Sustainability Reporting in Mining Industry: Does Board Structure and Ownership Matter?

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Abstract. This study examines the impact of board attributes and ownership structure on sustainability reporting disclosure (SRD) among mining companies listed on the Indonesia Stock Exchange (IDX) during the 2019–2023 period. Using a panel dataset of 265 firm-year observations, the research employs a fixed effects regression model to analyze how board size, board independence, and various types of ownership concentrated, foreign, institutional, and publica ffect the level of sustainability disclosure based on the Global Reporting Initiative (GRI) index. The findings reveal that board size does not significantly influence SRD, suggesting that the number of board members alone is insufficient to improve transparency. Conversely, board independence has a significant positive effect, indicating that independent directors enhance disclosure quality by strengthening oversight. Among ownership types, foreign ownership shows a significant negative impact on SRD, while institutional ownership is positively but weakly associated. Public ownership demonstrates a strong positive relationship, reflecting the importance of market-based transparency pressures. Concentrated ownership, however, is found to have no significant effect. These findings highlight the pivotal role of corporate governance in shaping ESG transparency in resource-intensive sectors and offer practical implications for regulators and policymakers seeking to promote sustainability accountability in emerging markets like Indonesia.

1 Introduction

Global awareness of sustainability issues has grown rapidly over the past few decades. Society, governments, and investors are increasingly demanding that companies be accountable for the social and environmental impacts of their business activities. Companies that previously focused solely on profit generation are now expected to integrate sustainability into their long-term strategic objectives. Sustainability reporting has emerged as a response to these rising expectations, enabling firms to disclose their performance in environmental, social, and governance (ESG) dimensions. According to Van et al. [1], high- quality sustainability reporting not only reflects corporate transparency but also enhances a

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firm's perceived value among stakeholders. In this context, corporate success is no longer assessed solely by financial indicators but also by its contributions to sustainable development [2].

In Indonesia, the role of sustainability reporting has become increasingly prominent following the issuance of the Financial Services Authority Regulation (OJK) No. 51/POJK.03/2017, which mandates financial institutions, issuers, and certain public companies to publish annual sustainability reports. This regulation aims to strengthen corporate accountability and promote the integration of ESG principles into business decision-making processes [3]. However, in practice, there remains a significant gap between policy and implementation. Many companies still regard reporting obligations as mere administrative burdens rather than strategic opportunities to improve their long-term reputation and competitiveness [4]. Key challenges contributing to the low quality of sustainability disclosure include limited resources, insufficient understanding of ESG concepts, and weak market-based incentives. Dissanayake et al. [5] emphasize that sustainability reports compiled solely for regulatory compliance without real integration of sustainability values tend to be ineffective in delivering tangible impact.

The mining sector is particularly exposed to sustainability challenges due to its inherent environmental and social risks. Activities such as resource exploration and extraction directly affect ecosystems, air and water quality, and often trigger social conflicts with local communities. Nevertheless, the mining industry also plays a pivotal role in national economic development, contributing significantly to GDP and government revenue. This dual role demands that mining companies manage externalities responsibly. In this context, sustainability reporting is not only a moral obligation but also a strategic necessity to maintain social legitimacy [6], [7], [8]. From a theoretical perspective, Legitimacy Theory provides a compelling framework for understanding corporate sustainability behavior. This theory posits that firms voluntarily disclose information as a means to maintain or repair legitimacy in the eyes of stakeholders and society [9]. In high-risk industries like mining, where environmental damage and social conflict are prevalent, sustainability reporting becomes a tool to justify operations, secure stakeholder approval, and preserve a “license to operate” [10]. However, the extent to which companies adopt such disclosures is often contingent on internal governance and external stakeholder pressures.

Within corporate governance, board structure play a critical role in shaping the direction and quality of sustainability reporting. A larger board size tends to bring greater diversity of perspectives, expertise, and experience, which can facilitate more comprehensive oversight of sustainability strategies [11]. Moreover, the presence of independent directors enhances objectivity in decision-making and mitigates management dominance over information flows. Empirical findings by Aladwey et al. [12] suggest that well-structured boards significantly promote transparent and accountable ESG disclosure practices. Therefore, the influence of board characteristics on sustainability reporting is particularly relevant in high-risk sectors such as mining.

