

The Nexus Between ESG Risk, Capital Structure, Profitability, and Firm Value: Firm Size as a Moderator

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ABSTRACT

The growing attention of investors to ESG risks in Indonesia highlights the importance of examining their impact on firm value. This study analyzes the effects of ESG Risk Rating, capital structure, and profitability on firm value, with firm size as a moderating variable. The sample consists of 90 observations from companies listed in the IDX ESG Leaders index during 2021–2023. Data were analyzed using Moderated Regression Analysis (MRA) with SPSS 25. The results show that ESG Risk Rating has a significant negative effect, capital structure a significant positive effect, and profitability a significant negative effect on firm value. Firm size weakens the influence of capital structure and strengthens the influence of profitability, but does not moderate the effect of ESG Risk Rating. The novelty lies in the use of Sustainalytics-based ESG Risk Rating and the anomalous finding of profitability's negative impact, contributing to sustainable finance literature and managerial practice.

Kata Kunci: *ESG Risk Rating; Capital Structure; Profitability; Firm Value.*

Ukuran Perusahaan sebagai Moderator Pengaruh Risiko ESG, Struktur Modal, dan Profitabilitas terhadap Nilai Perusahaan

ABSTRAK

Fenomena meningkatnya perhatian investor terhadap risiko ESG di Indonesia mendorong pentingnya kajian tentang pengaruh ESG Risk Rating terhadap nilai perusahaan. Penelitian ini menganalisis pengaruh ESG Risk Rating, struktur modal, dan profitabilitas terhadap nilai perusahaan dengan ukuran perusahaan sebagai variabel moderasi. Sampel terdiri dari 90 observasi perusahaan dalam IDX ESG Leaders periode 2021–2023. Data dianalisis menggunakan Moderated Regression Analysis (MRA) dengan SPSS 25. Hasil menunjukkan ESG Risk Rating berpengaruh negatif signifikan, struktur modal positif signifikan, dan profitabilitas negatif signifikan terhadap nilai perusahaan. Ukuran perusahaan memperlemah pengaruh struktur modal dan memperkuat pengaruh profitabilitas, namun tidak memoderasi ESG Risk Rating. Kebaruan penelitian terletak pada penggunaan ESG Risk Rating berbasis Sustainalytics serta temuan anomali pengaruh profitabilitas, yang memberi kontribusi bagi literatur keuangan berkelanjutan dan praktik manajerial.

Keywords: *ESG Risk Rating; Struktur Modal; Profitabilitas; Nilai Perusahaan*

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INTRODUCTION

The Industrial Revolution 4.0 era has brought significant changes to the business world and encouraged companies to pursue not only profits but also to sustainably increase corporate value (Brealey et al., 2023). One factor influencing corporate value is environmental issues, which are now a significant concern for investors. The case of PT RMK Energy Tbk (RMKE), which was subject to environmental sanctions and was removed from the IDX Quality30 Index, and the decline in the share prices of PT Semen Indonesia Tbk and PT Freeport Indonesia due to environmental issues, demonstrates that environmental violations can damage a company's reputation and significantly reduce its value (Gakkum KLHK, 2023; Basuki & Irwanda, 2018). This phenomenon confirms that investors are now considering Environmental, Social, and Governance (ESG) aspects in their investment decisions (Schaltegger & Burritt, 2018). In Indonesia, ESG implementation is increasingly being promoted by the Financial Services Authority (OJK) and the Indonesia Stock Exchange (IDX) through the IDX ESG Leaders index, which collaborates with Sustainalytics to assess ESG risk ratings (Fachrezi et al., 2024). In addition to ESG, an optimal capital structure and strong profitability also play a crucial role in increasing company value (Brigham & Houston, 2019; Harmono et al., 2023).

