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Board Composition and Greenwashing: Does Managerial Ownership Matter?

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Abstract: Awareness of environmental issues has become a focus for all parties. United Nations has focused on sustainability, and Indonesia has joined in supporting efforts to address it. This has led the Indonesian government to issue regulations requiring companies to participate in sustainability initiatives and report on them. Many have submitted sustainability reports, yet numerous companies still receive low ratings from the Ministry of Environment regarding their concrete actions on sustainability. This may indicate greenwashing. To address this issue, effective corporate governance is necessary, particularly through board size and board gender diversity. The objective of this study is to analyze the influence of board size and board diversity on greenwashing, with managerial ownership serving as a moderator. The research method used in this study is quantitative research. The research subjects are companies listed on the Indonesia Stock Exchange that employ a two-tier board structure, dividing the board into the board of directors and the board of commissioners. The results of this study indicate that neither the size of the board of directors nor that of the board of commissioners influences greenwashing. Gender diversity among board directors and commissioners reduces greenwashing. Managerial ownership only strengthens the influence of board diversity on greenwashing.

Keyword: Board Size, Gender Diversity, Greenwashing, Managerial Ownership, Two-Tier Context.

INTRODUCTION

Awareness of environmental issues has become a focus for all parties. The United Nations (UN), in the Rio Declaration and Agenda 21 in 1992, also addressed environmental and development issues, highlighting international strategies for a sustainable economy (Houssam et al., 2023). Discussions on addressing these environmental issues continued, leading to the 2030 Agenda for Sustainable Development titled “Transforming Our World: the 2030 Agenda for Sustainable Development” published on September 25, 2015, by the United Nations (United Nations, 2023). In response to this, Indonesia has joined in supporting this agenda by establishing a vision for a strategy to achieve low-carbon and

climate-resilient development by 2050, through which Indonesia aims to achieve low emissions by 2030 and net-zero emissions by 2060 or sooner (Zhong et al., 2025).

In the economic sector, to support the achievement of this vision, Indonesia issued Financial Services Authority Regulation No. 51/POJK.03/2017 on the implementation of sustainable finance for financial services institutions, issuers, and public companies, which requires companies to take responsibility for environmental issues and report on them in their sustainability reports (Indonesia, 2017). Sustainability reporting has gained strong momentum, reflected in the impressive increase in companies publishing these reports each year. At the Indonesia RE International Conference (IIC) in 2024, it was highlighted that companies listed on the Indonesia Stock Exchange (IDX) showed continuous growth in sustainability reporting from 2019 to 2024. The numbers tell a compelling story: 54 reports in 2019, surging to 153 in 2020, then 661 in 2021, 842 in 2022, 873 in 2023, and reaching 882 in 2024 (Indonesia Re International Conference (IIC) Organizing Committee, 2024).

According to a survey conducted by Kata Data (2024), 91–95% of companies report on sustainability, citing corporate value and environmental or social contributions as their reasons. However, many companies still cite compliance with regulations, improving their reputation, and investor demand as their primary motivations. This highlights the fact that companies have not yet fully recognized that concern for the environment, social issues, and governance is a corporate responsibility. This is supported by data from the Decree of the Minister of Environment and Forestry of the Republic of Indonesia regarding the Results of the Assessment of Corporate Performance Ratings in Environmental Management for 2022–2023, which shows that 13 companies received a green rating, 80 companies received a blue rating, 13 companies received a red rating, and 8 companies were suspended (Indonesia, 2024).

Based on Regulation of the Minister of Environment and Forestry of the Republic of Indonesia No. 1 of 2021 on the Program for Assessing Corporate Performance Ratings in Environmental Management, a Green rating indicates that a company's performance exceeds the required standards. A Blue rating indicates that a company's performance meets the required standards. A Red rating indicates that the company's performance falls below the required standards. A Suspended rating signifies a suspension of the rating due to the company being subject to administrative sanctions. This shows that many companies still do not meet required environmental standards, despite disclosures in sustainability reports (Indonesia, 2021).

One company that has not yet implemented sustainable management practices in accordance with regulatory requirements is PT Aneka Tambang Tbk (ANTAM), which received a suspended rating. For example, according to Mongbay (2021), ANTAM has been found to be polluting the coast of East Halmahera due to its mining activities. Despite this, in Antam's 2023 sustainability report, the company appears to gloss over this issue by instead highlighting its efforts to improve the welfare of the Halmahera community through the development of the Halmahera Coffee Farmers program. This phenomenon is known as greenwashing, specifically under the category of distraction.

