

The Strengthening Role of Proportion Women on Supervisory Board on The Correlation Among Firm Size and ESG Disclosure

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Abstrak

Studi ini meneliti peran proporsi perempuan dalam dewan pengawas dalam korelasi antara ukuran perusahaan dan pengungkapan ESG. Data panel tidak seimbang digunakan untuk mencakup 1518 perusahaan non-keuangan yang terdaftar di Bursa Efek Indonesia (IDX) periode 2018–2023. Analisis regresi moderasi (MRA) menganalisis pengujian hipotesis untuk memperkirakan efek langsung ukuran perusahaan dan proporsi perempuan, serta efek interaksi keduanya terhadap tingkat pengungkapan ESG. Hasil penelitian menunjukkan bahwa ukuran perusahaan berpengaruh positif terhadap pengungkapan ESG, dan proporsi perempuan dalam dewan pengawas berpengaruh positif terhadap pengungkapan ESG. Proporsi perempuan dalam dewan pengawas memperkuat pengaruh ukuran perusahaan terhadap pengungkapan ESG. Studi ini memperkaya dan menyoroti nilai tambah proporsi perempuan dalam fungsi pengawasan dan kualitas keputusan keberlanjutan. Secara teoritis, studi ini meningkatkan legitimasi, eselon atas, dan teori sosialisasi gender dalam tata kelola perusahaan dan praktik keberlanjutan. Secara praktis, studi ini memberikan kontribusi sebagai pengetahuan bagi investor, regulator, dan perusahaan untuk mempertimbangkan relevansi perempuan di dewan pengawas dan ukuran perusahaan sebagai indikator tata kelola untuk mempromosikan pengungkapan ESG.

Kata kunci: Pengungkapan ESG, Ukuran perusahaan, IDX, MRA, Perempuan di dewan pengawas

Abstract

This study examines the role of proportion of women on the supervisory board in the correlation among firm size and ESG disclosure. Unbalanced panel data is used to comprise 1518 non-financial companies listed on the Indonesia Stock Exchange (IDX) period 2018–2023. Moderated regression analysis (MRA) analyse hypothesis testing to estimate the direct effects of company size and the proportion of women, as well as their interaction effects on the level of ESG disclosure. The results of study show that Firm size has positively effect on ESG disclosure, and the proportion women on the supervisory board positively effects on ESG disclosure. The proportion women on the supervisory board strengthens the effect of firm size on ESG disclosure. This study enriches and highlights the added value of proportion women in the oversight function and the quality of sustainability decisions. Theoretically, this study enhances legitimacy, upper echelon, and gender socialization theory in corporate governance and sustainability practice. Practically, this study contributes as knowledge for investors, regulators, and companies to consider the relevance of women on supervisory boards and firm size as a governance indicator for promoting ESG disclosure.

Keywords: ESG disclosure, firm size, IDX, MRA, women on supervisory board

INTRODUCTION

Today, Corporate environmental, social, and governance become a highlight issue in global business practices that know sustainable business practice. Sustainable business practice paradigm not only prioritises financial profit as the sole measure of success but also demands companies make contributions for environmental conservation, social empowerment, and the implementation of good corporate governance (GCG). The transformation of business practices to Environmental, Social, and Governance (ESG) perspective, which positions companies not only as economic entities but also as socially and environmentally responsible entities. ESG disclosure (ESGD) has become an essential media for stakeholders to assess the company's obedience in conducting ethical, transparent, and long-term-oriented business practice. ESGD demonstrates companies' commitment to increase stakeholders trust in their responsible to social,

environmental, and governance impacts of their operational business (Eliwa et al., 2021).

The stakeholder's attention to ESGD tend more increasing global awareness of climate change, social inequality, and the ethical challenges in sustainable business (He & Ismail, 2024). Investors, regulators, and the public give more attention to how companies manage risks related to governance, environmental and social issues. ESGD is not only a commitment to ESG responsibility issue but also a business strategy that support companies to reach out social legitimacy and achieve a long-term competitive advantage (Siddique et al., 2026). Companies effectively manage and communicate their sustainability performance will get positive reputation, stakeholder loyalty, and greater access to capital, as investors tend to invest direct funds to strong ESG practices companies (Gracia & Siregar, 2021).

Firm size (FSZ) is one of variable influencing ESGD. Empirical study found that larger companies have more enough financial, technological, and managerial resources to implement and report comprehensively sustainable business practices (Damtoft et al., 2025). Furthermore, large companies generally face higher pressure from stakeholders to be transparent and accountable. Stakeholders are more caring to corporate ESG practice from the media and ESG rating agencies, which encourages them to evaluate corporate reputation relate to ESG commitment (Hoang et al., 2023). Chauhan & Kumar (2018), Hu et al. (2023) and Yu & Luu, (2021), have shown a positive and significant relationship between FSZ and ESGD. These findings increase the perspective of firm size as one of determinant factors in evaluating transparency and accountability ESG practices.

