THE INFLUENCE OF FEMALE DIRECTORS AND FEMALE COMMISSIONERS ON FIRM PERFORMANCE WITH CSR DISCLOSURE AS AN INTERVENING VARIABLE

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Abstract

This study aims to examine the influence of female directors and commissioners on firm performance, with CSR disclosure as an intervening variable in Basic Materials companies listed on the Indonesia Stock Exchange (IDX) for the 2022-2024 period. The population comprised all companies in the sector, with a sample of 48 companies (144 observations) selected through purposive sampling based on the availability of complete annual and sustainability reports. This study used quantitative methods and secondary data, panel data regression with E-Views testing tools in the form of classical assumption tests, t-tests, F-tests, R-Square tests, and Sobel tests to examine the mediation effect. Female directors were measured by the proportion of female directors, female commissioners by the proportion of female commissioners, firm performance by Tobin's Q, and CSR disclosure by the GRI index of 24 indicators (economic, social, and environmental). The results show that female directors do not have a significant positive effect on CSR Disclosure (H3 is rejected, p = 0.6575) and firm performance (H1 is rejected, p = 0.3896), while female commissioners have a significant positive effect on both (H2 and H4 are accepted, p = 0.0000 and p = 0.0052). CSR Disclosure does not have a significant effect on firm performance (H5 is rejected, p = 0.2672) and does not mediate the relationship between the two (H6 is rejected, the Sobel test is not significant). Adjusted R-Square for structural factor I is 0.72 and for structural factor II is 0.671. Conclusion: female commissioners can improve company performance directly, but CSR Disclosure does not play a mediating role in the Indonesian extractive sector.

Keywords: Corporate Social Responsibility (CSR), Female Commissioners, Female Directors, Firm Performance

INTRODUCTION

Gender inequality remains a problem for women employees worldwide. There are barriers that prevent women from fully utilizing the opportunities available in their workplaces. Gender discrimination has become deeply rooted in prevailing social norms in some societies, limiting women's roles to subordinate positions rather than decision-making roles. Women are still perceived as passive, making them considered unsuitable for managerial positions. These assumptions hinder women's career opportunities to attain top management positions (Fairuzi and Tjahjadi 2022).

The existence of labor laws provides women with equal capacity and opportunities in employment. This also encourages women to gain opportunities to be involved in leading companies. Law No. 13 of 2003 on Manpower, particularly Articles 5 and 6, emphasizes that every worker has the right to fairness and equality in employment relationships, as well as protection for workers, especially female workers. In this study, the authors use two independent variables, namely female directors and female commissioners, which differ in roles and responsibilities. Based on Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation, which was enacted into law through Law No. 6 of 2023, the board of directors is fully responsible for managing the company in the interest of the company and representing the company both inside and outside court in accordance with the articles of association. Meanwhile, the board of commissioners is responsible for conducting general and/or specific supervision in accordance with the articles of association and providing advice to the board of directors.

One phenomenon highlighted by the Census of Women in Executive Positions across 200 top companies listed on the Indonesia Stock Exchange (IDX) shows that the basic materials sector still has low female representation in executive positions, including CEOs and directors. In 2021, there was only 1 woman among 10 executives in the basic materials sector, and overall, only 8 out of 200 companies had female CEOs (Elga Nurmutia, published May 30, 2021).

Several issues can be derived from this phenomenon. First, women are often considered unsuitable for technical or strategic positions in harsh work environments. Second, there is a lack of female leadership figures in the basic materials sector. Third, not all companies in the basic materials sector have CSR programs that support women's empowerment, both internally and externally. With a higher proportion of women and the cognitive leadership styles they bring to companies in the basic materials sector, there is potential to improve company performance, particularly profitability, and enhance corporate reputation, thereby attracting stakeholders.

Corporate Social Responsibility (CSR) has progressively assumed a strategic role within companies. In fact, companies are increasingly committed to CSR practices, environmental management, and social solidarity as sources of competitive advantage. Gaio and Gonçalves (2022) aim to understand whether the presence of female directors is associated with CSR, as the literature suggests that women contribute valuable cognitive characteristics to companies.