Greenwashing is highly detrimental to various parties, particularly investors, and can erode trust in a company. To prevent investors from falling victim to greenwashing, it is essential to consider several aspects of a company before making an investment. As explained by the Ministry of Investment and Downstream Industries in 2022, there are three key aspects within the Sustainable Investment Indicators that investors should consider before investing: the economic aspect, the environmental aspect, and the social aspect. Within the social aspect, investors should consider the board of commissioners, the board of directors, and gender representation (Indonesia, 2022). These aspects were selected because, to mitigate greenwashing risk, companies need better corporate governance. A larger board

enhances governance in long-term decision-making and brings more diverse expertise (Ghazalat, 2025), 2025). With more varied expertise, board members provide broad perspectives on responsible actions for environmental issues. This reduces greenwashing practices. Gender diversity on the board, meaning the presence of women, creates a positive impression. Women have characteristics distinct from men, such as being more attentive to ethics and better at risk avoidance (Satrio, 2026). Their presence can help protect the company from irresponsible sustainability practices, including greenwashing.

In this study, board size and gender diversity will be divided into two categories: the board of directors and the board of commissioners. This study will employ a two-tier structure because the research subjects are companies whose shares are listed on the Indonesia Stock Exchange (IDX). Indonesia's corporate governance uses a two-tier system: a board of directors manages the company, while a board of commissioners supervises (World Bank, 2005). The directors manage under the commissioners' oversight, providing them with the information needed for decisions. The commissioners are accountable to shareholders, ensuring that management acts in the company's best interests (Arifah et al., 2023). As noted by Astami et al., (2024) this structure addresses weaknesses in single-level oversight, where the same board acts as both executive and supervisor. The implementation of this two-tier system represents an innovation in this study, as it differs from previous research conducted by Ghitti et al. (2024), which used a one-tier system. Specifically, the one-tier system combines management and oversight duties into a single role, making it unsuitable for application in research where the research subjects are located in Indonesia.

This study uses managerial ownership as a moderating variable. When the board acts as both agent and owner by holding company shares, its interests align more closely with company goals. Managerial ownership helps the board make decisions about environmental responsibilities that protect its interests, both as executives and owners, and reduces greenwashing practices. This study will use stakeholder theory and agency theory to explain the relationships among the variables

Stakeholder theory holds that companies must consider the interests of all stakeholders, not just shareholders (Freeman, 1984). Donaldson & Preston, (1995) identified key stakeholder groups, including government, investors, political groups, customers, communities, employees, trade associations, and suppliers. A company's ability to succeed depends on proactive management of these relationships. Effectively balancing these interests allows firms to create strategies that support both stakeholder needs and long-term business sustainability. The government requires companies to address environmental issues and submit sustainability reports. Companies also seek investors by emphasizing their environmental initiatives. Government mandates and investor interests can create opportunities for greenwashing. To reduce these risks, companies need strong corporate governance, especially through appointing qualified directors and commissioners. Stakeholder theory will explain the relationship among companies, investors, directors, and commissioners.

This study uses managerial ownership as a moderating variable, explained through agency theory. As proposed by Jensen & Meckling (1976), agency theory defines a contractual relationship where owners delegate authority to another party, potentially leading to opportunistic behavior. This relationship can cause information asymmetry, resulting in agency conflicts—especially when agents act as both executors and owners, such as directors or commissioners holding company shares. When this dual role exists, their goals can align. Therefore, this study examines how managerial ownership affects the link between board size, board gender diversity, and greenwashing within the agency theory framework.

Greenwashing occurs when a company's environmental claims are not supported by its actual operational practices, thereby misleading stakeholders (Sterbenk et al., 2022).

Greenwashing can also be defined as the voluntary and deliberate dissemination of false environmental information by companies to mislead the public (Ferrón Vilchez et al., 2020). The study by Ma & Ahmad (2024) defines greenwashing as a negative corporate strategy to project a positive social image regarding environmental performance. However, greenwashing can have significant negative impacts, including reputational damage, loss of consumer trust, regulatory sanctions, and operational disruptions.