Company size is a factor that can strengthen the influence of ESG, capital structure, and profitability on company value (Abdi et al., 2022). Previous research has primarily examined ESG in the context of GRI-based sustainability reports. Research specifically examining ESG risk ratings on company value is limited. Landi & Sciarelli (2019) found that ESG positively impacts financial performance, Priandhana (2022) examined ESG risk ratings on financial performance, and Firmansyah et al., (2023) examined ESG risk ratings on corporate risk. This study focuses on the influence of ESG risk ratings, capital structure, and profitability on firm value, considering firm size as a moderating variable. The study was conducted on companies listed in the IDX ESG Leaders index for the 2021–2023 period and is expected to contribute to the development of sustainable business literature and practices.

This research is based on legitimacy theory, trade-off theory, agency theory, and signaling theory. Legitimacy theory explains that companies must align with social values to maintain public acceptance, making ESG disclosure crucial for maintaining legitimacy (Cheers, 2011; Fatoni et al., 2016). Trade-off theory states that companies need to balance the tax benefits of debt with the risk of bankruptcy, where optimal debt use can increase company value (Ariyanto, 2018; Brealey et al., 2023). Agency theory highlights the conflict between management and owners resulting from information asymmetry, making profitability an important signal for investors in assessing company performance (Maghfirandito & Adiwibowo, 2022). Signaling theory emphasizes the importance of companies providing positive signals through financial report and ESG disclosures to reduce information asymmetry and increase investor confidence (Bergh et al., 2014; Safriani & Utomo, 2020).

Firm value is an important indicator reflecting investor perceptions of company performance and is measured by Tobin's Q. The ESG risk rating, developed by Sustainalytics, measures the ESG risks a company faces and its

ability to manage those risks. An appropriate capital structure can increase company value, while profitability reflects a company's ability to generate attractive returns for investors (Kanta et al., 2021; Noviani et al., 2019). Company size, measured by total assets, influences a company's ability to manage resources and attract market interest (Brigham & Houston, 2019; Madyan et al., 2021).

Companies that effectively manage environmental, social, and governance (ESG) issues tend to be more widely accepted by the public and gain investor trust. From the perspective of legitimacy theory and stakeholder theory, companies with high ESG risks may be perceived as failing to fulfill their social responsibilities, potentially reducing company value (Istikomah et al., 2023; Wahdan & Rahmawati, 2023). Previous research has shown that ESG risk ratings significantly influence company value (Alfajri & Warsini, 2024; Fachrezi et al., 2024). Companies with poor ESG risk management will face challenges in building their reputation and attracting investor interest. Therefore, this study proposes the following hypothesis:

H₁: ESG risk rating has a positive effect on firm value.

An optimal capital structure plays a crucial role in increasing firm value, as explained by trade-off theory, which emphasizes the balance between the tax benefits of debt and the risk of bankruptcy. Proper debt utilization can provide tax advantages and serve as a positive signal to investors about a company's ability to manage financial risk (Mudjijah et al., 2019). Several previous studies have also shown that improving capital structure can positively impact firm value (Amelia et al., 2024; Syamsudin et al., 2020; Valensiska, 2021). A well-managed capital structure enables companies to increase profits and provide attractive returns to investors. Therefore, the proposed hypothesis is:

H₂: Capital structure has a positive effect on firm value.

Profitability is a fundamental factor influencing investor perceptions of a company's prospects. According to signaling theory, high profitability provides a positive signal of good performance, while agency theory emphasizes that profitability reduces information asymmetry between managers and shareholders. Both perspectives indicate that profitability enhances investor confidence, ultimately impacting share prices and firm value (Ari, 2022). Previous research also shows that profitability has a positive effect on firm value (Amelia et al., 2024; Burhanuddin et al., 2023; Noviani et al., 2019; Setiawati et al., 2016). Therefore, the proposed hypothesis is:

H₃: Profitability has a positive effect on firm value..