Ownership structure also significantly influences a firm’s approach to sustainability disclosure. Institutional and foreign investors are generally more concerned with sustainability practices due to pressure from global financial standards, reputational concerns, and adherence to international norms [13], [14]. Public ownership, characterized by a wider distribution of shares among retail and small institutional investors, increases market pressure for information transparency, including ESG reporting. In contrast, concentrated ownership where a few dominant shareholders exert significant control can reduce public accountability, as strategic decisions may prioritize the interests of major shareholders over broader stakeholder concerns [15]. In developing countries, Shafai et al. [6] found that ESG disclosure levels are strongly influenced by the identity of the controlling parties. Thus, understanding the impact of ownership structure variations on sustainability disclosure is essential [16], [17].

Although numerous studies have investigated the individual impact of board attributes and ownership structure on sustainability reporting, there remains a notable gap in the literature regarding their simultaneous influence, particularly within the mining sector in Indonesia. This study seeks to bridge that gap by adopting an integrative approach, combining key corporate governance dimensions namely board characteristics (board size and board independence) and ownership structure (institutional, foreign, public, and concentrated ownership) into a single empirical model. Focusing on mining companies listed on the Indonesia Stock Exchange (IDX) offers a highly relevant context, given the sector's public visibility and strategic role in the national economy. The findings of this study are expected to provide both theoretical and practical contributions in strengthening sustainability governance practices in Indonesia's strategic industries.

Based on a thorough examination of existing literature and identified research gaps, this study formulates six hypotheses concerning the effects of board attributes and ownership structure on sustainability reporting disclosure.

H1 : Board size has a positive effect on sustainability reporting disclosure.
H2 : Board independence has a positive effect on sustainability reporting disclosure.
H3 : Concentrade ownership has a positive effect on sustainability reporting disclosure.
H4 : Foreign ownership has a positive effect on sustainability reporting disclosure.
H5 : Institutional ownership has a positive effect on sustainability reporting disclosure.
H6 : Public ownership has a positive effect on sustainability reporting disclosure.

2 Material and methods

2.1 Sampling and Data

This research adopts a quantitative methodological framework to examine the influence of board governance attributes on corporate sustainability disclosure, with a particular focus on three key variables: board size, board independence, and gender diversity within the board of directors. These variables were selected based on their relevance in prior corporate governance literature and their theoretical linkage to organizational transparency and accountability. The mining industry was chosen as the research context due to its substantial environmental footprint and increasing global scrutiny regarding Environmental, Social, and Governance (ESG) performance. Companies in this sector often face pressure to adopt responsible practices and report transparently, making them ideal subjects for studying sustainability disclosure behavior.

The analysis draws upon empirical data gathered from annual reports and sustainability reports of publicly listed mining companies on the Indonesia Stock Exchange (IDX), covering a five-year observation period from 2019 to 2023. The total sample consists of 265 firm-year observations, collected from 53 unique companies. This longitudinal approach allows the researcher to observe disclosure patterns and governance dynamics over time, offering more robust insights than a single-year cross-sectional design.

To ensure the credibility and validity of the analysis, multiple linear regression was applied using EViews 12 statistical software. This technique is widely used to assess causal relationships between independent and dependent variables in financial and governance research. Before conducting regression analysis, diagnostic testing was performed, including a multicollinearity test, to confirm that the independent variables did not exhibit high intercorrelation that could bias the regression results. By doing so, the study ensures that the estimated coefficients accurately reflect the unique contribution of each board structure and ownership to sustainability reporting levels.

The sampling method used was purposive sampling, a non-probability technique that allows the researcher to select units that meet certain predefined criteria. The firms included in the sample were selected based on the following specific conditions:

1. The company must have published complete and accessible annual and sustainability reports for each year from 2019 to 2023.
2. The company must be officially listed on the IDX, thereby subject to formal financial and non-financial reporting regulations in Indonesia.
3. The company must operate in the mining sector, an industry particularly relevant for studies on sustainability due to its exposure to environmental risks, community impacts, and governance scrutiny.

All data utilized in the study were extracted from publicly available company documents, including financial statements, sustainability reports, and GRI reference indices. The use of GRI-based indicators strengthens the objectivity of sustainability measurement, as GRI is the most widely recognized global standard for sustainability reporting [18]. The five-year period from 2019 to 2023 was deliberately selected to capture the most recent trends and policy developments, especially in response to regulatory changes such as POJK No. 51/POJK.03/2017, which requires financial institutions and certain public companies to disclose sustainability-related information.

