	21
Indep. Board	560	44.167	13.913	14.286	100
Gend. Diversity	560	9.558	12.676	0	75
Leverage	1021	0.211	0.197	0	0.768
Size	1021	21.376	1.646	17.401	25.239
Growth	741	0.062	0.252	-0.454	1.271

Moving on to the moderating variables of board governance: Board Size, Independent Board, and Gend. Diversity has average values of 6,404, 44,167, and 9,558. It can be seen that the average company in Indonesia has six board members, the proportion of independent boards is 44%, and the average female board is 10%. Furthermore, the moderating variables we use, such as Leverage, Size, and Growth, have an average of 0.211, 21,376, and 0.062. Regarding leverage, most Indonesian companies have a strong capital structure. The company's size does not seem far apart when viewed from its minimum and maximum values of 17,401 and 25,239, respectively. Meanwhile, the average revenue growth rate is 0.62%.

Pairwise Correlations

Table 3. Presents a correlation matrix that shows the relationship between variables. This test tests variables to determine whether there is a multicollinearity problem. A correlation coefficient value of more than 0.8 can be stated as having a multicollinearity problem (Boulhaga *et al.*, 2023; Gujarati and Porter, 2012). The results of this test show that all variables do not exceed 0.8. Finally, we conclude that our variables are free from multicollinearity problems.

Table 3. Pairwise Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Torbin's Q	1.00							
(2) Environmental	-0.03	1.00						
(3) Board Size	-0.02	0.19	1.00					
(4) Indep. Board	0.10	0.00	-0.21	1.00				
(5) Gend. Diversity	-0.09	-0.07	-0.16	0.15	1.00			
(6) Leverage	-0.06	-0.30	0.03	-0.06	-0.12	1.00		
(7) Size	-0.13	0.32	0.44	0.13	-0.14	0.04	1.00	
(8) Growth	0.01	0.03	-0.04	-0.05	-0.04	-0.07	0.03	1.00

Regression results

In looking at environmental influence on firm performance, we conducted a regression on equation (1). The results show that the coefficient value of environmental on Torbin's Q is -0.0286 with a significance level of 1%. These results indicate a strong influence between environmental performance variables on company performance. This negative result suggests that companies involved in sustainability and environmental investments regulated by specific regulations will increase company costs (Brouwers *et al.*, 2014; Saktiawan *et al.*, 2025). These results support our Hypothesis 1.

Table 4. Regression results with fixed effect(fe) model

	(1) Torbin's Q	(2) Torbin's Q	(3) Torbin's Q	(4) Torbin's Q
Environmental	-0.0286***	-0.0236	-0.0644***	-0.0165*
	(-4.04)	(-1.33)	(-3.62)	(-1.94)
Board Size		0.0567		
		(0.55)		
Board Size x Environmental		-0.0007		
		(-0.27)		
Indep. Board			-0.0237*	
			(-1.65)	
Indep. Board x Environmental			0.0009**	
			(2.41)	
Gend. Diversity				0.00302
				(0.15)
Gend. Diversity x Environmental				-0.0009**
				(-2.13)
Leverage	-3.135***	-3.075***	-3.221***	-3.088***
	(-3.02)	(-2.95)	(-3.20)	(-2.99)
Size	-0.235	-0.263	-0.163	-0.229
	(-1.00)	(-1.09)	(-0.79)	(-0.97)
Growth	0.134	0.151	0.0679	0.0833
	(0.34)	(0.39)	(0.17)	(0.22)
Constant	8.891*	9.128*	8.322*	8.561*
	(1.81)	(1.84)	(1.92)	(1.74)
N. obs.	449	448	448	448
N. Firms	71	71	71	71
r2_w	0.0926	0.0911	0.0629	0.107

Note: *, **, and *** denote significance in 10%, 5%, and 1%, respectively.