A study by Yang et al. (2020) defines six categories of greenwashing. Selective disclosure is when companies share only certain information about their actual practices, leaving out negative details. Decoupling occurs when companies claim to follow sustainable practices but do not actually implement them. Attention deflection refers to strategies that shift stakeholders' focus away from unethical behavior. Deceptive manipulation involves using sustainability messaging to falsely present a company's products or goals as environmentally friendly. Dubious authorizations and labels happen when a company authorizes third parties to give the impression of environmental compliance. Inefficient public voluntary programs arise when companies participate in government programs but fail to achieve real environmental improvements.

Board size refers to the total count of directors and commissioners (Thendean & Meita, 2019). Board size influences the board's decision-making effectiveness. Theoretically, increasing the number of directors yields both advantages and higher costs (Treepongkaruna et al., 2024). A larger board can strengthen corporate governance in long-term decision-making. Larger boards can introduce varied expertise (Ghazalat, 2025). A larger board brings together diverse information and experiences, fostering a broader perspective. This diversity can enhance decision-making on sustainability responsibilities and reporting, which in turn helps reduce the likelihood of greenwashing.

In this study, gender diversity refers specifically to examining the representation and roles of women within an organization. Gender diversity on the board demonstrates positive effects; specifically, gender diversity on the board can mitigate risks and enhance corporate performance (Ma & Ahmad, 2024). The presence of women on the board creates a positive impression on corporate governance; women are believed to possess individual characteristics distinct from men, thereby offering a different perspective and making them more attentive to ethical issues and risk avoidance (Satrio, 2026). Accordingly, the involvement of women on boards is viewed as beneficial, as they are considered more capable of making decisions and overseeing sustainability responsibilities and reporting, which can help mitigate the risk of greenwashing.

Managerial ownership refers to the number of shares held by individuals in managerial roles, including directors and commissioners (Francis et al., 2025). Such share ownership can align management's interests with those of shareholders, as managers who own shares tend to focus more on protecting their own financial interests. This situation will lead to risk aversion that is detrimental to the board as shareholders, so the board will make decisions and exercise oversight to prevent the company from engaging in greenwashing.

The novelty of this study lies in the fact that previous research examining the influence of boards of directors and commissioners on greenwashing has yielded mixed results. The board size variable has produced inconsistent results across several studies. As in previous research (Ghitti et al., 2024), the effect of board size on greenwashing is not significant, or board size has not been able to address greenwashing practices; and Poiriazi et al. (2025) found that larger board size can reduce the risk of greenwashing because larger boards typically form special committees to address sustainability issues. The representation of women on boards of directors has become a particular focus, as it is a step toward gender equality. Previous research (Ghitti et al., 2024; Poiriazi et al., 2025) treated the board of directors and the board of commissioners as a single unit. In contrast, this study will separate

the board of directors and the board of commissioners, as Indonesia adopts a two-tier board system. The managerial ownership will also be included as moderating variables. The aim of this research is to help investors avoid greenwashing perpetrated by irresponsible companies. This study also contributes to SDG 5 (Gender Equality) and SDG 13 (Climate Action), which are key to achieving Indonesia's Net Zero Emissions goal.

Conflicts of interest can arise in corporate governance, especially when shareholders pursue higher stock value and profits, while sustainability initiatives impose high costs that affect company finances. To protect profits and image, boards may issue misleading disclosures. Effective corporate governance through a larger and more gender-diverse board can help manage these conflicts, reduce disclosure risks, and balance the interests of all stakeholders. A larger board size helps companies avoid greenwashing. This is because a larger board can improve corporate governance regarding long-term decision-making, provide a wider range of expertise, and offer a broader perspective, thereby reducing the occurrence of greenwashing. Research conducted by Poiriazi et al. (2025) dan Jamil & Wahyuni (2025) indicates that board size has a negative effect on greenwashing.

H1: The size of the board of directors has a negative effect on greenwashing

H2: The size of the board of commissioners has a negative effect on greenwashing

This study examines how the presence of women on a board influences greenwashing. Women on boards often bring new perspectives, focus on ethical issues, take a long-term view, and avoid risk. These traits can support stronger decision-making on how companies report and implement sustainability, reducing greenwashing. Studies by Ma & Ahmad (2024); Nepal et al. (2025); Zahid et al. (2025) show that having women on boards reduces greenwashing.

