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The Impact of Risk-Based ESG Scores, Return on Asset (ROA) and Return on Equity (ROE) on Firm Value

Pengaruh Skor ESG Berbasis Risiko, Return on Asset (ROA) dan Return On Equity (ROE) Terhadap Nilai Perusahaan

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ABSTRACT

The urgency to understand the impact of risk-based Environmental, Social, and Governance (ESG) and financial factors on firm value remains high, especially for listed companies in Indonesia. Indonesia is a disaster-prone country. World Risk Report in 2021 shows that Indonesia ranks 38th out of 181 countries in the "High" disaster risk category, with an index score of 10.67, and in the "Very High" Risk Exposure category, with an index score of 21.30. This study examines the impact of risk-based ESG scores, ROA, and ROE on firm value. Using a quantitative and purposive sampling method, the research applies a panel data regression analysis of 300 observations from companies listed on the Indonesian Stock Exchange (2019–2023) with Sustainalytics ESG Risk Ratings. While the combined effect of ESG risk scores, ROA, and ROE significantly influenced firm value, partial analysis revealed no individual significance. The results underscore the need for Indonesian firms to integrate ESG practices holistically to enhance stakeholder trust and financial outcomes, while regulators should refine policies to incentivize ESG risk mitigation, particularly in high-risk sectors.

Key words: firm value; ROA; ROE; risk-based ESG scores; sustainalytics

ABSTRAK

Urgensi untuk memahami pengaruh faktor Lingkungan, Sosial, dan Tata Kelola (ESG) berbasis risiko serta faktor keuangan terhadap nilai perusahaan tetap tinggi, terutama bagi perusahaan yang terdaftar di Indonesia. Indonesia merupakan negara yang rawan bencana, sebagaimana ditunjukkan oleh World Risk Report tahun 2021 yang menempatkan Indonesia pada peringkat ke-38 dari 181 negara dalam kategori risiko bencana "Tinggi" dengan skor indeks 10,67, serta dalam kategori Paparan Risiko "Sangat Tinggi" dengan skor indeks 21,30. Penelitian ini mengkaji dampak skor ESG berbasis risiko, Return on Asset (ROA), dan Return on Equity (ROE) terhadap nilai perusahaan. Dengan menggunakan metode kuantitatif dan purposive sampling, penelitian ini menerapkan analisis regresi data panel pada 300 observasi perusahaan yang terdaftar di Bursa Efek Indonesia selama periode 2019–2023, menggunakan peringkat Risiko ESG Sustainalytics. Hasil penelitian menunjukkan bahwa pengaruh gabungan skor risiko ESG, ROA, dan ROE secara signifikan memengaruhi nilai perusahaan, namun analisis parsial tidak menemukan signifikansi dari masing-masing variabel secara individu. Temuan ini menegaskan perlunya perusahaan di Indonesia untuk mengintegrasikan praktik ESG secara holistik guna meningkatkan kepercayaan pemangku kepentingan dan hasil keuangan, sementara regulator perlu menyempurnakan kebijakan yang memberikan insentif mitigasi risiko ESG, khususnya di sektor berisiko tinggi.

Kata kunci: keberlanjutan, nilai perusahaan, ROA, ROE, skor ESG berbasis risiko

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INTRODUCTION

Climate change poses the greatest challenge to society today. Based on the Global Carbon Project (2022) Indonesia is one of the countries with the highest carbon emission levels in the world, experiencing an 18.3% increase compared to the previous year, which is also the highest increase among other countries. This situation indicates that industrial activities have a long-term negative impact on society and the surrounding environment. According to data from the World Risk Report in 2021, Indonesia ranks 38th out of 181 countries in the "High" disaster risk category, with an index score of 10.67, and in the "Very High" Risk Exposure category, with an index score of 21.30 (Aleksandrova *et al.,* 2021). Indonesia's vulnerability to the impacts of the climate crisis further exacerbates this situation to the impacts of the climate crisis, which ranks it as the third highest risk country in the world, according to The World Bank Group & Asian Development Bank (2021). Given this situation, investor interest in risks related to the environment and other financial factors is increasing *(Naeem et al.*, 2022).

However, the adoption of ESG practices in Indonesia remains relatively low. The Indonesia Business Council for Sustainable Development (IBCSD) conducted a study in 2021 which found that 40% of Indonesian companies have yet to recognize the importance of ESG implementation in their operations (Rahmaniati & Ekawati, 2024). Therefore, companies that do not pay attention to ESG risks in the long run may become vulnerable to risks that could harm the company's value and threaten its sustainability (Lhutfi et al., 2024). This situation arises because ESG disclosure in Indonesia is still voluntary, in contrast to developed countries where ESG disclosure is mandatory. In essence, risk-based ESG practice has been introduced and regulated through various policies, such as the Indonesian Financial Services Sector Master Plan 2021-2025 and Financial Services Authority (OJK) Regulation No. 51/POJK.03/2017.

