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ORIGINAL

The Power of ESG: Logistic Analysis of Sustainability-Driven Investment Decisions in Emerging Markets

El Poder de los Criterios ESG: Análisis Logístico de las Decisiones de Inversión Impulsadas por la Sostenibilidad en los Mercados Emergentes

Hermaya Ompusunggu[1,2], Helmi Yazid[1], Lia Uzliawati[1], Imam Abu Hanifah[1]

[1]University of Sultan Ageng Tirtayasa, Faculty of Economics and Business. Serang, Indonesia.
[2]University of Putera Batam, Faculty of Social Sciences and Humanities. Batam, Indonesia.

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Corresponding Author: Helmi Yazid

ABSTRACT

Introduction: sustainability is increasingly becoming a major concern in global investment, especially in the energy sector, which faces intense pressure from stakeholders to improve transparency and accountability. Environmental, Social, and Governance (ESG) has emerged as a strategic indicator that goes beyond traditional financial performance in assessing a company's long-term risk and attractiveness.
Objective: this study aims to analyse the effect of ESG performance on sustainable investment decisions in Indonesian energy companies, considering financial variables as control factors.
Method: this study uses a quantitative approach with logistic regression analysis on 155 observations of energy companies during the period 2019–2023. The main independent variable is the ESG score, while the control variables include Return on Assets (ROA), Return on Equity (ROE), Debt to Equity Ratio (DER), and company size.
Results: the results show that ESG has a positive and significant effect on sustainable investment, as indicated by a high odds ratio value. DER was found to have a significant negative effect, while ROA, ROE, and company size had no significant effect on investment decisions.
Conclusions: these findings confirm that ESG performance is a more decisive strategic factor than traditional financial indicators in attracting long-term investment in the energy sector. This study contributes to the ESG literature in emerging markets and suggests strengthening ESG reporting and green investment policies in Indonesia.

Keywords: Sustainability; ESG; Return on Assets; Return on Equity; Debt to Equity Ratio; Company Size.

RESUMEN

Introducción: la sostenibilidad se está convirtiendo cada vez más en una preocupación importante en las inversiones globales, especialmente en el sector energético, que se enfrenta a una intensa presión por parte de las partes interesadas para mejorar la transparencia y la rendición de cuentas. Los criterios ambientales, sociales y de gobernanza (ESG) se han convertido en un indicador estratégico que va más allá del rendimiento financiero tradicional a la hora de evaluar el riesgo y el atractivo a largo plazo de una empresa.
Objetivo: el objetivo de este estudio es analizar el efecto del rendimiento ESG en las decisiones de inversión sostenible de las empresas energéticas indonesias, teniendo en cuenta las variables financieras como factores de control.
Método: este estudio utiliza un enfoque cuantitativo con análisis de regresión logística sobre 155 observaciones

de empresas energéticas durante el periodo 2019-2023. La principal variable independiente es la puntuación ESG, mientras que las variables de control incluyen el rendimiento de los activos (ROA), el rendimiento del capital (ROE), el ratio de deuda sobre capital (DER) y el tamaño de la empresa.
Resultados: los resultados muestran que el ESG tiene un efecto positivo y significativo en la inversión sostenible, como lo indica un alto valor de la razón de probabilidades. Se encontró que el DER tiene un efecto negativo significativo, mientras que el ROA, el ROE y el tamaño de la empresa no tuvieron un efecto significativo en las decisiones de inversión.
Conclusiones: estos resultados confirman que el rendimiento ESG es un factor estratégico más decisivo que los indicadores financieros tradicionales a la hora de atraer inversiones a largo plazo en el sector energético. Este estudio contribuye a la literatura sobre ESG en los mercados emergentes y sugiere reforzar la información ESG y las políticas de inversión ecológica en Indonesia.

Palabras clave: Sostenibilidad; ESG; Rendimiento de los Activos; Rendimiento del Capital; Ratio Deuda/ Capital; Tamaño de la Empresa.