Research conducted by Fairuzi and Tjahjadi (2022) states that women at the board level tend to focus more on company performance with an orientation toward stakeholder interests, although the role of female directors in improving company profitability remains

debated. In contrast, (Gunawan and Wijaya 2021) found that the percentage of women on boards of commissioners and directors is associated with improved firm performance and has a significant impact on company performance, even though the proportion of women on boards of directors and the presence of female commissioners in manufacturing companies remain relatively small.

Studies on CSR, female directors, female commissioners, and firm performance are widely found in international literature, as issues of gender diversity and CSR have become increasingly important in many countries. Many international companies strive to enhance leadership diversity and demonstrate social responsibility, which is believed to create a positive corporate reputation, making this topic attractive to researchers. Song et al. (2024) found that women positively influence participation in corporate leadership through internal and external CSR mediation. However, companies with a higher proportion of female directors tend to engage more in external CSR than internal CSR, resulting in a positive relationship with firm profitability. Similarly, Ren et al. (2024) reported a strong correlation between female directors and internal CSR but found negative and insignificant results for external CSR. In contrast, Chapagain (2022) showed that all types of CSR practices positively affect firm profitability, thereby significantly enhancing corporate reputation.

Although many studies have examined how women in top management positions increase firm value, research on accounting students' perceptions of the role of CSR and women in top management positions remains limited. Therefore, this study aims to examine the role of CSR as a mediating variable in the influence of female directors and female commissioners on firm profitability.

Based on the background discussed above, this study also presents novelty. The novelty lies in the research object, namely companies in the Basic Materials Sector, as previous studies have not used this sector as their research reference. Furthermore, firm performance is measured using Tobin's Q, which has been used in some prior studies but remains relatively rare in Indonesian research, where ROE and ROA are more commonly applied. In addition, the study uses the GRI index to measure CSR, consisting of 24 GRI indicators divided into three dimensions: economic, environmental, and social.

REVIEW OF LITERATURE

Upper Echelon Theory

Upper Echelon Theory provides a framework for understanding how CSR decisions are made within companies by emphasizing the important role of leaders in influencing corporate strategy. Dewi, Wulan, and Mayanti (2021) explain that personal characteristics inherent in top management teams, which according to upper echelon theory affect the performance of the company they manage, make gender one of the most important factors to consider. The core of this theory is that leaders' interpretations of the situations they face and the consequences of the choices they make are strongly influenced by their backgrounds, such as experience, gender, and personality (Fairuzi and Tjahjadi 2022).

Legitimacy Theory

Legitimacy Theory, developed by Suchman (1995), proposes voluntary disclosure as a means for organizations to legitimize their existence. Research by (Zaki et al. 2024) states that CSR disclosure reflects corporate ethics and image and serves as a positive

signal to stakeholders, which is consistent with legitimacy theory asserting that companies seek to fulfill social expectations through transparency. Similarly, (Sriviana 2025) argues that based on legitimacy theory, companies can enhance CSR transparency to gain public support and maintain their corporate image and reputation.

The Influence of Female Directors on Firm Performance

Stela and Rhumah (2017) state that board diversity, measured by the percentage of female representation, has a significant influence on firm value. Das (2019) reports that female directors have a highly significant impact on firm profitability. Das (2019) also examines how female directors contribute to enhancing firm value in India and finds that microfinance institutions (MFIs) with boards possessing greater economic expertise and female representation are able to reduce operational costs.

H1: Female directors have a positive and significant effect on firm performance.

The Influence of Female Commissioners on Firm Performance

(Ayu et al. 2024) argue that larger board size, along with the presence of independent and female commissioners, has a positive impact on firm performance. Furthermore, (Ermawati and Soewarno 2024) find that female commissioners are able to improve firm performance. (Natalia and Isnalita 2023) also find that only female commissioners have a significant relationship with firm performance and financial performance, having tested the robustness of their findings before and during the COVID-19 pandemic.

