Does Greenwashing Hurt Firm Value? The Moderating Role of Corporate Governance

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ABSTRACT

Sustainability pressures have driven many firms to engage in greenwashing. This study examines the relationship between greenwashing and firm value, considering corporate governance as moderating variables. Greenwashing is measured through content analysis that incorporates both qualitative disclosures and quantitative indicators, such as monetary value and weight units. The authors employ panel data regression on firms listed in the ASEAN-5 countries—Indonesia, Malaysia, Thailand, the Philippines, and Singapore—covering the period 2017–2022. This study finds that greenwashing significantly reduces firm value and that corporate governance moderates the relationship between greenwashing and firm value. Specifically, the market penalizes firms with higher board independence and larger boards more severely when they engage in greenwashing. However, this study does not find that corporate governance has a significant impact on the likelihood of greenwashing. Overall, this study highlights how market perceptions of governance influence the impact of greenwashing on firm value.

1. INTRODUCTION

Greenwashing refers to a deceptive practice in which companies provide misleading information about their environmental performance to appear more sustainable than they actually are [1, 2]. This practice exposes firms to reputational and strategic sustainability risks by eroding the trust of shareholders and stakeholders [3, 4]. One of the most notable cases was the Volkswagen (VW) scandal, where the company falsely claimed its diesel vehicles were environmentally friendly while manipulating emissions test results [5]. Such misconduct significantly damaged the firm's reputation and value [6].

Previous studies on greenwashing have primarily focused on the product and marketing levels, exploring constructs such as green brand trust, green brand equity, and green purchase behavior [7-9]. In contrast, studies examining firm-level greenwashing, particularly within accounting and finance, remain relatively limited [10, 11]. Moreover, empirical findings on the relationship between greenwashing and firm value are inconsistent. Some studies report a negative relationship [12], while others find a positive or insignificant association [6, 13].

Corporate governance plays a vital role in monitoring and controlling managerial behavior related to ESG disclosure. Elements such as board independence, gender diversity, and board size have been shown to affect firm performance [14] and the quality of sustainability reporting [15]. Weak governance allows management to engage in opportunistic

impression management that can mislead stakeholders [16, 17]. Several studies also find that strong corporate governance helps reduce greenwashing [18] and mitigate its negative effect on firm value [19].

Most ESG and greenwashing studies focus on Western countries such as the United States, the United Kingdom, and China [20]. In contrast, ASEAN countries, despite being the world's fifth-largest economic bloc by GDP [21], operate under regulatory environments and governance structures that differ substantially from those in advanced markets. This distinction is theoretically meaningful because prior evidence on the governance–greenwashing nexus is highly fragmented: board independence has been shown to either increase greenwashing [12], or reduce it [18], and higher symbolic disclosure tendencies, while board size remains inconclusive across settings.

The ASEAN-5 region provides an important setting to revisit these inconsistencies, as firms operate within heterogeneous institutional arrangements, including widely discussed concerns about tokenistic board appointments and, in certain jurisdictions. One of them is Indonesia, a two-tier governance structure that separates supervisory and managerial authority. Although this study does not analyze countries individually, aggregating ASEAN-5 firms enables the capture of these structural variations within a single empirical framework, offering a unique opportunity to observe how governance mechanisms function under evolving ESG regulations and varying board authority structures. Consequently, the ASEAN-5 context allows for a more precise

identification of when governance moderates the relationship between greenwashing and firm value, helping reconcile the fragmented findings across Western and Chinese studies and addressing the limited attention to Southeast Asian governance systems in prior research.

The study investigates the effect of greenwashing on firm value and the moderating role of corporate governance on the relationship between greenwashing and firm value. Using content analysis of sustainability reports and panel data comprising 2,406 firm-year observations from the five ASEAN countries for the period of 2017-2022, the results indicate that greenwashing significantly reduces firm value. These results highlight that greenwashing is an irresponsible practice that harms firm value [22, 23]. This study also finds that corporate governance mechanisms moderate the relationship between greenwashing and firm value. Specifically, the market penalizes firms with higher board independence and larger boards more severely when they engage in such practices. However, this study does not find that corporate governance has a significant impact on the likelihood of greenwashing.

This study makes two main contributions. First, this study is the first to examine the moderating effects of corporate governance on the relationship between greenwashing and firm value. Therefore, this study contributes to the literature by offering a broader perspective on how governance structures mitigate the adverse effects of greenwashing. Second, the study provides a methodological contribution on greenwashing topic by developing a more representative dictionary of greenwashing phrases tailored to the ASEAN context (Table A1). The dictionary was created by combining phrases from prior studies [24-27] and adding contextually relevant expressions. This offers a more accurate measurement tool for greenwashing, particularly in emerging market settings.

The remainder of this paper is structured as follows. The first section outlines the study's background and objectives. The second section presents the theoretical framework and hypothesis development. The third section explains the research methodology, including data collection and analysis techniques. The fourth section reports the empirical results of hypothesis testing. The fifth section highlights the study's contributions, discusses its limitations, and offers recommendations for future research on sustainable business practices.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

According to legitimacy theory, companies require social acceptance to sustain operations and avoid external pressures [28]. Legitimacy is achieved when firms align their actions with societal values and expectations [29]. To build and maintain legitimacy, companies often publish sustainability reports to demonstrate their commitment to social and environmental responsibility [30]. However, not all disclosures are genuine. Greenwashing represents a form of information manipulation that creates an environmentally responsible image inconsistent with actual practices, thereby contradicting the core principles of legitimacy theory.

Impression management theory further explains that managers may strategically use sustainability reporting to shape favorable perceptions among stakeholders, including

investors, consumers, employees, and the broader public [17]. As transparency pressures intensify, firms may opportunistically employ narratives to conceal weak sustainability performance [16]. Although greenwashing may yield short-term reputational benefits, it is inherently deceptive and, once exposed, can provoke stakeholder backlash and severe reputational harm [1, 31].

Beyond reputational effects, greenwashing can also diminish firm value through financial and capital market mechanisms. When investors detect inconsistencies between a firm's sustainability claims and its actual practices, they may perceive higher information asymmetry and managerial opportunism, leading to increased risk and reduced confidence in the firm's long-term prospects [32]. In financial markets that increasingly value ESG performance, exposed greenwashing can result in lower stock valuations, reduced analyst coverage, or exclusion from ESG-oriented investment portfolios [33]. Furthermore, such firms may encounter regulatory scrutiny, litigation, and a higher cost of capital. Collectively, these consequences adversely affect the firm's future cash flows and market valuation.