Firm size is also expected to play a moderating role in the relationships examined. From the perspective of legitimacy theory, larger companies generally have more resources and stronger management to address ESG risks, thereby mitigating the negative impact of high ESG risks and improving firm reputation (Abdi et al., 2022; Prayogo et al., 2023). This allows large companies to mitigate the negative impact of high ESG risks. Based on this, the proposed hypothesis is

H₄: Company size positively moderates the effect of ESG risk ratings on firm value.

Regarding capital structure, trade-off theory suggests that large firms have easier access to external financing, stronger relationships with creditors, and greater capacity to maximize the benefits of debt in increasing firm value (Ayem & Ina, 2023; Fahri et al., 2022). Therefore, the proposed hypothesis is:

H₅: Firm size positively moderates the effect of capital structure on firm value.

Finally, based on signaling theory, large companies with operational stability and strong reputations are better able to leverage profitability as a credible signal of performance stability. High profits in large firms are perceived by investors as sustainable and trustworthy indicators of growth potential (Amelia et al., 2024; Dewantari et al., 2020; Rahmawati et al., 2021). In large companies, high profits are more trusted by investors as a signal of stable and prospective performance. Therefore, the proposed hypothesis is:

H₆: Firm size positively moderates the effect of profitability on firm value.

This study addresses the research gap by employing the Sustainability-based ESG Risk Rating, which has rarely been analyzed in Indonesia, as prior studies mainly relied on GRI-based disclosures. The novelty also lies in examining firm size as a moderating variable in the relationships between ESG risk, capital structure, profitability, and firm value. This contributes to the literature by providing empirical evidence on sustainable finance in emerging markets and offers practical insights for managers, investors, and regulators in evaluating key drivers of firm value.

Therefore, a conceptual framework for this study can be developed, as presented in Figure 1 below:

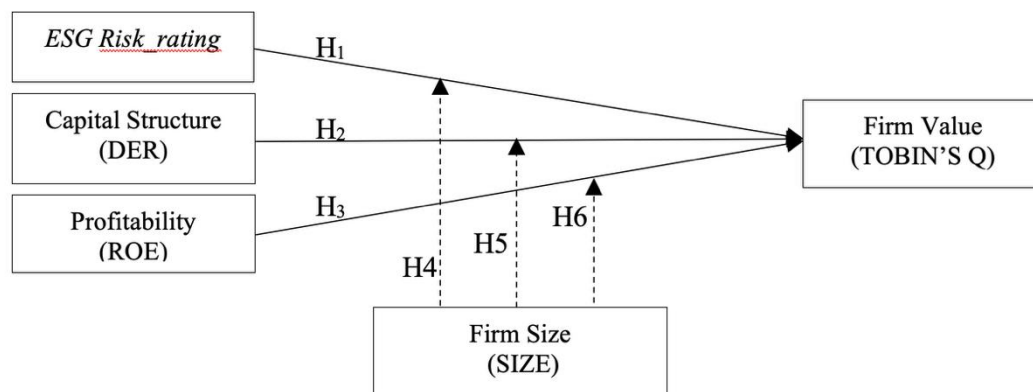


Figure 1. Conceptual Framework

Source: Research Data, 2025

RESEARCH METHODS

This study aims to examine the effect of ESG Risk Rating, capital structure, and profitability on firm value, with firm size as a moderating variable. The population in this study comprised all companies listed in the IDX ESG Leaders (ESGL) index on the Indonesia Stock Exchange during the 2021–2023 period. The sample was selected using a saturated sampling technique, so that all population members meeting the criteria were included in the sample. The total sample size was 90 observations. The data used were secondary data obtained through documentation of companies' annual reports and financial statements, as well as ESG risk rating data published by the Indonesia Stock Exchange.

