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The Effect of ESG on Firm Value Mediated by Firm Size in the Energy Sector BEI Period 2022-2024

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Abstract

The purpose of this study is to examine how Environmental, Social, and Governance (ESG) factors affect company value, using firm size as a mediating variable. Two panel data regression models are used for the testing. The first model examines how ESG affects firm size, whereas the second model examines how firm size affects firm value. 17 companies throughout a three-year period are included in the statistics. Using EViews software, the Chow, Hausman, and Lagrange Multiplier tests are used to choose model estimating techniques. The findings indicate that neither business size nor firm value is significantly impacted by ESG. According to the findings, firm size and firm value are not significantly impacted by ESG or firm size. This suggests that the indirect association between business size and ESG and firm value is not statistically supported over the time period and sample under study. These results highlight how crucial it is to choose the right variables and use the right analytical techniques when conducting research on how ESG affects overall business success.

Keywords: ESG, Company value, profitability, company size.

1. Introduction

Environmental, social, and governance (ESG) concerns have garnered more attention in recent years as stakeholders and investors call for sustainable corporate practices. (Antonius & Ida, 2023) Institutional investors are encouraged to purchase more shares when listed businesses exhibit strong ESG performance, which also immediately lowers corporate financing challenges. (Bai et al., 2022). Indonesia adopted ESG because it is an international standard in corporate management that can be attractive to foreign investors by foreign investors and multinational companies (Syarkani et al., 2024).

The energy sector, as one of the strategic and high-risk sectors for environmental issues, is required to be more transparent and responsible in managing its operational impacts. In Indonesia, energy sector companies listed in IDXENERGY show significant performance dynamics throughout 2022 to 2024, both in terms of market capitalization and investor expectations of company value. One indicator used to measure company value is Tobin's Q, which reflects market perceptions of the company's future prospects. Historical data shows a downward trend in Tobin's Q value in this

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sector, from 2.27 in 2020 to 2.21 in 2021, and continuing to decline to 1.65 in 2022. Despite a slight increase to 1.72 in 2023, the value again declined slightly to 1.70 in 2024. This decline indicates that investors are beginning to doubt the ability of energy companies to create long-term corporate value. Company value proxied by Tobin's Q in the energy sector from 2022 to 2024 has decreased. The energy sector is closely related to environmental issues so that the importance of ESG disclosure and performance as one of the factors that can influence market perceptions. The efficiency of ESG in raising company value is still up for question, nevertheless, in a number of business contexts, including the energy sector, which has unique operational and regulatory difficulties. A possible discrepancy between market expectations and the fundamentals of energy companies is indicated by the drop in Tobin's Q value between 2020 and 2024. This could be due to suboptimal ESG implementation or other factors including firm size. (Aydoğmuş et al., 2022). Bigger companies are typically better equipped to apply ESG rules methodically, which can improve the company's reputation and market perception. For a more thorough knowledge of the factors influencing energy business value in Indonesia, it is crucial to investigate the mediating function of firm size in the relationship between ESG and firm value. It is anticipated that this study will contribute both academically and practically to the creation of corporate sustainability plans and ESG-based investment selection.

2. Literature Review

Legitimation theory states that organizations constantly work to ensure that their activities are safe and can be carried out by the general public in accordance with the laws and regulations in place. In the context of ESG, businesses that adhere to and implement keberlanjutan principles are more socially and environmentally conscious. This increases the company's legitimacy in the eyes of the public and investors, which eventually might increase the company's value. Due to the increasing awareness of environmental issues, ESG implementation in the energy sector is crucial.(Nur'aeni*, 2023)

Signaling theory explains that information provided by companies, such as sustainability reports, acts as a signal to the market regarding the quality and prospects of the company. ESG is considered a positive signal that the company is operating responsibly and sustainably. Investors interpret this signal as an indication of lower risk and better management, potentially increasing firm value as measured by Tobin's Q. (Nur'aeni*, 2023)

The resource-based view approach holds that a company's competitive edge stems from its own internal resources, which are hard to duplicate. ESG can be viewed as a strategic tool that offers competitive advantage, particularly when used in a methodical and sustainable manner. The fact that large companies typically have more resources available to them for the establishment and

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administration of ESG initiatives supports the idea that firm size acts as a mediator between ESG and company value. (Sariyer & Taşkın, 2022).

Integrating ESG principles into business strategies is becoming more and more evident as a means of increasing company value because investors are now carefully evaluating business operations when making decisions. As a result, businesses that successfully implement ESG practices can increase their business hours and make more significant contributions to economic and environmental goals. (Arifah, 2024). Since ESG companies offer reliable indicators of seller quality and non-opportunistic behavior, stakeholders are also more receptive to them, which leads to feel-good factors and increased sales and profits. All these ESG strategies are in line with risk reduction and revenue growth, contributing to the company's competitiveness and long-term sustainable value creation. (E-Vahdati et al., 2022).