2.1 Greenwashing and firm value

Previous literature shows that the relationship between greenwashing and firm value remains debated. Some studies suggest that greenwashing can temporarily enhance firm value by sending positive signals to investors and fostering a false sense of legitimacy among stakeholders. For instance, Chen et al. [13] found that firms engaging in greenwashing can attract market attention and raise valuations, consistent with the notion that perceived legitimacy gained through environmental communication can strengthen stakeholder trust [34, 35].

However, other studies report that greenwashing is negatively associated with firm value due to the gap between environmental claims and actual performance, which leads to reputational risks, loss of legitimacy, and reduced investor confidence. Ghitti et al. [12] argued that greenwashing increases market uncertainty, prompting investors to penalize firms caught engaging in such behavior. These findings align with prior evidence showing that inconsistencies between environmental communication and corporate practices result in adverse financial outcomes [36-38].

Conversely, some studies contend that greenwashing has no significant impact on firm value. Lee et al. [6], for example, argued that in the social media era, greenwashing is quickly exposed by the public, regulators, and activist groups, which may neutralize its financial consequences. This finding aligns with research indicating that although greenwashing raises ethical concerns, its influence on financial performance is relatively limited due to increased oversight and transparency [2, 8, 11, 39-41].

Despite these mixed findings, this study assumes that investors are becoming more critical of corporate sustainability practices. Greenwashing, often viewed as a negative signal of information asymmetry and weak governance, is therefore expected to reduce firm value.

Based on this reasoning, the first hypothesis is formulated as follows:

H1: Greenwashing has a negative effect on firm value.

2.2 Corporate governance and greenwashing

Corporate boards play a central role in shaping firms'

sustainability strategies and ensuring that environmental disclosures reflect substantive practices rather than symbolic compliance. Drawing on agency theory, stakeholder theory, impression management theory, and legitimacy theory, this study examines three key board attributes—board independence, gender diversity, and board size—that are frequently highlighted in the governance literature as mechanisms to curb opportunistic disclosure behaviors such as greenwashing [12, 42]. Although these attributes are generally assumed to enhance accountability, their actual influence may differ across institutional contexts, especially in emerging markets where formal governance structures do not always translate into effective monitoring and oversight.

Board independence is theoretically regarded as a governance mechanism that strengthens the board's monitoring function over management [42]. The presence of independent directors is expected to increase objectivity in decision-making and reduce conflicts of interest, thereby promoting transparency and higher-quality information disclosure. In the environmental domain, several studies have shown that independent boards help reduce greenwashing by enhancing accountability and discouraging opportunistic managerial behavior [18].

However, other findings reveal a different pattern. Ghitti et al. [12] found that firms with a higher proportion of independent directors tend to engage in more greenwashing. This may stem from reputational incentives, as independent directors seek to project a positive environmental image to enhance their public credibility and increase their likelihood of appointment to other boards. Consequently, board independence could also be associated with a greater tendency toward greenwashing. These contrasting perspectives suggest that the empirical literature remains inconclusive: some studies argue that independence strengthens monitoring and reduces greenwashing [18, 43], while others observe the opposite effect [12].

Given this inconsistency in prior findings, this study proposes the following hypothesis:

H2: Board independence has a negative effect on greenwashing.

Gender diversity on the board of directors is a vital governance characteristic that can significantly influence a company's sustainability practices. Agency theory highlights the importance of governance mechanisms in mitigating conflicts between managers and owners [44]. Female directors, known for their active involvement and heightened sensitivity to ethical issues, play a key role in promoting more credible sustainability disclosures [15, 45]. Their proactive monitoring and ethical sensitivity can substantially reduce the likelihood of manipulative practices such as greenwashing.

This aligns with stakeholder theory, which suggests that women's awareness of diverse stakeholder needs drives companies to enhance the authenticity of sustainability disclosures [15, 46]. From a legitimacy theory perspective, the presence of women on boards helps maintain organizational legitimacy, as they are more likely to encourage firms to achieve legitimacy through genuine environmental performance rather than image management. Consistent with impression management theory, greenwashing represents a risky form of image manipulation, and women—typically more cautious and ethical in managing reputations—tend to reject such practices [47].

Empirical evidence also supports this argument. Zahid et al.

[45] found that the presence of women on boards is negatively associated with both greenwashing and ESG decoupling practices. In other words, firms with greater female representation on boards are less likely to engage in greenwashing. However, Ghitti et al. [12] reported contrasting results, showing that in certain contexts, gender diversity may be positively related to greenwashing, possibly due to time constraints and the multiple roles women often balance in board positions.

These mixed findings suggest that the relationship between board gender diversity and greenwashing remains inconclusive and context-dependent. Based on the theoretical rationale and prior evidence, this study proposes the following hypothesis:

H3: Board gender diversity has a negative effect on greenwashing.

Board size is another governance mechanism that may influence greenwashing practices. Prior studies have shown that its impact on corporate oversight remains debated. On the one hand, excessively large boards can create inefficiencies in decision-making and coordination among members [48]. On the other hand, larger boards are believed to enhance monitoring by reducing the dominance of individual members, thereby increasing accountability and oversight effectiveness.

Ghitti et al. [12] argued that larger boards can establish dedicated committees to oversee sustainability matters and tend to exhibit a positive relationship with environmental performance [49]. This suggests that companies with larger boards are less likely to engage in greenwashing. Similarly, Yu et al. [18] emphasized that greater board size strengthens management oversight, reducing the likelihood of greenwashing. Prior research also indicates that larger boards are associated with higher environmental disclosure quality, including improved carbon disclosure, and encourage greater information transparency—thereby reducing information asymmetry between firms and stakeholders [50, 51]. Overall, the literature suggests that larger boards enhance monitoring effectiveness and lower the risk of greenwashing.

Based on these theoretical arguments and empirical findings, this study proposes the following hypothesis:

H4: Board size has a negative effect on greenwashing.

