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ESG Performance and Corporate Governance—The Moderating Role of the Big Four Auditors

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Abstract: The purpose of this study is to investigate the impact of corporate governance on ESG performance in large publicly listed firms in Indonesia from 2016 to 2023. The study adopts both stakeholder-agency theory and resource dependency theory to explore the relationship between sustainability assurance, board governance characteristics, and the extent of ESG performance. Fixed effects regression controlling both industry and year fixed effects is used to measure the relationship between sustainability assurance, corporate governance characteristics, and ESG performance. We find a positive significant relationship between assurance sustainability reports and ESG performance. Additionally, we also document a positive association between sustainability committees and ESG performance. Adopting the Big Four auditors as a moderating variable, we find a positive relationship between gender-diverse boards and firms audited by the Big Four auditors and sustainability performance. This result suggests that firms with gender-diverse boards audited by the Big Four auditors enhance sustainability performance. Additional robustness tests using GMM estimation, conducted to address endogeneity concerns, corroborated the main test results.



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1. Introduction

Globally, corporations are addressing wide-ranging sustainability challenges by exhibiting firm commitment to comply with current sustainability standards and practices. The calls for transparency and accountability, especially in the domain of environmental, social, and governance (ESG), continue to permeate in developing countries, particularly Indonesia, being one of the most populous countries in the world. In 2015, 17 Sustainability Development Goals (SDG) promoted by the United Nations underscored the significance of governance, social, and environmental issues that exist universally (GRI, 2018). To explicitly and accurately inform stakeholders regarding their ESG activities, frameworks used by entities to report sustainable and ESG practices are essential (Schaltegger et al., 2017). For institutional investors who are predisposed to sustainable and green investments, climate risks potentially have an adverse impact on financial returns (Krueger et al., 2020). Moreover, Albitar et al. (2020) find that the long-term success of an entity is contingent on its capability to manage ESG-related challenges.

There has been an escalation of academic research in the sustainability space, particularly in the developing countries in the Asia Pacific and Southeast Asia. [Buniamin et al. \(2020\)](#) document a positive relationship between gender diversity, firm size, and board size with SDG initiatives in listed Malaysian firms. Additionally, [Jan et al. \(2023\)](#) found that companies with Islamic corporate sustainability practices aligned with the SDGs in Malaysian and Indonesian firms are associated with better financial performance. In a separate study, [Susilowati et al. \(2022\)](#) document higher levels of corporate governance disclosures in Malaysian Fintech companies in comparison to Indonesian Fintech companies. Moreover, another comparative study between Japan and Indonesia documents a distinct difference in their governance systems in achieving the SDGs ([Morita et al., 2020](#)).

Indonesia is chosen as the country for this study for the following reasons. In Indonesia, the recent movement in the legislative and regulatory landscape specifically around environmental, social, and governance (ESG) space has encouraged many organizations to embrace sustainability ([IDX, 2020](#)). The advent of sustainability initiatives encompassing the SDGs and GRI frameworks assessing company climate change and critical sustainability practices propel a global movement towards corporate social responsibility ([GRI, 2018](#)). [Chitimiea et al. \(2021\)](#) found that investors are more likely put their money in firms that espouse sustainability practices, with green investments escalating expeditiously. Globally, stakeholders are demanding transparency on ESG activities emphasizing global warming, social hazards, and governance challenges ([KPMG, 2022](#)). These international trends have resulted in Indonesian corporations focusing and overseeing ESG risks associated with social inequality and environmental and governance issues. Indonesian entities can avoid these risks and benefit by providing fair and equitable labor practices, reducing environmental threats, and promoting strong governance reforms ([IDX, 2020](#)). On 8 March 2023, the Indonesia Stock Exchange (IDX) highlighted the importance of gender equality by organizing the “Ring the Bell for Gender Equality” event to increase awareness of the role and opportunities of women in the corporate sector. Consequently, ESG-conscious entities are able to compete internationally and successfully with global brands and other industry players ([KPMG, 2022](#)). Research on the requirements for sustainability reports to be assured and verified to lend credibility to the disclosures made by organizations commenced in the late nineties ([Beets & Souther, 1999](#)). [Simnett et al. \(2009\)](#) argue that entities striving to augment the reliability of their corporate social responsibility (CSR) reports and enhance their corporate reputation tend to have their sustainability reports assured. From a gender diversity perspective, [Zampone et al. \(2022\)](#) found that female directors play a pivotal role in fostering sustainability initiatives. Separately, [Bradbury et al. \(2022\)](#) document a positive association between the presence of a sustainability committee and having an external assessor for the sustainability report. Given the importance of such attributes in cultivating the sustainability agenda, this study emphasizes sustainability assurance, gender-diverse boards, and the existence of sustainability committees in large listed Indonesian firms.

This study makes the following contributions. To the best of our knowledge, this is a novel sustainability study linking sustainability assurance, gender diversity, and sustainability committees together for large, listed firms in Indonesia. Second, this study provides an update on sustainability reporting in Indonesia after the introduction of the United Nations Sustainable Development Goals (UNSDG) in 2015. Third, using a moderating variable, i.e., the Big Four auditors, this paper also investigates whether gender-diverse boards and Big Four auditors have an impact on the ESG performance of firms. While there are ESG studies on corporate governance focusing primarily on board independence, board size, and frequency of board meetings, this research reviews the relevance of sustainability report assurance and the existence of sustainability committees. Moreover, this paper also investigates the importance of the Big Four auditors and gender-diverse boards in

uplifting ESG performance. Therefore, this research fills a gap in the literature by examining these distinct governance mechanisms that may affect ESG performance in Indonesian listed firms.