This detailed research design aims not only to identify whether board characteristics have a statistically significant relationship with sustainability disclosure, but also to offer insight into how corporate governance mechanisms can be optimized to enhance transparency in ESG practices particularly in environmentally sensitive industries like mining. The results of this study are expected to contribute both theoretically and practically, providing empirical evidence for academics and actionable insights for policymakers, regulators, and corporate decision-makers in Indonesia and beyond.

2.2 Variables and data analysis

To empirically investigate the relationship between board and ownership structures and the extent of sustainability reporting disclosure, this study identifies several variables based on relevant theories and previous empirical findings. The variables consist of dependent, independent, and control variables, each of which is defined in accordance with established measurements in corporate governance and sustainability disclosure research. The operational definitions of these variables are summarized in Table 1.

 https://doi.org/10.1051/e3sconf/202565203001

Table 1. Variable of the Current Study

Variabel	Operational Definition
Dependent Variables:	
Sustainability Reporting Disclosure **(SRD)**	Total disclosure based on GRI index
Indeoendent Variabels:	
Board size **(BS)**	Total board of directors and commissioners
Board Independence **(BI)**	Precentage of independentboard members to total board members
Ownership structure:	
Concentrade Ownership **(CO)**	Percentage of shares held by the largest shareholder's owning more than 5% of total shares
Foreign Ownership **(FO)**	Percentage of shares owned by foreign investors
Institutional Ownership **(IO)**	Percentage of shares owned by institutional investors
Public Ownership **(PO)**	Percentage of shares held by the general public
Control Variables:	
Firm size **(FS)**	Log natural total asset
Leverage **(Lev)**	Total liabilities divided by total asserts
ROA	Return on assets, net income divided by total assets

To test the hypothesis in this study, panel data regression was conducted using a fixed effect model and the given equation:

$$CSD_{it} = \alpha + \beta 1BS_{it} + \beta 2BI_{it} + \beta 3CO_{it} + \beta 4FO_{it} + \beta 5IO_{it} + \beta 6PO_{it} + \beta 7FS_{it} + \beta 8LEV_{it} + \beta 9 ROA_{it} + \mu_i + \epsilon_{it}$$

Description:

CSD : Corporate Sustainability Disclosure
α : Constant
$\beta 1, \ldots, \beta 9$: Independent and Control Variable Coefficients
μ_i : Fixed effects that capture individual company characteristics that do not change over time
ϵ_{it} : Error term

3 Results and discussion

3.1 Descriptive statistics of CSD and the Multicollinearity test

Table 2 presents the descriptive statistics of the variables used in this study, including the mean, median, maximum, minimum, standard deviation, and the number of observations (Obs.). These statistics provide an overview of the data distribution and central tendencies for each variable, which are essential for understanding the characteristics of the sample prior to conducting further analysis

Table 2. Statistic Descriptive

	SRD	BS	BI	CO	FO	IO	PO	FSize	Lev	ROA
Mean	0.275	4.132	0.401	0.718	0.278	0.708	0.241	19.357	0.483	0.074
Median	0.259	4.000	0.400	0.775	0.173	0.806	0.206	19.069	0.451	0.040
Max	1.000	11.000	1.000	0.977	0.998	0.999	0.764	23.101	1.416	1.079
Min	0.000	1.000	0.000	0.000	0.000	0.000	0.000	15.231	0.007	-1.012
Std. Dev.	0.285	1.780	0.125	0.190	0.293	0.303	0.144	1.796	0.262	0.173
Obs	265	265	265	265	265	265	265	265	265	265