The variables in this study were defined as follows: ESG Risk Rating (independent variable) was obtained from Sustainalytics as published by the IDX, which measures the company's exposure to ESG risks and its ability to manage them (Istikomah et al. 2023). Capital Structure (independent variable) was measured by the Debt to Equity Ratio (DER), representing the proportion of debt relative to equity financing (Irnawati et al. 2023). Profitability (independent variable) was measured by Return on Equity (ROE), which reflects the company's efficiency in generating profits from shareholders' equity (Parzonko et al., 2023). Firm Value (dependent variable) was measured using Tobin's Q, a ratio comparing market value to book value of assets to capture investor perceptions of firm performance (Madyan et al., 2021). Firm Size (moderating variable) was measured using the natural logarithm of total assets as a proxy of company scale and resource capacity (Madyan et al., 2021).

The regression model used in this study was to test the moderating role of firm size:

$$\text{TOBIN'S Q} = \alpha + \beta_1 \text{ ESG_Risk} + \beta_2 \text{ DER} + \beta_3 \text{ ROE} + \beta_4 \text{ ESG_Risk*SIZE} + \beta_5 \text{ DER*SIZE} + \beta_6 \text{ ROE*SIZE} + e$$

Data analysis was performed using Moderated Regression Analysis (MRA) using SPSS version 25. The test began with descriptive statistical analysis to describe the characteristics of the data, then continued with classical assumption tests including normality tests, multicollinearity tests, heteroscedasticity tests, and autocorrelation tests to ensure the feasibility of the regression model. Next, an F-test was conducted to assess the overall feasibility of the model, a coefficient of determination (R^2) test to see how much the model is able to explain the dependent variable, and a t-test to examine the effect of each independent variable on the dependent variable. MRA analysis was used to examine the moderating role of company size in strengthening or weakening the influence of ESG risk rating, capital structure, and profitability on company value.

RESULTS AND DISCUSSION

Table 1. Descriptive Analysis Results

	N	Minimum	Maximum	Mean	Std. Deviation
ESG_RISK	90	11.31	30.26	21.8522	4.72176
DER	90	.02	15.31	2.0114	2.47265
ROE	90	-.29	2.38	.1994	.33922
SIZE	90	28.44	35.32	31.4526	1.73701
TOBIN	90	.02	10.57	1.8047	1.84015
Valid N (listwise)	90				

Source: Research Data, 2025

Based on the descriptive analysis, firm value, as measured by Tobin's Q, averaged 1.8047 with a standard deviation of 1.84015, reflecting heterogeneity between companies' market value and book value of assets. ESG risk averaged 21.85 and a standard deviation of 4.72, indicating that companies' ESG risk levels were moderate but varied. Capital structure, as measured by DER, averaged 2.01

and a standard deviation of 2.47, indicating a predominance of debt in the capital structure and significant differences between companies. Profitability, as measured by ROE, averaged 0.20 and a standard deviation of 0.34, indicating that although some companies experienced losses, most maintained positive profitability. Company size, as measured by total assets, averaged 31.45 and a standard deviation of 1.74, indicating that the companies in the sample were relatively large and relatively uniform in size.

Table 2. Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		90
Normal Parameters ^{a,b}	Mean	0.000
	Std. Deviation	0.022
	Absolute	.102
Most Extreme Differences	Positive	.102
	Negative	-.061
Kolmogorov-Smirnov Z		.965
Asymp. Sig. (2-tailed)		.200

Source: Research Data, 2025

Based on the results above, the Asymp. Sig. (2-tailed) value is 0.200, which is greater than 0.05. Therefore, it can be concluded that the residuals in this regression model are normally distributed.

Table 3. Multicollinearity Test Results

	Model	Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ESG_RISK	.819	1.220
	DER	.709	1.411
	ROE	.806	1.240

Source: Research Data, 2025

Based on the results above, all independent variables have a Tolerance value above 0.10 and a VIF value below 10. Thus, it can be concluded that there is no multicollinearity among the independent variables in this regression model. This indicates that the regression model is suitable for use in further analysis because there is no high correlation between the independent variables that could interfere with the estimation of the regression parameters.