We find a positive association between the assurance of sustainability reports and the ESG performance of large Indonesian listed firms for the period covering 2016 to 2023. We also find a statistically positive and significant relationship between ESG scores and the existence of sustainability committees. Using the Big Four as a moderating factor, we find that gender-diverse boards audited by the Big Four auditors are positively associated with ESG performance.

The remainder of this paper is structured as follows. In Section 2, we review the literature on sustainability assurance, gender diversity, and sustainability committees and develop our hypotheses. In Section 3, we outline the research method. Section 4 descriptive statistics and correlations for the sample are discussed and the results from our main empirical tests with additional analyses are reported. In Section 5, the discussion and conclusion of the paper are presented.

2. Theory, Literature Review, and Hypothesis Development

2.1. Theoretical Framework

For this study, we adopted both stakeholder-agency theory and resource dependency theory as the focal theoretical frameworks. Hill and Jones (1992) argue that a combined theoretical lens is relevant in minimizing the deficiencies of agency and stakeholder theory. Given the inadequate focus on the principal and manager relationship based on agency theory, Zaman et al. (2021) argue that a joint theory approach is more appropriate, particularly for ESG studies involving multiple stakeholders. Adopting stakeholder-agency theory underlines the importance of the entitlements of every stakeholder within the firm and not solely the shareholders (Hill & Jones, 1992). Similarly, Zolotoy et al. (2021) contend that proponents of stakeholder-agency theory mitigate the conflicts between stakeholders. Moreover, Gerged (2020) argue that the theoretical context of stakeholder-agency lessens both internal and external pressures from conflicting interests between the different parties in the nexus of relationships within the firm.

We utilized resource dependency theory to demonstrate the importance and dynamics of female directors in the boardroom. Hillman et al. (2007) found that gender-diverse boards provide greater perspectives in generating alternative solutions. Hillman et al. (2007) argue women have the potential to connect the organizations to different stakeholders in comparison to men. Martinez-Ferrero et al. (2021) found that boards with female representation in emerging economies in South America are associated with higher CSR commitments and accountabilities. Likewise, based on a global study involving 39 companies, Zampone et al. (2022) argue that gender-diverse boards are linked with increased SDG disclosure. Considering that ESG studies involve a myriad of stakeholders, we suggest that both stakeholder-agency and resource dependency theories are applicable to this paper.

2.2. Literature Review and Hypotheses Development

2.2.1. Literature Review on Sustainability Reporting/ESG Performance

The sustainability theme has been ubiquitous on the academic research agenda for last decade, and the propagation of sustainability reporting research after the introduction of the United Nations SDGs in 2015 has been evident (Adams, 2022; Emma & Jennifer, 2021; Garcia-Blandon et al., 2024; Lim et al., 2021; Pranugrahaning et al., 2023; Sorooshian, 2024).

Bose et al. (2024) find that active stakeholder engagement programs, the existence of sustainability committees, and the having a separate sustainability report are three main characteristics of the companies reporting against the UN SDGs framework. Hendratama and Huang (2021) document a positive association between CSR disclosure and firm value, which is contingent on firm life cycle in a study of Southeast Asian firms. Rassanjani (2018) contend that a relevant poverty-reduction program like Zakat, best practices, and novel databases are significant considerations to eradicate poverty in Indonesia. Furthermore, Gunawan et al. (2020) highlight the urgent need for the Indonesian government to harmonize their earmarked SDGs by engaging and communicating with local firms. Comparably, Morita et al. (2020) disclose the challenges that Indonesia confronts in achieving the SDGs, especially in setting the vision and implementation phases.

Najaf et al. (2024) found that independent board members and increased board meetings are associated with better ESG performance in a study of Malaysian listed firms. Additionally, Chebbi and Ammer (2022) found that the board size and board independence of Saudi listed firms are significantly correlated with ESG disclosures. A review of UK listed firms documents the role of female directors in attenuating the adverse impact of earnings management on ESG performance (Adeneye et al., 2024). Separately, Yorke et al. (2023) argue that the presence of female financial experts on audit committees enhances ESG performance in US listed firms. Likewise, a significant positive association was found between audit committee independence and expertise and ESG performance (Pozzoli et al., 2022). Finally, Elamer (2024) argue that the presence of proper corporate governance structures impede ESG controversies and promote ESG growth.

Literature Review—Sustainability Assurance

The surge in sustainable assurance research has expanded in recent years. More countries are acceding to the well-received initiatives of the UN SDGs and sustainability frameworks like the Global Reporting Initiative (GRI) (Al-Shaer & Zaman, 2019; Baboukardos et al., 2021; O'Dwyer, 2011).

Steinmeier and Stich (2019) argue that that sustainability assurance (SA) provided by an auditor is associated with enhanced sustainability investment efficiency. Likewise, a positive relationship between external assurance and the quality of sustainability reporting is evident from research on Malaysian listed firms (Elaigwu et al., 2022). Moreover, Clarkson et al. (2019) document that investors value sustainability reports more when they are assured by the Big Four accounting firms. Additionally, Chapple et al. (2017) found that the benefits of a sustainability committee are linked with higher levels of assurance and the selection of accounting firms as assurance providers. In a separate study, the CSR performance of large US companies was associated with improved financial performance when such companies appointed external CSR assurance (Kim et al., 2019). Nevertheless, one recent study on international assurance suggests that sustainability assurance growth lagged the growth in sustainability reporting (Alsahali & Malagueno, 2022). Finally, Cuadrado-Ballesteros et al. (2017) argue that information asymmetries are only impacted by assurance engagement when provided by accounting professionals with a higher level of assurance. Based on the above literature review, we postulate the following hypothesis:

H1. *Indonesian firms with assured sustainability reports are associated with higher ESG performance.*

Literature Review—Gender Diversity

The view of having females in the boardroom originates from prior research advocating women as being more cautious, principled, and vigilant in contrast to men (Amorelli & Garcia-Sanchez, 2021; Thiruvadi, 2012; Thiruvadi & Huang, 2011).