INTRODUCTION

Environmental, social, and governance (ESG) issues have become a major focus in global business dynamics,[1] especially in the energy sector, which is at the forefront of the transition to sustainable development.[2] Increased investor awareness of sustainability has encouraged ESG to play a role not only as a risk management tool but also as a long-term value creation strategy.[3,4] Various studies show mixed results: in Indonesia, ESG disclosure has been shown to increase company value, although company size can weaken this relationship[5]; at the global level, the impact of ESG on stock volatility differs between developed and developing countries[6] ; while in broader domestic markets, the social dimension is the most decisive factor in influencing market capitalization while attracting investors who are increasingly concerned about carbon emissions, social impact, and corporate reputation.[7] Investors no longer only consider financial aspects, but also assess how companies manage risks and opportunities related to ESG issues.[8,9]

Although attention to ESG in investment decision-making is increasing globally, most empirical research still focuses on the context of developed countries and multinational companies.[10] Studies on the impact of ESG on sustainable investment in emerging markets, particularly in the energy sector of Indonesia, are still limited. This creates a significant knowledge gap in the sustainability literature.[11] Lopez-De-silanes et al.[10] emphasizes that the ESG literature is primarily geographically biased, with most empirical evidence originating from countries with established ESG regulatory frameworks. The study underscores the need for further research in emerging markets to identify local characteristics and institutional barriers that may affect the effectiveness of ESG on sustainable performance and investment.

In addition, Syarkani et al.[12] show the strongest impact on firm value compared to environmental and social factors. However, implementation faces substantial obstacles including weak regulatory enforcement, limited monitoring capacities, and inconsistent reporting frameworks.[13] ESG policies risk becoming “greenwashing” tools driven by international pressure rather than genuine sustainability impact.[14] Investor confidence depends heavily on transparency, standardization, and third-party audits,[15] while stronger regulatory frameworks correlate with better corporate adherence.[16]

The study by [4] also underlines that ESG implementation in emerging economies still faces significant challenges, such as a lack of consistent data, non-uniform reporting frameworks, and uneven investor awareness. This makes it difficult for investors to make optimal ESG-based decisions and points out the importance of research that focuses on ESG reporting standards and ESG’s relationship with investment stability in the local context.

Although ESG is increasingly becoming a global concern in investment decision-making, empirical studies evaluating the impact of ESG performance on sustainable investment in Indonesia are still very limited, especially in the energy sector, which is characterized by complex risks and challenges. Most previous studies have focused on developed countries or multinational companies, thus failing to reflect the context of emerging markets such as Indonesia, which has different policy dynamics, regulations, and ESG awareness.[17]

This gap highlights the need for studies that specifically focus on Indonesia’s energy sector to understand how ESG performance affects investor interest and the obstacles companies face in implementing sustainability practices. Thus, this study aims to analyze the impact of ESG performance on sustainable investment in energy companies in Indonesia and identify the most dominant ESG dimensions in attracting investor interest. This study uses quantitative ESG data and investment trends to provide an empirical basis for analysis.

In this study, Stakeholder Theory is the main theoretical framework in understanding how companies consider the interests of various interested parties (stakeholders) in decision making, including in sustainability

practices and ESG (Environmental, Social, and Governance) performance. In the context of sustainability-based investment, stakeholder theory suggests that companies that actively manage ESG issues will be viewed more favorably by investors, as they demonstrate social responsibility and good governance, which ultimately reduces long-term risk and increases firm value.[18,19,20,21] This is particularly relevant in emerging markets that face institutional challenges and high social and environmental risks. In the context of ESG (Environmental, Social, and Governance), this theory explains that good ESG performance can increase investor and public confidence, thus encouraging sustainable investment.[17]

In the context of the global transition towards more sustainable business practices, Environmental, Social, and Governance (ESG) has become an important indicator in evaluating the long-term integrity of a company, including in the energy sector, which is at high risk of environmental and social issues.[22] Good ESG performance reflects a company's commitment to comprehensive sustainability principles[11] and is believed to increase investor confidence, strengthen corporate reputation, and reduce exposure to non-financial risks. Based on the findings,[23] there is a significant positive relationship between ESG scores and financial performance, such as ROA and ROE, in the energy and utilities sector, which strengthens the attractiveness of companies to sustainability-oriented investors.[23] From the above description:

H1: ESG performance has a positive and significant effect on sustainable investment in energy companies in Indonesia.

In addition, in developing countries, ESG does not always have a direct effect on profitability (ROA/ROE), but ESG still has a significant influence on the company's market value and long-term investment decisions.[24] In this case, sustainable investment is influenced not only by ESG, but also by the financial condition of the firm, including profitability (ROA, ROE), capital structure (Debt-to-Equity Ratio), and firm size, which can serve as control variables. As noted by Xu[25], large firms with high social reputation are more valued by the market, even when industry profitability is controlled, which suggests that firm size amplifies the effect of ESG on investment decisions. Thus, while high ESG performance in energy firms will increase the probability of sustainable investment, this effect may be affected by financial conditions and firm characteristics. Therefore, it is important to examine the relationship between ESG and sustainable investment by considering ROA, ROE, DER, and Firm Size as control variables to more accurately isolate the influence of ESG and explain the dynamics of sustainable investment in Indonesia's emerging energy sector.