2.3 Corporate governance, greenwashing, and firm value

Previous research indicates that greenwashing can erode firm value by increasing information asymmetry and reputational risk [12, 36]. Investors typically react negatively when they detect inconsistencies between sustainability claims and actual performance. To strengthen the theoretical foundation of this relationship, Expectation–Violation Theory (EVT) provides an important lens for explaining why market responses may intensify under certain governance conditions. EVT posits that stakeholders form prior expectations based on observed governance structures and reputational signals; when actual behavior violates these expectations, negative reactions become stronger and more punitive. In this context, board independence, gender diversity, and board size become not only governance mechanisms but also sources of reputational expectations that shape how the market interprets greenwashing incidents. In this context, the roles of board independence, gender diversity, and board size become crucial as governance mechanisms shaping the relationship between greenwashing and firm value.

Theoretically, higher board independence enhances management oversight and helps curb opportunistic behavior, including greenwashing [18]. However, other studies suggest that board independence is not always effective and may even exacerbate greenwashing due to independent directors' reputational incentives [12]. In such cases, board independence can intensify the adverse impact of greenwashing on firm value.

In other words, although greenwashing is already viewed negatively by investors, the presence of board independence may further intensify this adverse impact. The market perceives this as a governance failure, signaling that even with board independence, greenwashing persists or worsens. Consequently, when greenwashing occurs in firms with higher board independence, it sends a stronger negative signal about corporate governance and integrity, leading to greater penalties on firm valuation.

Based on this reasoning, the following hypothesis is proposed:

H5: Board independence has a negative moderating effect on the relationship between greenwashing and firm value.

Moreover, gender diversity on board is believed to strengthen monitoring mechanisms and heighten sensitivity to sustainability issues. The presence of women directors enables faster detection and greater scrutiny of greenwashing practices, making them harder to conceal. This may lead to stronger market sanctions when firms with high board gender diversity engage in greenwashing, as investors perceive a contradiction between the board's sustainability oversight role and the firm's deceptive practices. In this sense, gender-diverse boards amplify the negative impact of greenwashing on firm value, reinforcing the central argument of this study.

Based on this reasoning, the following hypothesis is formulated:

H6: Board gender diversity has a negative moderating effect on the relationship between greenwashing and firm value.

The governance literature highlights that effective board monitoring is essential in mitigating reputational risk and maintaining corporate legitimacy in the eyes of investors [50]. A larger board size is often viewed as strengthening its monitoring function over management, thereby reducing the potential for opportunistic practices such as greenwashing. Larger boards can establish specialized committees, increase the diversity of perspectives, and provide broader resources for oversight, ultimately reducing the tendency for management to misuse environmental communications [18, 49]. Therefore, when firms with larger boards conduct greenwashing, market will react more negatively on firm value. Based on this reasoning, the following hypothesis is formulated:

H7: Board size has a negative moderating effect on the relationship between greenwashing and firm value.

3. RESEARCH METHODOLOGY

3.1 Data and sample

This study employs a quantitative approach to examine the relationship between greenwashing and firm value, along with the moderating role of corporate governance mechanisms. Secondary data were collected from multiple sources, including company websites, Bloomberg, and Refinitiv, covering sustainability reports, annual reports, and financial data. The study population consists of all publicly listed companies in five ASEAN countries, Indonesia, Malaysia, Singapore, the Philippines, and Thailand, over the 2017–2022 period.

From a total of 3,327 companies, an initial screening identified firms that were active during the study period and had ESG scores available on Bloomberg or Refinitiv. This process yielded 542 eligible companies from Bloomberg and 732 from Refinitiv. Additional verification ensured that each company's website remained active and complied with Global Reporting Initiative (GRI) standards. The GRI's multi-stakeholder framework [52] aligns with the objectives of this study. The six-year timeframe (2017–2022) was selected to produce a robust and comprehensive dataset. Following the selection process, the final sample comprised 2,406 firm-year observations.

3.2 Definition and measurement of variables

Table 1 presents the definitions and measurements of all variables used in this study, including firm value (Tobin's Q), multiple greenwashing proxies derived from Bloomberg and Refinitiv, corporate governance, and control variables.

3.2.1 ESG disclosure score

To measure the level of greenwashing, this study adopts four proxies derived from the gap between ESG disclosure and ESG performance. The first proxy (GWPB1) measures the difference between ESG Disclosure (Python-based) and ESG Performance from Bloomberg, using the industry-year average as a benchmark. The second proxy (GWPB2) applies the same approach but uses the yearly average. The third proxy (GWPR1) captures the difference between ESG Disclosure (Python-based) and ESG Performance from Refinitiv, benchmarked against the industry-year average. Lastly, GWPR2 is constructed similarly to GWPR1 but based on the yearly average.

These four proxies reflect the extent to which a firm's ESG disclosure exceeds or diverges from its actual performance, signaling potential greenwashing behavior. This method is consistent with prior studies that distinguish between symbolic disclosure and substantive performance when evaluating the integrity of corporate sustainability strategies.

The ESG disclosure score in this study follows the content analysis approach developed by Kornreich and Thewissen [27] and Ruiz-Blanco et al. [26]. The phrases used in the content analysis reflect different emphases in prior studies, including CSR and stakeholder focus [53], disclosure quality [24], quality index [25], ESG-GRI-based analysis [26], and green claim detection [27]. This study integrates and expands these approaches by combining existing phrase sets and adding new expressions to create a more representative dictionary of greenwashing phrases suited to the ASEAN context (Table A1).

To adapt and contextualize the greenwashing dictionary for the ASEAN-5 setting, this study began by compiling phrases from prior foundational research on greenwashing [24-27, 53]. The initial list of 136 phrases was then refined by removing 11 terms that did not appear in any sustainability reports within the ASEAN-5 sample. Using NVivo's word-frequency function, the dictionary was subsequently expanded by adding 16 new phrases that emerged organically from the regional

sustainability disclosures, capturing linguistic nuances specific to the ASEAN context. One keyword, "sustainability," was later excluded due to its artificially high frequency, as it frequently appeared in page headers and footers rather than as substantive content. Overall, this iterative process resulted in the removal of 12 terms and the development of a final dictionary comprising 140 phrases that more accurately represent greenwashing expressions in the ASEAN-5 environment (Table A2).