As an additional analysis, we also examine the relationship of moderating variables from the relationship between environmental performance and company performance. The results in column (2) show that the environmental variables, board size, and their interactions do not significantly affect the effect. The number of boards does not moderate the relationship between environmental and company performance. This result means that hypothesis 2 is not supported. Column (3) shows a significant effect of the interaction of environmental and independent boards, which has a positive impact. The coefficient value obtained is 0.0009 with a significance level of 5%. The existence of an independent board can weaken the negative relationship between environmental performance and company performance and supports hypothesis 3. Finally, column (4) shows the results of the interaction between environmental and gender diversity, which is negatively significant with a coefficient value of -0.0009 and a significance level of 5%. Gender diversity strengthens the negative relationship between environmental and company performance, thus supporting hypothesis 4.

Furthermore, the only control variable that has an effect is leverage. The results obtained are consistent in all of our regression estimates. High levels of leverage tend to have the opposite company performance.

Robustness test

In testing the results' consistency, we use various alternative proxies and regression methods. The alternative method we use is the Ordinary Least Squares (OLS) regression estimation in column (1). Furthermore, column (2) is tested using Random Effect (RE). In addition, we also test various proxies of company performance, namely ROA, ROE, and ROS, which are each in columns (3), (4), and (5).

Table 6. Robustness test

	(1) Torbin's Q	(2) Torbin's Q	(3) ROA	(4) ROE	(5) ROS
Environment	-0.0286***	-0.0301***	-0.00089***	-0.00209***	-0.00110**
	(-4.04)	(-3.66)	(-4.92)	(-2.70)	(-2.37)
Leverage	-3.135***	-2.321*	-0.246***	-0.210*	-0.287***
	(-3.02)	(-1.92)	(-9.20)	(-1.86)	(-4.20)
Size	-0.235	-1.171**	0.0102	0.0477*	0.0171
	(-1.00)	(-2.47)	(1.48)	(1.92)	(1.08)
Growth	0.134	0.452	0.0560***	0.117***	0.124***
	(0.34)	(1.12)	(5.85)	(2.70)	(4.90)
Constant	8.891*	29.18***	-0.0644	-0.772	-0.163
	(1.81)	(2.91)	(-0.45)	(-1.50)	(-0.49)
N. obs.	449	449	449	449	449
N. Firms	71	71	71	71	71
r2_w	0.0926	0.103	0.314	0.0684	0.162

Note: *, **, and *** denote significance in 10%, 5%, and 1%, respectively.

In the robustness test of alternative regression estimation in columns (1) and (2), we show that the relationship between environmental and company performance has a significant negative result. The regression estimation in the OLS model has a coefficient of -0.0286 with a significance level of 1%. This result is also supported by the RE estimation, which obtains a coefficient of -0.0301 with a significance level of 1%. This result shows that the relationship between environmental performance and company performance is robust in the OLS and RE regression estimations.

Furthermore, columns (3), (4), and (5) show the same results, namely significant negative. The coefficient values of ROA, ROE, and ROS are -0.00089, -0.00209, and -0.00110, respectively. The significance value of ROA and ROE is 1%, while ROS is 5%. This negative result also applies to other company performance indicators. Overall, the results of this robustness test indicate that environmental performance significantly reduces company performance, as evidenced by a strong significance level. After testing other estimation models and indicator variables, the results remain the same. Therefore, our research results are robust and support the validity of our main findings.

Discussion

The results obtained in this analysis indicate a negative relationship between environmental performance and company performance. Financial performance will suffer due to diversifying company resources (Saktiawan *et al.*, 2025). Diversifying company resources to this environmental initiative will result in operational inefficiency (Chen *et al.*, 2023). Environmental responsibility investments do not have a good impact on increasing company value because environmental investments will consume a lot of business capital (Brammer and Pavelin, 2006). In addition to diversifying business capital, the additional costs of environmental investments also cause companies to divert significant costs to environmental responsibility. These results are also supported by the statement of Lozano and Martínez-Ferrero (2022), which states that developing countries pay less

attention to their environmental responsibilities. In line with our research sample, Indonesia is a developing country. Our results align with research (Kalia and Aggarwal, 2023; Saktiawan *et al.*, 2025).