H2: Female commissioners have a positive and significant effect on firm performance.

The Influence of Female Directors on CSR Disclosure

The presence of female directors can enhance participation in social and environmental activities and encourage a more participative and democratic leadership style, as explained by (Oino and Liu 2022) using Upper Echelon Theory. (Thambugala and Rathwatta 2021) also state that, from the perspective of Upper Echelon Theory, female directors tend to be more interested in CSR practices related to women and children, reflecting their empathy and understanding of specific social needs. Song et al. (2024) argue that female family leadership significantly influences CSR. In addition, (Ludya and Dewi 2024) find a positive association between female directors and CSR levels, reinforcing the notion that female directors can enhance corporate CSR performance.

H3: Female directors have a positive and significant effect on CSR disclosure.

The Influence of Female Commissioners on CSR Disclosure

Female commissioners, in particular, can exert cognitive influence in CSR-related decision-making (Benaguid et al. 2023), resulting in a positive and significant relationship between the proportion of female commissioners and CSR disclosure activities. Similarly, (Chang et al. 2024) conclude that based on Upper Echelon Theory, women bring characteristics such as empathy, care, and sensitivity that encourage companies to adopt more pro-CSR policies. (Rahma and Aldi 2020) conclude that board ethnicity and board feminism have a positive and significant effect on CSR disclosure, highlighting the important role of women in expanding CSR disclosure.

H4: Female commissioners have a positive and significant effect on CSR disclosure.

The Influence of CSR Disclosure on Firm Performance

(AM, Saraswati, and Subekti 2024) explain that partial CSR disclosure can improve firm performance. Legitimacy theory supports the finding that CSR disclosure has a positive effect on firm performance, as CSR is used by companies to gain legitimacy in the eyes of the public, which ultimately increases stakeholder support and positively impacts firm performance (Dinda, Wicaksono, and Hwihanus 2024). (Christine Cicilia Saputra, Rivaldo Martadinata Anthonie, and Hwihanus Hwihanus 2024) state that CSR reflects the notion that companies should fulfill social responsibilities in addition to generating profits.

H5: CSR disclosure has a significant effect on firm performance.

The Mediating Role of CSR Disclosure in the Relationship between Female Directors, Female Commissioners, and Firm Performance

(Devy and Hukmi 2021) reveal that the presence of female directors and female commissioners can mediate the relationship between CSR and firm value. Amadi et al. (2023) argue that women tend to demonstrate qualities that encourage increased participation in CSR activities, indicating that a higher proportion of female directors and commissioners promotes CSR engagement. Findings by (Anjar and Nu 2024) also show that CSR mediates the influence of the board of commissioners, particularly female commissioners.

H6: CSR disclosure mediates the effect of female directors and female commissioners on firm performance.

Conceptual Framework

Based on the theoretical foundation and research hypotheses above, this study examines the effects of female directors and female commissioners on firm performance, with CSR disclosure serving as a mediating variable. The following conceptual framework illustrates the relationships examined in this study.