The results show that ESG has a significantly negative influence on corporate financial performance as measured by return on assets (ROA), which supports the trade-off hypothesis where investment in ESG activities increases business costs. In addition, we found that the negative effect of ESG on CFP is more pronounced in companies certified by Big Four accounting firms. ESG has a significantly positive effect on revenue, which suggests that customers are more attracted to companies that invest in ESG activities. (Zahid et al., 2022)

A company's market value divided by the replacement value of its assets is known as Tobin's Q. The market's evaluation of a company's efficiency and growth potential can frequently be measured by this ratio. A high Tobin's Q value suggests that people think the company has a lot of potential. Firm value is significantly and favorably impacted by ESG performance and governance. The association between ESG Performance and Firm Value is further reinforced by the moderating effect of Company Size. These findings highlight the significance of applying ESG principles to raise businesses' long-term sustainability and competitiveness. (Arifah, 2024).

3. Research Method

This research is quantitative with an explanatory research approach, which aims to examine the effect of ESG on firm value (Tobin's Q) with company size as a mediating variable, using panel data on energy sector companies on the IDX during the period 2022-2024. The population in this study is all energy sector companies incorporated in the IDXENERGY index on the Indonesia Stock Exchange (IDX) during 2022-2024. The sampling technique uses purposive sampling with the following criteria: (1) Companies listed consistently for 3 consecutive years (2022-2024). (2) Providing complete and accessible annual and sustainability reports. (3) Not under delisting, merger, or suspension conditions during the observation period.

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Data analysis uses panel data regression that combines the dimensions of time (time series) and company (cross-section). The analysis is carried out in the following stages: (1) Classical Assumption Test, (2) Structure Model 1 and Model 2, (3) Model estimation selection, (4) Chow Test (Pooled Least Squares vs Fixed Effect Model), (5) Hausman Test (Fixed Effect vs Random Effect Model), (6) Breusch-Pagan Lagrange Multiplier (LM Test) (Pooled vs Random Effect)

4. Finding and Discussion

This section presents the results of empirical data analysis that aims to examine the interrelationships between variables through two panel regression models. The first model evaluates the effect of variable X (ESG) as the independent variable on variable Z as the intervening variable, while the second model assesses the effect of variable Z (Firm size) on variable Y (Firm Value) as the dependent variable. The analysis was conducted using a panel data approach, accompanied by model testing using the Chow test, Hausman test, and Lagrange Multiplier to determine the most appropriate estimation method. Data processing was conducted using EViews software with a coverage of 17 cross-sections over the period 2022 to 2024.

Model 1 is variable X (ESG) to variable Z (Firm Size). In panel data analysis, a number of diagnostic tests are carried out to identify the best estimation model. First, the Chow Test is employed to determine whether there are significant differences between the fixed effect model and the common effect model across cross-sectional units. The Hausman Test is then used to determine whether the fixed effect or random effect models are more likely to be correlated with the independent variables. In order to determine whether the random effect model is better than the common effect model, the Lagrange Multiplier (LM) Test is used to look for panel effects.

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Table 1. Chow test.

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	186.292366	(16,33)	0.0000
Cross-section Chi-square	230.234855	16	0.0000

The Cross-section Chi-square probability value is 0.0000, as seen in the above table. The fixed effect is utilized in place of the common effect if the Prob. Cross-section Chi-square value is less than 0.05.

Table 2. 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	3.930983	1	0.0474

The probability value of Cross-section Random is 0.0474, as seen in the above table. Fixed effect is utilized in place of random effect if the Prob. Cross-section Random value is less than 0.05.

Table 3. Regression analysis.

Cross-section random effects test equation:
Dependent Variable: Z
Method: Panel Least Squares
Date: 05/14/25 Time: 10:49
Sample: 2022 2024
Periods included: 3
Cross-sections included: 17
Total panel (balanced) observations: 51

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	30.59879	0.159668	191.6405	0.0000
X	-0.002626	0.002717	-0.966726	0.3407
Effects Specification				
Cross-section fixed (dummy variables)				
Root MSE	0.141056	R-squared		0.989792
Mean dependent var	30.44627	Adjusted R-squared		0.984533
S.D. dependent var	1.409973	S.E. of regression		0.175355
Akaike info criterion	-0.373444	Sum squared resid		1.014730
Schwarz criterion	0.308377	Log likelihood		27.52282
Hannan-Quinn criter.	-0.112900	F-statistic		188.2132
Durbin-Watson stat	2.457705	Prob(F-statistic)		0.000000