We added an analysis to observe the role of board governance in moderating the relationship between environmental performance and firm performance. We hypothesize that board size, independent board, and gender diversity moderate the relationship between environmental and firm performance. The results we get from the role of board size do not play any role in the relationship between environmental performance and firm performance. The quantity of the board alone is not enough to improve firm performance; quality is also needed (Pane and Nainggolan, 2024). Moving on to the independent board variable, which positively affects firm performance when interacting with the environment, indicates that the independent board has a diversity of perspectives, which perspectives are used to prioritize stakeholder interests (Al-Jaifi *et al.*, 2023). The supervision carried out is strategic supervision that ensures that environmental initiatives can be integrated into broader corporate goals, thereby increasing the proportion of environmental performance to firm performance (Dohrmann *et al.*, 2024). Furthermore, the gender diversity variable strengthens the negative influence of environmental performance and firm performance. This relationship gives rise to complex dynamics. Increased board independence caused by high gender diversity will increase attention to environmental performance (Hillman and Dalziel, 2003). Based on the nature of women who tend to pay attention to ethics and other non-financial aspects (Hollindale *et al.*, 2019). However, the main results of this study, which state that the higher the environmental performance, the lower the company's performance, can align with the results of this moderation. This condition will strengthen the negative relationship.

5. Conclusion

This study examines the effect of environmental performance on company performance in Indonesia. High environmental performance decreases company performance and increases costs greater than the benefits. Looking at the influence further, we find variations in the moderating role of board governance. The board size variable does not moderate this relationship.

In contrast, independent boards and gender diversity have a moderating effect. An Independent board can weaken the negative relationship between environmental and company performance. Conversely, gender diversity shows the opposite result, strengthening the negative relationship between environmental and company performance.

The implications of this study state that corporate governance and environmental strategy need to be aligned. Policymakers must observe the expertise of members of the company's board of directors to balance environmental concerns and company performance. Stakeholder alignment with management is the impact of the role of the independent board. In addition, other independent board roles include monitoring environmental performance and making strategic policies.

The limitations of this study are related to the sample tested. The study focuses on companies in Indonesia and limits the generalization of different governance and regulatory systems. This study also does not consider the specific specifications of the industry concerned because different specifications of each industry can affect the relationship between environmental performance and company performance. Recommendations for future research can be in the form of samples covering several countries so that the results can be more generalized. Furthermore, related to board governance variables, more can be added, such as the Audit Committee or CEO duality, to enrich the literature on this relationship. Finally, it can compare developed and developing countries with different possible results.

References

Adomako, S. and Tran, M.D. (2022), "Stakeholder management, CSR commitment, corporate social performance: The moderating role of uncertainty in CSR regulation", *Corporate Social Responsibility and Environmental Management*, John Wiley & Sons, Ltd, Vol. 29 No. 5, pp. 1414–1423, doi: https://doi.org/10.1002/csr.2278.

Aguiera, R., A. Desender, K. and Castro, L.R.K. (2012), "A bundle perspective to comparative corporate governance", *The SAGE Handbook of Corporate Governance*, SAGE Publications Ltd, London, pp. 379–405, doi: 10.4135/9781446200995.

Akram, F. and Haq, M.A.U. (2022), "Integrating agency and resource dependence theories to examine the impact of corporate governance and innovation on firm performance", *Cogent Business & Management*, Cogent OA, Vol. 9 No. 1, p. 2152538, doi: 10.1080/23311975.2022.2152538.

Al-Jaifi, H.A., Al-Qadasi, A.A. and Al-Rassas, A.H. (2023), "Board diversity effects on environmental performance and the moderating effect of board independence: evidence from the Asia-Pacific region", *Cogent Business and Management*, Cogent, Vol. 10 No. 2, doi: 10.1080/23311975.2023.2210349.