Freeman (1984) stated that a company is required to provide benefits to other stakeholders during its operations (Zahid *et al.,* 2022). ESG-related information is expected to encourage investors to engage in ESG-based investments. ESG scoring serves as a measurement tool to assess a company's performance (Bukari *et al.,* 2024). Investors should to consider not just financial elements but also ESG factors as non-financial aspects before making investment decisions. Thus, ESG aspects serve as a reference for investors to incorporate sustainability considerations into their investment decisions before investing (Parikh *et al.,* 2023). Erdogan *et al.,* (2024) found that ESG disclosure positively impacts investment efficiency. ESG disclosure has a positive impact on investment efficiency. In some literature, ESG performance plays a crucial role in enhancing a company's value (Wu *et al.*, 2022).

Investors' perception frequently characterizes company value and it is often linked to stock prices (Aljifri, 2023). Besides non-financial aspects, investors also consider a company's financial performance through ROA and ROE. ROA represents a company's ability to generate profits over a certain period using its assets (Bui *et al.,* 2023). If a company has a higher ROA than the previous year, it indicates good company value in terms of asset management (Ahmad *et al.,* 2021). Meanwhile, ROE reflects the effectiveness of a company's management in driving performance through sales and investments. This theory is supported by Ahmed *et al.,* (2024), who found that ROE significantly affects company value. However, other studies indicate that while long-term debt negatively impacts both return on assets and return on equity, the effect is not statistically significant (Ngatno *et al.,* 2021).

Literature studies examining risk-based ESG through ESG risk ratings remain scarce. Investigating whether ESG implementation and transparency influence corporate risk profiles and valuation assessments remains a key area of inquiry, with no one has reached definitive conclusions thus far (Gillan *et al.,* 2021). Studies that analyze risk-based ESG remain limited and a comprehensive taxonomy of ESG risks is still lacking (Giuli *et al.*, 2024). Moreover, this study adopts the ESG Risk Rating issued by Sustainalytics, differing from previous studies that primarily relied on sustainability reports and referred to GRI, Bloomberg, Refinitiv, S&P, etc. standards (Giuli *et al.,* 2024). This research is expected to contribute to management literature related to sustainable management through the implementation of risk-based ESG.

Based on the problem formulation above, it is necessary to conduct research to identify how the implementation and disclosure of risk-based ESG affect firm value in Indonesia, especially considering the low level of ESG adoption and the

voluntary nature of its disclosure. Additionally, it is important to examine the extent to which ESG risk scores and financial performance indicators such as ROA and ROE influence firm value.

RESEARCH METHODS

Research Method and Sample

This research uses secondary data, such as financial reports from companies that have received an ESG score from Sustainalytics for the period 2019-2023. This secondary data can be obtained from several official sources, such as IDX and the official websites for each company. The research period lasts for one month, from November 2024 to December 2024.

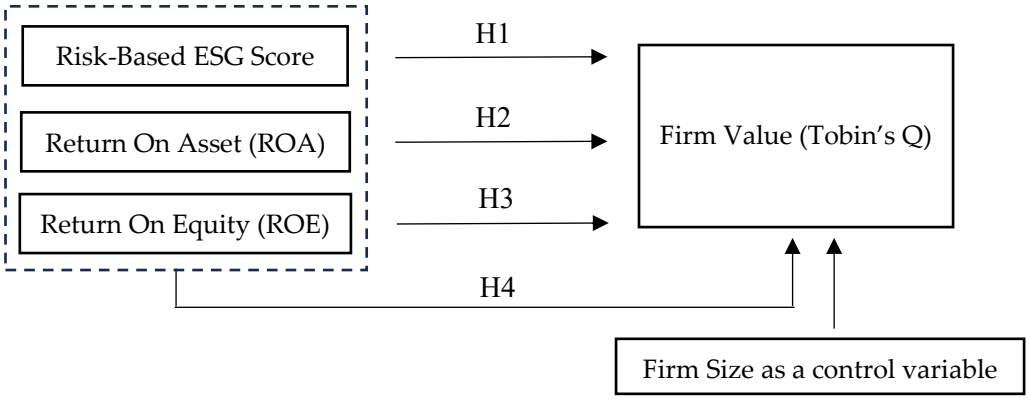
The population in this research consists of companies that received an ESG Risk Rating score from Sustainalytics during the 2019-2023 period. Based on the collected data, there are 80 companies in the population. The sample is selected using a non-probability sampling technique that employs a purposive sampling method, which selects samples based on specific criteria to ensure they align with the desired characteristics (Cash *et al.*, 2022). The respondent criteria are as follows:

a. Companies that have received an ESG Risk Rating score from Morningstar Sustainalytics during the 2019-2023 period.
b. Companies that have consistently published financial reports from 2019 to 2023.
c. Companies that have never been delisted during the 2019-2023 period.