H2: the positive effect of ESG performance on sustainable investment remains significant after controlling for Return on Assets (ROA).

Environmental, Social, and Governance (ESG) performance has become a key focus in investment decisions, particularly in the context of long-term sustainability. ESG reflects a company's commitment to managing environmental impacts, maintaining social responsibility, and implementing good corporate governance. Based on stakeholder theory, companies that consider the interests of various stakeholders through ESG practices will gain greater legitimacy in the eyes of investors. This is reinforced by signaling theory, which states that ESG performance serves as a positive signal to investors that the company is able to manage non-financial risks and demonstrate a commitment to sustainability.

Empirical research indicates that ESG performance has a substantial impact on investment decisions, even after accounting for traditional financial metrics such as Return on Equity (ROE). Study Fatemi contributes positively to firm value independently of ROE.[26] Another study by Gillan et al.[18] also concluded that ESG factors are increasingly used by investors separately from conventional accounting indicators. In the context of emerging markets, ESG is becoming increasingly important due to high institutional uncertainty and socio-environmental risks. Therefore, while ROE is an important indicator in assessing corporate profitability, ESG performance is still believed to have its own influence on sustainability-based investment decisions. Based on the theoretical basis and empirical findings, the hypotheses proposed in this study are:

H3: the positive effect of ESG performance on sustainable investment remains significant after controlling for Return on Equity (ROE).

Environmental, Social, and Governance (ESG) performance has evolved into a key indicator in assessing corporate sustainability and attracting investor attention, especially in the context of sustainable investment. ESG refers to a company's practices in managing environmental impacts, prioritizing social welfare, and applying transparent and ethical governance principles. From the perspective of stakeholder theory, companies that consistently implement ESG principles will gain trust and legitimacy from various stakeholders.

Meanwhile, the Debt-to-Equity Ratio (DER) is an indicator that reflects a company's capital structure and the level of leverage or dependence on debt. Investors often use DER as a consideration of financial risk in the investment decision-making process. However, some studies show that although DER plays a role in assessing financial risk, ESG performance still has its own appeal for sustainability-oriented investors. Regarding capital structure, debt financing enhances ESG performance across all dimensions, while equity financing shows no significant effect.[27] ESG performance is positively associated with book leverage, suggesting firms increase debt capital through sustainable practices.[28] ESG scores significantly reduce debt costs, with the most indebted

companies and those with highest agency costs benefiting most from ESG performance.[29] However, trade-offs exist between ESG performance and investment patterns, with positive correlations for capital investments but negative relationships with environmental investments.[30] By referring to these theories and empirical findings, it can be concluded that ESG performance has an independent influence on sustainable investment, even though the company has a certain level of leverage. Therefore, the hypothesis proposed in this study is:

H4: the positive effect of ESG performance on sustainable investment remains significant after controlling for Debt to Equity Ratio (DER).

One important factor that investors also consider is firm size, which is typically measured by total assets or revenue. Firm size is often associated with the ability to access resources, manage risk, and deal with pressure from the public or regulators. Larger firms often have more resources to invest in ESG initiatives, benefiting from economies of scale and greater stakeholder scrutiny.[31] However, ESG data may exhibit size bias, with larger firms tending to receive higher ESG scores, which can affect portfolio management decisions.[32] In the banking sector, the relationship between firm size and ESG risk is non-linear, following a U-shaped pattern, suggesting both benefits and diseconomies of scale in ESG risk management.[32] Firm size also moderates the impact of ESG disclosure on firm value and financial performance, particularly in industries like airlines[33] and agriculture.[34] Overall, ESG performance is positively associated with firm value and profitability,[35] though the relationship can be non-linear and influenced by ownership structure and disclosure practices.[36] Measurement challenges and data discrepancies remain important considerations.[37] Based on the theory and empirical evidence, it can be concluded that although firm size may influence ESG strategy and exposure, the influence of ESG on sustainable investment remains independently significant. Therefore, the hypothesis formulated in this study is:

H5: the positive effect of ESG performance on sustainable investment remains significant after controlling for Firm Size.