Zahid et al. (2020) argue that women possess distinct characteristics that may enhance governance processes and manage stakeholders' requirements based on their own experiences and perspectives. Furthermore, because female directors are seen to manage sustainability issues better, having adequate representation on the board will be an asset for an organization (Martinez-Ferrero et al., 2021; Rao & Tilt, 2021). Leaning on resource dependency theory, female directors enable corporations to achieve diverse connections and access to external resources and environments, which are crucial to success (Pfeffer & Salancik, 1978). In a similar vein, Albitar et al. (2020) contend that having women on boards encourages robust decision-making processes. Consequently, Wasiuzzaman and Wan Mohammad (2020) argue that gender-diverse boards are perceived as signaling transparency, accountability, and good governance practices. In contrast, Manita et al. (2018) did not find any association between female directors and CSR disclosure; however, they claim that a higher percentage of women board members is linked with greater sustainability disclosures. Given the overwhelming positive perspectives on gender-diverse boards, the following hypothesis is postulated for this study:

H2. *Indonesian firms with gender-diverse boards are associated with higher ESG performance.*

Literature Review—Sustainability Committee

A study on large multinational corporations emphasized the significance of a sustainability committee in which its members are observed to foster corporate transparency, carry out sustainability policies, and mandate the assurance of sustainability reports (Garcia-Sanchez et al., 2019). From a Southeast Asian perspective, Tran et al. (2020) assert that the presence of a sustainability committee is associated with greater sustainability disclosures. Concurrently, they argue that board diversity and block ownership and board size are the main influences on sustainability disclosures. Li et al. (2022) found that an efficacious sustainability committee enhanced environmental performance in a study of Australian firms. Similarly, Baraibar-Diez and Odriozola (2019) document that firms with CSR committees have higher ESG performance compared to firms without such specialized committees in the case of some European firms. In another study of Italian firms, Spallini et al. (2021) found a positive relationship between the existence of sustainability committees and Global Reporting Index (GRI) scores.

In contrast, although Burke et al. (2019) document that sustainability committees influence sustainability initiatives, their presence alone does not alleviate sustainability risks and concerns. Moreover, Al-Shaer and Zaman (2018) discovered an adverse association between sustainability committees and the assurance of sustainability reports, implying that the formation of such committees burdens smaller entities. Nonetheless, they found that experienced audit committees have an essential task in maintaining the credibility of sustainability reports (Al-Shaer & Zaman, 2018). Considering the above arguments, we propose the following hypothesis:

H3. *Indonesian firms with sustainability committees are associated with higher ESG performance.*

3. Research Methodology

3.1. Sample Selection and Documentation

After standard exclusions, our initial population included 640 firm-year observations for the period 2016 to 2023. We excluded 325 firm-year observations because of missing data in ESG measures, giving a final usable sample of 314 firm-year observations. This study focused on the top 80 listed firms in Indonesia (IDX80) as they are susceptible to higher scrutiny from diverse stakeholders, especially in sustainability/CSR-related disclosures (Cowen et al., 1987; Hackston & Milne, 1996; Watts & Zimmerman, 1978). The period for this study was 2016 to 2023 to ensure an up-to-date state of ESG reporting in Indonesia after the introduction of the United Nations SDGs initiative. ESG scores were downloaded from the London Stock Exchange Group (LSEG) Refinitiv Workspace database, while the remaining data were collected from the Indonesian annual/sustainability reports, which are available publicly on the respective websites.

3.2. Measurement of Dependent Variable—SDGs Disclosure

Aligned with past studies on ESG/sustainability reporting, ESG scores were collected from the LSEG Refinitiv Workspace database, in which three different measurements of ESG are used (Paolone et al., 2022; Pozzoli et al., 2022; Yorke et al., 2023). Once downloaded from Refinitiv database, we captured the ESG score (ESG_SCORE_{it}); the ESG combined score (ESG_COMB_{it}); and the sum of environmental, governance, and social pillar scores (ESG_SUM_{it}). The definitions of these dependent variables are listed under Appendix A.

3.3. Measurement of Independent Variables

3.3.1. Assurance of Sustainability Report

We measured assurance of sustainability reports ($ASSD_RPT_{it}$) using a dichotomous variable. As an indicator variable, firm i was scored 1 if assured by an independent assurance provider at the end of period t ; otherwise, it was scored 0. This dichotomous measurement has been consistently used in previous research on sustainability assurance (Baboukardos et al., 2021; Bradbury et al., 2022).

3.3.2. Gender Diversity

We measured board gender diversity using a continuous measure (FEM_BOD_{it}). The continuous measure was the percentage of the total number of female directors to the total number of directors on the board. This proxy of gender diversity has been frequently employed in past studies involving female representation on boards of directors (Brahma et al., 2021; Wasiuzzaman & Wan Mohammad, 2020).

3.3.3. Sustainability Committees

We measure sustainability committees (SUS_COM_{it}) using a dichotomous variable of 1 if a sustainability or CSR committee was present and 0 otherwise. This measure has been typically applied in prior studies on sustainability committees (Gallego-Alvarez & Pucheta-Martinez, 2020; Lopez-Arceiz & del Rio, 2022; Zampone et al., 2022).

3.4. Measurement of Control Variables

Consistent with prior literature, we controlled for variables that are associated with corporate governance and ESG reporting (Orazalin, 2019; Zampone et al., 2022). We controlled for the independent directors ($IND_DIR\%_{it}$), number of board meetings ($MEET_BOD_{it}$), leverage level (LEV_{it}), firm size (TA_{it}), age of firm (Age_{it}), and whether the firm is audited by one of the Big Four auditors (Big_Four_{it}), as these characteristics may have an influence

on corporate governance and ESG reporting. Definitions for these control variables are provided in Appendix A.