Almaqtari, F.A., Elmashtawy, A., Farhan, N.H.S., Almasria, N.A. and Alhajri, A. (2024), "The moderating effect of board gender diversity in the environmental sustainability and financial performance nexus", *Discover Sustainability*, Springer International Publishing, Vol. 5 No. 1, doi: 10.1007/s43621-024-00517-7.

Aydoğmuş, M., Gülay, G. and Ergun, K. (2022), "Impact of ESG performance on firm value and profitability", *Borsa Istanbul Review*, doi: 10.1016/j.bir.2022.11.006.

Barnett, M.L. and Salomon, R.M. (2012), "Does it pay to be really good? addressing the shape of the relationship between social and financial performance", *Strategic Management Journal*, John Wiley & Sons, Ltd, Vol. 33 No. 11, pp. 1304–1320, doi: https://doi.org/10.1002/smj.1980.

Baron, R.M. and Kenny, D.A. (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research. Conceptual, Strategic, and Statistical Considerations", *Journal of Personality and Social Psychology*, Vol. 51 No. 6, pp. 1173–1182, doi: 10.1037/0022-3514.51.6.1173.

Bhaskaran, R.K., Ting, I.W.K., Sukumaran, S.K. and Sumod, S.D. (2020), "Environmental, social and governance initiatives and wealth creation for firms: An empirical examination", *Managerial and Decision Economics*, John Wiley & Sons, Ltd, Vol. 41 No. 5, pp. 710–729, doi: https://doi.org/10.1002/mde.3131.

Bhattacharjee, A. and Han, J. (2014), "Financial distress of Chinese firms: Microeconomic, macroeconomic and institutional influences", *China Economic Review*, Vol. 30, pp. 244–262, doi: 10.1016/j.chieco.2014.07.007.

Boivie, S., Withers, M.C., Graffin, S.D. and Corley, K.G. (2021), "Corporate directors' implicit theories of the roles and duties of boards", *Strategic Management Journal*, John Wiley & Sons, Ltd, Vol. 42 No. 9, pp. 1662–1695, doi: https://doi.org/10.1002/smj.3320.

Boulhaga, M., Bouri, A., Elamer, A.A. and Ibrahim, B.A. (2023), "Environmental, social and governance ratings and firm performance: The moderating role of internal control quality", *Corporate Social Responsibility and Environmental Management*, Vol. 30 No. 1, pp. 134–145, doi: 10.1002/csr.2343.

Brammer, S. and Pavelin, S. (2006), "Voluntary environmental disclosures by large UK companies", *Journal of Business Finance and Accounting*, Vol. 33 No. 7–8, doi: 10.1111/j.1468-5957.2006.00598.x.

Broadstock, D.C., Matousek, R., Meyer, M. and Tzeremes, N.G. (2020), "Does corporate social responsibility impact firms' innovation capacity? The indirect link between environmental & social governance implementation and innovation performance", *Journal of Business Research*, Elsevier, Vol. 119 No. April 2018, pp. 99–110, doi: 10.1016/j.jbusres.2019.07.014.

Brouwers, R., Schoubben, F., Van Hulle, C., Van Uytbergen, S. and Leuven, K. (2014), "The link between corporate environmental performance and corporate value: A literature review", *Review of Business and Economic Literature* , Vol. 58 No. 4.

Chang, Y.-J. and Lee, B.-H. (2022), "The Impact of ESG Activities on Firm Value: Multi-Level Analysis of Industrial Characteristics", *Sustainability*, doi: 10.3390/su142114444.

Chen, S., Song, Y. and Gao, P. (2023), "Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance", *Journal of Environmental Management*, Elsevier Ltd, Vol. 345 No. September, p. 118829, doi: 10.1016/j.jenvman.2023.118829.

Christensen, D.M., Serafeim, G. and Sikochi, A. (2022), "Why is Corporate Virtue in the Eye of The Beholder? The Case of ESG Ratings", *The Accounting Review*, Vol. 97 No. 1, pp. 147–175, doi: 10.2308/TAR-2019-0506.

Cooper, H. and Hedges, L. V. (1993), *The Handbook of Research Synthesis*, Russell Sage Foundation.