Table 1. The variables description

Variables	Symbol	Description	Data Source
Greenwashing Score		A peer-relative greenwashing score for company i of country j in year t, which measures the magnitude of a firms' greenwashing behaviour in ESG dimensions	Bloomberg, Refinitiv, Sustainability Report
	GWPB1	Greenwashing score resulted from Python (as disclosure score) and Bloomberg (as performance score) with using industry-year approach	Hand-collected
	GWPB2	Greenwashing score resulted from Python (as disclosure score) and Bloomberg (as performance score) with using year approach	Hand-collected
	GWPR1	Greenwashing score resulted from Python (as disclosure score) and Refinitiv (as performance score) with using industry-year approach	Hand-collected
	GWPR2	Greenwashing score resulted from Python (as disclosure score) and Refinitiv (as performance score) with using year approach	Hand-collected
Tobin's Q	TOB	Approximated by natural logarithm of the market value of equity plus the book value of all liabilities and preference shares divided by total assets	Bloomberg
Board Independence	IND	Number of independent directors divided by total number of directors on board	Refinitiv
Board Gender Diversity	BGD	The gender representativeness, equal to the share of women directors in the company board	Refinitiv
Board size	BSI	Total number of board members	Refinitiv
Age	AGE	Natural log of the number of years since first listing	Refinitiv
Debt Asset Ratio	DAR	Total debt divided by total assets	Refinitiv
Employees	EMP	Natural log of number of employees	Refinitiv
GDP	GDP	Natural log of annual GDP of the country	www.data.worldbank.org
ROA	ROA	The company return on assets	Refinitiv
Total Asset	TA	Natural log of total assets	Refinitiv
Total Asset Turnover	TAT	The company sales divided by average total asset	Refinitiv

Rather than using manual coding, this research applies automated text analysis in Python [27]. The advantages of automated text analysis include the ability to process thousands of reports efficiently, apply the same method across different datasets, and minimize subjective bias inherent in manual coding. The automated analysis scans each report and calculates the proportion of symbolic versus substantive disclosure. Sentences containing monetary data, identified by the presence of phrases, numbers, and currency symbols, are assigned a score of three. Quantitative sentences that include numerical figures such as percentages or weight (kg/g) and length (mm/cm) units, but no currency symbols, receive a score of two. Qualitative sentences containing relevant phrases are scored as one, while non-informative or irrelevant sentences are scored as zero.

The ESG disclosure score is then calculated as the ratio of total information weight to the total number of sentences in the report, producing a value between 0 (lowest) and 3 (highest). This score captures the breadth and depth of a firm's ESG disclosure [24, 54].

3.2.2 ESG performance score

ESG performance reflects a company's progress in narrowing the gap between current and targeted ESG outcomes [55]. In this study, following previous research, ESG performance scores are obtained from Bloomberg and Refinitiv [6, 56, 57]. Bloomberg and Refinitiv are among the most credible ESG data providers widely used in academic studies.

Bloomberg calculates ESG scores based on 120 indicators covering environmental, social, and governance dimensions

[57]. These indicators are compiled annually from public disclosures and direct communications, with scores ranging from 0 to 10. Refinitiv, in contrast, assesses more than 500 ESG metrics across the same dimensions, using standardized data collected globally from company reports, websites, filings, and news sources [6]. Its ESG scores range from 0 to 100 and are continuously updated and quality-checked to ensure accuracy and comparability across firms.

3.2.3 Greenwashing score

The greenwashing score is calculated by subtracting the ESG disclosure score from the ESG performance score after normalizing both to a common scale (mean = 0; standard deviation = 1), following the method used by Yu et al. [18], Zhang [58], Chen and Dagestani [13], and Hu et al. [59]. The greenwashing score is defined as follows:

$$Greenwashing\ Score_{i,t} = \left(\frac{ESG_{dis\ i,t} - \overline{ESG_{dis}}}{\sigma_{dis}} \right) - \left(\frac{ESG_{per\ i,t} - \overline{ESG_{per}}}{\sigma_{per}} \right) \quad (1)$$

where, $ESG_{dis\ i,t}$ and $ESG_{per\ i,t}$ represent the ESG disclosure and ESG performance scores of firms i in year t, respectively. $\overline{ESG_{dis}}$ and $\overline{ESG_{per}}$ denote their respective means, while σ_{dis} and σ_{per} are their standard deviations.

A positive greenwashing score indicates potential overstatement, meaning the firm projects a sustainable image that is not supported by its actual performance. Conversely, a negative score suggests possible understatement. This measure captures inconsistencies between a company's

sustainability narrative and its actual ESG performance [32, 60, 61].

3.2.4 Firm value

Firm value is measured using Tobin's Q, which serves as the dependent variable in this study. Tobin's Q is defined as the ratio of a firm's total market value, including circulating stocks, non-circulating stocks, and liabilities, to the replacement cost of its assets. Unlike traditional indicators such as Return on Assets (ROA) or Return on Equity (ROE), Tobin's Q captures both current financial performance and future growth expectations as reflected in market perceptions. Because it incorporates stock price fluctuations, Tobin's Q provides a long-term measure of firm value [62]. It is widely recognized as a robust indicator of firm performance and is frequently employed in corporate finance research [13]. Data on Tobin's Q were obtained from Bloomberg to ensure consistency and comparability across firms.

3.2.5 Corporate governance

Corporate governance in this study is measured using three key indicators: board independence, gender diversity, and board size. Board independence is calculated as the percentage of independent directors relative to the total number of board members. This measure is applied in Malaysia, the Philippines, Singapore, and Thailand. For Indonesia, which adopts a two-tier board system, board independence is represented by the ratio of independent commissioners [63].

Board gender diversity is measured by the proportion of female board members, reflecting cognitive diversity and stronger commitments to corporate social responsibility [64-66]. Board size is measured by the total number of board members. While a larger board may enhance oversight, it can also lead to coordination difficulties [50]. Previous research suggests that an optimal board size is around eight members [19]. All corporate governance data were obtained from Refinitiv.

3.2.6 Control variables

This study includes several control variables based on prior literature: firm age (measured as the natural logarithm of the number of years the firm has been listed), profitability (measured by ROA), leverage (measured by the debt-to-asset ratio), firm size (log of total assets), number of employees, asset turnover (total sales divided by total assets), and Gross Domestic Product (GDP) in USD to represent macroeconomic conditions [58, 59, 67-69].

3.3 Estimation model and analysis technique

This study employs a panel data regression model using a random effects approach to examine the effect of greenwashing on firm value and to analyze the moderating role of corporate governance mechanisms. The Hausman test yields a p-value of 0.3723, indicating that the Random Effects (RE) model is the appropriate estimator for this study. Accordingly, we explicitly designate RE as the main specification and have adjusted all table labels and textual descriptions to ensure complete consistency, including clearly indicating the use of RE with industry and year dummies. This justification aligns with the statistical evidence from the Hausman test and ensures that the empirical results are reported in a coherent and methodologically rigorous manner.