3.5. Regression Model

Regression analyses were performed to examine whether firms with the independent variables indicated earlier have an association with ESG performance.

The first regression equation on ESG_SCORE_{it} concerning sustainability assurance reports, gender diversity, and sustainability committees for every year and industry was run adopting Equation (1), as follows:

$$ESG_SCORE_{it} = \beta_0 + \beta_1 ASSD_RPT_{it} + \beta_2 FEM_BOD_{it} + \beta_3 SUS_COM_{it} + \beta_4 IND_DIR_{it} + \beta_5 MEET_BOD_{it} + \beta_6 LEV_{it} + \beta_7 TA_{it} + \beta_8 Age_{it} + \beta_9 Big_Four_{it} + \varepsilon_{it} \quad (1)$$

where the variables of interest are $ASSD_RPT_{it}$, FEM_BOD_{it} , and SUS_COM_{it} ; the coefficient $ASSD_RPT_{it}$, and FEM_BOD_{it} and SUS_COM_{it} , were projected to be significant in the above ESG_SCORE_{it} model.

The second regression equation on ESG_COMB_{it} relating to sustainability assurance, gender diversity, and sustainability committees for every year and industry was run adopting Equation (2), as follows:

$$ESG_COMB_{it} = \beta_0 + \beta_1 ASSD_RPT_{it} + \beta_2 FEM_BOD_{it} + \beta_3 SUS_COM_{it} + \beta_4 IND_DIR_{it} + \beta_5 MEET_BOD_{it} + \beta_6 LEV_{it} + \beta_7 TA_{it} + \beta_8 Age_{it} + \beta_9 Big_Four_{it} + \varepsilon_{it} \quad (2)$$

where the variables of interest are $ASSD_RPT_{it}$, FEM_BOD_{it} , and SUS_COM_{it} . The coefficient $ASSD_RPT_{it}$, and FEM_BOD_{it} and SUS_COM_{it} , were projected to be significant in the above ESG_COMB_{it} model.

The final regression equation on ESG_SUM_{it} relating to sustainability assurance, gender diversity, and sustainability committees for every year and industry was run adopting Equation (3), as follows:

$$ESG_SUM_{it} = \beta_0 + \beta_1 ASSD_RPT_{it} + \beta_2 FEM_BOD_{it} + \beta_3 SUS_COM_{it} + \beta_4 IND_DIR_{it} + \beta_5 MEET_BOD_{it} + \beta_6 LEV_{it} + \beta_7 TA_{it} + \beta_8 Age_{it} + \beta_9 Big_Four_{it} + \varepsilon_{it} \quad (3)$$

where the variables of interest are $ASSD_RPT_{it}$, FEM_BOD_{it} , and SUS_COM_{it} . The coefficient $ASSD_RPT_{it}$, and FEM_BOD_{it} and SUS_COM_{it} , were projected to be significant in the above ESG_SUM_{it} model.

4. Empirical Results

4.1. Descriptive Statistics and Correlations

Table 1 provides the descriptive statistics of the dependent variables (ESG ratings) and the independent and control variables that were used. The mean aggregate for the ESG_SCORE_{it} is 51.2 with a median of 51.66, whereas the mean and median for ESG_COMB_{it} are 51.05 and 51.61, respectively. For ESG_SUM_{it} , the mean and median are 151.4 and 152.4, respectively. Approximately 33.4% of the firms have their assurance report audited and 15.3% of the firms have gender-diverse boards. Approximately 18.8% of the firms have a sustainability committee whereas the percentage of independent board members is only 5.8%. The boards of directors in large, listed firms meet frequently, as is evident from the average number of 30.17 meetings. The median leverage level of the firms from the sample study is 39.9% and the median of the total assets is USD 2.9 billion. Finally, the average age of the sampled companies is 46.03 years and approximately 78.0% of the companies are audited by the Big Four auditors.

Table 1. Descriptive statistics of the variables used in the analysis.

	Obs.	Mean	S.D.	P25	Median	P75
Dependent Variables						
<i>ESG_SCORE_{it}</i>	314	51.20	19.71	36.01	51.66	66.71
<i>ESG_COMB_{it}</i>	314	51.05	19.67	36.01	51.61	66.46
<i>ESG_SUM_{it}</i>	314	151.4	60.52	103.5	152.4	201.0
Independent/Control Variables						
<i>ASSD_RPT_{it}</i>	314	0.334	0.473	0	0	1
<i>FEM_BOD_t</i>	314	0.153	0.179	0	0.111	0.25
<i>SUS_COM_{it}</i>	314	0.188	0.391	0	0	0
<i>INDEP_DIR%_{it}</i>	314	0.058	0.135	0	0	0.125
<i>MEET_BOARD_{it}</i>	314	30.17	24.43	12	23.5	43
<i>LEV_{it}</i>	314	17.91	181.3	0.129	0.398	0.900
<i>TA_{it} (In Billion USD)</i>	314	13.2	41	1.55	2.9	7.19
<i>Age_{it}</i>	314	46.03	25.22	30	44	57
<i>Big_Four_{it}</i>	314	0.780	0.415	1	1	1
Instrumental Variable						
<i>AUD_IND_{it}</i>	314	0.239	0.690	0	0	0

* *ESG_SUM_{it}* is the sum of the environmental pillar score, social pillar score, and governance pillar score.