Cordeiro, J.J., Profumo, G. and Tutore, I. (2020), "Board gender diversity and corporate environmental performance: The moderating role of family and dual-class majority ownership structures", *Business Strategy and the Environment*, John Wiley & Sons, Ltd, Vol. 29 No. 3, pp. 1127–1144, doi: https://doi.org/10.1002/bse.2421.

Dohrmann, M., Martinez-Blasco, M., Moring, A. and Margarit, J.C. (2024), "Environmental performance and firm performance in Europe: The moderating role of board governance", *Corporate Social Responsibility and Environmental Management*, No. February, pp. 1–18, doi: 10.1002/csr.2898.

Fama, E.F. and Jensen, M.C. (1983), "Separation of Ownership and Control Separation of Ownership and Control", *Journal of Law and Economics*, Vol. 26 No. 2, pp. 301–325.

Fernández-Kranz, D. and Santaló, J. (2010), "When Necessity Becomes a Virtue: The Effect of Product Market Competition on Corporate Social Responsibility", *Journal of Economics & Management Strategy*, John

Wiley & Sons, Ltd, Vol. 19 No. 2, pp. 453–487, doi: https://doi.org/10.1111/j.1530-9134.2010.00258.x.
Freeman, R.E. (1994), "The Politics of Stakeholder Theory: Some Future Directions", *Business Ethics Quarterly*, Cambridge University Press, Vol. 4 No. 4, pp. 409–421, doi: 10.2307/3857340.
García-Ramos, R. and Díaz, B.D. (2021), "Board of directors structure and firm financial performance: A qualitative comparative analysis", *Long Range Planning*, Vol. 54 No. 6, doi: 10.1016/j.lrp.2020.102017.
Gujarati, D.N. and Porter, D.C. (2012), *Dasar-Dasar Ekonometrika : Basic Econometrics*, Ed. 5 Buku., Jakarta : Salemba Empat, Jakarta.
Hilirisasi, K.I. dan. (2024), "INVEST Magazine Green Investment", *Bkpm.Go.Id*, Jakarta, January.
Hillman, A.J. and Dalziel, T. (2003), "Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives", *The Academy of Management Review*, Academy of Management, Vol. 28 No. 3, pp. 383–396, doi: 10.2307/30040728.
Hollindale, J., Kent, P., Routledge, J. and Chapple, L. (2019), "Women on boards and greenhouse gas emission disclosures", *Accounting & Finance*, John Wiley & Sons, Ltd, Vol. 59 No. 1, pp. 277–308, doi: https://doi.org/10.1111/acfi.12258.
Husted, B.W. and Sousa-Filho, J.M. de. (2019), "Board structure and environmental, social, and governance disclosure in Latin America", *Journal of Business Research*, Vol. 102, pp. 220–227, doi: https://doi.org/10.1016/j.jbusres.2018.01.017.
Iazzolino, G., Bruni, M.E., Veltri, S., Morea, D. and Baldissarro, G. (2023), "The impact of ESG factors on financial efficiency: An empirical analysis for the selection of sustainable firm portfolios", *Corporate Social Responsibility and Environmental Management*, John Wiley & Sons, Ltd, Vol. 30 No. 4, pp. 1917–1927, doi: https://doi.org/10.1002/csr.2463.
Jensen, M.C. and Meckling, W.H. (1976), "Theory of the firm: Managerial behavior, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, doi: 10.1016/0304-405X(76)90026-X.
Jo, H. and Harjoto, M.A. (2011), "Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility", *Journal of Business Ethics*, Vol. 103 No. 3, pp. 351–383, doi: 10.1007/s10551-011-0869-y.
Kalia, D. and Aggarwal, D. (2023), "Examining impact of ESG score on financial performance of healthcare companies", *Journal of Global Responsibility*, Vol. 14 No. 1, doi: 10.1108/JGR-05-2022-0045.
Kehutanan, K.L.H. dan. (n.d.). "Sejarah Proper", *Kementerian Lingkungan Hidup Dan Kehutanan*.