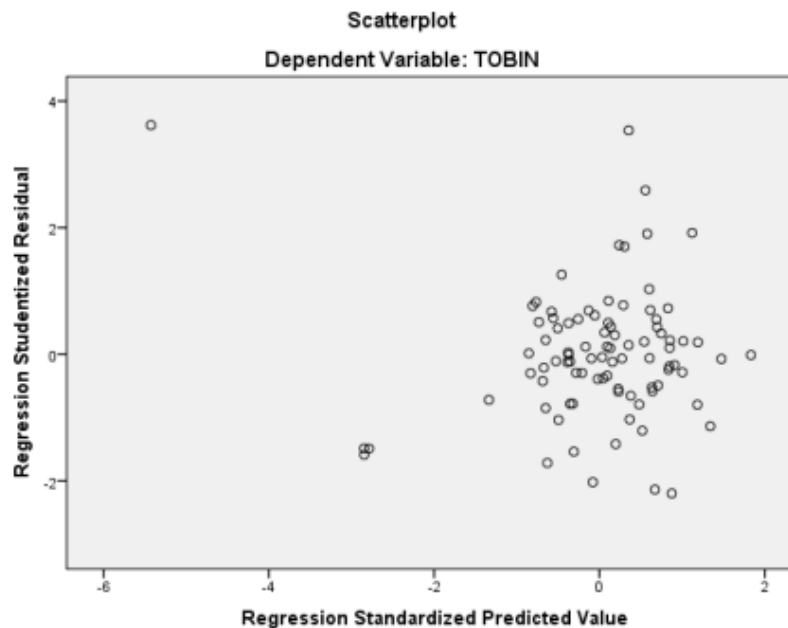


Figure 2. Scatterplot Test Results

Source: Research Data, 2025

Furthermore, based on the scatterplot between the residuals and predicted values, it can be seen that the points are randomly distributed and do not form a specific pattern (such as a funnel or fan shape). This further strengthens the evidence that the residual variance is constant, and the classical assumption of homoscedasticity has been met in this model.

Table 4. MRA Results

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
	B	Std. Error			
(Constant)	.609	.012		52.750	.000
ESG_RISK	-.007	.003	-.422	-2.115	.037
DER	.134	.024	4.222	5.678	.000
1 ROE	-5.951	.249	-25.729	-23.869	.000
ESG_SIZE	-0.000009	.000	-.019	-.088	.930
DER_SIZE	-.004	.001	-4.248	-5.630	.000
ROE_SIZE	.187	.008	25.107	23.397	.000

Source: Research Data, 2025

Based on Table 7, the Tobin's Q regression equation is as follows:

$$\text{Tobin's Q} = 0.609 - 0.007 + 0.134 - 5.951 - 0.000009 - 0.004 + 0.187 + e. \dots\dots\dots(1)$$

The constant value of 0.609 indicates that when all independent variables are zero, the firm value (Tobin's Q) is 0.609. The ESG_Risk coefficient of -0.007 indicates that an increase in the ESG risk score negatively impacts firm value. The DER

coefficient of 0.134 indicates that a higher DER tends to increase firm value. However, ROE has a negative coefficient of -5.951, indicating that an increase in ROE actually decreases firm value. The interaction between the main variables and company size showed different results. The ESG_Risk \times SIZE interaction, with a coefficient of -0.000009, indicates that company size does not significantly change the effect of ESG Risk on company value. Meanwhile, the DER \times SIZE interaction coefficient of -0.004 indicates that in large companies, the positive effect of DER on company value is weaker. This reflects potential investor concerns about high debt levels in large companies. Conversely, the ROE \times SIZE interaction showed interesting results, with a positive coefficient of 0.187. This means that company size strengthens the relationship between ROE and company value. In other words, in large companies, high ROE levels are more likely to drive increased company value than in small companies. This finding underscores the importance of company size as a moderating variable, particularly in strengthening the influence of profitability on company value.