METHOD

This research is a quantitative analytical observational study that aims to examine the effect of Environmental, Social, and Governance (ESG) performance on sustainable investment in energy companies in Indonesia. The research is non-experimental and uses a cross-sectional approach with observation of secondary company data without intervention. The research population includes all energy companies listed on the Indonesia Stock Exchange (IDX) for the period 2019–2023. The sample was selected using purposive sampling, namely companies that had complete ESG data and financial reports for the research period. After a screening process to eliminate incomplete or inconsistent data, 155 company data were included in the final analysis.

The ESG Score variable is a composite score that reflects the company's performance in environmental, social, and governance aspects. This score is obtained from an agency Refinitiv and is used in the form of continuous data.[38] Sustainable investment is measured by a dummy variable, which is worth 1 if the company continues to invest in projects that support sustainability, and 0 if not.[39] For the control variable Return on Assets is the ratio of net income to total assets which shows the efficiency of using the company's assets. Return on Equity measures net income to total equity, reflecting the effectiveness of managing own capital Debt to Equity Ratio is the ratio of total debt to equity, illustrating the company's financing structure and level of leverage.[40] Meanwhile, Firm Size is measured by the natural logarithm of total assets (ln total assets), as an indicator of the scale and capacity of the company.[41] Details of the operational definitions and measurement of variables are provided in table 1.

Table 1. Operational Definitions and Measurement of Variables

No	Variable	Operational Definition	Measurement
1	Sustainable Investment (SIV)	Investments that consider aspects of corporate sustainability, including environmental, social, and governance (ESG) performance, as well as capital allocation directed to companies with sustainable business practices.	Dummy variable (coded as 1 if the company receives or is listed as a recipient of sustainable/green investment or issues green instruments such as green bonds; 0 otherwise).
2	Environmental, Social, and Governance (ESG-SCORE)	A score that reflects the company's sustainability performance in environmental, social, and governance aspects.	ESG-SCORE = E+S+G /3
3	Profitability (ROA/ROE)	The ability of a company to generate profits from assets and equity.	ROA = Net Profit/Total Assets ROE = Net Profit/Total Equity
4	Leverage (DER)	The level of debt utilization in a company's capital structure to fund its assets.	DER = Total liability / Total Equity
5	Firm Size (FZ)	Large and small based on total assets.	FZ = Ln (Total Assets)

Data processing and analysis were performed using Stata software version 16. The main analysis technique used was logistic regression because the dependent variable, sustainable investment, is binary. To ensure the accuracy of the model, all variables were carefully checked for completeness and consistency before analysis. The analysis examined the relationship between ESG-SCORE performance (independent variable) and sustainable investment (dependent variable), while controlling for ROA, ROE, DER, and Firm Size. The data processing was carried out systematically, ensuring data validity through cross-checking between sources, including Refinitiv for ESGSCORE data and company annual reports for financial and investment information. The model built in this study is mathematically formulated as follows:

$$SIV = \beta_0 + \beta_1(ESG\text{-}SCORE) + \beta_2(ROA) + \beta_3(ROE) + \beta_4(DER) + \beta_5(FZ) + \varepsilon$$

Where Sustainable Investment (SIV) is the dependent variable that indicates the company's involvement in sustainability-oriented projects or expenditures, ESG-SCORE is the main independent variable that reflects the quality and sustainability score of the company based on environmental, social, and governance factors. Meanwhile, ROA (Return on Assets) and ROE (Return on Equity) are used as profitability indicators, DER (Debt to Equity Ratio) as an indicator of capital structure, and Firm Size is calculated from the natural logarithm of total assets as a proxy for firm size - all four are used as control variables to isolate the direct influence of ESG on sustainable investment decisions.

This study uses public secondary data and does not involve direct interaction with human participants. Research ethics standards are met by maintaining the confidentiality of company information and using data in accordance with publication guidelines, as well as upholding academic integrity and transparency in every stage of analysis and reporting.

RESULTS

Descriptive statistics

The following table presents descriptive statistics of the variables used in this study, including the mean, standard deviation, minimum, and maximum values. These statistics provide a summary of the main characteristics of each variable and form the basis for further analysis.

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
SIV	155	0,1806452	0,385971	0	1
ESG-SCORE	155	0,3566513	0,196787	0	0,7921
ROA	155	0,0649819	0,3235065	-3,54	0,6163
ROE	155	0,0917729	0,7422696	-7,5584	1,3742
DER	155	1,56585	3,454596	-7,5443	29,1428
FZ	155	29,36942	1,88328	22,0809	32,7646

The number of observations (Obs) for each variable is 155, which means that all variables have complete data on the 155 companies or entities studied. The sustainability investment variable has an average value of 0,1806 and a standard deviation of 0,3860. The minimum and maximum values are 0 and 1, respectively, which indicates that only about 18 % of the sample is worth 1, while the rest is worth 0. The ESG-Score variable shows the company's Environmental, Social, and Governance score. The average ESG score is 0,3567 with a standard deviation of 0,1968, and a minimum value of 0 and a maximum of 0,7921. This indicates that the ESG score among companies in the sample is quite varied, although in general it is still in the lower middle range from a scale of 0 to 1.