The relationship between FSZ and ESGD can explain with legitimacy theory. Legitimacy theory explains why companies disclose their ESGD information. According to legitimacy theory, Directly or indirectly, companies make social contract with society where they do operational. Corporate legitimacy depends on how companies to align their business and information disclosures with social expectations. When companies mismatch in aligning companies' operational practices and social expectations, corporate legitimacy is threatened. This condition prompts management to apply ESGD as maintenance to enhance their legitimacy (Ben Ismail et al., 2021; Jiang et al., 2021; Khan, 2022; Lu & Abeysekera, 2014; Raman et al., 2023).

Integrating legitimacy theory in ESGD emphasizes several principles. First, companies must comply with a social contract by taking obedience to regulations, laws, and social expectations (Raman et al., 2023). Second, legitimacy is viewed as a strategic resource to establish, maintain, and restore through active disclosure strategies to respond to legitimacy threats resulting from crises or public pressure ((Khan, 2022). Third, ESGD is often used as a legitimacy media to develop social and environmental responsibility, especially when a company's performance does not really fully align with social expectations (Hoepner et al., 2025) Empirical studies show that companies' motivations in implementing ESG practice are strongly influenced by external pressures and stakeholder perception. Companies facing higher public and political pressure, such as lack environmental performance, high visibility, or operating in high risk and sensitive industries, tend to increase ESGD to mitigate legitimacy threats (Cho & Patten, 2007; Cho & Roberts, 2010; Jiang et al., 2021; Lucuț Capraș et al., 2025). ESGD can manage reputation and risk by highlighting positive actions of the company to influence stakeholder perceptions of company sustainability commitments to boost their performance (Ravenda et al., 2022). ESGD becomes a mechanism in the corporate legitimacy process to meet the expectations of public and stakeholders (Giordino et al., 2024).

Organizational characteristics play a significant role in maintaining legitimacy as determinants factors of ESGD. Companies operate in sensitive industry to environmental and social issues tend has higher ESGD (Ali et al., 2021; Lucuț Capraș et al., 2025). However, ESGD does not always reflect real sustainability performance, it can be strategically used to enhance

corporate legitimacy without substantiating improvements in sustainability performance (Hoepner et al., 2025). Legitimacy theory provides a wider explanation for the motivational ESGD. The potential for symbolic disclosure appears, where ESGD serves more as a reputation and branding media than as a real media of accountability and transparency (Raman et al., 2023). Although legitimacy theory predicts that firms with a lower ESG performance tend to make wider disclosures to avoid legitimacy threats (Jiang et al., 2021).

However, the relationship between FSZ and ESGD is not always linear significant. Not all larger firms allocate their capacity and resources to enhance ESGD. However, some large firms do selective disclosure to enhance their reputation ESG practices (Gregory, 2024). The supervisory board contributes in determining how much ESGD information should be disclosed to the public (Bolibok, 2024). Based on this perspective, this research focuses on contemporary research on the proportion women on supervisory boards (FOC). FOC contributes to increase corporate commitment in integrating business practice to environmental conservation, social awareness, and the empowerment of governance action (Hadi et al., 2025). FOC show higher levels of social empathy and environmental awareness, which can affect ESGD. Khatri (2023) and Marchini et al., (2022) found that companies with higher FOC perform better in ESGD. FOC are considered more inclusive in decision-making, more compliant with regulations, and more sensitive to social and environmental issues (Amadi et al., 2023).

However, most research on the role of gender diversity in corporate governance strategic business decision most focus on the role women on boards of directors rather than on supervisory boards. In fact, within the two-tier system implemented in Indonesia, the role women on supervisory board plays a different role, yet equally strategic in corporate governance, than the board of directors. The proportion women on supervisory board is responsible for ensuring that the managerial functions executed by the board of directors performs in accordance with the principles of good corporate governance (Dienes & Velte, 2016) Therefore, FOC can enhance a deeper and widely evaluation to corporate commitment in conserve of social and environmental issues (Christy et al., 2025).

Furthermore, most research on the relationship between the proportion women on corporate governance and sustainability practices most focus in developed countries with relatively developed economic prosperity and good corporate governance cultures. Indonesia has regulated about sustainable practice in public companies listed in Indonesia Stock Exchange (IDX). OJK Regulation No. 51/POJK.03/2017 has emphasised the importance of integrating sustainability principles, included gender inclusivity in corporate business practice (Aprullah et al., 2025). However, the implementation of the regulation is still initial stage that face more challenging, including the low representation of women in strategic positions on supervisory boards, included in supervisory board. Therefore, this study is examining the relationships among FSZ, FOC, and ESGD in Indonesia as crucial issue to provide a deeper contextual insight for stakeholder's decision making.