Table 5. Model Suitability Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.183	3	.061	119.113	.000 ^b
	Residual	.044	86	.001		
	Total	.227	89			

Source: Research Data, 2025

The significance value (Sig.) of $0.000 < 0.05$ indicates that the regression model used is statistically feasible.

Table 6. Determination Coefficient Test

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.898 ^a	.806	.799	.02261	1.736

Source: Research Data, 2025

Based on the results of the regression test, the R Square value of 0.806 indicates that the regression model consisting of ESG Risk, DER, and ROE is able to explain variations in company value (Tobin's Q) by 80.6%, while the remainder is explained by other factors outside the model.

Table 7. Result of T-test

	Variable	Coefficient	t	Sig.
1	(Constant)	.609	52.750	.000
	ESG_RISK	-.007	-2.115	.037
	DER	.134	5.678	.000
	ROE	-5.951	-23.869	.000
	ESG_SIZE	-0.000009	-.088	.930
	DER_SIZE	-.004	-5.630	.000

ROE_SIZE	.187	23.397	.000
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Source: Research Data, 2025

The analysis results show that ESG Risk Rating has a significant negative effect on firm value with a coefficient of -0.007 and a significance level of 0.037, thus accepting the hypothesis. DER has a significant positive effect on firm value with a coefficient of 0.134 and a significance level of 0.000, supporting the proposed hypothesis. Meanwhile, ROE actually shows a significant negative effect on firm value with a coefficient of -5.951 and a significance level of 0.000, which contradicts the initial hypothesis and therefore rejects the hypothesis.

The interaction analysis results indicate that the interaction variable between ESG Risk and company size is insignificant (0.930 significance), thus the hypothesis is rejected. The interaction between DER and company size is significant but negative (coefficient -0.004; significance 0.000), indicating that company size actually weakens the effect of DER on company value, thus the hypothesis is rejected. Meanwhile, the interaction between ROE and company size is significantly positive (coefficient 0.187; significance 0.000), indicating that company size strengthens the effect of ROE on company value, thus the hypothesis is accepted.

The first hypothesis (H1) shows that ESG Risk Rating has a significant negative effect on firm value. The regression results indicate a coefficient of -0.007 with a p-value of 0.037 (<0.05). This finding means that the higher the ESG risk, the lower the firm's value in the eyes of investors. High ESG risk is perceived as a negative signal of poor sustainability and governance practices, thereby reducing market confidence. These findings are consistent with Alfajri & Warsini (2024), Istikomah et al. (2023) and (Landi & Sciarelli 2019), who reported that ESG risk negatively impacts market value. Similarly, Melinda & Wardhani (2020) emphasized that high exposure to ESG risks reduces corporate legitimacy, leading to declining firm value. From a practical perspective, managers should proactively reduce ESG risks to protect firm reputation, investors should include ESG risk as part of their valuation criteria, and regulators should continue strengthening ESG disclosure standards to increase transparency and accountability.

The second hypothesis (H2) confirms that the Debt to Equity Ratio (DER) positively affects firm value, with a coefficient of 0.134 and a p-value of 0.000 (<0.05). This result suggests that higher leverage, when optimally managed, increases firm value. The finding aligns with trade-off and signaling theory, as debt provides tax benefits and signals confidence in the company's growth prospects. Prior studies by (Aprillando & Mujiyati (2022), Irnawati et al. (2023) and Kusumaningrum & Iswara (2022) also confirmed that debt-based capital structures enhance firm value when efficiently managed. This provides managerial implications for maintaining an optimal debt ratio that balances benefits and risks, while investors must carefully evaluate whether debt is used productively..