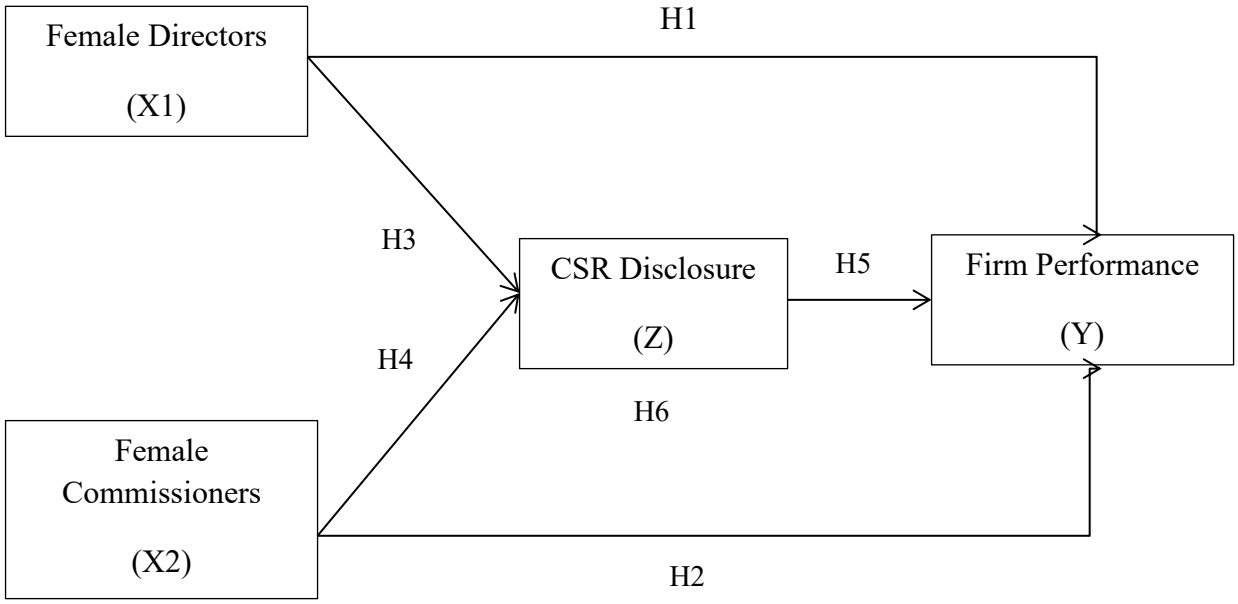

Figure 1.
Conceptual Framework

RESEARCH METHOD

In this study, the authors employ a quantitative approach to examine the effect of female directors and female commissioners on firm performance, with CSR disclosure serving as an intervening (mediating) variable. The research object consists of all companies in the basic materials sector listed on the Indonesia Stock Exchange (IDX). The sample comprises 48 companies selected and published on the IDX during the 2022–2024 period, chosen using purposive sampling. This study uses secondary data, with sample selection criteria including companies that consistently publish annual reports and sustainability reports during the 2022–2024 period. The analytical tool used in this research is E-Views version 12.

Each variable in this study is measured using specific indicators. The independent variable, female directors, is measured using the proportion of female directors as proposed by Wiryani, Sukoharsono, and Mardiati (2019)**.** Female commissioners are measured using the proportion of female members on the board of commissioners, following (Nabil and Dwiridotjahjono 2024)**.** The dependent variable, firm performance, is measured using Tobin's Q as proposed by Ishaq, (Ishaq, Islam, and Ghouse 2021) The intervening (mediating) variable, CSR disclosure, is measured using a CSR index proposed by (Joni et al. 2024), which refers to the GRI index, where a value of 1 is assigned if an item is disclosed and 0 if it is not disclosed.

The study applies data analysis techniques based on the panel data regression analysis textbook using E-Views by (Anwar and Nursan 2025), including descriptive statistical analysis. The researchers determine the appropriate estimation model among the Common Effect Model, Fixed Effect Model, and Random Effect Model. The selection of the estimation model aims to identify the most suitable method for panel data regression analysis. The Chow test, Hausman test, and Lagrange Multiplier test are employed to determine the most appropriate model.

Classical assumption tests conducted in this study include multicollinearity and heteroskedasticity tests. Hypothesis testing consists of the t-test (partial test), F-test (overall significance test), and the coefficient of determination (R^2). Finally, the Sobel test, based on (Basuki 2021), is used to examine whether CSR disclosure significantly mediates the relationship between female directors, female commissioners, and firm performance.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

	X1	X2	Y	Z
Mean	24.25785	393.9573	1731.002	2444.370
Median	20.10500	370.7700	1709.245	2359.790
Maximum	84.46000	889.3200	2673.560	3743.920
Minimum	12.37000	200.0000	1062.970	1780.430
Std. Dev.	13.61071	124.0843	360.9070	443.8859
Skewness	3.038779	1.439404	0.487838	0.939914
Kurtosis	12.98067	5.683544	2.880742	3.480886
Jarque-Bera	819.3026	92.93365	5.796996	22.59001
Probability	0.000000	0.000000	0.055106	0.000012
Sum	3493.130	56729.85	249264.3	351989.3
Sum Sq. Dev.	26490.97	2201760.	18626298	28175955
Observations	144	144	144	144