Keuangan, O.J. (2017), *Peraturan Otoritas Keuangan Nomor 51/POJK.03/2017 Tentang Keberlanjutan Keuangan Bagi Lembaga Jasa Keuangan, Emiten, Dan Perusahaan Publik*, Indonesia.
Khurram, M.U., Abbassi, W., Chen, Y. and Chen, L. (2024), "Outward foreign investment performance, digital transformation, and ESG performance: Evidence from China", *Global Finance Journal*, Elsevier Inc., Vol. 60 No. November 2023, p. 100963, doi: 10.1016/j.gfj.2024.100963.
King, A.A. and Lenox, M.J. (2001), "Does It Really Pay to Be Green? An Empirical Study of Firm Environmental and Financial Performance: An Empirical Study of Firm Environmental and Financial Performance", *Journal of Industrial Ecology*, John Wiley & Sons, Ltd, Vol. 5 No. 1, pp. 105–116, doi: https://doi.org/10.1162/108819801753358526.
Kock, C.J., Santaló, J. and Diestre, L. (2012), "Corporate Governance and the Environment: What Type of Governance Creates Greener Companies?", *Journal of Management Studies*, John Wiley & Sons, Ltd, Vol. 49 No. 3, pp. 492–514, doi: https://doi.org/10.1111/j.1467-6486.2010.00993.x.
Kumar, S., Sharma, D., Rao, S., Lim, W.M. and Mangla, S.K. (2022), "Past, present, and future of sustainable finance: insights from big data analytics through machine learning of scholarly research", *Annals of Operations Research*, doi: 10.1007/s10479-021-04410-8.
Li, Y. and Li, S. (2024), "ESG performance and innovation quality", *International Review of Economics and Finance*, Elsevier Inc., Vol. 92 No. February, pp. 1361–1373, doi: 10.1016/j.iref.2024.02.063.
Liang, H. and Renneboong, L. (2020), *Corporate Social Responsibility and Sustainable Finance: A Review of the Literature*, *ECGI Working Paper Series in Finance*, doi: 10.1108/SAMPJ-05-2017-0043.
Lozano, M.B. and Martínez-Ferrero, J. (2022), "Do emerging and developed countries differ in terms of sustainable performance? Analysis of board, ownership and country-level factors", *Research in International Business and Finance*, Vol. 62, doi: 10.1016/j.ribaf.2022.101688.
Lu, L.W. (2021), "The moderating effect of corporate governance on the relationship between corporate sustainability performance and corporate financial performance", *International Journal of Disclosure and Governance*, Vol. 18 No. 3, pp. 193–206, doi: 10.1057/s41310-020-00099-6.
Manusia, K.H. dan H.A. (2007), *Undang-Undang Republik Indonesia Nomor 40 Tahun 2007 Tentang Persereoan Terbatas*, Indonesia.
Mitchell, R.K., Agle, B.R. and Wood, D.J. (1997), "Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts", *The Academy of Management Review*, Academy of Management, Vol. 22 No. 4, pp. 853–886, doi: 10.2307/259247.

Mohammadi, S., Saeidi, H. and Naghshbandi, N. (2021), "The impact of board and audit committee characteristics on corporate social responsibility: evidence from the Iranian stock exchange", *International Journal of Productivity and Performance Management*, Vol. 70 No. 8, pp. 2207–2236, doi: 10.1108/IJPPM-10-2019-0506.

Nguyen, T.H.H., Elmagrhi, M.H., Ntim, C.G. and Wu, Y. (2021), "Environmental performance, sustainability, governance and financial performance: Evidence from heavily polluting industries in China", *Business Strategy and the Environment*, Wiley Online Library, Vol. 30 No. 5, pp. 2313–2331.

Nurhayati, R., Taylor, G., Rusmin, R., Tower, G. and Chatterjee, B. (2016), "Factors determining social and environmental reporting by Indian textile and apparel firms: A test of legitimacy theory", *Social Responsibility Journal*, doi: 10.1108/SRJ-06-2013-0074.