The following empirical models are used to test the study's hypotheses.

All models control for firm age (AGE), leverage (DAR), number of employees (EMP), country GDP (GDP), profitability (ROA), total assets (TA), and asset efficiency (TAT). Industry and year dummy variables are included to account for sectoral differences and macroeconomic fluctuations across time [70].

Model for Hypothesis 1: Testing the effect of greenwashing on firm value (Tobin's Q)

$$Tobin's\ Q_{jit} = \alpha_0 + \beta_1 GW_{jit} + \beta_2 AGE_{jit} + \beta_3 DAR_{jit}$$
$$+\beta_4 \log(EMP)_{jit} + \beta_5 \log(GDP)_{jit}$$
$$+\beta_6 ROA_{jit} + \beta_7 \log(TA)_{jit}$$
$$+\beta_8 TAT_{jit} + \sigma_\omega jit + \varepsilon_{jit}$$
(Model 1)

Model for Hypothesis 2-4: Testing the relationship between corporate governance mechanisms and greenwashing.

$$GW_{jit} = \alpha_0 + \beta_1 IND_{jit} + \beta_2 BGD_{jit} + \beta_3 BSI_{jit} + \beta_4 AGE_{jit}$$
$$+\beta_5 DAR_{jit} + \beta_6 \log(EMP)_{jit} + \beta_7 \log(GDP)_{jit}$$
$$+\beta_8 ROA_{jit} + \beta_9 \log(TA)_{jit} + \beta_{10} TAT_{jit} + \sigma_\omega jit$$
$$+\varepsilon_{jit}$$
(Model 2)

Models for Hypotheses 5-7: Testing the moderating role of corporate governance mechanisms in the relationship between greenwashing and firm value.

Model for Hypothesis 5 (Board Independence):

$$Tobin's\ Q_{jit} = \alpha_0 + \beta_1 GW_{jit} + \beta_2 IND_{jit} + \beta_3 GW_{jit} * IND_{jit}$$
$$+\beta_4 AGE_{jit} + \beta_5 DAR_{jit} + \beta_6 \log(EMP)_{jit}$$
$$+\beta_7 \log(GDP)_{jit} + \beta_8 ROA_{jit} + \beta_9 \log(TA)_{jit}$$
$$+\beta_{10} TAT_{jit} + \sigma_\omega jit + \varepsilon_{jit}$$
(Model 3)

Model for Hypothesis 6 (Board Gender Diversity):

$$Tobin's\ Q_{jit} = \alpha_0 + \beta_1 GW_{jit} + \beta_2 BGD_{jit} + \beta_3 GW_{it} * BGD_{jit}$$
$$+\beta_4 AGE_{jit} + \beta_5 DAR_{jit} + \beta_6 \log(EMP)_{jit}$$
$$+\beta_7 \log(GDP)_{jit} + \beta8 ROA_{jit} + \beta_9 \log(TA)_{jit}$$
$$+\beta_{10} TAT_{jit} + \sigma_\omega jit + \varepsilon_{jit}$$
(Model 4)

Model for Hypothesis 7 (Board Size):

$$Tobin's\ Q_{jit} = \alpha_0 + \beta_1 GW_{jit} + \beta_2 BSI_{jit} + \beta_3 GW_{jit} * BSI_{jit}$$
$$+\beta_4 AGE_{jit} + \beta_5 DAR_{jit} + \beta_6 \log(EMP)_{jit}$$
$$+\beta_7 \log(GDP)_{jit} + \beta_8 ROA_{jit} + \beta_9 \log(TA)_{jit}$$
$$+\beta_{10} TAT_{jit} + \sigma_\omega jit + \varepsilon_{jit}$$
(Model 5)

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

Table 2 presents the descriptive statistics for all variables used in this study. Based on six years of data (2017–2022), the results show substantial variation across the sample, reflecting heterogeneity among firms in the ASEAN-5 countries analyzed [71, 72].

Table 2. Descriptive statistics

Variable	Observations	Mean	SD	Min	Max
TOB	2406	1.7674	1.6996	0.0000	23.2858
GW PB1	1119	0.5712	1.6002	-3.7523	8.2767
GW PB2	1119	-0.1235	1.2332	-4.4508	5.7219
GW PR1	1212	0.0040	1.5977	-4.2717	9.1944
GWPR2	1212	-0.2049	1.1081	-3.2226	5.6490
IND	2163	0.4915	0.1444	0.1250	1.0000
BGD	1821	0.2193	0.1100	0	1
BSI	2184	9.4345	3.1716	1	21
AGE	2402	33.2398	22.0112	0	124
DAR	2399	0.5247	0.2156	0.0084	1.4776
EMP	1877	13.691	27.299	8	250.000
GDP	2406	523.000	263.000	319.000	1.320.000
ROA	2354	0.0570	0.0750	-0.4673	0.8496
TA	2406	12.300	39.300	26	555.000
TAT	2375	14.4426	215.1845	0.0000	9127.2870

The average firm value, measured by Tobin's Q, is 1.77 with a standard deviation of 1.70. This indicates that, on average, firms have market valuations exceeding their book asset values, although the relatively high dispersion suggests notable differences in firms' market performance and resource utilization efficiency [73].

This study employs two types of normalization windows to construct the greenwashing proxies. GWPB1 and GWPR1 use an industry-year normalization window, meaning that ESG disclosure and ESG performance are compared against firms from the same industry in the same year. Under this benchmark, both proxies yield positive mean values, indicating that, relative to their closest operational peers, firms tend to provide ESG disclosures that exceed expectations based on their actual ESG performance. This suggests that greenwashing is prevalent when firms are evaluated within comparable competitive and regulatory contexts.

In contrast, GWPB2 and GWPR2 use a year-only normalization window, in which firms are benchmarked against all other firms in the same year, regardless of industry. Both proxies produce negative mean values, implying that, on average, firms disclose less ESG information than expected relative to their ESG performance when industry differences are not accounted for. This divergence highlights that the detection of greenwashing is highly sensitive to the choice of normalization window. Specifically, industry-year normalization appears more effective at identifying greenwashing, as it compares disclosure behavior across firms with similar operational characteristics, disclosure norms, and industry-specific sustainability exposures.