The total sample consists of 60 companies. Although 80 firms received an ESG Risk Rating score from Morningstar Sustainalytics, only 60 consistently had complete scores during the 2019-2023 period. Thus, the total observable data amounts to 300 (60 companies x 5 periods). Table 1 presents the selected firms and the total observations used in this study.

Measurements

This study employs the risk-based ESG score as the independent variable, using the ESG Risk Rating proxy provided by the independent institution Sustainalytics, consistent with previous studies (Handoyo et al., 2023). ESG risk rating by Sustainalytics is capable of measuring the magnitude of ESG risks that directly impact financial performance. Whereas conventional ESG ratings (such as those based on GRI or Refinitiv) primarily assess the level of transparency, compliance and implementation of ESG initiatives without necessarily linking them to business and financial risks.



Source: Authors', 2025

Figure 1. Conceptual model

Table 1. Sample selection criteria

Sample Selection Criteria	Number of Companies
Companies that received an ESG Risk Rating score from Morningstar Sustainalytics	80
Companies that did not consistently obtain an ESG Risk Rating score from Morningstar Sustainalytics during the 2019-2023 period	(20)
Companies that do not have complete financial reports for the 2019-2023 period	0
Number of Samples per Year	60
Total Observations (60 companies x 5-year period)	300

Source: Authors' (2025)

Morningstar Sustainalytics conducts the assessment of ESG risk levels using the concept of risk decomposition. Münchhausen *et al.,* (2024) outline the ESG risk rating approach for companies using the following two measurement dimensions.

a. Exposure

The assessment team evaluates the exposure dimension at the sub-industry level, then processes and adjusts it at the company level. This score is updated annually. Several factors used as the basis for assessing the exposure dimension include:

1. History of company events.
2. Organized external data (e.g., CO2 emissions).
3. Corporate reporting and external research.

b. Management

Researchers obtain the measurement of the management dimension from a series of management indicators, including regulations, management frameworks, accreditations, and others, as well as indicators focusing on management effectiveness outcomes, either in numerical form (e.g., CO2 emissions or CO2 intensity) or through a company's participation in an event. For each combination of material ESG issues/sub-industries, researchers choose and prioritize management indicators, quantitative performance, and events to collectively provide the most significant indication for understanding and evaluating how effectively a company addresses an issue.

Thus, the ESG Risk Rating measures exposure by referring to material ESG risks that affect the company and contribute to ESG risk assessment. Furthermore, it evaluates how effectively a company's management handles ESG issues through various policies and programs, such as Corporate Social Responsibility (CSR) or other initiatives. Morningstar Sustainalytics categorizes the ESG score assessment for publicly traded companies into five groups, as shown in Table 2.

Table 2. ESG Risk rating category

Risk-Based ESG Score	Category	Description
0-10	Negligible	Regarded as having minimal ESG risk
10-20	Low	Regarded as having a low level of ESG risk
20-30	Medium	Regarded as having a moderate level of ESG risk
30-40	High	Regarded as having a high level of ESG risk
More than 40	Severe	Regarded as having significant ESG risk

Source: Sustainalytics & Natixis (2023)

Based on the ESG Risk Rating above, companies scoring above 30 are classified as high risk, while those scoring below 30 are classified as low risk. The ESG score reflects good corporate governance (Sustainalytics & Natixis, 2023).

Calculating this ratio helps determine how well a company employs its total assets to produce net profit after tax. The higher the ROA ratio, the more effectively the company manages its assets to generate net profit. Calculate ROA using the following formula:

$$\text{ROA} = \frac{\text{Net Profit After Tax}}{\text{Total Assets}}$$

Next, investors use the ROE to evaluate a company's capacity to generate net profit after tax in relation to shareholder equity (Bui *et al.,* 2023). A high ROE ratio suggests that the company is increasingly efficient and effective in utilizing its capital. Calculate ROE using the following formula:

$$\text{ROE} = \frac{\text{Net Profit After Tax}}{\text{Total Equities}}$$

Meanwhile, firm value represents the dependent variable, proxied through the Tobin's Q ratio. Firm value reflects investors' perception of a company, which is often linked to stock prices (Suteja *et al.,* 2023). The calculation method for Tobin's Q is as follows:

$$\text{Tobin's Q} = \frac{(\text{Share Price} \times \text{Outstanding Shares}) + \text{Total Debt}}{\text{Total Assets}}$$

Additionally, this study includes a control variable, namely firm size (SIZE), which can indicate differences in the connection between ESG and firm value in large and small companies. The larger a company, the greater the tendency for investors to be interested in its shares, which in turn increases stock prices and enhances firm value (Bheenick *et al.,* 2023). According to Boateng *et al.* (2022) firm size can be assessed by taking the logarithm of the company's total assets or the following formula:

$$\text{Ln (Total Asstes)}$$

Data Analysis

This study uses descriptive analysis, a systematic process of examining and organizing collected data to enhance understanding of the findings and present the results effectively (Kotronoulas *et al.,* 2023). This study utilizes panel

data regression analysis as its analytical method. After forming the panel data regression model, we conduct serial correlation (autocorrelation) and heteroskedasticity tests to assess its validity. We perform these tests on the errors or residuals generated from the regression model.