Pane, J.F.R. and Nainggolan, Y.A. (2024), "Board Characteristics and ESG Performance: An Empirical Study of Public Companies in Indonesia", *Syntax Literate*, Vol. 9 No. 11, doi: https://doi.org/10.36418/syntax-literate.v9i11.16921.

Rachmadi, E. and Saktiawan, B. (2024), "Independent directors and profitability: Evidence from Indonesia", *Sebelas Maret Business Review*, Vol. 9 No. 1, p. 67, doi: 10.20961/smbr.v9i1.90198.

Rahmaniati, N.P.G. and Ekawati, E. (2024), "The role of Indonesian regulators on the effectiveness of ESG implementation in improving firms' non-financial performance", *Cogent Business & Management*, Cogent OA, Vol. 11 No. 1, p. 2293302, doi: 10.1080/23311975.2023.2293302.

Saktiawan, B., Risfandy, T., Hanafi, M.M. and Rachmadi, E. (2025), *Environmental Responsibility and Firm Performance in ASEAN-5 Countries: The Moderating Role of Firm Size*, doi: https://dx.doi.org/10.2139/ssrn.5078640.

Saleh, M.W.A. and Maigoshi, Z.S. (2024), "The nexus of ESG and environmental sustainability: Does gender diversity make a difference in Asian companies?", *Environment, Development and Sustainability*, doi: 10.1007/s10668-024-04498-5.

Saleh, M.W.A., Zaid, M.A.A., Shurafa, R., Maigoshi, Z.S., Mansour, M. and Zaid, A. (2020), "Does board gender enhance Palestinian firm performance? The moderating role of corporate social responsibility", *Corporate Governance (Bingley)*, Vol. 21 No. 4, pp. 685–701, doi: 10.1108/CG-08-2020-0325.

Shahbaz, M., Karaman, A.S., Kilic, M. and Uyar, A. (2020), "Board attributes, CSR engagement, and corporate performance: What is the nexus in the energy sector?", *Energy Policy*, Elsevier Ltd, Vol. 143 No. May, p. 111582, doi: 10.1016/j.enpol.2020.111582.

Shin, D. (2024), *ESG Shifts in Lending and the Cost of Bank Loans*, *SSRN Electronic Journal*, doi: https://dx.doi.org/10.2139/ssrn.3740710.

Siedschlag, I. and Yan, W. (2023a), "Do green investments improve firm performance? Empirical evidence from Ireland", *Technological Forecasting and Social Change*, Elsevier Inc., Vol. 186 No. PB, p. 122181, doi: 10.1016/j.techfore.2022.122181.

Siedschlag, I. and Yan, W. (2023b), "Do green investments improve firm performance? Empirical evidence from Ireland", *Technological Forecasting and Social Change*, Vol. 186, p. 122181, doi: https://doi.org/10.1016/j.techfore.2022.122181.

The Global Sustainable Investment Alliance. (2018), *Global Sustainable Investment Review*, *The Global Sustainable Investment Alliance*.

Wu, S., Li, X., Du, X. and Li, Z. (2022), "The Impact of ESG Performance on Firm Value: The Moderating Role of Ownership Structure", *Sustainability (Switzerland)*, Vol. 14 No. 21, pp. 1–22, doi: 10.3390/su142114507.

Yilmaz, M.K., Hacioglu, U., Tatoglu, E., Aksoy, M. and Duran, S. (2023), "Measuring the impact of board gender and cultural diversity on corporate governance and social performance: evidence from emerging markets", *Economic Research-Ekonomska Istraživanja*, Routledge, Vol. 36 No. 2, p. 2106503, doi: 10.1080/1331677X.2022.2106503.

Zhang, D., Rong, Z. and Ji, Q. (2019), "Green innovation and firm performance: Evidence from listed companies in China", *Resources, Conservation and Recycling*, Vol. 144, pp. 48–55, doi: https://doi.org/10.1016/j.resconrec.2019.01.023.