H3: Gender diversity on the board of directors has a negative effect on greenwashing

H4: Gender diversity on the board of commissioners has a negative effect on greenwashing

Managerial ownership by the board refers to the board's ownership of the company's shares. This ownership gives the board a sense of ownership of the company. Consequently, in managing and overseeing the company, the board shares aligned objectives as an operator, supervisor, and owner. This prevents agency conflicts, as described in agency theory. With this sense of ownership, the board will be more cautious in its decision-making and will consider its own interests as owners. Therefore, the board's managerial ownership is considered to strengthen the influence of board size on greenwashing. Research conducted by Liu et al. (2026); Xu et al. (2026); Zhu et al. (2024) also found that managerial ownership can influence board sustainability decision-making and reduce greenwashing.

H5: Managerial ownership strengthens the influence of the board of directors' size on greenwashing

H6: Managerial ownership strengthens the influence of the board of commissioners' size on greenwashing

The presence of women on boards has a positive impact on corporate governance. Women are considered to pay more attention to ethical issues and long-term goals. When women on boards hold managerial ownership, they are better positioned to reduce the likelihood of greenwashing practices. This is because holding company shares tends to encourage consideration of long-term initiatives, the allocation of resources to support corporate sustainability, and the making of long-term decisions that comply with environmental standards. Consequently, this can reduce the occurrence of greenwashing. Research by Liu et al. (2026); Xu et al. (2026); Zhu et al. (2024) also found that managerial ownership can influence board decision-making and reduce greenwashing.

H7: Managerial ownership strengthens the influence of the board of directors' gender diversity on greenwashing

H8: Managerial ownership strengthens the influence of the board of commissioners' gender diversity on greenwashing

METHOD

This quantitative study uses secondary data collection, in which data are obtained not directly by the researcher but through intermediaries such as annual reports and data provider websites (LSEG Workspace and ESG Intelligence). The research applies a panel data design, which combines objects of observation and time, or more specifically, merges time series and cross-sectional data (Wibowo, 2025). In this case, the study analyzes companies across all sectors listed on the Indonesia Stock Exchange (IDX) for the period from 2022 to 2023.

The population of this study consists of all companies whose shares were listed on the Indonesia Stock Exchange (IDX) from 2022 to 2023. The sample includes companies listed on the IDX in that period that satisfy the following selection criteria: (1) publication of both annual and sustainability reports, and (2) availability of an ESG Disclosure Score and an ESG Performance Score. Purposive sampling will be used to select companies meeting these criteria.

Tabel 1. Sample Selection

Selection criteria	Observations
Publication Of Both Annual and Sustainability Reports (2022 and 2023)	1.728
Doesn't Has an ESG Performance Score	(1.542)
Doesn't Has an ESG Disclosure Score	(4)
Final observations	182

Source: Research Data

Greenwashing is measured by comparing ESG disclosures, assessed using the ESG Disclosure Score, and actual ESG performance, assessed using the ESG Performance Score (Ghitti et al., 2024; Sensharma et al., 2022). The ESG Disclosure Score, from ESG Intelligence, is based on the total environmental, social, and governance items reported by the company. The ESG Performance Score, from LSEG Workspace, reflects the company's ESG performance. This metric indicates that if a company's ESG disclosure score is higher than its ESG performance score, it is suspected of greenwashing, and vice versa.

$$\text{Greenwashing} = \text{ESG Disclosure} - \text{ESG Performance Score}$$

This study investigates two independent variables: board size and gender diversity. Board size is assessed by the total number of directors and commissioners on each board, following the measurement used by Issa et al. (2021) and Nashirudin & Rosadi (2025). Treepongkaruna et al. (2024) found that larger boards bring more information, experience, and diversity, leading to better decisions and fewer ESG controversies.

Building on this, the inclusion of women on boards—as the primary indicator of gender diversity—has become a key issue in corporate governance. Female board leadership fosters a more ethical and socially responsible corporate environment (Dah et al., 2025). According to Areneke et al. (2023), gender diversity can enhance a company's ability to adopt good governance practices, and the presence of women brings broader perspectives and creativity to the board. Accordingly, this study specifically focuses on the proportion of women on boards as its gender diversity variable. To measure gender diversity, the research approach used in (Nashirudin & Rosadi, 2025; Quoc Trung, 2022) will be employed; the measurement for gender diversity is as follows:

$$\text{Board of Directors Gender Diversity} = \frac{\text{Number of women directors}}{\text{Total directors}}$$

$$\text{Board of Commissioners Gender Diversity} = \frac{\text{Number of women commissioners}}{\text{Total commissioners}}$$