The serial correlation (autocorrelation) test examines the correlation of error terms over time in a panel data model. Researchers conduct this test using the Breusch-Pagan LM Test. If the significance level exceeds 0.05, autocorrelation is not present, and vice versa (Iswajuni *et al.*, 2018). Meanwhile, researchers use the heteroskedasticity test to determine whether the variance of residuals is constant across observations in the regression model (Khaled *et al.*, 2019). This test using the Modified Wald Test for Groupwise Heteroskedasticity. If the significance value is greater than 0.05, heteroskedasticity is not present. However, if the significance value is less than 0.05, heteroskedasticity is present in the data.

Panel data regression analysis combines cross-sectional data (observations across different entities) with time-series data (observations over multiple periods). In this approach, the same cross-sectional units are measured at different time points (Mack *et al.*, 2024). Panel data regression is conducted through three approaches: Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). This study determines the most suitable model by applying the Chow test, Hausman test, and Lagrange Multiplier test. Tables 3 and 4 present the complete findings of the best model selection.

Researchers apply the Chow test to determine the most appropriate model between Pooled Least Squares (PLS) and the Fixed Effect Model (FEM), where H0: PLS and H1: FEM. Based on the Chow test results, the probability value obtained is 0.00 < 0.05 (α=5%), so the Fixed Effect Model (FEM) selected. Next, the researcher conducts Hausman test to select between the Fixed Effects Model (FEM) and the Random Effects Model (REM).

Table 4 shows that the Hausman test yielded a probability value of 0.01 > 0.05 (α=5%), indicating that the Fixed Effect Model is more appropriate than the Random Effect Model. Therefore, we conclude that the FEM model is the most suitable for this study. Since we have selected the best model based on these two tests, conducting the multiple Lagrange test is unnecessary.

Thus, the general form of the Fixed Effect Model equation (Sharma *et al.*, 2023) used in this study is as follows.

$$Y_{it} = \alpha_i + \beta_1 X_{1,it} + \beta_2 X_{2,it} + \beta_3 X_{3,it} + \beta_4 X_{4,it} + e_{it}$$

Where:

- Y_{it} = the dependent variable for entity *i* at time *t*
- α_i = the intercept or fixed effect for entity *i*, representing time-invariant characteristics unique to each entity
- $X_{1,it}$, $X_{2,it}$, …, $X_{k,it}$ = the independent variables 1 through k for entity *i* at time *t*
- $\beta_1, \beta_2, \ldots, \beta_k$ = the regression coefficients for each independent variable
- e_{it} = the error term (residual), capturing other factors not included in the model

Table 3. Chow test results

Effect Test	Alpha	Prob.	Model Estimation
Cross-section F	0.05	0.00	Fixed Effect Model
Cross-section Chi-square	0.05	0.00	

Table 4. Hausman test results

Test Summary	Alpha	Prob.	Model Estimation
Cross-section random	0.05	0.01	Fixed Effect Model

RESULTS AND DISCUSSION

As previously stated, researchers carried out the data analysis for this research using panel data regression analysis with the help of STATA software. The data analysis methods involve several steps. Figure 2 provides a more detailed explanation.

This study analyzes descriptive statistics using 300 observations for the variables Firm Value (Tobin's Q), Risk-based ESG score, ROA, ROE, and Firm Size (SIZE). This section presents the minimum, maximum, mean, and standard deviation values of each variable. Table 5 provides a more comprehensive description.

The descriptive statistical analysis table above shows that Tobin's Q has a minimum value of 0.22, a maximum value of 6.91, and an average of 1.45. The standard deviation of 1.10 indicates a relatively large range of variation. For the risk-based ESG score, the minimum value is 11.45, and the maximum value is 52.80. The mean value is 31.64, with a standard deviation of 8.33, suggesting that most companies in the sample score above the

average on risk-based ESG, although there is significant variation.

Furthermore, the descriptive statistics show that ROA has a minimum value of -35.65, a maximum value of 31.85, a mean of 5.12, and a standard deviation of 7.32. For ROE, the minimum value is -102.45, the maximum value is 221.10, and the mean is 11.46. The standard deviation of 23.52 indicates extreme variations among some companies. Regarding the firm size variable (SIZE), the minimum value is 27.42, the maximum value is 35.21, and the mean is 31.27. The standard deviation of 1.49 suggests that the data variation range is relatively close.