The Return on Assets variable has an average of 0,06498, meaning that, in general, companies only generate a return of around 6,5 % on their total assets. However, the standard deviation is quite significant at 0,3235, with a minimum value of -3,54 and a maximum of 0,6163, indicating a very high variation in the efficiency of asset utilization among companies, even those with significant large losses (negative ROA). The Return on Equity variable has an average of 0,0918 or about 9,2 % return on equity. However, the minimum value is very low at -7,5584, while the maximum is 1,3742, and the standard deviation is 0,7423. This significantates a large disparity in profitability between companies, with some companies experiencing extreme losses relative to their capital. The Debt-to-Equity Ratio variable has a mean value of 1,5659 and a standard deviation of 3,4550, with a minimum value of -7,5443 and a maximum value of 29,1428. In general, very high DER values indicate that some companies have a highly risky capital structure, with debt significantly exceeding equity. Finally, the firm size variable indicates the size of the company, which is calculated as the natural logarithm of total assets.

The mean is 29,37 with a standard deviation of 1,883, and a range of values from 22,08 to 32,76. This indicates that the companies in the sample are in the medium to extensive size range, with less extreme variations in size.

Goodnes Of Fit Test

The following table presents the Pearson Goodness-of-Fit test results for the logistic regression model used in this study. This test assesses whether the model adequately fits the observed data. The data used in this analysis were obtained from Refinitiv Eikon for ESG scores and annual financial reports of energy companies listed on the Indonesia Stock Exchange (BEI) for the control variables and sustainable investment information.

Table 3. Goodnes Of Fit Test

Number of observations	155
Number of covariate patterns	155
Pearson chi2(149)	120,78
Prob > chi2	0,9565

Based on table 3, the Prob > chi2 value is 0,9565, which is greater than the conventional threshold of 0,05. This indicates that there is no significant difference between the observed and predicted values, suggesting that the logistic regression model adequately fits the data. In other words, the model is appropriate for estimating the relationship between ESG performance and sustainable investment in energy companies, and the predictions derived from this model can be considered reliable for further analysis.

Logistic Regression Test

The following table presents the results of the logistic regression analysis used to examine the effect of ESG performance on sustainable investment in energy companies. The table includes regression coefficients, standard errors, and significance levels, providing insights into the strength and direction of the relationships between the independent and dependent variables.

Table 4. Logistic Regression Test

SIV	Odds Ratio	Std. Err.	z	P>|z|	95 % Confidence	Interval
ESG-SCORE	280,9616	468,4477	3,38	0,001	10,70132	7376,606
ROA	0,0071028	0,0339554	-1,03	0,301	6,06e-07	83,29862
ROE	9,814798	23,203	0,97	0,334	0,0954047	1009,701
DER	0,577325	0,1611181	-1,97	0,049	0,3340948	0,9976335
FZ	1,06797	0,1997627	0,35	0,725	0,740189	1,540903
_cons	0,0053464	0,0274565	-1,02	0,308	2,27e-07	125,7317

Statistik model:
Number of observations = 155
LR chi2(5) = 30,92
Prob > chi2 = 0,0000
Pseudo R2 = 0,2111
Area under ROC curve = 0,8268

Based on table 4, the analysis will describe the effect of the ESG-SCORE variable and the control variables, namely ROA, ROE, DER & FZ on the SIV variable (Sustainable Investment) and explain how much influence the variables included in the independent model have on the variables included in the dependent model, where the variables included in the independent model are declared to have a significant influence on the variables included in the dependent model if they have a prob value of less than 0,05 (<0,05).

The ESG-SCORE variable has a prob value of 0,001 (<0,05), it can be concluded that the ESG-SCORE variable has a significant effect on the SIV (Sustainable Investment) variable, with an Odds Ratio value of 280,9616, meaning that each one unit increase in the ESG-SCORE value will increase the probability of Sustainable Investment by 280 times, assuming other factors are constant. The ROA variable has a prob value of 0,301 (>0,05), it can be concluded that the ROA variable has no significant effect on the SIV (Sustainable Investment) variable. The ROE variable has a prob value of 0,334 (>0,05), it can be concluded that the ROE variable has no significant effect on the SIV (Sustainable Investment) variable.