Corporate governance indicators also reveal meaningful patterns. Independent directors constitute approximately 49.5% of board members, and the average board size is nine. Board gender diversity remains relatively low, with women representing about 21.93% of directors. Although higher than in several emerging markets, this still reflects ongoing challenges in achieving gender balance at the board level [64].

4.2 Correlation analysis

Before conducting the regression analysis, the authors tested for multicollinearity among the variables. Correlation analysis was used to examine the relationships among key variables, including greenwashing, firm value, and corporate governance indicators such as board independence, gender diversity, and board size.

The results in Table 3 show no significant correlations among the main independent variables. As a preliminary test for multicollinearity, all correlation coefficients fall below the conventional threshold of 0.65 [74], indicating no initial signs of multicollinearity.

However, high correlations were observed among the greenwashing proxies (GWPB1, GWPB2, GWPR1, and GWPR2), which is expected given their interrelated measurement techniques. This does not pose a problem, as each proxy is tested separately in the regression models, consistent with prior studies [18, 32, 58]. This approach ensures internal validity and model stability, aligning with established empirical standards in quantitative panel research [75].

Table 3. Correlation matrix

	TOB	GWPB1	GWPB2	GWPR1	GWPR2	IND	BGD	BSI	AGE	DAR	EMP	GDP	ROA	TA	TAT
TOB	1.0000														
GWPB1	-0.0113	1.0000													
GWPB2	-0.0370	0.8973	1.0000												
GWPR1	-0.0701	0.8569	0.6786	1.0000											
GWPR2	-0.0691	0.7146	0.6444	0.9074	1.0000										
IND	0.0283	-0.0826	-0.1265	-0.0949	-0.1161	1.0000									
BGD	0.0820	-0.0253	-0.0152	-0.0096	-0.0299	0.1454	1.0000								
BSI	-0.1205	0.0697	-0.0004	0.0743	0.0505	-0.1428	-0.2088	1.0000							
AGE	-0.0199	0.0797	0.0839	0.0376	-0.0176	-0.0746	0.0323	0.1125	1.0000						
DAR	-0.0828	0.1591	0.1796	0.0704	-0.0036	-0.0457	-0.0038	0.1971	0.2960	1.0000					
EMP	-0.0548	0.0844	0.1225	-0.0012	0.0131	0.0133	-0.1204	0.1286	0.1870	0.1558	1.0000				
GDP	0.0531	0.0534	0.0579	0.0471	-0.0049	-0.2053	-0.0648	-0.3330	0.0674	-0.0080	0.0399	1.0000			
ROA	0.4971	-0.0384	-0.0726	-0.0321	-0.0483	-0.0749	0.0585	-0.1346	-0.0680	-0.2870	-0.0868	0.1126	1.0000		
TA	-0.1438	0.0336	0.0345	-0.0020	-0.0624	0.1460	-0.0343	0.1567	0.2868	0.4372	0.2217	-0.0579	-0.1798	1.0000	
TAT	0.0928	0.0623	0.0705	0.0777	0.0761	-0.0417	0.0463	0.0286	0.0238	-0.0534	-0.0276	-0.0088	0.0752	0.0313	1.0000

Notes: This table represents the correlation coefficients between greenwashing score, firm value and control variables for the whole sample. The variables are defined in Table 1.

4.3 Empirical results

The empirical analysis examines the relationships proposed in Hypotheses 1–7 using panel regression models with industry and time fixed effects. The results are presented sequentially, with robustness checks performed using both Bloomberg and Refinitiv proxies for greenwashing. Consistent with the theoretical framework, the discussion integrates insights from legitimacy theory, impression management theory, stakeholder theory, and agency theory to explain how markets in emerging economies respond to environmental disclosure practices and the governance mechanisms underlying them.

The analysis begins with Hypothesis 1, which examines whether greenwashing negatively affects firm value. As shown in Table 4, greenwashing measured using Bloomberg proxies (GWPB1 and GWPB2) exhibits a negative and statistically significant relationship with Tobin's Q. Specifically, a one-unit increase in greenwashing scores corresponds to a decline in firm value ranging from –5.71% to –10.20%. A similar pattern is observed using Refinitiv proxies (GWPR1 and GWPR2), where the reduction in firm value ranges from –4.7% to –7.2%.

These consistent results across model specifications provide strong empirical support for Hypothesis 1, confirming that markets penalize discrepancies between environmental claims and actual sustainability performance. This finding aligns with legitimacy and impression management theories, suggesting that inconsistencies between narrative and practice erode stakeholder trust and damage market perceptions [16, 32, 76].

Table 4. Regression results for model 1

Variables	FV (1)		FV (2)		FV (1)		FV (2)	
GWPB	-0.0571	**	-0.1020	***				
	(-2.2579)		(-3.0427)					
GWPR					(-0.0467)	**	(-0.0722)	**
					(-2.2026)		(-2.3756)	
AGE	0.0012		0.0012		0.0013		0.0012	
	(0.3529)		(0.3590)		(-0.0032)		(0.3883)	
DAR	1.6546	***	1.6753	***	0.8516	***	0.8500	***
	(4.4023)		(4.4589)		(0.0065)		(2.7223)	
LOG(EMP)	0.0980	*	0.1035	*	0.0570		0.0570	
	(1.7628)		(1.8600)		(1.1096)		(1.1120)	
LOG(GDP)	0.1357		0.1454		0.1032		0.1080	
	(0.7601)		(0.8148)		(0.6167)		(0.6463)	
ROA	3.7483	***	3.6908	***	3.4632	***	3.4543	***
	(6.8945)		(6.7857)		(8.0268)		(8.0007)	
LOG(TA)	-0.3890	***	-0.3994	***	-0.3302	***	-0.3345	***
	(-5.9446)		(-6.0932)		(-5.6110)		(-5.6839)	
TAT	0.0013	***	0.0014	***	0.0011	***	0.0011	***
	(3.3548)		(3.4307)		(2.9444)		(2.9752)	
C	4.3955		4.2646		4.5388		4.4717	
	(0.8665)		(0.8414)		(0.9605)		(0.9479)	
Industri Fixed Effect	Yes		Yes		Yes		Yes	
Time Fixed Effect	Yes		Yes		Yes		Yes	
Observations	1046		1046		1155		1155	
R-square	0.1686		0.1719		0.1759		0.1768	
Adjusted R-squared	0.1499		0.1532		0.1591		0.1601	