Descriptive statistics in Table 2 provide a comprehensive overview of the central tendencies and dispersion of the variables examined in this study. The mean value of Sustainability Reporting Disclosure (SRD) is 0.275, indicating that, on average, mining companies listed on the Indonesia Stock Exchange (IDX) disclose approximately 27.5% of the sustainability items based on the Global Reporting Initiative (GRI) index. This low disclosure rate may reflect a lack of regulatory pressure or limited internal capacity to implement comprehensive Environmental, Social, and Governance (ESG) practices in the mining industry—one of the sectors most exposed to environmental and social risks. The relatively high standard deviation (0.285) suggests considerable variation in disclosure levels across firms, reinforcing the view that sustainability disclosure remains voluntary and inconsistently practiced in Indonesia. Regarding board characteristics, the average board size (BS) is 4.132 members, suggesting compact governance structures that may influence the board's ability to oversee a wide range of strategic issues, including sustainability. Furthermore, Board Independence (BI) averages 40.1%, indicating that less than half of board members are independent, which might weaken board objectivity and its role in safeguarding stakeholders' interests, especially in sustainability matters. Prior research shows that independent directors are more likely to promote transparency and ESG disclosure due to their monitoring function.

In terms of ownership structure, the descriptive results show that Concentrated Ownership (CO) has a mean of 0.718, suggesting that in most firms, a single shareholder or small group of shareholders holds more than 71% of the total shares. This aligns with the typical ownership concentration pattern in emerging markets, where control is often centralized. Such ownership may lead to entrenchment issues, where controlling shareholders dominate corporate decisions, potentially limiting the firm's motivation to disclose non- financial information that does not directly benefit them. Foreign Ownership (FO) has an average of 27.8%, indicating moderate participation by international investors, who are generally more demanding in terms of transparency and sustainability performance. Institutional Ownership (IO) is relatively high at 70.8%, which is promising, as institutional investors tend to favor long-term value and good governance, including robust sustainability reporting. Conversely, Public Ownership (PO) remains low at 24.1%, suggesting limited dispersion of shares among retail investors. Regarding financial characteristics, the mean Firm Size (FSize) is 19.357 (log of total assets), with significant variation, indicating the sample covers firms of various scales. Leverage (Lev) shows a moderate mean of 0.483, suggesting that companies are partly funded by debt. Lastly, Return on Assets (ROA) has a relatively low average of 0.074, with a wide range (from -1.012 to 1.079), pointing to profitability volatility among mining firms. These patterns underscore the heterogeneous nature of the sample and provide a solid foundation for exploring how governance and ownership characteristics shape sustainability disclosure in resource-intensive sectors.

3.2 Results of the hypothesis test

To examine the influence of independent variables on the level of sustainability reporting disclosure (SRD), a multiple linear regression analysis was conducted. The results of the hypothesis testing are presented in Table 4, which includes the regression coefficients, probability values (significance levels), and supporting statistical indicators such as the adjusted R-squared, F-statistic, and the probability of the F-statistic. Asterisks (*) denote significance at the 5% and 10% levels. These findings serve as the basis for evaluating whether each independent variable has a significant effect on a firm's sustainability reporting disclosure.

Table 4. Hypothesis Test

Variable	Coefficient	Prob.
C	-3.1485	0.0006
BS	0.0213	0.1181
BI	0.5878	0.0026*
CO	-0.0931	0.3379
FO	-0.2980	0.0063*
IO	0.2399	0.0728**
PO	0.8112	0.0009*
Fsize	0.1566	0.0012
Lev	-0.3615	0.0004
ROA	0.3762	0.0003
Adjusted R-squared	0.5180	
F-statistic	5.6518	
Prob(F-statistic)	0.0000	

Note: *, ** indicate significance at the 5%, 10% levels.

The regression analysis presented in Table 4 offers critical insights into the influence of board attributes and ownership structure on the extent of corporate sustainability disclosure (SRD) among mining firms in Indonesia. The results reveal that board size (BS) does not have a statistically significant impact on SRD ($p = 0.1181$), indicating that having a larger board does not necessarily enhance sustainability transparency. This finding suggests that the effectiveness of the board in promoting ESG disclosure lies not in its size, but in the quality of its members, their expertise, and the degree of engagement in sustainability oversight. This result is consistent with Kumari et al. [19], who observed that board size had no significant effect on environmental disclosure in Indian sensitive industries, positing that larger boards may suffer from coordination inefficiencies that dilute strategic oversight.

Conversely, board independence (BI) is found to exert a significant positive influence on SRD (coefficient = 0.5878, $p = 0.0026$), thus supporting H2. The presence of independent directors appears to enhance the firm’s commitment to transparent sustainability reporting, likely because such directors serve as a mechanism for monitoring management behavior and ensuring the protection of broader stakeholder interests. This finding corroborates Nguyen and Nguyen [20], who found a similar positive association between board independence and sustainability disclosure in Vietnamese listed companies. Independent board members are often perceived as more objective and less susceptible to managerial capture, thereby strengthening accountability and transparency.