Table 2 documents the pairwise Pearson correlation coefficients among all the variables for this research. The table includes the three dependent variables, namely *ESG_SCORE_{it}*, *ESG_COMB_{it}*, and *ESG_SUM_{it}*. Several observations emerge from the analysis of the Pearson correlation matrix in Table 2: First, the three dependent variables are significantly associated with the assurance of sustainability reports (*ASSD_RPT_{it}*) at the 1% significance level. Second, the three ESG scores are not significantly correlated with gender-diverse boards, which was our second independent variable (*FEM_BOD_{it}*). Third, the dependent variables are also positively correlated with sustainability committees, our third independent variable (*SUS_COM_{it}*), at the 1% significance level. Fourth, all the dependent variables are significantly associated with firm size (*TA_{it}*) at the 1% level, suggesting that larger companies tend to pay more attention to ESG initiatives within their organization (Udayasankar, 2008). Table 3 documents the correlation between the dependent, endogenous, and instruments variables that were used in the robustness test of this study, namely the independence of audit committees (*AUD_IND_{it}*). Other than the three dependent variables, which were regressed separately, none of the correlations in the matrix are in excess of the multi-collinearity limit of 0.80 (Hair et al., 1995) and thus we did not find any abnormal correlations among the variables in the regressions that were concerning.

Table 2. Pairwise correlation.

Variables	ESG_SCORE _{it}	ESG_COMB _{it}	ESG_SUM _{it}	ASSD_RPT _{it}	FEM_BOD _{it}	SUS_COM _{it}	IND_DIR _{it}	MEET_BOD _{it}	LEV _{it}	TA _{it}	Age _{it}	Big_Four _{it}
<i>ESG_SCORE_{it}</i>	1											
<i>ESG_COMB_{it}</i>	0.998 ***	1										
<i>ESG_SUM_{it}</i>	0.991 ***	0.989 ***	1									
<i>ASSD_RPT_{it}</i>	0.468 ***	0.461 ***	0.491 ***	1								
<i>FEM_BOD_{it}</i>	−0.002	−0.001	−0.010	0.042	1							
<i>SUS_COM_{it}</i>	0.268 ***	0.267 ***	0.282 ***	0.108 *	−0.019	1						
<i>IND_DIR_{it}</i>	−0.145 **	−0.144 **	−0.145 ***	−0.140 **	0.107 *	0.001	1					
<i>MEET_BOD_{it}</i>	0.334 ***	0.333 ***	0.329 ***	0.258 ***	−0.007	−0.082	−0.141 **	1				
<i>LEV_{it}</i>	−0.024	−0.024	−0.021	0.066	−0.013	0.141 **	0.025	−0.072	1			
<i>TA_{it}</i>	0.290 ***	0.285 ***	0.299 ***	0.291 ***	−0.004	−0.078	−0.075	0.111 **	−0.031	1		
<i>Age_{it}</i>	0.369 ***	0.366 ***	0.405 ***	0.369 ***	0.027	0.030	−0.063	0.241 ***	−0.091	0.292 ***	1	
<i>Big_Four_{it}</i>	0.407 ***	0.405 ***	0.396 ***	0.213 ***	0.060	0.078	0.008	0.240 ***	0.011	0.130 **	0.220 ***	1

*, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively. Refer to Appendix A for details of variable definitions.

Table 3. Correlation between dependent, endogenous, and instrument variables.

Variables	ESG_SCORE _{it}	ESG_COMB _{it}	ESG_SUM _{it}	ASSD_RPT _{it}	AUD_IND _{it}
ESG_SCORE _{it}	1				
ESG_COMB _{it}	0.998 ***	1			
ESG_SUM _{it}	0.991 ***	0.989 ***	1		
ASSD_RPT _{it}	0.468 ***	0.461 ***	0.491 ***	1	
AUD_IND _{it}	0.053	0.056	0.059	0.127 **	1

*, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively. Refer to Appendix A for details of variable definitions.

4.2. Multivariate Regression Results

Table 4 describes the main regression results of the relationship between ESG scores and the independent variables of this study, namely the assurance of sustainability reports (*ASSD_RPT_{it}*), gender diversity (*FEM_BOD_{it}*), and the presence of sustainability committees (*SUS_COM_{it}*). The regression results produced an adjusted R² of 51.6%. The R² and adjusted R² results are consistent with some of the prior literature on ESG associated with corporate governance mechanisms (Asante-Appiah & Lambert, 2022).

Table 4. Fixed effects regression—main results.

Variables	(1) ESG_SCORE _{it}	(3) ESG_COMB _{it}	(5) ESG_SUM _{it}
ASSD_RPT _{it}	6.4881 *** (3.058)	6.2532 *** (2.932)	20.3083 *** (3.184)
FEM_BOD _{it}	0.2566 (0.045)	0.4367 (0.077)	−3.2498 (−0.192)
SUS_COM _{it}	9.3258 *** (4.837)	9.2661 *** (4.708)	30.8439 *** (5.235)
IND_DIR _{it}	−8.7791 * (−1.900)	−8.8098 * (−1.838)	−25.0676 (−1.568)
MEET_BOD _{it}	0.1185 ** (2.449)	0.1219 ** (2.519)	0.3588 ** (2.332)
LEV _{it}	−0.0085 *** (−5.303)	−0.0080 *** (−4.487)	−0.0258 *** (−5.198)
TA _{it}	0.0000 * (1.788)	0.0000 * (1.872)	0.0000 * (1.734)
Age _{it}	0.1288 *** (4.040)	0.1266 *** (3.769)	0.4497 *** (4.740)
Big_Four _{it}	10.5853 *** (4.579)	10.5703 *** (4.576)	30.1416 *** (4.341)
Constant	29.3914 *** (11.401)	29.3139 *** (11.192)	84.1930 *** (10.892)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	314	314	314
R-squared	0.553	0.542	0.580
Adjusted R-squared	0.516	0.504	0.545
F-statistic	23.32	20.73	25.31

Robust *t*-statistics in parentheses. *, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively. Refer to Appendix A for details of variable definitions.