The DER variable has a prob value of 0,049 (<0,05), it can be concluded that the DER variable has a

significant adverse effect on the SIV (Sustainable Investment) variable, with an Odds Ratio value of 0,577, meaning that every one unit increase in DER will reduce the possibility of Sustainable Investment by 42,3 % (<1). The FZ variable has a prob value of 0,725 (>0,05), so it can be concluded that the FIRMSIZE variable has no significant effect on the SIV (Sustainable Investment) variable. Furthermore, the LR chi2 (5) value of 30,92 with a prob value of 0,0000 (<0,05) concludes that the overall model is significant or FIT. The Pseudo R2 value of 0,2111 indicates that the contribution of the influence of the ESGSCORE variable and the control variables, namely ROA, ROE, DER & FZ to the sustainable investment variable is 21,11 %.

Roc Test

The results of the Receiver Operating Characteristic (ROC) test are presented in table 5 and picture 1, which is used to evaluate the predictive accuracy of the logistic regression model. The ROC test assesses the model's ability to accurately distinguish between companies that invest sustainably and those that do not, thereby providing an overall measure of the model's suitability.

Table 5. Roc Test

Number of observations	155
Area under ROC curve	0,8268

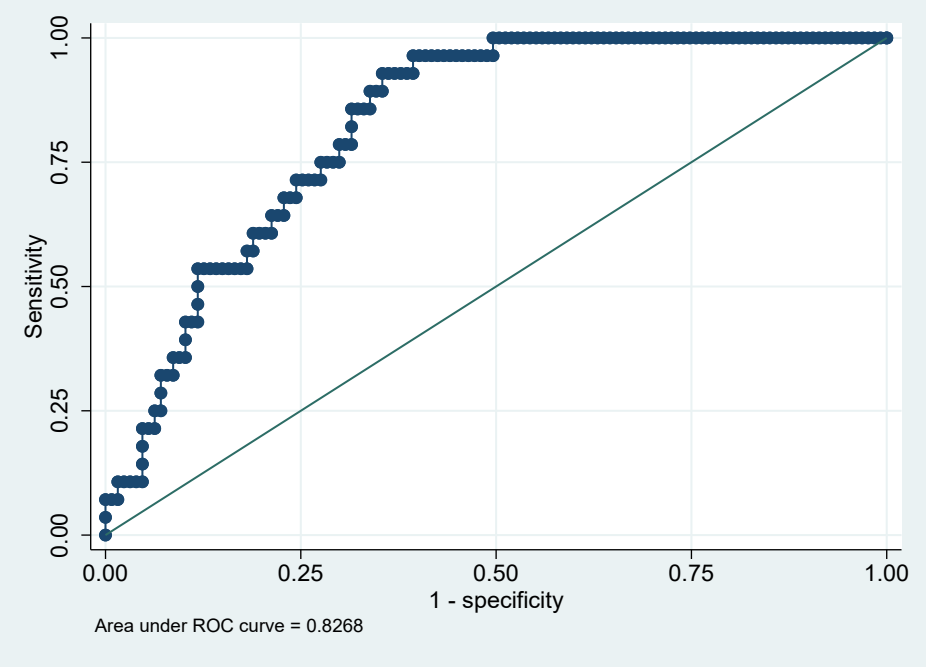

Figure 1. Results of the ROC analysis

Based on table 5 and figure 1, the Area Under the Curve (AUC) is 0,8268, indicating that the logistic regression model demonstrates good discriminative ability in distinguishing between companies that continue sustainable investment and those that do not. Specifically, the model is able to correctly predict the outcome in approximately 82,68 % of cases, suggesting that the model provides a reliable basis for further analysis of the relationship between ESG performance and sustainable investment in energy companies.