Previous empirical studies exploring the effect of FOC in the relationship between FSZ and ESGD is still limited. FOC can be strengthening or weakening the relationship between FSZ and ESGD. We believe that large companies with high resource may only maximise their potential ESGD when there is a strong monitoring from FOC. Other hand, companies tend operate within a wider framework of social values to meet public expectation. Larger companies have high public visibility tend face higher reputational risks if they ignore public expectations. (Fiana & Endri, 2025). Therefore, ESGD becomes a strategy to reach out social legitimacy. In this context, FOC can also enhance a company's legitimacy by demonstrating corporate commitment to equality and diversity in corporate governance.

This study offers some new contributions to develop the sustainability empirical studies.

First, this study, theoretically, explains how FSZ and FOC interact to influence ESGD non-financial companies listed in IDX period 2018-2023. This study confirms that FOC is not only a symbol of equality but also a substantive corporate governance role in enhancing the effectiveness of corporate governance in implementing ESGD. Second, empirically, this study provides evidence on ESG practices in Indonesia, a developing country that is currently strengthening its sustainability regulations to support SDGs. Third, practically, the results of this study are expected to provide input for regulators, investors, and creditors to consider FSZ and FOC in evaluating ESGD. Otherwise, corporate management can integrate FSZ and FOC into their sustainability strategies to gain social legitimacy.

HYPHOTHESIS DEVELOPMENT

Firm Size and ESG Disclosure

FSZ and ESGD have a positive relationship between. Larger companies tend to disclose higher-quality ESGD than smaller companies. ESGD is on account of the resource advantages of larger companies, higher stakeholder interest, and they demand larger information from companies, which encourages more extensive ESGD (Duan et al., 2025). FSZ is the most significant variable in explaining ESGD, with a stronger marginal effect than other factors such as profitability or board characteristics (Hoang et al., 2023). ESGD is voluntary disclosure that larger companies are more likely to publish corporate social responsibility reporting and disclose more wider ESGD to protect stakeholder interests and stabilize market reactions to ESGD (Hu et al., 2023). Mechanistically, the effect of FSZ on ESGD can be explained through several mechanisms. First, larger companies have greater resource charitable fund, such as financial and human resources, which allow them to implement ESGD more effectively (Bissoondoyal-Bheenick et al., 2023; Crossley et al., 2021). Second, FSZ is often used as a proxy for the level of information asymmetry. Theoretically, larger companies are more proactive in disclosing due to resource and information constraints than smaller companies (Filgueira & Norden, 2025). Third, large companies face greater pressure from regulators, analysts, and other stakeholders that increasing demands for ESGD transparency and accountability (E. P. Yu & Luu, 2021)

The impact of ESGD on the financial market tends to be more attractive for larger companies, which are better able to translate ESGD into increased productivity and market value, while smaller companies tend have experience weaker or even negative market reactions due to resource and information constraints (Hu et al., 2023). Furthermore, the relationship between FSZ and ESGD can be positive, negative, or insignificant, depending on the type of disclosure and the empirical context analyzed (Lu & Wang, 2021). Based on the description, hypothesis is formulated below:

H1. Firm size positively affects ESG disclosure

Women on The Supervisory Board and ESG Disclosure

FOC and ESGD have a widely researched topic in that relationship. This relationship has conducted mixed results across countries, sectors, and methodological approaches. Some empirical studies showed that FOC and ESGD have positive relationship. FOC and ESGD reflected how women in corporate governance involved in increasing transparency and disclose ESG activities across various industry and geographic contexts (Agnese et al., 2024; Alkhawaja et al., 2023; Sundarasan et al., 2024). Women in supervisory board have sustainable diverse perspectives, ethical orientations, and sensitivity to social and environmental issues, that encouraging companies to respond to ESGD more effectively (Borrero-Domínguez et al., 2024) The empirical literature emphasizes that the positive impact of FOC on ESGD becomes more pronounced if the number of women on the supervisory board reaches a certain quota (Donkor et al., 2025). The positive

effects of FOC on ESGD are stronger in companies with higher CSR engagement when women in strategic leadership structure, such as the supervisory board (Słomka-Golebiowska et al., 2023a; Sundarasan et al., 2024). Furthermore, FOC is consistently associated with higher ESGD (Schoonjans, 2024). Theoretically, the relationship between FOC and ESG can be explained by the Upper Echelons Theory and the Gender Socialization Theory. Upper Echelon Theory explains that FOC can influence strategic decisions regarding ESG disclosure. FOC is often associated with prudence, ethical orientation, and concern for stakeholders, which encourages ESG transparency (Anisykurlillah et al., 2025a; Valls Martínez & Soriano Román, 2022). Gender Socialization Theory explains that the socialization process shapes stronger communal values and ethical sensitivity in women, making them more likely to promote ESG and more responsible governance (Areneke et al., 2023). A positive relationship between FOC and ESGD occurs when the number of women in each governance structure reaches out quota of more than 3 members, that consistent with the critical mass concept ((Almaqtari et al., 2024). However, empirical studies have found different results depending on the context, so further research is needed (Husted & Sousa-Filho, 2019; Khamisu & Paluri, 2024; Sun et al., 2022a). Based on the description, hypothesis is formulated below:

H2. Women on the supervisory board positively affect ESG Disclosure

Firm Size, Women on The Supervisory Board, and ESG Disclosure

FOC can act as moderating variable in the relationship between FSZ and ESGD. A higher FOC is associated with higher ESGD to indicate substantively influence of FOC in strategic decision-making related to ESGD issues (Alkhawaja et al., 2023; Giannarakis et al., 2023). Companies have larger size and higher FOC tend to have higher ESGD. FOC can be complementing factor to corporate governance structure and FSZ (Anisykurlillah et al., 2025b; McGuinness et al., 2024). FSZ is consistently positively related to ESGD because they have larger available resources to need report widely to stakeholders. FOC strength positive relationship between FSZ and ESGD, especially in larger companies that face stronger social legitimacy demands from stakeholders (Giannarakis et al., 2023). Interaction FOC and FSZ can encourage ESGD to be higher (Nguyen, 2023). So, in this study, the positive impact of FOC on ESGD may depend on the proportion of FOC in Indonesia context. Developed countries tend make quotas for women on corporate boards. This policy enhance role of FOC in increasing ESGD to be more pronounced (Alkhawaja et al., 2023). Legitimacy, upper echelon theory, and gender socialization provide complementary theoretical foundations for explaining the role of FOC in the relationship between FSZ and ESGD. Legitimacy theory states that larger companies face greater public pressure and therefore seek to increase ESGD to maintain social legitimacy. FOC can be a corporate commitment to diversity and sustainability that can strengthen FSZ's positive effect on ESGD (López-Cabarcos et al., 2023; Pradhan et al., 2025).

Furthermore, upper echelons theory emphasizes that FOC will improve decision-making quality, oversight, and reporting transparency in large companies with high operational complexity (Frag & Mallin, 2017; Nguyen & Nguyen, 2023). Meanwhile, gender socialization theory explains that women tend to adopt a long-term perspective on ethical orientation toward sustainable issues and encourage companies to disclose more ESGD (Badrul Muttakin et al., 2022; Tahat & Hassanein, 2024). Empirical findings generally support the role of FOC in strengthening the positive relationship between FSZ and ESGD (Alkhawaja et al., 2023; Słomka-Golebiowska et al., 2023b; Sun et al., 2022b). These empirical study findings confirm that FOC moderates the relationship between FSZ and ESGD in a contextual issue (Husted & Sousa-Filho, 2019; Sun et al., 2022b). Based on the description, hypothesis is formulated below:

H3. Women on the supervisory board moderate the relationship between firm size and ESG Disclosure

RESEARCH METHOD

Sample

The population for this study comprises all non-financial companies listed on the IDX during 2018-2023. Non-financial companies' considerations were selected because the financial sector has different regulations and reporting requirements, which could introduce bias into the research results. This study uses purposive sampling, which selects samples based on specific criteria. Table 1 shows the criteria include: (1) the company published an annual report and/or sustainability report during the study period; (2) the company has complete data on firm size and the proportion women on the supervisory board. Based on these criteria, Table 1 shows that 1518 unbalanced firm-year observations (unbalanced panel data) were collected from 2018 to 2023.

Table 1. Sample Selection Process

Sample Selection Stage	Number of Obsv
The company published an annual report and/or sustainability report during	2221
Excluded: incomplete data for ESGD, FSZ, and FOC	(575)
Excluded: outlier observations	(128)
Final sample of the study	1518

Source: Processed Data (2026)

Operationalisation of Variables

Three types of variables are used in this study: dependent, independent, and moderating. The dependent variable is Environmental, Social, and Governance (ESG) disclosure, the independent variable is company size (firm scale), and the moderating variable is the presence of women on the supervisory board. Each variable is operationalised using specific indicators and measures that can be tested quantitatively. ESG disclosure, the dependent variable, is measured using a disclosure index developed from the Global Reporting Initiative (GRI) guidelines, widely used in sustainability research. Each ESG disclosure item is assigned a binary score: 1 if the company discloses it, and 0 if it does not. The total scores are then summed and divided by the number of items that should be disclosed, yielding a proportional ESG disclosure index (CESGS, 2025). Company size, as the independent variable, is measured using the natural logarithm of total assets (Ln Total Assets). This proxy is chosen because total assets reflect the company's overall scale. The use of the natural logarithm aims to normalise the data distribution and reduce bias caused by significant differences in company sizes. The presence of women on the supervisory board, as a moderating variable, is measured by the proportion of female supervisory board members to the total number of supervisory board members. This measurement enables the identification of the extent to which female representation contributes to the company's oversight process. The following Table 2 shows the operationalisation of the variables used in this study:

Table 2. The operationalisation of the variables

Variables	Definition Operational	Indicators / Measurements	Source
ESG Disclosure (Dependent)	Level of disclosure of information related to environmental, social, and governance aspects in annual sustainability reports (Eliwa et al., 2021)	ESG index based on GRI guidelines, calculated with the formula: Number of ESG items disclosed ÷ Number of relevant ESG items.	CESGS
Firm Size	Large-scale and small-scale, a	Natural logarithm of total assets	TICMI

Variables	Definition Operational	Indicators / Measurements	Source
(Independent)	company that reflects capacity, source power, and operational complexity (Fiana & Endri, 2025)	(Ln Total Assets).	
Women on the Supervisory Board (Moderating)	Represent women in the company's supervisory board structure (Khatiri, 2023)	Proportion of members of the supervisory board, women to the total Number of members of the supervisory board.	TICMI

Data collection procedures

This research is an empirical test of a hypothesis based on secondary data. Data were obtained from the annual reports and sustainability reports of non-financial companies listed on the Indonesia Stock Exchange (IDX) during the 2018–2023 period, obtained from CESGS (Center for Environmental, Social, and Governance Studies) Universitas Airlangga and TICMI (The Indonesia Capital Market Institute), the official website of Indonesia Stock Exchange (IDX), and official website non-financial companies listed on IDX.

Data analysis

The method used was the Moderated Regression Analysis (MRA) with unbalanced panel data to analysed data. MRA was chosen because it can directly test the effects of FSZ and FOC on ESGD, as well as the moderating role of FOC in strengthening or weakening this relationship. The panel data used is unbalanced because the number of company observations varies throughout the study period. The test was conducted using an unbalanced panel data regression model in EViews 13, with a significance level of $\alpha = 0.05$ (5%). Before selecting the estimation model, model specification testing was performed using the Chow, Hausman, and LM tests to determine the most appropriate model.

The MRA approach in this study refers to the model developed by modified Sharma (2003) model, which tests whether moderating variables strengthen or weaken the relationship between the independent and dependent variables. Mathematically, the regression model developed in this study can be formulated as follows:

Model (1)

$$ESGD_{it} = \beta_0 + \beta_1 FOC_{it} + \beta_2 FSZ_{it} + \varepsilon_{it}$$

Model (2)

$$ESGD_{it} = \beta_0 + \beta_1 FOC_{it} + \beta_2 FSZ_{it} + \beta_3 FSZ_{it} * FOC_{it} + \varepsilon_{it}$$

Where: $ESGD_{it}$ is ESG disclosure score of firm i at time t ; FOC_{it} is the composition of women on the board of commissioners of firm i at time t ; FSZ_{it} is Firm size of firm i at time t ; $FSZ_{it} * FOC_{it}$: Interaction between firm size and the composition of women on the board of commissioners of firm i at time t ; β_0 : constant; β_1 - β_3 : coefficient; ε_{it} : error term of firm i at time t .

Prior to hypothesis testing, the data were analysed using a series of classical assumption tests and model fit tests, including tests for multicollinearity and heteroscedasticity, and the Hausman test to determine whether the fixed or random effects model was most appropriate. Next, the regression estimation results were interpreted based on coefficient values and statistical significance levels. The direct effect of FSZ on ESGD was examined to test the first hypothesis.

The direct effect of FOC on ESGD was examined to test the second hypothesis. The moderating role of FOC in the relationship between FSZ and ESGD was tested through an interaction between FSZ and FOC, which served as the basis for testing the third hypothesis.

RESULT

Descriptive statistics

Before hypothesis testing, Tables 2 and 3 present descriptive statistics and Pearson correlation. ESGD has an average of 0.436, ranging from 0.111 to 1.000. This finding indicates that ESGD across the sample companies varies considerably, with some disclosing only 11.1% and others 100%. The average of 43.6% indicates that most companies have a moderate ESGD. FSZ, proxied by the natural logarithm of total assets, averages 28.825 with a minimum of 23.388 and a maximum of 33.730. The average of FSZ indicates that the majority of companies in the sample with relatively large companies. FOC averages 11,1 % with a minimum of 0 % and a maximum of 40%. A minimum of 0% indicates that there are companies with no members of FOC. Meanwhile, a maximum of 40% indicates that there are companies with 40% FOC. Approximately 11.1% of FOC indicate that FOC remains low.