Notes: This table presents random effects regression results of greenwashing on firm value and controls over the period 2017 – 2022. (1) for industry-year technique and (2) for year technique. All variables are explained in Table 1. p values in parentheses. The symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 5. Regression results for Model 2

Variables	Model 2			
	GWPB1	GWPB2	GWPR1	GWPR2
IND	0,1511	-0,3242	0,0765	-0,2989
	(0,3317)	(-0,9289)	(0,1789)	(-1,0074)
BGD	-0,4690	-0,4538	-0,7704	-0,6595
	(-0,8191)	(-1,0265)	(-1,4364)	(-1,7748)
BSI	0,0258	-0,0188	0,0476 *	0,0196
	(0,9760)	(-0,9223)	-19.341	-11.407
C	-16.063	17.545	-19.487	0,9206
	(-0,2243)	(0,3144)	(-0,2902)	(0,1951)
Control	Yes	Yes	Yes	Yes
Industri Fixed Effect	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
Observations	865	865	943	943
R-square	0,1237	0,0458	0,1782	0,0482
Adjusted R-squared	0,0976	0,0173	0,1558	0,0223

Notes: This table presents random effects regression results of corporate governance on firm value and controls over the period 2017 – 2022. (1) for industry-year technique and (2) for year technique. All variables are explained in Table 1. p values in parentheses. The symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

The role of corporate governance is examined in Hypotheses 2, 3, and 4. Table 5 indicates partial support, as only board gender diversity shows marginally significant negative association with greenwashing, and only when measured using the Refinitiv GWPR2 proxy ($p < 0.10$). Neither board independence nor board size exhibits consistent significance, suggesting that these governance attributes do not systematically constrain greenwashing. These results highlight the limitations of structural governance indicators in emerging markets, where formal mechanisms often exist without corresponding monitoring effectiveness. This interpretation aligns with Fama and Jensen's [42] argument that effective governance requires both structural provisions and directors' willingness to challenge managerial behavior.

Hypotheses 5 and 7 receive stronger empirical support. Table 6 and Table 7 show that both board independence and board size intensify the negative relationship between greenwashing and firm value. For board independence, the estimated decline in Tobin's Q worsens from –5.71% to –17.38% (GWPB1) and from –10.20% to –14.34% (GWPB2) when independent directors are present but fail to prevent misleading ESG disclosures. This finding aligns with agency theory, as ineffective oversight by independent directors can be perceived by investors as a breach of trust, prompting harsher market reactions [16, 76]. Similarly, larger boards exacerbate the adverse impact of greenwashing, with the effect under GWPB1 increasing from –5.71% to –11.60% and under GWPB2 from –10.20% to –11.44%.

By contrast, Hypothesis 6 is not supported, as the interaction between greenwashing and board gender diversity is statistically insignificant across all models. This challenges prior assumptions that gender-diverse boards inherently promote greater transparency and accountability [64, 65], suggesting that diversity alone may not be sufficient to mitigate reputational damage arising from perceived ESG misrepresentation.

Table 6. The moderating role of board characteristics – Using greenwashing Python Bloomberg (GWPB)

Variables	FV					
	Model 3		Model 4		Model 5	
	(1)	(2)	(1)	(2)	(1)	(2)
GWPB x IND	-0.1738 ***	-0.1434 ***				
	(-4.8545)	(-3.9764)				
GWPB x BGD			-0.0446	-0.0167		
			(-1.1631)	(-0.4322)		
GWPB x BSI					-0.1160 ***	-0.1144 ***
					(-3.2303)	(-2.9753)
GWPB	-0.0863 **	-0.1131 ***	-0.0728 *	-0.1118 ***	-0.0949 **	-0.1384 ***
	(-2.1703)	(-2.7637)	(-1.7639)	(-2.6446)	(-2.3515)	(-3.3449)
C	1.3586	1.8292	3.7064	3.8318	4.7104	5.0928
	(0.2715)	(0.3654)	(0.6375)	(0.6576)	(0.8956)	(0.9698)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Industri Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1044	1044	867	867	1046	1046
R-square	0.1917	0.1899	0.1893	0.1913	0.1761	0.1783
Adjusted R-squared	0.1719	0.1700	0.1652	0.1673	0.1559	0.1581

Notes: This table presents random effects regression results of greenwashing on firm value and controls over the period 2017 – 2022 for the greenwashing score Python Bloomberg (GWPB). (1) for industry-year technique and (2) for year technique. All variables are explained in Table 1. p values in parentheses. The symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 7. The moderating role of board characteristics – Using greenwashing Python Refinitiv (GWPR)

Variables	FV					
	Model 3		Model 4		Model 5	
	(1)	(2)	(1)	(2)	(1)	(2)
GWPR x IND	-0.1203 ***	-0.1186 ***				
	(-4.1238)	(-3.8236)				
GWPR x BGD			-0.0037	0.0223		
			(-0.1364)	(0.7800)		
GWPR x BSI					-0.0849 ***	-0.0622 **
					(-3.0678)	(-2.0816)
GWPR	-0.0775 **	-0.0790 **	-0.0203	-0.0135	-0.0820 **	-0.0827 **
	(-2.2957)	(-2.3530)	(-0.6466)	(-0.4255)	(-2.4087)	(-2.4476)
C	2.0823	2.5923	4.2479	4.4459	4.0645	5.0659
	(0.4430)	(0.5550)	(0.8116)	(0.8483)	(0.8386)	(1.0522)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Industri Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1145	1145	952	952	1154	1154
R-square	0.1936	0.1936	0.2013	0.2015	0.1828	0.1808
Adjusted R-squared	0.1756	0.1755	0.1797	0.1800	0.1647	0.1626

Notes: This table presents random effects regression results of greenwashing on firm value and controls over the period 2017 – 2022 for the greenwashing score Python Refinitiv (GWPB). (1) for industry-year technique and (2) for year technique. All variables are explained in Table 1. p values in parentheses. The symbols ***, **, and * indicate significance at the 1%, 5% and 10% level, respectively.

Taken together, these findings reaffirm that greenwashing is consistently penalized by capital markets, but the severity of this penalty depends on governance contexts. Governance attributes, particularly board independence and size, can amplify market sanctions when greenwashing occurs, underscoring that governance structures may operate as double-edged swords. This has important implications for policymakers and regulators in emerging economies, where the credibility of sustainability disclosures increasingly depends on both formal governance arrangements and their practical implementation.