DISCUSSION

ESG Performance has a Positive and Significant Effect on Sustainable Investment

The results of this study show that Environmental, Social, and Governance (ESG) performance has a highly significant influence on sustainable investment decisions, with an odds ratio of 280 times. This means that companies with higher ESG scores are 280 times more likely to get sustainability-oriented investments than companies with low ESG scores. This finding is exciting and confirms the paradigm shift of modern investors who now no longer only pursue short-term profitability, but also consider the environmental and social integrity of the Company.[42] This provides a strong signal that investors are now more selective and focused on non-financial risk management, especially those related to environmental and governance aspects. Research by Al Frijat confirms that strong ESG integration contributes to lower risk perception by investors, thereby increasing market confidence in the company.[43] The logistic model used in this study also proved to be quite robust, with

an Area Under Curve (AUC) value of 82,68 %, indicating that the model has excellent classification accuracy in distinguishing companies that continue or do not continue sustainable investment.[44] The strategic implication of these findings is the need for energy companies in Indonesia to not only improve profitability, but also systemically strengthen sustainability practices. These practices may include energy efficiency, environmental protection, and transparent and inclusive governance. This is in line with advice from [45], which emphasizes that sustainability reputation has a material impact on investor preferences in the energy and utilities sector. In addition, companies with strong ESG practices also tend to have higher resilience to economic and regulatory shocks. Meanwhile, for regulators such as OJK and the Ministry of Energy and Mineral Resources, this result is a strong impetus to accelerate the standardization of ESG reporting, including developing a green taxonomy and a data-based ESG verification system. Nasta states that regulatory support in the form of fiscal incentives, mandatory disclosure policies, and access to green financing can strengthen the sustainable investment ecosystem.[46] Thus, these results not only contribute to the academic literature but also provide a solid foundation for policymakers in promoting the transition to a low-carbon economy and long-term value-oriented capital markets.

The findings also provide a strong empirical basis for companies to treat ESG as a strategic instrument, not just a form of compliance or reporting. Companies that successfully internalize sustainability principles into their main business strategies have a greater chance of gaining access to cheaper and more stable funding. This is reinforced by [47], which shows that solid ESG performance is associated with reduced financing risks and increased attractiveness of companies in the eyes of institutional investors, particularly in the energy and infrastructure sectors.

Good ESG performance contributes significantly to sustainability-conscious investment decision-making. Modern investors are increasingly prioritizing transparency, social responsibility and good corporate governance as part of their investment strategy. The results of this study are in line with research results[48] that high ESG scores often go hand in hand with increased investment from funds that prioritize ESG principles, which also contribute to the long-term viability of the company.

The AUC value of 0,8268 resulting from ROC testing also proves that the model used in this study has high predictive accuracy. According to [49], predictive models that integrate ESG generally have better classification performance than financial-based models alone. This explains why investors and financing institutions are increasingly making ESG indicators an important component in investment feasibility analysis.

In the context of public policy, these results can be used as a reference by institutions such as OJK and the Ministry of Energy and Mineral Resources to encourage the development of ESG reporting policies that are mandatory, verified, and based on global standards such as GRI or SASB. In addition, fiscal policies that incentivize companies with high ESG scores, such as tax incentives or access to green credit, can accelerate the adoption of sustainable business practices in the energy sector. Loang shows that regulatory interventions that favor ESG can create positive market signals and strengthen the green investment ecosystem.[22]

Finally, it is important for corporate decision-makers to understand that sustainability is not just a moral or reputational imperative, but also a source of competitive advantage that can increase a company's valuation. Studies by Jin in Corporate Governance conclude that companies that are active in ESG reporting and demonstrate transparency in governance are more likely to be eyed by large institutional investors with a long-term orientation.[50] In this regard, Indonesian energy companies are strategically positioned to take a leading role in the transition to a low-carbon and sustainable economy.

ESG Performance on Sustainable Investment Controlling for Profitability (ROA)

Logistic regression analysis shows that the influence of ESG remains significant after controlling for ROA, while ROA itself is not significant for sustainable investment decisions (p = 0,301). These findings indicate that investors not only assess companies based on short-term asset performance, but also consider environmental, social, and governance aspects as a basis for decision making. This study aligns with previous literature, which suggests that ESG performance contributes to increasing firm value and influencing the strategic behavior of firms in the long run. According to [51], more than 90 % of empirical studies show a positive relationship between ESG practices and corporate financial performance, including ROA. Research by [52] in Malaysia also found that ESG disclosure has a significant positive relationship with ROA, meaning that companies active in sustainability practices generally show better profitability. However, the findings of this study did not reveal a significant effect of ROA on sustainable investment (p-value = 0,301). This suggests that ESG has a direct influence on sustainable investment decisions that is not solely mediated by financial performance such as ROA.