The third hypothesis (H3) yields a negative effect of Return on Equity (ROE) on firm value, with a coefficient of -5.951 and a p-value of 0.000 (<0.05). This result contradicts conventional expectations under signaling theory that profitability increases firm value. The negative effect suggests that a high ROE is not always perceived positively by investors, especially when driven by short-

term efficiency or excessive leverage. This finding is consistent with (Cahya & Riwoe, 2018; Gusmiarni & Delviana Manalu, 2023 and Hasanah, 2023), who argue that profitability must be evaluated in the context of earnings quality and sustainability. Compared with studies that reported a positive effect (Noviani et al., 2019; Setiawati et al., 2016), this highlights an empirical gap, suggesting that ROE-based profitability may sometimes signal risk rather than opportunity. In practice, managers should communicate the quality and sustainability of earnings, while investors need to analyze the underlying drivers of profitability before interpreting its effect on firm value.

The fourth hypothesis (H4) indicates that firm size does not moderate the effect of ESG Risk Rating on firm value. The interaction coefficient of -0.000 with a p-value of 0.930 (>0.05) shows that company size does not influence investor perceptions of ESG risk. This finding supports Fachrezi et al. (2024), who concluded that ESG risks are universally important for investors regardless of firm size. This implies that both small and large companies must manage ESG risks effectively, as investors treat these risks as critical regardless of asset scale.

The fifth hypothesis (H5) reveals that firm size negatively moderates the effect of DER on firm value. The coefficient of -0.004 with a p-value of 0.000 indicates that while DER has a direct positive effect, its impact weakens in larger companies. This suggests that investors expect large firms to adopt conservative financing strategies, and excessive debt may be interpreted as a negative signal. These results are consistent with (Amelia et al., 2024 and Tsaa Afnitasari et al., 2023), who found that high debt in large firms could reduce investor confidence. Therefore, larger companies need to carefully manage leverage and ensure that debt financing is aligned with long-term stability.

The sixth hypothesis (H6) demonstrates that firm size strengthens the effect of ROE on firm value, with an interaction coefficient of 0.187 and a p-value of 0.000 (<0.05). This finding supports the notion that profitability signals are more credible in large companies, as they are perceived to have better governance, stronger risk management systems, and greater resources. This result aligns with (Amelia et al., 2024; Mercyana et al., 2022), who reported that large firms can leverage profitability to create stronger investor trust. Practically, large firms should continue to emphasize profitability as a strategic performance signal, while small firms must enhance the credibility of their earnings reports to gain similar investor confidence.

CONCLUSION

This study concludes that ESG Risk Rating, capital structure (DER), and profitability (ROE) significantly influence firm value. ESG Risk Rating has a negative effect, DER has a positive effect, while ROE unexpectedly shows a negative effect on firm value. Furthermore, firm size moderates the effects of DER and ROE on firm value but does not moderate the relationship between ESG Risk Rating and firm value. These findings highlight the importance of integrating ESG risk, capital structure, and profitability with firm size considerations to better understand firm value formation. From a theoretical perspective, the negative relationship between ROE and firm value provides evidence that contradicts the

conventional view of signaling theory, suggesting that profitability ratios must be interpreted within the context of earnings quality, risk exposure, and financial sustainability. This contributes to the literature by refining the understanding of how profitability interacts with investor perceptions.

From a practical perspective, the findings emphasize that managers need to strengthen ESG risk management and adopt optimal capital structures to sustain firm legitimacy and investor trust. Investors should carefully assess not only profitability but also its underlying drivers, while regulators are encouraged to enhance ESG disclosure frameworks to increase transparency and accountability in the capital market. This study has several limitations. First, the negative effect of ROE may be influenced by external factors not captured in this model, such as earnings management or sector-specific risks. Second, ESG Risk Rating data were obtained from a single source (Sustainalytics through IDX), potentially limiting generalizability. Third, macroeconomic conditions, including the post-COVID-19 recovery period, were not included, which could have affected the results. For future research, it is suggested to: (1) incorporate macroeconomic variables such as interest rates, inflation, or exchange rates as potential moderators to enrich theoretical testing; (2) use multiple ESG data sources to enhance the robustness of ESG-related findings; and (3) conduct comparative studies across sectors or regions to improve the external validity of the results.

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