Sub-Structural I: X1(FD) AND X2(FC) ON Z(CSR_D)
Regression model selection
Chow test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.205994	(47,94)	0.0000
Cross-section Chi-square	163.061053	47	0.0000

The Chow test results show a probability value <0.05. This indicates that the pooled model is not suitable for use because it is deemed incapable of capturing differences in characteristics between companies in panel data. Therefore, based on these test results, the analysis is directed to using the fixed effects approach.

Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	15.236420	2	0.0005

Furthermore, the Hausman test results also show a probability value <0.05. This condition indicates a correlation between individual company effects and the independent variables in the model. Because the Random Effect model assumes that individual effects are uncorrelated with the independent variables, this assumption is not met. Thus, the Hausman test results confirm that the Fixed Effect Model remains the most appropriate model for use in this study.

Because the Chow and Hausman tests both lead to the selection of the Fixed Effect Model, the Lagrange Multiplier (LM) test is not necessary. The LM test is only used to determine whether the Pooled or Random Effect model is more appropriate. However, in this case, both Pooled and Random Effects have been eliminated by the results of the previous test. Therefore, the panel model selection process is considered complete, and the Fixed Effects model is used for further analysis.

Sub-Structural Model Selection II
Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.153112	(47,93)	0.0008
Cross-section Chi-square	106.022856	47	0.0000

The Chow test results show a probability value <0.05. This indicates that the pooled model is not suitable for use because it is deemed incapable of capturing differences in characteristics between companies in panel data. Therefore, based on these test results, the analysis is directed to using the fixed effects approach.

Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	31.231088	3	0.0000

Furthermore, the Hausman test results also show a probability value <0.05. This condition indicates a correlation between individual company effects and the independent variables in the model. Because the Random Effects model assumes that individual effects are uncorrelated with the independent variables, this assumption is not met. Thus, the Hausman test results confirm that the Fixed Effects Model remains the most appropriate model for use in this study.

Because the Chow and Hausman tests both lead to the selection of the Fixed Effects Model, the Lagrange Multiplier (LM) test is unnecessary. The LM test is only used to determine whether the Pooled or Random Effects model is more appropriate. However, in this case, both Pooled and Random Effects have been eliminated by the previous test results. Therefore, the panel model selection process is considered complete, and the Fixed Effects model is used for further analysis.

Sub-Structural Model I (Selected FEM Model)

Classical Assumption Testing

Multicollinearity Test (pair-wise correlation method)

	X1	X2	Z
X1	1	0.24194733...	-0.0342294...
X2	0.24194733...	1	0.63208117...
Z	-0.0342294...	0.63208117...	1

The correlation value is <0.80.

- ✓ The correlation coefficient of X1 and X2 is 0.241 <0.80
- ✓ The correlation coefficient of X1 and Z is -0.034 <0.80
- ✓ The coefficient of X2 and Z is 0.632 >0.80

All data passes the multicollinearity test.

Heteroscedasticity Test

Dependent Variable: ABS(RESID)
Method: Panel Least Squares
Date: 12/01/25 Time: 08:52
Sample: 2022 2024
Periods included: 3
Cross-sections included: 48
Total panel (balanced) observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	43.91761	15.31741	2.867170	0.0051
X1	-0.247073	0.232960	-1.060584	0.2916
X2	0.029380	0.019352	1.518221	0.1324
Z	-0.010884	0.006450	-1.687524	0.0949

Probability value > 0.05. The probability value for all variables is > 0.05, which means the data is free from heteroscedasticity and passes the heteroscedasticity test.