Board managerial ownership is defined as the shareholding held by directors and commissioners as a percentage of the company's total shares (Y. Liu, 2023). This managerial ownership can foster the board's motivation toward a long-term orientation to create value (Ongsakul et al., 2025). In line with established research, this study will measure managerial ownership using commonly adopted approaches in the literature, thereby allowing for consistent comparison and validity (Wei et al., 2024; Yanto et al., 2024). The measurements for managerial ownership are as follows:

$$\text{Board of Directors Share Ownership} = \frac{\text{Total share owned by the directors and commissioners}}{\text{Total share}}$$

To analyze the effects of board size and board gender diversity on greenwashing, with managerial ownership as a moderating variable, EViews will be used to process the data. Two regression models will be used: the first to examine the direct effects, and the second to include the moderating effect of managerial ownership.

$$\begin{aligned} GWS_{it} &= \alpha + \beta_1 SBD_{it} + \beta_2 SBC_{it} + \beta_3 GDD_{it} + \beta_4 GDC_{it} + \beta_5 MO_{it} + \epsilon_{it} \\ GWS_{it} &= \alpha + \beta_1 SBD_{it} + \beta_2 SBC_{it} + \beta_3 GDD_{it} + \beta_4 GDC_{it} + \beta_5 MO_{it} + \delta_1 (SBD_{it} \times MO_{it}) \\ &\quad + \delta_2 (SBC_{it} \times MO_{it}) + \delta_3 (GDD_{it} \times MO_{it}) + \delta_4 (GDC_{it} \times MO_{it}) + \mu_i + \theta_i + \epsilon_{it} \end{aligned}$$

In this regression, GWS stands for greenwashing, SBD for the size of the board of directors, SBC for the size of the board of commissioners, GDD for gender diversity on the board of directors, GDC for gender diversity on the board of commissioners, MO for managerial ownership.

RESULT AND DISCUSSION

Table 2 presents the descriptive statistical analysis for this study. Greenwashing had the highest value of 0.42, the lowest value of -0.67, and a mean of -0.02. This indicates that there are still companies suspected of engaging in greenwashing practices, as evidenced by the presence of positive values in the greenwashing scores. A positive value indicates that the company's disclosures exceed what it actually does. However, the mean value of -0.02 suggests that, on average, the companies in this study have made greater tangible efforts toward environmental responsibility than is disclosed in their sustainability reports. The sizes of the board of directors and the commissioners are the same, with a maximum of 15 and a minimum of 2. This minimum requirement confirms that the company has complied with the provisions of Law No. 40 of 2007 of the Republic of Indonesia on the minimum composition of the boards of directors and commissioners of public companies, namely two members on each board. Gender diversity on the boards, as indicated by the proportion of women on the boards, has the same scale for both the board of directors and the board of commissioners, with a maximum value of 0.75 (75% women on the board) and a minimum value of 0 (no women on the board). Managerial ownership has a maximum value of 1.01, yet some companies still lack it.

Tabel 2. Statistic Descriptive

	Mean	Median	Max.	Min.	Std. Dev
GWS	-0.02	0.01	0.42	-0.67	0.22
SBD	6.74	6.00	15.00	2.00	2.59
SBC	5.77	5.00	15.00	2.00	2.44
GDD	0.16	0.15	0.75	0.00	0.17

	Mean	Median	Max.	Min.	Std. Dev
GDC	0.14	0.13	0.75	0.00	0.15
MO	0.05	0.00	1.01	0.00	0.18

Source: Data Analysis Results

Classical assumption tests were conducted in this study. The normality test was performed using the Jarque-Bera statistic, yielding a result of 2.622630. This result indicates that the data in this study is normally distributed because the Jarque-Bera value is greater than 0.05. The data in this study passed the multicollinearity test; the results are shown in Table 3, which indicates that the correlation coefficients between variables are less than 0.8.

Tabel 3. Multicollinearity Test

	SBD	SBC	GDD	GDC	MO
SBD	1	0.59	0.09	-0.24	-0.08
SBC	0.59	1	-0.11	-0.20	-0.17
GDD	0.09	-0.11	1	0.11	-0.01
GDC	-0.24	-0.20	0.11	1	-0.02
MO	-0.08	-0.17	-0.01	-0.02	1

Source: Data Analysis Results

A heteroscedasticity test was conducted, and the results are shown in Table 4. The table shows that the probability values for all variables exceed 0.05, indicating no heteroscedasticity in the data.