The regression results of the first model are:

$Z = 30.59879 - 0.002626 (X) + \varepsilon 1$

X=ESG

Z= Firm size

To ascertain whether the Fixed Effect model is more suitable than the Common Effect, Model 1 testing starts with the Chow Test (Table 1). Since there are notable variations between entities or cross-sections, the Fixed Effect model is deemed more suitable for application based on the test findings, which reveal a probability value of 0.0000, which is less than 0.05. Additionally, a comparison between Fixed Effect and Random Effect was performed using the Hausman Test (Table 2). The findings confirm that the Fixed Effect model is the best estimate technique to apply in this model since the probability value of 0.0474 is smaller than 0.05. The Fixed Effect model's regression findings between variables X (ESG) (ESG) and Z (Firm size) are displayed in Table 3. The coefficient of X (ESG) is -0.002626 with a probability value of 0.3407 (> 0.05), which

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indicates that variable X (ESG) has no statistically significant effect on Z (Firm size). Although the R-squared value is 0.002626, the R-squared value is 0.002626. Although the R-squared value of 0.989792 indicates that the model is able to explain almost all variations in the data, the contribution of X (ESG) individually remains insignificant to Z (Firm Size).

Model 2 is from variable Z (Firm Size) to variable Y (Firm value).

In panel data analysis, a number of diagnostic tests are carried out to identify the best estimation model. First, the Chow Test is employed to determine whether there are significant differences between the fixed effect model and the common effect model across cross-sectional units. The Hausman Test is then used to determine whether the fixed effect or random effect models are more likely to be correlated with the independent variables. In order to determine whether the random effect model is better than the common effect model, the Lagrange Multiplier (LM) Test is used to look for panel effects.

Table 4. Chow test.

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	103.187692	(16,33)	0.0000
Cross-section Chi-square	200.55349416		0.0000

The Cross-section Chi-square probability value is 0.0000, as seen in the above table. The fixed effect is utilized in place of the common effect if the Prob. Cross-section Chi-square value is less than 0.05.

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Table 5. 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	1.679939	1	0.1949

The Cross-section Random probability value is 0.1949, as seen in the above table. The random effect is applied if the probability cross-section random is greater than 0.05.

Table 6. Lagrange Multiplier Tests.

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis Cross-section	Time	Both
Breusch-Pagan	47.73756 (0.0000)	1.572074 (0.2099)	49.30963 (0.0000)
Honda	6.909237 (0.0000)	-1.253824 (0.8950)	3.998981 (0.0000)
King-Wu	6.909237 (0.0000)	-1.253824 (0.8950)	1.120963 (0.1312)
Standardized Honda	7.380438 (0.0000)	-1.029783 (0.8484)	1.299155 (0.0969)
Standardized King-Wu	7.380438	-1.029783	-0.968933

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	(0.0000)	(0.8484)	(0.8337)
Gourieroux, et al.	--	--	47.73756 (0.0000)

As can be seen from the above table, the probability value is approximately 0.000, with a value around 0.05. Therefore, the Lagrange Multiplier Test indicates that the best estimation method is the Random Effect.

Table 7. Regression analysis.

Dependent Variable: Y
Method: Panel Least Squares
Date: 05/14/25 Time: 10:51
Sample: 2022 2024
Periods included: 3
Cross-sections included: 17
Total panel (balanced) observations: 51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.022383	7.808093	-0.643228	0.5231
Z	0.230378	0.256186	0.899262	0.3729

Root MSE	2.503592	R-squared	0.016236
Mean dependent var	1.991765	Adjusted R-squared	-0.003841
S.D. dependent var	2.549283	S.E. of regression	2.554174
Akaike info criterion	4.751761	Sum squared resid	319.6665
Schwarz criterion	4.827519	Log likelihood	-119.1699
Hannan-Quinn criter.	4.780710	F-statistic	0.808671
Durbin-Watson stat	0.058987	Prob(F-statistic)	0.372911

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The regression results of the second model are:

Y = -5.022383+ 0.230378 (Z) + ε1

Z= Firm size

Y= Firm Value

Model 2's testing resumes with Uji Chow (Table 4), which yields a probability of 0.0000, indicating that the Fixed Effect model is more accurate than the Common Effect model. However, when the Hausman test is performed (Table 5), the results show a probability of 0.1949 (> 0.05), which indicates that the Random Effect model is more appropriate to use because there is no significant correlation between the independent variable and the individual effect. To confirm that Random Effect is superior to Common Effect, the Lagrange Multiplier Test (Table 6) is used, which yields a probability value of 0.0000 for the Breusch-Pagan and Honda tests, thereby strengthening the argument for using the Random Effect model. The regression results in Table 7 show the relationship between variables Z (Firm size) and Y. With a coefficient of determination of 0.230378 and a probability of 0.3729 (> 0.05), it can be concluded that variable Z does not significantly affect Y. In addition, the R-squared value of only 0.016236 indicates that this model is quite effective in explaining the variable Y.