We can present data in the form of a histogram to make it easier to visualize the data distribution. A histogram helps identify distribution patterns such as normal distribution, skewness to the left or right, and the presence of outliers. Figures 3, 4, 5, 6, and 7 display the histograms for each variable.

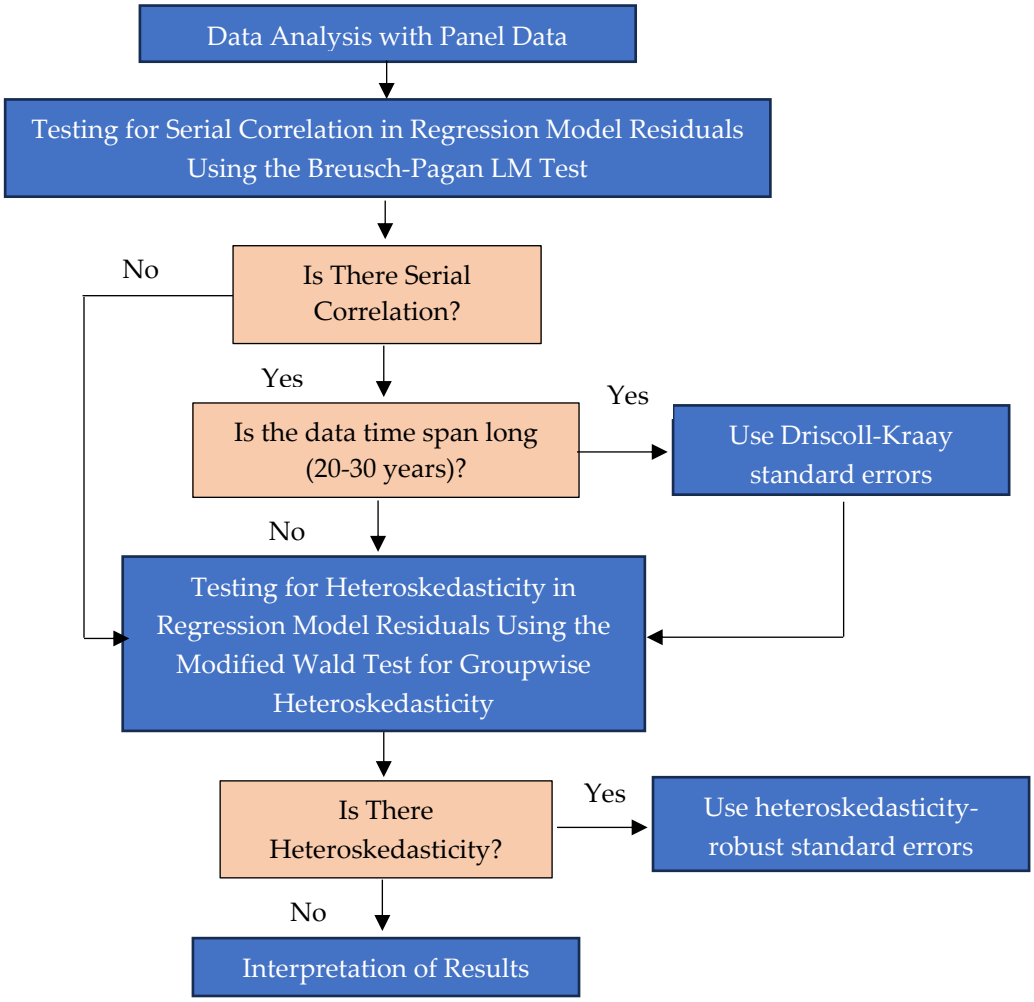


Figure 2. Research analysis flow

Table 5. Descriptive statistical analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Tobin's Q	300	0.22	6.91	1.45	1.10
Risk-Based ESG Score	300	11.45	52.80	31.64	8.33
ROA	300	-35.65	31.85	5.12	7.32
ROE	300	-102.45	221.10	11.46	23.52
SIZE	300	27.42	35.21	31.27	1.49

Source: Data Proceed, 2025

Figure 3 shows the histogram of the ESG variable, where the data distribution tends to approach a normal pattern. The average ESG value is 31.64 with a standard deviation of 8.33. The data distribution is relatively symmetrical and spreads evenly around the mean, showing no significant outliers. This suggests that most companies have ESG values within the average range, with reasonable variation.