Tabel 4. Heteroskedasticity Test

Variable	Prob.
C	0.0001
SBD	0.1581
SBC	0.8831
GDD	0.8650
GDC	0.9908
MO	0.1061

Source: Data Analysis Results

Model selection was performed using three model selection tests: the Chow test, the Hausman test, and the Lagrange Multiplier test. Turning to the analytical approach, the results of the model selection are shown in Table 5. The first test was conducted using the Chow test, with a chi-square value of $0.0000 < 0.05$, so the selected model was the FEM (Fixed-effects model). This was followed by the Hausman test, with a probability value of $0.4002 > 0.05$, resulting in the selection of the REM (Random Effects Model), and the final test—the Lagrange multiplier test—yielded a Breusch-Pagan statistic of $0.00 < 0.05$. Therefore, the appropriate regression model for this study is the REM or Random Effects Model.

Tabel 5. Model Selection Test

Test	Result	Decision
Chow	Chi-Square $0.0000 < 0.05$	FEM
Hausman	Prob. $0.4002 > 0.05$	REM
LM	Breusch-Pagan $0.00 < 0.05$	REM

Source: Data Analysis Results

The regression results using the random effects model in the first stage of the regression yielded a probability value of $0.2189 > 0.05$ for SBD and $0.3619 > 0.05$ for SBC, so H1 and H2 are rejected. The probability values for GDD are $0.0029 < 0.05$ and for GDC are $0.0374 < 0.05$.

0.05; therefore, H3 and H4 are significant, and the coefficients for GDD and GDC are negative. The adjusted R^2 value is 0.069592, indicating that SBD, SBC, GDD, GDC, and MO explain 6.7% of greenwashing, with the remainder explained by other variables.

Tabel 6. Phase I Regression Test

Variable	Coefficient	t-Statistic	Prob.
C	0.194191	2.949673	0.0036
SBD	-0.010846	-1.233896	0.2189
SBC	-0.008721	-0.914045	0.3619
GDD	-0.315013	-3.021675	0.0029
GDC	-0.252415	-2.097439	0.0374
MO	-0.003669	-0.033509	0.9733
Adj. R^2	0.069592		
F-Stat.	3.707655		0.003243

Source: Data Analysis Results

The results of the second-stage regression were used to test moderation in this study. SBDxMO, SBCxMO, and GDCxMO have p-values < 0.05 , so H6, H7, and H9 are rejected. GDDxMO has a probability value of $0.0233 < 0.05$ and a coefficient of -2.542308, indicating a significant negative relationship, and H8 is accepted.

Tabel 7. Phase II Regression Test

Variable	Coefficient	t-Statistic	Prob.
SBDxMO	-0.062666	-0.923611	0.3570
SBCxMO	0.195463	1.632321	0.1044
GDDxMO	-2.542308	-2.289458	0.0233
GDCxMO	0.055242	0.038951	0.9690

Source: Data Analysis Results

The Effect of Board Size on Greenwashing

Based on the regression analysis, the probability value for the size of the board of directors on greenwashing was $0.2189 > 0.05$, with a coefficient of -0.010846. The probability value for the size of the board of commissioners on greenwashing was $0.3618 > 0.05$, with a coefficient of -0.008721. Based on these results, H1 and H2 are rejected. These findings contradict the research by Jamil & Wahyuni (2025) and Poiriazi et al. (2025). However, they align with the study by Ghitti et al. (2024) and Yu et al. (2020) which states that board size does not influence greenwashing. Board size is considered to not affect greenwashing because larger boards of directors and commissioners are thought to increase costs, lead to free-riding, coordination problems among board members, slower decision-making, and supervisory inefficiencies

The Effect of Board Gender Diversity on Greenwashing

Table 6 shows that the p-value for the relationship between gender diversity on the board of directors and greenwashing is 0.0029 ($p < 0.05$), with a coefficient of -0.315013. This indicates that the presence of women on the board of directors has a negative effect on greenwashing. For every 1% increase in the gender diversity of the board of directors, greenwashing decreases by -0.315013, so H3 is accepted. The probability value of the gender diversity of the board of commissioners regarding greenwashing is $0.0374 < 0.05$, and the coefficient is -0.252415. This indicates that the presence of women on the board of commissioners negatively affects greenwashing: a 1% increase in gender diversity on the board results in a decrease in greenwashing of -0.252415. Based on this, it can be concluded that H4 is accepted. These findings align with the research by (Ma & Ahmad (2024); Nepal et

al. (2025); Zahid et al. (2025) who found that the presence of women on boards can reduce the likelihood of greenwashing. The presence of women on boards of directors and commissioners is considered more ethical, seeks to protect all stakeholders, and can reduce financial and information fraud (Ma & Ahmad, 2024). Nepal et al. (2025) states that the presence of women on the board brings diverse perspectives and a broader way of thinking to the consideration and oversight of sustainability responsibilities and reporting.