Autocorrelation Test

Mean dependent var	2444.370
S.D. dependent var	443.8859
Akaike info criterion	14.01012
Schwarz criterion	15.04130
Hannan-Quinn criter.	14.42913
Durbin-Watson stat	2.629012

The Durbin-Watson value of 2.62 is within the range of 1.5–2.5, which is often used to indicate that a model is free of autocorrelation. Because the value is close to 2, the model can be declared free of autocorrelation, both positive and negative. Thus, the residuals of the regression model are random and do not exhibit any specific patterns that could undermine the model's validity.

Sub-Structural Model II (Selected FEM Model)

Classical Assumption Test

Multicollinearity Test (pair-wise correlation method)

	X1	X2	Y	Z
X1	1	0.24194733...	-0.0713434...	-0.0342294...
X2	0.24194733...	1	0.60216925...	0.63208117...
Y	-0.0713434...	0.60216925...	1	0.70602697...
Z	-0.0342294...	0.63208117...	0.70602697...	1

The correlation value is <0.80.

- ✓ The correlation coefficient of X1 and X2 is 0.241 <0.80
- ✓ The correlation coefficient of X1 and Z is -0.034 <0.80
- ✓ The correlation coefficient of X1 and Y is -0.071 <0.80
- ✓ The coefficient of X2 and Z is 0.632 >0.80
- ✓ The coefficient of X2 and Y is 0.602 >0.80

All data passes the multicollinearity test.

Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	83.15160	87.87802	0.946216	0.3465
X1	-0.609375	1.271161	-0.479384	0.6328
X2	0.286872	0.126908	2.260472	0.2615
Y	-0.097184	0.039748	-2.445029	0.1638
Z	0.046827	0.035286	1.327049	0.1878

Probability value > 0.05. The probability value for all variables is > 0.05, which means the data is free from heteroscedasticity and passes the heteroscedasticity test.

Autocorrelation Test

Mean dependent var	1731.002
S.D. dependent var	360.9070
Akaike info criterion	13.77258
Schwarz criterion	14.82439
Hannan-Quinn criter.	14.19998
Durbin-Watson stat	2.483468

The Durbin-Watson value of 2.48 is within the range of 1.5–2.5, which is often used to indicate that a model is free of autocorrelation. Because the value is close to 2, the model can be declared free of autocorrelation, both positive and negative. Thus, the residuals of the regression model are random and do not exhibit any specific patterns that could undermine the model's validity.

Hypothesis Testing

Sub-Structural Model I (REM selected model)

T-Test (partial effect)

Dependent Variable: Z
Method: Panel Least Squares
Date: 12/01/25 Time: 09:02
Sample: 2022 2024
Periods included: 3
Cross-sections included: 48
Total panel (balanced) observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2018.725	129.0335	15.64497	0.0000
X1	-1.655043	3.721579	-0.444715	0.6575
X2	1.182344	0.284432	4.156859	0.0001

The Female Directors variable (X1) has a Prob. (Significance) value of 0.6575 (>0.05), thus it can be concluded that the Female Directors variable does not have a significant effect on CSR D(Z). This does not support H3, which states that Female Directors have a significant positive effect on CSR Disclosure, therefore H3 is rejected.

The Female Commissioners variable (X2) has a Prob. (Significance) value of 0.0052 (<0.05), thus it can be concluded that the Female Commissioners variable has a significant effect on CSR D(Z). This supports H4, which states that Female Commissioners have a significant positive effect on CSR Disclosure, therefore H4 is accepted.

F-Test (simultaneous effect)

R-squared	0.818477
Adjusted R-squared	0.723853
S.E. of regression	233.2608
Sum squared resid	5114595.
Log likelihood	-958.7284
F-statistic	8.649787
Prob(F-statistic)	0.000000

The F-Statistic value is 8.649 with a probability value of 0.000 (<0.05), so it can be concluded that the Independent Variable (X) has a significant simultaneous effect on the Intervening Variable (Z).