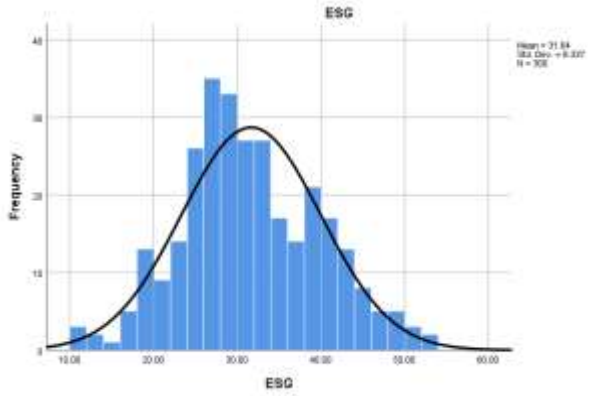


Figure 3. ESG Histogram

Figure 4 shows the histogram of ROA values from 300 data samples. The data cluster around the mean value of 5.12, with a standard deviation of 7.32. Most ROA frequencies fall between 0 and 10, with the distribution skewed slightly to the right. This distribution indicates relatively large variability, but no evident extreme outliers appear.

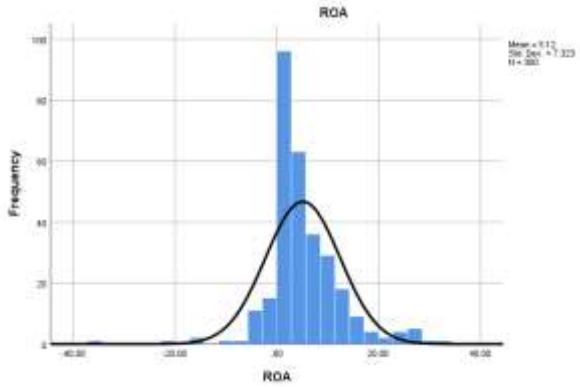


Figure 4. ROA Histogram

Figure 5 shows the histogram of ROE values, with an average ROE of 11.46 and a relatively large standard deviation of 23.52, indicating wide data variation. Most ROE frequencies concentrate around values from 0 to 50, with a fairly symmetrical distribution that has a longer tail on the right side, indicating some extreme high values. This data reflects significant variability in ROE among the observed companies.

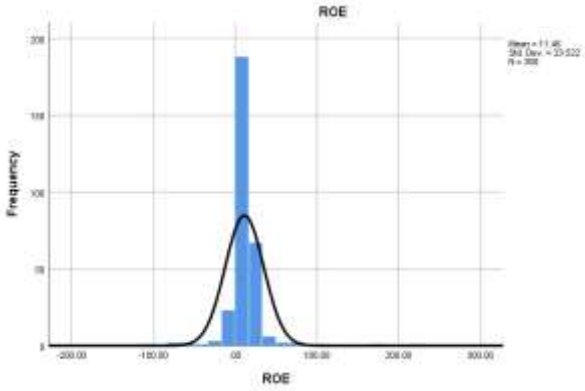


Figure 5. ROE Histogram

Figure 6 shows a histogram of the size data distribution, which follows an approximately normal pattern. Most size values concentrate around 31 and 32, with a mean of 31.27 and a standard deviation of 1.49. The data centers mostly around the mean, indicating a symmetrical distribution.

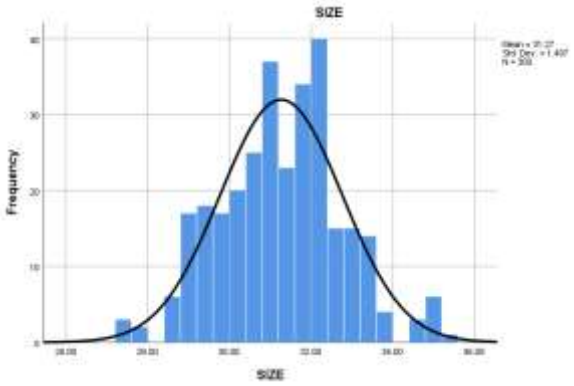


Figure 6. Size Histogram

Figure 7 shows a histogram of the value data distribution, which is right-skewed. Most value data concentrate below 2, with the highest frequency near 0. The mean value is 1.45, with a standard deviation of 1.10, indicating several extreme values on the right side that cause the distribution to be asymmetrical.

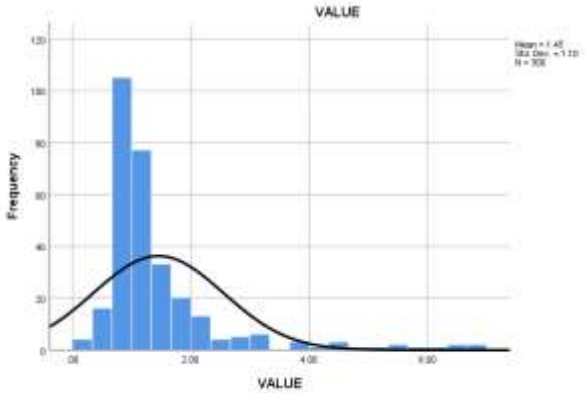


Figure 7. Value Histogram

The next step involves conducting autocorrelation and heteroscedasticity tests. Table 6 presents the results of the autocorrelation test to determine whether the data contain auto-correlation. Therefore, we need to conduct the autocorrelation test as follows.