In column 1, we find that the assurance of sustainability reports (*ASSD_RPT_{it}*) is positively and significantly associated across the three dependent variables, namely *ESG_SCORE_{it}*, *ESG_COMB_{it}*, and *ESG_SUM_{it}*, at the 1% significance level, suggesting that the assurance of sustainability reports influences ESG performance. This result is in harmony with the findings of [Elaigwu et al. \(2022\)](#) and [Bradbury et al. \(2022\)](#), claiming that assured sustainability reports enhance the quality of sustainability reporting and

ESG performance. We did not find any significant association between gender-diverse boards and ESG performance across any of the three dependent variables. This result is consistent with Manita et al. (2018), who failed to find any positive relationship between female directors and CSR disclosure, suggesting that only a higher proportion of women on boards promotes sustainability practices. For our third independent variable, we found a positive significant association between sustainability committees (SUS_COM_{it}) and ESG scores. This conclusion is in harmony with previous research on sustainability committees, contending that their existence assists in promoting the sustainability agenda (Cosma et al., 2022; Orazalin, 2019; Zampone et al., 2022).

We also document a significant relationship between ESG performance and the number of board meetings held. This finding is consistent with an earlier study indicating that diligent board members are more in favor of pursuing CSR endeavors (Handayanti et al., 2022). Finally, we also found that companies that engaged the Big Four auditors are associated with higher ESG performance at the 1% significance level across all the dependent variable measurements, implying that experienced and high-quality auditors can also contribute to higher ESG performance. This is in line with the previous findings of Handayanti et al. (2022), from an Indonesian perspective.

4.3. Additional Analyses

Moderation Effect Between Gender-Diverse Boards and the Big Four Auditors

To further examine the ESG performance of large, listed firms in Indonesia, we used a moderating variable, the Big Four auditors, with interaction with board gender diversity. We tested whether gender-diverse boards audited by the Big Four audit firms have any influence on ESG performance. We decided to investigate this interaction effect because the findings of the main test for female directors on ESG performance was not significant. We opined that firms with women on the board are more likely to support sustainability initiatives if they are also audited by the Big Four auditors.

Based on the results depicted in Table 5, the interaction variable of gender-diverse boards and the Big Four auditors is positively associated with the ESG scores. This observation suggests that firms with gender-diverse boards with high-quality and experienced external auditors contribute to better ESG performance. This finding is consistent with the view that there are potential benefits associated with engaging high-quality and experienced external auditors and having gender-diverse boards. These governance traits consequently promote greater sustainability initiatives and practices within an organization (Dakhli, 2021; Zampone et al., 2022).

Table 5. Interaction between gender diversity and the Big Four auditors.

	(2)	(4)	(6)
Variables	ESG_SCORE_{it}	ESG_COMB_{it}	ESG_SUM_{it}
$ASSD_RPT_{it}$	5.2906 ** (2.540)	5.0635 ** (2.418)	16.5392 *** (2.648)
FEM_BOD_{it}	−28.4431 *** (−3.064)	−28.0743 *** (−3.035)	−93.5777 *** (−3.449)
SUS_COM_{it}	10.0210 *** (5.383)	9.9568 *** (5.232)	33.0321 *** (5.860)
IND_DIR_{it}	−11.9619 *** (−2.695)	−11.9717 *** (−2.633)	−35.0850 ** (−2.450)

Table 5. Cont.

Variables	(2) <i>ESG_SCORE_{it}</i>	(4) <i>ESG_COMB_{it}</i>	(6) <i>ESG_SUM_{it}</i>
<i>MEET_BOD_{it}</i>	0.1059 ** (2.329)	0.1093 ** (2.404)	0.3189 ** (2.204)
<i>LEV_{it}</i>	−0.0089 *** (−5.475)	−0.0084 *** (−4.658)	−0.0270 *** (−5.410)
<i>TA_{it}</i>	0.0000 * (1.772)	0.0000 * (1.861)	0.0000 * (1.714)
<i>Age_{it}</i>	0.1297 *** (4.206)	0.1275 *** (3.906)	0.4525 *** (4.889)
<i>Big_Four_{it}</i>	4.7406 (1.648)	4.7641 * (1.657)	11.7462 (1.384)
<i>FEM_BOD_{it} × Big_Four_{it}</i>	39.2024 *** (3.695)	38.9445 *** (3.677)	123.3834 *** (4.006)
Constant	34.3390 *** (11.437)	34.2290 *** (11.310)	99.7649 *** (11.226)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	314	314	314
R-squared	0.574	0.563	0.602
Adjusted R-squared	0.537	0.525	0.567
F-statistic	26.35	23.68	29.11

Robust *t*-statistics in parentheses. *, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively. Refer to Appendix A for details of variable definitions.

4.4. Robustness Tests

When investigating the relationships between firms' ESG scores and corporate governance variables, endogeneity and reverse causality are common concerns that may occur. To mitigate these issues, and as a robustness check to validate the main results, we adopted the Generalized Method of Moments (GMM) approach (Wintoki et al., 2012). We considered the variable “independence of audit committee” as the instrumental variable. A valid instrumental variable should meet two criteria: First, it needs to be correlated with the endogenous variable. Second, it should not be correlated with the dependent variable (exogeneity). A preliminary check of the validity of the instrumental variable was conducted using pairwise correlation. Referring to Table 3, we found that the independence of audit committees was significantly correlated with the assurance of sustainability reports at the 5% significance level but was not significantly correlated with any ESG measurement, which satisfies both conditions. As GMM is a dynamic panel model, lagged dependent and independent and control variables were used in the analysis. Fixed effects were not included in the model as these are addressed implicitly by the GMM approach.