5. Conclusion

The purpose of this study is to examine the relationship between independent (X), intervening (Z), and dependent (Y) variables using two panel regression models. The first model examines the long-term effects of variable X (ESG) on Z (Firm Size), while the second model examines the effects of variable Z (Firm Size) on Y (Firm Value). Based on the results of the study conducted using the panel model, it can be concluded that the estimation model used complies with the Chow, Hausman, and Lagrange multiplier tests.

However, the analysis's findings indicate that variable X does not significantly affect variable Z. Additionally, variable Z does not significantly affect variable Y. In other words, there is no strong and statistically significant relationship between the variables in the model that is being used. This indicates that the variables that are being examined in this study's context and time frame are unable to adequately explain the variables that occur in a meaningful way.

In general, the relationship between variables X (ESG), Z (Firm Size) , and Y (Firm Value) is not significant, so it is necessary to reevaluate the methods used for variable selection and analysis.

It is recommended that a few points be taken into consideration for the subsequent research so that the results are more representative and pertinent. The first step is for researchers to increase the

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model's kekuatan by reducing or increasing independent or intervening variables that are more relevant to the dependent variables under analysis. Secondly, data collection can be necessary from both cross-sectional and observational time periods to reduce bias potential and make observations longer. Third, other model approaches such as nonlinear regression, structural equation modeling (SEM), or moderation/mediation analysis can also be used to more thoroughly examine the complex relationship between the variables. Finally, it is important to return to the conceptual and theoretical aspects of each variable to ensure that the connected entities have strong logistical and empirical foundations.

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References.

Antonius, F., & Ida, I. (2023). Pengaruh Environmental, Social, Governance (ESG) dan Intellectual Capital terhadap Kinerja Perusahaan. *Jurnal EKOBIS: Ekonomi, Bisnis, Dan Manajemen*, *13*(2), 126–138. http://ejournal.utmj.ac.id/index.php/ekobis126

Arifah, J. (2024). The Effect Of Environmental, Social, And Governance Performance On Firm Value With Firm Size As A Moderating Variable. *Eduvest - Journal of Universal Studies*, *4*(8), 7416–7433. https://doi.org/10.59188/eduvest.v4i8.1516

Aydoğmuş, M., Gülay, G., & Ergun, K. (2022). Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review*, *22*, S119–S127. https://doi.org/10.1016/j.bir.2022.11.006

Bai, X., Han, J., Ma, Y., & Zhang, W. (2022). ESG performance, institutional investors' preference and financing constraints: Empirical evidence from China. *Borsa Istanbul Review*, *22*, S157–S168. https://doi.org/10.1016/j.bir.2022.11.013

E-Vahdati, S., Wan-Hussin, W. N., & Mohd Ariffin, M. S. (2022). Sustainability performance and board compensation in Japan and ASEAN-5 countries. *Borsa Istanbul Review*, *22*, S189–S199. https://doi.org/10.1016/j.bir.2022.12.004

Nur'aeni*, W. S. (2023). The Effect of Environmental, Social and Governance (ESG) on Firm Value in Companies Listed on the Indonesia Stock Exchange. *Indonesian Journal of Economic and Mangement*, *4*(1), 129–139. https://doi.org/10.54443/jarudav.v2i1.73

Sariyer, G., & Taşkın, D. (2022). Clustering of firms based on environmental, social, and governance ratings: Evidence from BIST sustainability index. *Borsa Istanbul Review*, *22*, S180–S188. https://doi.org/10.1016/j.bir.2022.10.009

e-ISSN: 3064-6030
FMI, Vol 2
15-17 July 2025

Syarkani, Y., Subu, M. A., & Waluyo, I. (2024). Impact of ESG Performance on Firm Value: A Comparison of Emerging and Developed Markets. *Commercium : Journal of Business and Management*, *2*(4), 204–219.

Zahid, R. M. A., Khan, M. K., Anwar, W., & Maqsood, U. S. (2022). The role of audit quality in the ESG-corporate financial performance nexus: Empirical evidence from Western European companies. *Borsa Istanbul Review*, *22*, S200–S212. https://doi.org/10.1016/j.bir.2022.08.011

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