Table 6. Serial correlation test (autocorrelation)

Serial Correlation Test	
p-value	0,0000

Source: Data Proceed (2025)

According to the table above, the autocorrelation test results show a p-value of less than 0.05, indicating that the data contain autocorrelation. Several studies suggest that if the data span is less than 20 to 30 years, autocorrelation is not a significant issue. Since this study uses a five-year data span from 2019 to 2023, we can disregard the presence of autocorrelation.

Table 7 displays the findings heteros-kedasticity test to determine whether the data exhibits heteroskedasticity. The following heteros-kedasticity test is conducted.

Table 7. Heteroskedasticity test

Heteroskedasticity Test	
p-value	0,0000

Source: Data Proceed (2025)

Based on the table above, the p-value is 0.0000, which is less than 0.05. With a significance level of 5%, this result shows the presence of heteroskedasticity. Therefore, a correction is applied using Heteroskedasticity-Robust Standard Error.

Hypothesis testing results using robust standard error. The correction of standard error with Robust Standard Error is applied to address the violation of the heteroskedasticity assumption, as such a violation may lead to inconsistent estimators (MacKinnon et al., 2023). The table below shows the panel data regression results with robust standard error using the STATA program.

Table 8 interprets the partial (t) test among the variables used. The table shows that the variables Risk-based ESG scores, ROA, and ROE do not impact firm value, with t-values above 0.05. According to (Maqdliyan & Setiawan, 2023), there are regulations on the decision of test results as follows:

a. If probability value < 0.05 indicates that a significant difference between the two variables.
b. If probability value > 0.05 indicates that there is no meaningful difference between the two variables.

Table 9 shows the results of the simultaneous test using the F-test, which finds that risk-based ESG scores, ROA, and ROE collectively have a significant effect on firm value. The statistical results show a significance value of 0.04, which is lower than 0.05, indicating that the predictor variables significantly influence the response variable when considered together.

Based on the data analysis, several findings were identified. Statistically, the risk-based ESG score does not significantly impact firm value, leading to reject H1. This result aligns with the study of Cohen (2023) which states that individual ESG scores have no direct impact on economic performance. However, it contradicts Srivastava & Anand (2023) findings, which show a positive association and significant effect of ESG scores on firm value. These test results suggest that investors have not yet considered risk-based ESG information as a primary factor in their investment decisions (Amini & Yulianti, 2025).

This situation may result from ineffective regulations that impose sanctions on companies failing to manage ESG-related risks. Indonesia's capital market and regulatory framework for ESG are still developing. Consequently, investors tend to perceive that potential costs from these risks do not significantly affect company operations. Zaporowska & Szczepański (2024) support this view, showing that only a limited number of entities currently address operational risks, including ESG-related risks. Stakeholder theory states that companies must consider other stakeholders and align their decisions with applicable principles (Annisawanti et al., 2024).

Furthermore, this study rejects H2 because ROA does not significantly affect firm value. This finding is align with the study by Harmono et al. (2024), which revealed that ROA does not influence firm value. Similarly, Khalifaturofi'ah & Setiawan (2024) found that ROA does not significantly impact firm value.

Table 8. Partial (t) test results

Hypotheses	Relationships	P> t
H1	Risk-Based ESG Score → Firm Value	0.42
H2	Return On Asset (ROA) → Firm Value	0.17
H3	Return On Equity (ROE) → Firm Value	0.74

Source: Data Proceed (2025)

Table 9. Simultaneous (F) test results

Hypotheses	Relationships	Prob > F
H4	Risk-Based ESG Score → Return on Asset (ROA) → Return On Equity (ROE) → Firm Value	0.04

Source: Data Proceed (2025)

This contrasts with previous research by Akbar *et al.*, (2022), which indicates that ROA has a significant and positive effect on firm value. Likewise, H3 is also rejected as ROE does not significantly affect firm value. This finding supports the results of studies by Abdallah & Bahloul (2023).

Several factors may explain why ROA and ROE do not significantly affect firm value. Based on these results, investors do not necessarily need to consider financial measures, particularly ROA and ROE, when evaluating a company's value. Tarczyński *et al.*, (2020) explain that, in determining enterprise value, investors commonly use other value categories such as book value, liquidation value, replacement value, market value, and others.