Table 3. Descriptive Statistics

Variables	Obsv	Min	Max	Mean	Std. Dev.
ESGD	1518	0.111	1.000	0.436	0.188
FSZ	1518	23.388	33.730	28.825	19.860
FOC	1518	0.000	0.400	0.111	0.116

Table 4. Pearson Correlation

Correlation	ESGD	FSZ	FOC
ESGD	1		
FSZ	0.429**)	1	
FOC	0.123**)	0.113**)	1

Note: **) Indicates significance at 1% and *) indicates significance at 5%

Model Selection

In the panel data model testing to explain the relationship between FOC, FSZ, and ESGD for non-financial companies listed on IDX during 2018 - 2023, as shown in the Table. 5, the Chow test is used to determine which one the two more applicable models are the Common Effect Model (CEM) or the Fixed Effect Model (FEM). The test results for Models 1 and 2 showed a p-value of $0.000 < 0.05$, indicating that the CEM is declining and the FEM is proper for this research. Next, the Hausman test was conducted to compare the FEM with the Random Effect Model (REM). In Models 1 and 2, the Hausman test p-value was greater than 0.05, so the FEM was rejected, and the REM was the most appropriate model. A Lagrange Multiplier (LM) test is used to compare the CEM with the REM. The results showed that models (1) and (2) have a probability of $0.000 < 0.05$, indicating that the REM is more proper than the CEM.

Table 5. Panel Data Model Test Results

Uji Chow		Uji Hausman		Uji- LM		Accepted Model
CSF	Prob.	CSR	Prob.	Breusch-	Prob	

Pagan							
Model 1	2.237	0.000	4.818	0.085	355.308	0.000	REM
Model 2	2.344	0.000	2.775	0.420	366.435	0.000	REM

Source: Processed Data (2026)

Classical Assumption Test Results

To assess the validity of the regression model, we test normality, heteroscedasticity, multicollinearity, and autocorrelation. Abnormality in panel data is justifiable. the Central Limit Theorem (CLT) stated that the estimator in the Random Effects Model (REM) tend consistent for panel data with a large number of observations, so the distribution of the t-test and F-test statistics will close with a normal distribution. Therefore, the test results remain valid, even though the residuals are not normally distributed (Kuersteiner & Prucha, 2013). Furthermore, the results of the multicollinearity test by using the Pairwise Correlation indicated that there is no indication of multicollinearity among the independent variables. Correlation coefficients between the independent variables are below 0.80 (Project & Prokofjevs, 2021). Heteroscedasticity test using the Glejser approach also indicate that the research model is free of heteroscedasticity based on the p-value of each independent variable relative to the absolute residual is greater than 0.05 (Martin, 2023). To address the possibility of heteroscedasticity and autocorrelation in the model, we use method of the White cross-section (period-cluster) standard errors method (Abadie et al., 2023; Hoechle, 2007). Based on the overall results of the classical tolerance test, this research model aims to meet the BLUE (Best Linear Unbiased Estimator) criteria, indicating that the regression model produces unbiased, efficient, and consistent estimates.

Table 6. Pairwise Corellation Testing

	FSZ	FOC
FSZ	1	0.113
FOC	0.113	1

Source: Processed Data (2026)

Table 7. Heteroscedasticity Test Results

Variable	Model 1		Model 2	
	Coef	Prob.	Coef	Prob.
FSZ	0.009	0.158	0.008	0.375
FOC	0.065	0.116	-0.236	0.456
FOCxFSZ	-	-	0.010	0.372

Result of Testing of Hypothesis

Regression analysis on Table 8 was conducted to test the effects of Firm Size (FSZ) and the proportion of women on the supervisory board (FOC) on ESG disclosure (ESGD), and to determine whether FOC can moderate the relationship between company size and ESG disclosure. The estimation results partially show that FSZ has a positive coefficient of 0.039, significant at the < 0.01 level. This result indicates that the larger the company size, the higher the level of ESGD. Additionally, the FOC variable exhibits a positive coefficient of 0.150, with a p-value < 0.001 , indicating that FOC has a statistically significant positive effect on ESG disclosure. Thus, the results in Model (1) confirm Hypotheses 1 and 2, which state that both FSZ and FOC have a positive and significant influence on the level of ESGD. The larger the company and the stronger its gender inclusion in supervising and prioritizing sustainability, the greater the

transparency of the information it discloses to the public. Model 1 shows an R-squared value of 0.130 and an Adjusted R-squared value of 0.129. This finding indicates that approximately 13% of the variation in ESGD can be attributed to FSZ and FOC. So, Model 1 is considered moderate in explaining the observed phenomena. Model (2) adds the interaction variable FSZ (x) FOC, which has a coefficient of 0.056 with a p-value < 0.05 that proves FOC can moderate the relationship between FSZ and ESGD. So, the third hypothesis is accepted. The R-squared in Model 2 is 0.134, with an Adjusted R-squared of 0.133. The Prob(F-statistic) value of 0.000 confirms that the Model (1) and (2) is overall significant, indicating that the variables used jointly influence ESG disclosure.