Table 6 presents our GMM results. In models (1) to (3), we found a significant positive relationship between the assurance of sustainability reports and firms' ESG scores at the 10% significance level. The existence of sustainability committees also positively affects firms' ESG performance at the 10% significance level for two of the three ESG measures. In addition, we found that the *p*-values for AR (2) in all three models were insignificant, implying that there is no second-order autocorrelation of error terms. The *p*-values for both the Sargan and Hansen tests in all models were above the 10% significance threshold, suggesting that there are no over-identification issues and, hence, supporting the validity of our instruments.

Table 6. GMM analysis.

	(1)	(2)	(3)
Variables	<i>ESG_SCORE_{it}</i>	<i>ESG_COMB_{it}</i>	<i>ESG_SUM_{it}</i>
<i>L.ESG</i>	0.7326 *** (7.604)	0.7100 *** (7.165)	0.7724 *** (7.895)
<i>L.ASSD_RPT_{it}</i>	4.2662 * (1.982)	5.0595 * (2.007)	14.6088 * (1.938)
<i>L.FEM_BOD_{it}</i>	8.7740 (0.809)	8.7712 (0.829)	15.8262 (0.502)
<i>L.SUS_COM_{it}</i>	4.0186 * (1.693)	1.9647 (0.654)	14.9086 * (1.785)
<i>L.IND_DIR_{it}</i>	−9.8169 * (−1.864)	−11.2606 * (−1.934)	−27.2843 ** (−2.102)
<i>L.MEET_BOD_{it}</i>	0.0112 (0.390)	0.0155 (0.725)	0.0060 (0.049)
<i>L.LEV_{it}</i>	−0.0113 ** (−2.668)	−0.0113 ** (−2.275)	−0.0359 ** (−2.637)
<i>L.TA_{it}</i>	0.0000 (0.869)	0.0000 (0.989)	0.0000 (0.368)
<i>L.Age_{it}</i>	0.0182 (0.324)	−0.0060 (−0.096)	0.0971 (0.632)
<i>L.Big_Four_{it}</i>	2.2596 (0.617)	2.4052 (0.665)	1.1012 (0.095)
Constant	9.8493 * (1.890)	11.8454 ** (2.175)	27.2096 * (1.794)
Observations	263	263	263
Number of firms	50	50	50
<i>p</i> -value of AR (1) test	0.003	0.003	0.002
<i>p</i> -value of AR (2) test	0.615	0.330	0.593
<i>p</i> -value of Sargan test	0.549	0.733	0.543
<i>p</i> -value of Hansen test	0.502	0.499	0.346

Robust *t*-statistics in parentheses. *, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively. Audit committee independence was used as an instrumental variable. Refer to Appendix A for details of variable definitions.

To further test the robustness of the main results, we utilized logarithm transformation for leverage (*LN_LEV_{it}*) and total assets (*LN_TA_{it}*) and reran the main analysis. As reflected in Table 7, the results for all the independent variables remained unchanged.

Table 7. Fixed effects regression—main results with logarithm transformation of leverage and total assets.

	(1)	(2)	(3)
Variables	<i>ESG_SCORE_{it}</i>	<i>ESG_COMB_{it}</i>	<i>ESG_SUM_{it}</i>
<i>ASSD_RPT_{it}</i>	7.1592 *** (3.349)	6.9389 *** (3.230)	22.1833 *** (3.468)
<i>FEM_BOD_{it}</i>	−1.0762 (−0.184)	−1.0035 (−0.172)	−6.9429 (−0.398)
<i>SUS_COM_{it}</i>	9.0976 *** (4.643)	9.0367 *** (4.521)	30.3108 *** (5.086)
<i>IND_DIR_{it}</i>	−8.4922 * (−1.877)	−8.5435 * (−1.827)	−23.9033 (−1.536)
<i>MEET_BOD_{it}</i>	0.1046 ** (2.151)	0.1083 ** (2.218)	0.3205 ** (2.080)
<i>LN_LEV_{it}</i>	−1.6109 (−1.336)	−1.6118 (−1.351)	−5.1706 (−1.452)

Table 7. Cont.

	(1)	(2)	(3)
Variables	<i>ESG_SCORE_{it}</i>	<i>ESG_COMB_{it}</i>	<i>ESG_SUM_{it}</i>
<i>LN_TA_{it}</i>	0.0288 (0.039)	−0.0376 (−0.050)	−0.0572 (−0.026)
<i>Age_{it}</i>	0.1390 *** (4.241)	0.1365 *** (3.986)	0.4801 *** (4.934)
<i>Big_Four_{it}</i>	10.5360 *** (4.578)	10.5584 *** (4.594)	29.9341 *** (4.324)
Constant	30.0553 (1.233)	32.0481 (1.318)	90.4977 (1.249)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	313	313	313
R-squared	0.545	0.534	0.574
Adjusted R-squared	0.507	0.495	0.538
F-statistic	17.15	16.41	19.12

Robust *t*-statistics in parentheses. *, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively.

Additionally, to address potential dependence issues in the model, we performed regressions with Driscoll–Kraay standard errors as a robustness check by assuming the presence of cross-sectional dependence (Hoechle, 2007). The main independent variables (*ASSD_RPT_{it}* and *SUS_COM_{it}*) remained statistically significant, as shown in Table 8.

Table 8. Regression with Driscoll–Kraay standard errors.