Inefficiency prevails within the country's capital markets. This inefficiency causes crucial information, including financial performance data, to often not fully incorporate into stock prices. Limited access to information, low levels of transparency, and inadequate pricing mechanisms fail to adequately account for non-financial risks. Moreover, a broader range of factors beyond profitability shape firm value. Investors frequently weigh non-financial elements such as a company's reputation, innovation capacity, strategic direction, and investor sentiment more heavily than standard financial ratios like ROA (Nawawi, 2025). External influences, including macroeconomic conditions and government policies, also significantly affect firm value. During economic uncertainty, investors tend to prioritize these external factors over a company's financial results (Yang *et al.*, 2023).

Based on the F-test, we found that risk-based ESG scores, ROA, and ROE significantly and positively affect firm value when analyzed simultaneously, leading us to accept H4. Pulino *et al.*, (2022), support this finding by showing that ESG disclosure positively impacts a company's financial performance. Research by Abdi *et al.*, (2022) and Aydoğmuş *et al.*, (2022), also found significant effects on firm value. These results further reinforce the notion that exploring the relationship between ESG ratings and financial performance highlights the importance of sustainability practices in achieving financial success.

These findings emphasize that risk-based ESG scores can reduce firm value. If company fail to consider this aspect, their firm value may decline. Thus, the higher a company's risk-based ESG score, the more likely it is to decrease its firm value (Yu & Xiao, 2022). Through risk-based ESG scores, companies and investors can reduce information asymmetry regarding both financial and non-financial performance, particularly in ESG aspects (Kim & Koo, 2023), by relying on evaluations from credible independent institutions such as Sustainalytics. In integrating risk-based ESG, companies can implement various approaches, such as identifying and reducing carbon emissions, promoting diversity and inclusion, ensuring transparency in periodic ESG performance reporting, and complying with regulations.

Moreover, companies can allocate resources for research and development as well as adopt new technologies to help minimize negative environmental impacts and improve social performance. Companies must also raise awareness among employees to support effective ESG risk management (Martiny *et al.*, 2024). By incorporating risk-based ESG into their operations, companies can enhance financial performance, attract sustainable investments, and build trust with stakeholders. These findings urge policymakers to enact stringent regulations that compel firms to integrate ESG principles into their governance structures, thereby enhancing firm value (Bukari *et al.*, 2024).

This aligns with stakeholder theory, which states that individuals or groups can affect or be affected by a company's objectives (Osobajo *et al.*, 2023). Through ESG disclosure, stakeholders assess the risks that a company's operational activities pose to the environment and surrounding communities and observe the company's efforts to manage and mitigate these risks (Ferreira *et al.*, 2024). Companies and society maintain a close relationship (Tajuddin *et al.*, 2024), which aligns with the assumptions of legitimacy theory. From this perspective, companies gain public recognition for their efforts to align corporate values with societal norms. As sustainability gains increasing attention, management information and investor behavior will contribute to balancing stock prices and the market.

CONCLUSION AND RECOMMENDATION

This study examines how risk-based ESG scores, ROA, and ROE impact firm value. The findings show that risk-based ESG scores, ROA, and ROE do not significantly influence firm value on a partial basis. This result suggests that investors have not yet fully considered ESG scores and financial performance measures in their investment decisions. We assume two main reasons for this. First, ineffective enforcement of regulations sanctioning companies that fail to manage ESG risks leads investors to perceive the costs associated with these risks as relatively immaterial. Second, since instruments such as risk-based ESG scores and sustainability reports are still relatively new, investors tend to focus more on other financial indicators, such as company revenue, rather than on non-financial information like risk-based ESG scores.

Meanwhile, risk-based ESG scores, ROA, and ROE significantly affect firm value when analyzed simultaneously. This confirms that sustainability practices and financial performance together increase firm value. These findings imply that companies must integrate risk-based ESG considerations into their operations, including reducing carbon emissions, promoting diversity and inclusion, and ensuring reporting transparency. This study supports stakeholder and legitimacy theories, showing that ESG disclosure enables stakeholders to assess corporate risks and their impacts on the environment and society. Therefore, companies must balance financial performance with sustainable practices to achieve holistic success. However, ESG risks can be numerous and often ambiguous because they vary across sectors.

This study recommends that regulators consider implementing effective sanction regulations to ensure companies mitigate ESG-related risks as optimally as possible. By doing so, investors can comprehensively assess that the ESG risks posed by companies are materially significant. On the other hand, this study acknowledges certain limitations and provides several recommendations. Research on risk-based ESG scores remains relatively scarce, especially those utilizing Sustainalytics assessments.

Additionally, this study covers only a five-year period, so future research could extend the study period to at least ten years for broader coverage and more accurate results. Future research could also enhance these findings by utilizing various methodologies, such as longitudinal research or mixed methods, to offer more profound insights into the implementation of risk-based ESG practices. This underscores the necessity of thoughtfully evaluating sample characteristics to ensure better representation. Furthermore, this study recommends further exploration of alternative management theories, such as agency theory, signaling theory, or others, to deepen understanding and application of risk-based ESG performance in various organizational contexts.

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