5. CONCLUSIONS

Overall, the empirical evidence provides a clear mapping between the hypotheses and the observed outcomes while reinforcing the "double-edged sword" nature of corporate governance in the context of greenwashing. Consistent with H1, greenwashing is found to significantly reduce firm value, confirming that markets penalize firms whose sustainability claims diverge from actual environmental performance. However, H2, H3, and H4 are rejected, as board independence, board gender diversity, and board size do not consistently reduce greenwashing. In some greenwashing proxies, board gender diversity negatively affects GWPR2, and board size even shows a positive association with GWPR1. Turning to the moderating hypotheses, H5 and H7 are supported, indicating that both board independence and board size exacerbate, rather than mitigate, the negative impact of greenwashing on firm value. Whereas H6 is rejected because board gender diversity does not significantly moderate this relationship. Together, these findings underscore a double-edged sword insight: although governance mechanisms in ASEAN-5 firms do not effectively prevent greenwashing, the market reacts more harshly when firms with stronger governance structures engage in such practices. This paradox highlights the complexity of governance dynamics in emerging markets and advances the theoretical understanding of how greenwashing interacts with corporate oversight and market discipline.

A possible explanation for these non-results lies in the institutional characteristics of ASEAN markets that may limit the effectiveness of formal governance structures. In several ASEAN countries, the role of independent directors and female directors is sometimes constrained by tokenism, where appointments serve symbolic compliance rather than substantive monitoring, thereby reducing their ability to challenge managerial discretion over sustainability communication. In addition, variations in board structures, including hybrid or two-tier board systems, may dilute oversight responsibilities and weaken the board's capacity to scrutinize ESG claims. The wider governance environment in emerging markets, where ownership is often concentrated and regulatory enforcement varies across jurisdictions, can also reduce reliance on board-level monitoring, making standard governance mechanisms less influential in curbing greenwashing. These contextual features help explain why governance variables do not emerge as significant moderators, even though markets still penalize firms when misleading sustainability disclosure is detected.

Methodologically, this study contributes to the emerging literature on greenwashing measurement by expanding and contextualizing a dictionary-based content analysis framework for the ASEAN setting. The adapted dictionary provides a more comprehensive linguistic foundation for identifying greenwashing patterns in sustainability narratives across emerging markets, where disclosure standards remain heterogeneous.

Overall, these findings contribute to the broader debate on how governance mechanisms interact to influence corporate transparency and market outcomes. The results highlight that governance quality remains a crucial safeguard against opportunistic ESG communication. For policymakers and investors, these insights underscore the need to strengthen governance codes and ESG reporting standards to enhance the credibility of sustainability disclosure in ASEAN markets.

This study is not without limitations. Although this study extends the content analysis approach by developing a broader dictionary of greenwashing phrases, there remains scope for refinement. Future research could customize content analysis for specific industries or regional contexts, as sustainability disclosures often use sector-specific terminology. Such refinements may yield more precise and meaningful assessments of ESG disclosure and sustainability performance.

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APPENDIX

Table A1. Dictionary of greenwashing phrases

NO	PHRASES	NO	PHRASES	NO	PHRASES
1	accountability	48	employee_turnover_rate	95	local_community
2	anti_competitive_behavior	49	**employees***	96	management_relation
3	anti_competitive_behaviour	50	employment	97	market_presence
4	anti_corruption	51	energies	98	market_share
5	biodiversity	52	energy	99	marketing_communication
6	board_diversity	53	energy_consumption	100	material
7	board_size	54	energy_intensity	101	materials
8	board_structure	55	**energy_management***	102	materials and services
9	bribery	56	energy_usage	103	non-discrimination
10	**carbon_emission***	57	environment	104	ownership_structure
11	carbon_emissions	58	environmental	105	public_policy
12	child_labor	59	environmental_assessment	106	R&D
13	child_labour	60	environmental_impacts	107	raw_material_sourcing
14	climate	61	environmental_initiatives	108	recycle
15	climate_change_risks	62	environmental_policy	109	recycling
16	climates	63	**environmental_protection***	110	regulatory_compliance
17	collective_bargaining	64	environments	111	regulatory_risks
18	**community***	65	equal_opportunity	112	responsible_marketing
19	community_relations	66	equal_remuneration	113	safety
20	community_work	67	ethics_code	114	security
21	compliance	68	executive_compensation_schemes	115	security_practices
22	compulsory_labor	69	fair_labor_practices	116	**services***
23	compulsory_labour	70	forced_labor	117	shareholder_rights
24	corruption	71	forced_labour	118	**social***
25	customer	72	freedom_of_association	119	society
26	customer_compliance	73	gender_diversity	120	supplier_code
27	customer_health	74	gender_pay_ratio	121	supply_chain_management

28	customer_privacy	75	**governance***	122	**take_over***
29	customer_product	76	health	123	tax_transparency
30	customer_relations	77	health and safety	124	training
31	customer_safety	78	human_capital_management	125	training and education
32	**development***	79	human_rights	126	transparency
33	discriminaton	80	impact_society	127	transport
34	diversity	81	indigenous_rights	128	transportation
35	diversity_issues	82	**infrastructure***	129	**union***
36	donations	83	injury_rate	130	**voting***
37	economic_impact	84	labeling	131	voting_procedures
38	education	85	labor	132	wastage
39	effluent	86	labor_management	133	waste
40	effluents	87	labor_practices	134	wastes
41	emission	88	labor_relations	135	water
42	emissions	89	**labour***	136	water_management
43	employee	90	labour_relation	137	water_resources
44	employee_grievance	91	**labour_relations***	138	water_sustainability
45	employee_health	92	land_use	139	waters
46	employee_relations	93	legal_risks	140	weather_events
47	employee_safety	94	local_communities		***New phrases added**

Table A2. Phrases removed from dictionary of greenwashing phrases

NO	PHRASES REMOVED	NO	PHRASES REMOVED	NO	PHRASES REMOVED
1	anti-takeover_measures	5	confidential_voting	9	initiatives_for_environmental_protection
2	board_separation_of_powers	6	controversial_business	10	procurement_practices
3	CEO_duality	7	employee_qualification	11	union_relationships
4	CEO_pay_rate	8	incentivized_pay	12	sustainability