Regarding ownership structure, the findings demonstrate that concentrated ownership (CO) does not significantly affect SRD (p = 0.3379), leading to the rejection of H3. This result suggests that dominant shareholders may not view sustainability disclosure as a priority, possibly due to their privileged access to internal information or their preference for short-term financial performance over long-term ESG strategies. This aligns with the work of Kumari et al. [19], who argued that controlling shareholders in emerging markets often lack incentives to promote voluntary ESG disclosures.

Interestingly, foreign ownership (FO) shows a statistically significant negative relationship with SRD (coefficient = -0.2980, p = 0.0063), contrary to the expectation outlined in H4. This unexpected outcome may reflect the behavior of foreign investors in Indonesia's mining sector who are more concerned with financial returns and regulatory efficiency than with promoting ESG transparency. This result is aligned with Zahid et al. [21], who found that foreign ownership does not always enhance sustainability reporting in developing countries, particularly when foreign investors have passive ownership or are not bound by strict home-country ESG mandates.

Institutional ownership (IO) is marginally significant at the 10% level (p = 0.0728), thus weakly supporting H5. This finding implies that institutional investors may exert some influence on corporate sustainability practices, though the extent of this influence may vary depending on the institutional type and their ESG engagement intensity. Similar conclusions were drawn by Bello et al. [18], who emphasized the heterogeneity in institutional investor activism regarding sustainability issues in Southeast Asia, where some investors prioritize ESG integration while others focus solely on financial metrics.

Finally, public ownership (PO) shows a strong and statistically significant positive association with SRD (coefficient = 0.8112, p = 0.0009), providing robust support for H6. This finding underlines the importance of public pressure and capital market discipline in shaping corporate disclosure behavior. Firms with higher public ownership are more likely to enhance transparency, possibly due to reputational considerations and the need to reduce information asymmetry with dispersed shareholders. This result is consistent with Buallay et al. [22], who reported that firms with broad public shareholding tend to disclose more sustainability information to meet the expectations of a wider and more diverse investor base, especially in high-impact sectors such as mining.

4 Conclusion

This study explores the influence of board attributes and ownership structure on sustainability reporting disclosure (SRD) in Indonesia's mining industry, using panel data from 265 firm-year observations between 2019 and 2023. The empirical findings indicate that board size does not significantly impact SRD, suggesting that the number of board members alone is not a sufficient determinant of transparency. In contrast, board independence demonstrates a significant positive effect, highlighting the importance of independent directors in strengthening sustainability oversight and improving ESG disclosure quality. These results reinforce agency and stakeholder theory, which emphasize the role of independent governance mechanisms in aligning corporate behavior with broader stakeholder interests.

Regarding ownership structure, the results show that concentrated ownership has no significant relationship with SRD, indicating that dominant shareholders may prioritize private control over public accountability. Notably, foreign ownership exhibits a significant negative association with SRD, contrary to common expectations. This suggests that foreign investors in the mining sector may be more profit-oriented and less engaged with ESG issues, especially in contexts where regulatory enforcement is weak. Institutional ownership demonstrates a marginally positive influence, reflecting the uneven ESG activism among institutional investors. On the other hand, public ownership emerges as the strongest positive predictor of SRD, suggesting that market pressures from retail investors and dispersed shareholders play a vital role in driving corporate transparency.

These findings carry meaningful theoretical and practical implications. Theoretically, they emphasize the importance of disaggregating ownership types in governance studies, as different shareholder categories exert distinct pressures on ESG behavior. Practically, regulators should consider reinforcing governance regulations by requiring higher proportions of independent directors and encouraging board accountability through targeted ESG training. Furthermore, capital market development that promotes public participation in ownership can strengthen sustainability governance. Policymakers may also consider implementing stewardship codes or disclosure mandates for institutional and foreign investors to enhance their engagement in corporate ESG practices. In sum, enhancing sustainability reporting in high-risk sectors like mining requires both internal reforms in board structure and external pressures through more inclusive and responsible ownership.

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