R Square

R-squared	0.818477
Adjusted R-squared	0.723853
S.E. of regression	233.2608
Sum squared resid	5114595.
Log likelihood	-958.7284
F-statistic	8.649787
Prob(F-statistic)	0.000000

Given that the Adjusted R Square value is 0.72, it can be concluded that the Female Directors (X1) and Female Commissioners (X2) variables explain 72% of the CSR variable D(Z), while the remaining 28% is explained by other variables.

Sub-Structural Model II (CEM Selected Model)

Hypothesis Testing

T-Test (Personally Influenced)

Dependent Variable: Y
Method: Panel Least Squares
Date: 12/01/25 Time: 09:01
Sample: 2022 2024
Periods included: 3
Cross-sections included: 48
Total panel (balanced) observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	708.2708	217.1772	3.261258	0.0016
X1	2.855368	3.303011	0.864474	0.3896
X2	1.786872	0.274378	6.512459	0.0000
Z	0.102077	0.091446	1.116265	0.2672

The Female Directors (X1) variable has a Prob. (Significance) value of 0.3896 (>0.05), thus it can be concluded that the Female Directors variable does not significantly influence Firm Performance (Y). This result does not support H1, which states that Female directors have a significant positive effect on firm performance, therefore H1 is rejected.

The Female Commissioners (X2) variable has a Prob. (Significance) value of 0.0000 (<0.05), thus it can be concluded that the Female Commissioners variable has a significant effect on Firm Performance (Y). This result supports H2, which states that Female commissioners have a significant positive effect on firm performance, therefore H2 is accepted.

The CSR Disclosure (Z) variable has a Prob. (Significance) of 0.2672 (>0.05) then it can be concluded that the CSR Disclosure Variable (Z) does not have a significant effect on Firm Performance (Y), this result does not support H5 which states that CSR Disclosure has a significant effect on firm performance, so H5 is rejected.

F Test (simultaneous influence)

R-squared	0.786453	Mean dependent var	1731.002
Adjusted R-squared	0.671643	S.D. dependent var	360.9070
S.E. of regression	206.8084	Akaike info criterion	13.77258
Sum squared resid	3977582.	Schwarz criterion	14.82439
Log likelihood	-940.6259	Hannan-Quinn criter.	14.19998
F-statistic	6.850043	Durbin-Watson stat	2.483468
Prob(F-statistic)	0.000000		

The F-Statistic value is 6.8500 with a probability value of 0.000 (<0.05), so it can be concluded that the Independent Variable (X) and Intervening Variable (Z) have a significant simultaneous effect on Firm Performance (Y).

R Square

R-squared	0.786453	Mean dependent var	1731.002
Adjusted R-squared	0.671643	S.D. dependent var	360.9070
S.E. of regression	206.8084	Akaike info criterion	13.77258
Sum squared resid	3977582.	Schwarz criterion	14.82439
Log likelihood	-940.6259	Hannan-Quinn criter.	14.19998
F-statistic	6.850043	Durbin-Watson stat	2.483468
Prob(F-statistic)	0.000000		

Given that the Adjusted R Square value is 0.671, it can be concluded that the variables Female Directors (X1), Female Commissioners (X2), and CSR D(Z) can explain 67% of the Firm Performance (Y) variable, while the remaining 33% is explained by other variables.

Sobel Test

Substructural I (Independent Variables versus Intervening Variables)

Dependent Variable: Z
Method: Panel Least Squares
Date: 12/01/25 Time: 09:06
Sample: 2022 2024
Periods included: 3
Cross-sections included: 48
Total panel (balanced) observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2018.725	129.0335	15.64497	0.0000
X1	-1.655043	3.721579	-0.444715	0.6575
X2	1.182344	0.284432	4.156859	0.0001

The Numbers to be used

X1	-1.655043	3.721579	-0.444715	0.6575
X2	1.182344	0.284432	4.156859	0.0001

Substructural II (intervening variables on dependent)

Dependent Variable: Y
Method: Panel Least Squares
Date: 12/01/25 Time: 09:07
Sample: 2022 2024
Periods included: 3
Cross-sections included: 48
Total panel (balanced) observations: 144