	(1)	(2)	(3)
Variables	<i>ESG_SCORE_{it}</i>	<i>ESG_COMB_{it}</i>	<i>ESG_SUM_{it}</i>
<i>ASSD_RPT_{it}</i>	6.4881 * (2.338)	6.2532 * (2.311)	20.3083 * (2.185)
<i>FEM_BOD_{it}</i>	0.2566 (0.069)	0.4367 (0.118)	−3.2498 (−0.355)
<i>SUS_COM_{it}</i>	9.3258 ** (3.387)	9.2661 ** (3.295)	30.8439 *** (3.653)
<i>IND_DIR_{it}</i>	−8.7791 ** (−2.398)	−8.8098 * (−2.238)	−25.0676 (−1.754)
<i>MEET_BOD_{it}</i>	0.1185 *** (4.554)	0.1219 *** (4.738)	0.3588 *** (3.915)
<i>LEV_{it}</i>	−0.0085 *** (−7.806)	−0.0080 *** (−8.145)	−0.0258 *** (−7.678)
<i>TA_{it}</i>	0.0000 *** (3.821)	0.0000 *** (3.824)	0.0000 *** (3.814)
<i>Age_{it}</i>	0.1288 ** (3.464)	0.1266 ** (3.072)	0.4497 *** (3.640)
<i>Big_Four_{it}</i>	10.5853 *** (3.521)	10.5703 *** (3.529)	30.1416 *** (3.508)
Constant	14.7703 *** (9.527)	14.0734 *** (7.196)	36.5643 *** (10.448)
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	314	314	314
Clusters	51	51	51

Table 8. Cont.

	(1)	(2)	(3)
Variables	ESG_SCORE_{it}	ESG_COMB_{it}	ESG_SUM_{it}
R-squared	0.553	0.542	0.580
Maximum lag	2	2	2
F-statistic	88.67	142.8	122

Robust *t*-statistics in parentheses. *, **, and *** denote two-tailed significance levels at the 10%, 5%, and 1% levels, respectively.

5. Discussion and Conclusions

Impelled by concerns about sustainability issues around the developing world, specifically within Indonesia, we examined whether the assurance of sustainability reports and corporate governance are linked with ESG performance in large public listed firms in Indonesia. We investigated the assurance of sustainability reports, gender diversity, and sustainability committees as they have substantial consequences for social, environmental, and governance matters in large corporations. Using a sample for 314 firm-years for the period 2016 to 2023, we found that firms with assured sustainability reports are positively associated with higher ESG scores. We did not find any association between gender-diverse boards and ESG performance. This phenomenon may have occurred because of the lower percentage of women on corporate boards, as documented in the previous studies of [Rosati and Diniz Faria \(2019\)](#) and [Manita et al. \(2018\)](#). We found a statistically significant positive relationship between the existence of sustainability committees and ESG scores. Additionally, we also found that gender-diverse boards and assurance from the Big Four auditors are positively associated with ESG scores. Our results are robust to alternative measurements of our independent and dependent variables. Additional tests have also addressed the heteroskedasticity and autocorrelation concerns associated with sustainability research.

The results from this study underline the significance and importance of having sustainability reports assured. Additionally, structuring boards to be more ESG/sustainability conscious by assembling a sustainability committee is beneficial to attaining sustainability objectives. Previous studies have linked the importance of having sustainability reports assured and the presence of sustainability committees in uplifting ESG performance ([Bradbury et al., 2022](#); [Clarkson et al., 2019](#)). The outcomes from this study may motivate policymakers and standard-setters in Indonesia to consider the benefits of mandating that sustainability reports be verified by an external assurance provider and having a sustainability committee. Additionally, the ramifications of having gender-diverse boards that are audited by one of the Big Four accounting firms should be viewed seriously. These are notable signals to stakeholders and policymakers that both female directors and experienced external auditors can better contribute to ESG performance and sustainability practices. Similarly, policymakers in Indonesia may recommend a minimum quota for women participation on boards considering the prominent role female directors exhibit in sustainability matters. Specifically, the results from this research imply that the assurance of sustainability reports and the existence of sustainability committees are pivotal in achieving the sustainability agenda in Indonesia. From a theoretical viewpoint, our results support both the stakeholder-agency theory and resource dependency theory considering the diverse stakeholders involved.

Comparable to other studies, this research is not without its limitations. First, this study was restricted to Indonesia, the institutional settings of which may vary from another jurisdictions. Second, we focused on the top 80 largest publicly listed firms in Indonesia and not the entire Jakarta Stock Exchange. While we acknowledge that there may be limitations, the strength and valuable implications of the findings cannot be ignored.

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Appendix A. Variable Definition

Variable	Definition	Source
Dependent variables		
ESG_SCORE_{it}	ESG score, with ESG score being an overall company score based on the self-reported information in the environmental, social, and corporate governance pillars.	London Stock Exchange Group (LSEG) Refinitiv Workspace
ESG_COMB_{it}	ESG combined score, with the combined score being the ESG score with an ESG controversies overlay.	LSEG Refinitiv Workspace
ESG_SUM_{it}	Sum of environmental, governance, and social pillar scores. The environmental pillar measures a company's impact on living and non-living natural systems, including the air, land, and water as well as complete ecosystems. The corporate governance pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. The social pillar measures a company's capacity to generate trust and loyalty with its workforce, customers, and society through its use of best management practices.	LSEG Refinitiv Workspace
Independent Variables		
$ASSD_RPT_{it}$	Assurance of sustainability report, score = 1, otherwise 0.	Annual Report
FEM_BOD_{it}	Percentage of female on the board.	Annual Report
SUS_COM_{it}	Existence of sustainability committee, score = 1, otherwise 0.	Annual Report

Variable	Definition	Source
Control variables		
$INDEP_DIR\%_{it}$	Percentage of independent directors on the board.	Annual Report
$MEET_BOARD_{it}$	Annual number of meetings for the board of directors.	Annual Report
LEV_{it}	Ratio of book value of debt and book value of total assets.	Annual Report
TA_{it}	The total assets of the firm.	Annual Report
Age_{it}	Number of years from the time of incorporation of the firm.	Annual Report
Big_Four_{it}	Companies audited by the Big Four audit firms, score = 1, otherwise 0.	Annual Report

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