Managerial Ownership Moderates the Effect of Board Size on Greenwashing

The regression results for the moderating variables are presented in table 7, the table indicates that the p-values for H5 and H6 are $0.3570 > 0.05$ and $0.1044 > 0.05$, respectively. These values suggest that managerial ownership does not strengthen the effect of board of director's size or board of commissioner's size on greenwashing. These results contradict the findings of Liu et al. (2026); Xu et al. (2026); and Zhu et al. (2024) but align with those of Akermi & Amar (2025) and Aulia Indy et al. (2022). In this study, many companies have low levels of managerial ownership, and many do not have managerial ownership at all; this was also found in the study by Indy et al. (2022). High managerial ownership by the board is considered to encourage the board to make short-term decisions for personal gain rather than considering long-term interests regarding environmental responsibility (Akermi & Amar, 2025). Larger boards with managerial ownership provide diverse perspectives but also lead to free-riding, resulting in ineffective coordination among board members and an inability to reduce greenwashing practices

Managerial Ownership Moderates the Effect of Board Gender Diversity on Greenwashing

Managerial ownership strengthens the effect of board of directors' gender diversity on greenwashing, as evidenced by a p-value of 0.0233 and a coefficient of -2.542308. Based on these results, it can be concluded that managerial ownership negatively affects the relationship between the board of directors' gender diversity and greenwashing; therefore, H7 is accepted. A 1% increase in managerial ownership strengthens the effect of the board of directors' gender diversity on greenwashing by -2.542308, indicating that higher managerial ownership enhances the role of the board of directors' gender diversity in reducing greenwashing. These results align with those of Liu et al. (2026); Xu et al. (2026); and Zhu et al. (2024). The composition of the board of directors is considered to offer a more diverse perspective, greater attention to ethical issues, a long-term orientation, and a focus on risk avoidance. Therefore, the presence of women on the board and their involvement in managerial roles can help reduce the occurrence of greenwashing. Female directors will establish policies that protect the company from the risk of greenwashing by fulfilling sustainability responsibilities and reporting transparently on actions taken. This approach ensures a long-term orientation and protects both the company and the director herself as a stakeholder from losses. Managerial ownership does not strengthen the effect of the board of commissioners' gender diversity on greenwashing, as evidenced by a p-value of $0.9690 > 0.05$, thus rejecting H8. In this study, many companies still have low levels of managerial ownership, and many do not have managerial ownership at all; this was also found in Indy et al. (2022). The presence of female in board of commissioners is considered to provide higher integrity in monitoring greenwashing; thus, even without managerial ownership, gender diversity on the board is sufficiently effective in reducing greenwashing.

CONCLUSIONS AND RECOMMENDATIONS

This study aims to analyze the effects of SBD, SBC, GDD, and GDK on GWS, with MO serving as a moderator. The analysis indicates that SBD and SBC do not affect GWS. GDD and GDK have a significant negative effect on GWS, meaning that the presence of women on the board can reduce greenwashing. MO does not amplify the effects of SBD, SBC, and GDK on GWS. However, MO can amplify the effect of GDD on GWS. Based on these findings, investors may wish to consider the proportion of women on the board of directors and the board of commissioners when seeking companies that demonstrate integrity regarding sustainability issues and wish to avoid the risk of greenwashing. They should also consider whether women hold executive positions on the board of directors. Additionally, companies can use these findings as a basis for including women on their boards.

This study also has limitations. The adjusted R^2 value is low because many factors influence greenwashing. These factors may have a greater impact than board composition. Additionally, the data lacks diversity. Nearly all companies and years have similar values due to the use of proportions, which also reduces the magnitude of their individual contributions. Recommendations for future research include using other variables, such as independent commissioners, special committees on sustainability issues, and auditors specifically tasked with auditing sustainability reports, as independent variables. Future research may also incorporate control variables such as firm size, ROA, and leverage. In future research, it is also recommended to use the same sources to derive ESG disclosure and ESG performance scores to avoid discrepancies in score measurement.

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