Table 8. Hypothesis Testing Result (Random Effects Model)

Variable	Model (1)			Model (2)		
	Coefficient	Std. Error	t-Statistic	Coefficient	Std. Error	t-Statistic
C	-0.702**	0.083	-8.453	-0.529**	0.104	-5.096
FOC	0.039**	0.003	13.058	0.033**	0.004	8.847
FSZ	0.150**	0.043	3.446	-1.483*	0.628	-2.360
FSZ*FOC				0.056*	0.022	2.568
R-squared	0.130			0.134		
Adjusted R-squared	0.129			0.133		
F-statistic	113.105			78.372		
Prob(F-statistic)	0.000			0.000		
Durbin-Watson Stat	1.726			1.741		

Note: * indicates significance at the 5% and **indicates significance at the 5% and 1%

DISCUSSION

The impact of Firm Size on ESG Disclosure

FSZ significantly positive affect on ESGD. This finding indicates that larger companies tend to disclose higher ESGD. Therefore, FSZ can be viewed as variable determining ESGD. These findings support integrating legitimacy theory in sustainability concept. Larger companies get more expectation and pressure from the public, regulators, investors, and other stakeholders. Ben Ismail et al. (2021), Jiang et al. (2021), Khan (2022), Lu & Abeysekera, (2014), and Raman et al., (2023) stated that corporate legitimacy depends on how a company's disclose its activities and maintaining social norm. ESGD can be a strategy management to maintain its social legitimacy when FSZ tend larger that cause the risk of legitimacy threats rises. Larger companies disclose higher ESGD because they have sufficient financial and resources to maintain their reputations (Drempetic et al., 2020; Fiana & Endri, 2025). Larger companies have been more transparent and responsible in doing ESG practice (Alhady & Risanty, 2023). Furthermore, Bissoondoyal-Bheenick et al., (2023) and Fiana & Endri (2025) show that FSZ has a stronger marginal effect on ESGD than other company characteristics, such as profitability. The impact of ESGD on the financial market tends to be more attractive for larger companies. FSZ can generate ESGD to increased corporate productivity and market value (Gregory, 2024; E. P. yi Yu & Luu, 2021). To maintain their reputations in accessing global capital markets, large companies tend to increase ESGD (Lisin et al., 2022). Based on the description, these findings support the hypothesis stated that firm size positively affects ESG disclosure.

The effect of proportion women on the supervisory board on ESG Disclosure

FOC has significantly a positive effect on ESGD. Higher FOC have more transparent

ESGD. These results strengthen the argument that proportion women on supervisory board plays a significant role in encouraging ESG Disclosure. This finding is supported by previous empirical literature showing a positive relationship between FOC and ESGD (Agnese et al., 2024; Borrero-Domínguez et al., 2024; Eskantar et al., 2024; Giannarakis, Andronikidis, et al., 2023). In line with gender socialization theory, FOC bring more heterogenous perspectives, a stronger ethical behaviour orientation, and a higher sensitivity to social and environmental issues, thus encouraging companies to respond more effectively to ESGD (Borrero-Domínguez et al., 2024). In line with upper echelon theory, FOC enrich decision-making process by enriching inclusive perspectives, values, and leadership. We believe that FOC not only improves the quality of supervision but also strengthens the company's commitment to ESGD and ethical and reputational risk possible threat company. Thus, FOC substantially increases the quantity and quality of ESGD.

These research findings also align with the view that the positive impact of FOC becomes stronger as the number of women reaches a certain threshold (Donkor et al., 2025; Sundarassen et al., 2024). The positive effects of FOC on ESGD will be effective in higher companies' commitment to ESG practice (De Novellis et al., 2025; Hoang et al., 2023). The structural and functional role of FOC is more important than its representation in amount (Schoonjans, 2024; Słomka-Golebiowska et al., 2023). From a governance perspective, FOC is often associated with higher levels of concern for social and environmental responsibility and a tendency to promote greater transparency. These findings support those of Baghdadi et al. (2023), who state that FOC can improve sustainability performance and the quality of non-financial reporting. Susanto et al. (2024) also found that higher FOC more active in monitoring and supervision as effectively response to stakeholder pressure and interests.

Although, FOC averaging only 11.1% in the non-financial companies listed in IDX period 2018-2023, FOC contribute a positive impact on ESGD. This finding reveals that the potential contribution of FOC to strengthening corporate ESGD in Indonesia persist substantial. FOC play a crucial role in accelerating ESGD. By incorporating broader perspectives, enhanced ethical standards, and more effective supervisory and monitoring, FOC can stimulate companies to be more responsible to ESGD.