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	708.2708	217.1772	3.261258	0.0016
X1	2.855368	3.303011	0.864474	0.3896
X2	1.786872	0.274378	6.512459	0.0000
Z	0.102077	0.091446	1.116265	0.2672

The numbers to be used

Z	0.102077	0.091446	1.116265	0.2672

$$\mathbf{t = \frac{ab}{\sqrt{(b^2SEa^2)+(a^2SEb^2)}}}$$

Description:
a = path of the independent variable to the intervening variable
b = path of the intervening variable to the dependent variable
SE = standard error

Female Directors on Firm Performance through CSR Disclosure

$$\mathbf{t = \frac{-1656043\ x\ 0{,}102077}{\sqrt{(0{,}102077x\ 3{,}721579^2)+((1656043)^2x\ 0{,}091448^2)}}}$$

$$\mathbf{t = \frac{-0{,}1691}{\sqrt{(0{,}1441)+(0{,}0228)}}}$$

$$\mathbf{t = \frac{-0{,}1691}{\sqrt{0{,}1669}}}$$

$$\mathbf{t = \frac{-0{,}1691}{0{,}4085}}$$

t = -0,414 (minus indicates the direction of the relationship)

t tabel = 1.977

The calculated t-value (0.414) < t-table (1.9720), which means that the Female Directors (X1) variable does not affect Firm Performance (Y) through the CSR variable D(Z) as an intervening variable.

Female Commissioners on Firm Performance through CSR Disclosure

$$\mathbf{t = \frac{1{,}182344\ \ x\ 0{,}102077}{\sqrt{(0{,}102077^2x\ 0{,}284432^2)+(1{,}182344^2x\ 0{,}091448^2)}}}$$

$$\mathbf{t = \frac{0{,}1207}{\sqrt{(0{,}00848)+(0{,}0117)}}}$$

$$\mathbf{t = \frac{0{,}1207}{\sqrt{0{,}01254}}}$$

$$\mathbf{t = \frac{0{,}1207}{0{,}1120}}$$

t = 1,078

t tabel = 1.977

The calculated t-value (1.078) < t-table (1.9720), indicating that the Female Commissioners variable (X2) has no effect on Firm Performance (Y) through the CSR variable D(Z) as an intervening variable.

From the two Sobel test results, it can be seen that CSR Disclosure cannot mediate the influence of female directors and female commissioners on firm performance. This result does not support H6, which states that CSR Disclosure mediates the influence of female directors and female commissioners on firm performance. Therefore, H6 is rejected.

CONCLUSION

This study concludes that female commissioners have a significant positive effect on CSR disclosure (H4 accepted, p=0.0052) and firm performance (H2 accepted, p=0.0000), while female directors do not significantly influence either (H1 and H3 rejected, p=0.3896 and 0.6575, respectively). CSR disclosure does not significantly influence firm performance (H5 rejected, p=0.2672) and fails to mediate the relationship between female directors and female commissioners and firm performance (H6 rejected, Sobel test insignificant). Overall, female commissioners directly improve company performance in the Basic Materials sector of the IDX for the 2022-2024 period, but CSR disclosure does not act as a mediator. Similar to previous studies, this study also has several limitations such as the document does not explicitly state the limitations of the study separately, but it can be concluded from the methodological context that there is a limitation to the sample of only 48 Basic Materials sector companies with purposive sampling based on the availability of annual reports and sustainability. The analysis period is limited to 2022-2024 (144 observations), so the results may not generalize to other sectors or longer periods. CSR is measured using the GRI index of 24 simple indicators (binary score 0-1) and firm performance using only Tobin's Q. This study also does not use control variables because it would make other variables unstable. However, the authors also have several suggestions for future research: expanding the sample to other sectors on the IDX or for a longer period to test the generalizability of the findings on female commissioners. Include moderating variables such as board size, institutional ownership, or the pandemic context to explore why female directors are insignificant. Use more comprehensive CSR measures (e.g., GRI indicator weights or external ESG ratings) and alternative firm performance measures such as ROA/ROE to compare the Tobin's Q results.

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