The effect of proportion of women on the supervisory board in the relationship between firm size and ESG disclosure

FOC is strengthening the relationship between FSZ and ESGD. The positive effect of FSZ on ESGD becomes stronger as the proportion of FOC increases. FOC can motivate larger companies to disclose higher ESGD. Empirical studies found that a higher FOC can contribute to higher ESGD if women on the supervisory board have sufficient space to contribute to strategic decision-making, such as ESGD (Alkhawaja et al., 2023; Giannarakis et al., 2023; Sundarassen et al., 2024). Larger companies also can generate higher ESGD if they have concrete commitment to FOC. FOC can be complement for FSZ in strengthening ESGD (Dienes & Velte, 2016).

This finding is in line with legitimacy, upper echelon, and gender socialization theory. Legitimacy theory states that larger companies face greater public pressure and therefore seek to increase ESGD to maintain social legitimacy. FOC can be a corporate commitment to diversity and sustainability that can strengthen FSZ's positive effect on ESGD (López-Cabarcos et al., 2023; Pradhan et al., 2025).

Furthermore, upper echelons theory emphasizes that FOC will improve decision-making quality, oversight, and reporting transparency in large companies with high operational complexity (Frag & Mallin, 2017; Nguyen & Nguyen, 2023). Meanwhile, gender socialization theory explains that women tend to adopt a long-term perspective on ethical orientation toward sustainable issues and encourage companies to disclose more ESGD (Badrul Muttakin et al., 2022; Tahat & Hassanein, 2024). Empirical findings generally support the role of FOC in strengthening the

positive relationship between FSZ and ESGD (Alkhawaja et al., 2023; Słomka-Golebiowska et al., 2023b; Sun et al., 2022b).

Practically, countries implement quota for women policies on corporate boards, the positive impact of FOC on ESGD be stronger (Alkhawaja et al., 2023). The effectiveness of FOC in affecting ESGD is not only determined by numbers women on the supervisory board, but also supporting inclusion policy by regulator and involving FOC in all stage of decision-making (Husted & Sousa-Filho, 2019; Jiang et al., 2021; Sun et al., 2022b). Eliwa et al. (2023) and Zampone et al. (2024) found that FOC is more sensitive to social and environmental issues that enhance corporate ESGD. Furthermore, FOC keep prioritize to the interests of non-economic stakeholders, such as society and the environment (Setiani, 2023). FOC has also been to increase monitoring and supervising effectively that can reduce opportunistic management behavior in disclosing ESGD information (Eliwa et al., 2023). Based on this finding, we believe that FOC is not only merely an issue of equality or inclusion but also it is a strategic tool to improve corporate governance quality, strengthen legitimacy, and enhance a company's reputation in the eyes of stakeholders.

CONCLUSION

Based on result and discussion, we conclude that FSZ and FOC positively affect ESGD. FOC strengthens the relationship between FSZ and ESGD non-financial companies listed on IDX period 2018-2023. FOC is not only an issue of gender inclusion in corporate governance but also a strategic decision to enhances ESGD that impacts to company reputation. Therefore, this study enriches the academic empirical literature on corporate sustainable governance and provides practical implications for regulators, investors, creditors, and management in promoting good corporate governance to create better sustainability practices in Indonesia. This study contribute to enrich literature of the corporate governance in sustainability issues in two aspects. First, this finding strengthens legitimacy theory which larger companies disclose more ESGD to reach out social legitimacy. Second, in perspective of upper echelon and gender socialization theory, FOC is a strategic resource that can enhance relevancy relationship between FSZ and ESGD. Practically, this study has three significant implications. First, these findings can inform affirmative action policies that increase FOC to regulators in Indonesia. This policy is in line with the global agenda to promote gender inclusion in corporate governance. Second, companies with higher FOC have better ESGD that is important to investors. Third, the importance of FOC is not only as formal requirement for company management in engaging sustainability in business practice, but also as a strategy to enhance stakeholders trust and corporate reputation. Although this study makes a significant theoretical and practical contribution, this study has two limitations. First, the research data only covers non-financial companies listed on the Indonesia Stock Exchange for the 2018–2023 period, so the results cannot be generalized to specific sectors in longer period. Second, ESG disclosure measurement is based on a disclosure index extracted from annual reports and sustainability reports, which may not fully lens the quality of disclosure of sustainability substances. We recommend to future research to extend the sample included the financial sector or companies in the ASEAN countries to make cross-country comparisons. Furthermore, future research can develop ESG disclosure measurement that consider the quality of ESG disclosure than just quantity of ESG Disclosure. Ownership structure, and government regulations can also be included to obtain factors of the determinants of ESG disclosure.

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