Furthermore, a study by [53] highlights that ESG not only reflects the company's operational efficiency, but also increases trust from investors and stakeholders, which in turn encourages responsible and sustainable investment decisions. This is also supported by [54] which found that companies with good ESG tend to attract long-term investors and avoid short-term risky investment practices, even though internal financial conditions are not optimal. Thus, the findings of this study make an important contribution that ESG performance not

only improves financial performance, but also directly drives sustainable investment decisions, even when financial factors such as ROA are controlled. This suggests that companies are not only driven by profitability alone, but also by long-term sustainability considerations represented by ESG practices. Therefore, ESG can be considered an independent strategic variable that plays a crucial role in corporate sustainable investment decision-making, in line with stakeholder theory.

ESG Performance on Sustainable Investment Controlling for Profitability (ROE)

Thelogistic regression results also show that the influence of ESG remains significant even when ROE is controlled for, while ROE itself is not significant (p > 0,05). This confirms that sustainable investment decisions are not only influenced by equity returns, but also by the quality of a company's ESG as an independent strategic factor. Stakeholder theory emphasizes that companies with high ESG gain leniency from regulatory authorities, credibility in the eyes of investors, and reputational benefits. Studies by [51] sharpen this opinion, stating that improved governance and social responsibility increase firm value without sacrificing profitability. In your model, the effect of ESG on IB remains significant despite the ROE variable, suggesting that ESG-oriented firms are likely to make sustainable investment decisions even if the potential increase in ROE is not high.

Overall, these findings have important implications. First, ESG is not just a signal of financial performance, but an independent strategic factor that drives sustainable investment. Second, corporate policies and leaders should prioritize this aspect of sustainability as a core element of strategy, rather than just as a tool to increase profitability (ROE).

ESG Performance on Sustainable Investment Controlling for Leverage (DER)

The influence of ESG remains significant even when the debt-to-equity ratio (DER) is controlled, while DER itself has a significant negative effect (p = 0,049). This shows that highly leveraged companies tend to have lower opportunities for sustainable investment, but ESG remains the main predictor.

The corporate debt structure is a crucial variable in ESG strategic models. A meta-study by [51] shows that companies with high ESG often have lower leverage levels, as a good reputation facilitates access to external capital at a smaller cost. Findings, on the other hand, show that companies with high leverage tend to have a lower probability of sustainable investment, but still their ESG performance remains a significant predictor variable. This indicates that ESG is not merely a proxy for debt risk, but also plays a strategic role that is independent of investment choices.

The ESG approach is considered a risk framework that integrates environmental and social risks into corporate management, allowing for more long-term-minded investment decisions. Practical and theoretical literature suggests that capital structure and ESG influence such decisions simultaneously. This study corroborates that ESG shapes risk mitigation strategies and reputation beyond the influence of debt structure alone.

ESG Performance on Sustainable Investment Controlling for Firm Size

The impact of ESG remains significant even when company size is controlled for, while company size itself is not significant. This suggests that sustainable investment decisions are driven by the intrinsic value of ESG, rather than company scale. The literature supports this finding,[55] which found that firm size is significantly positively associated with ESG scores. This is because large firms have the resources to report on ESG extensively, although this poses a risk of size bias in ESG assessments. However, although firm size affects ESG scores, in this model, firm size does not interfere with the strong effect of ESG on IB, suggesting that the effect of ESG on sustainable investment is independent of the effect of firm size.

Furthermore, a systematic study by [56] reviewing 75 studies shows that although firm size and industry factors can moderate the effect of ESG on firm value, the main impact of ESG on strategic decisions such as investment remains strong. This aligns with regression findings—while size is not significant, the ESG score effect still significantly contributes to sustainable investment. Theoretical approaches stakeholder theory are also supportive. Large companies are often compelled to present high-quality ESG to meet stakeholder expectations, but investment decisions are driven by the intrinsic value of ESG, such as reputation, risk management, and strategic opportunities, rather than size.

CONCLUSIONS

This study emphasizes the importance of ESG performance and corporate factors in driving sustainable investment decisions in Indonesia's energy sector. The results show that ESG plays a significant strategic role in determining sustainable investment, while traditional financial variables such as profitability, leverage, and company size have varying roles. These findings have important implications for companies and regulators to strengthen sustainability practices, increase transparency, and pay attention to non-financial risks as part of their long-term business strategies.

Furthermore, this research opens opportunities for further studies, including the exploration of contextual

variables such as ownership structure, industry type, and operational complexity, as well as the integration of additional moderating or mediating factors such as governance quality and institutional ownership. Thus, these findings not only contribute to the academic literature but also provide a basis for strategic decision-making and public policy in promoting sustainability-oriented investment.

This study has several limitations. First, the data only comes from energy companies listed on the Indonesia Stock Exchange, so generalizations to other sectors or international markets should be made with caution. Second, the use of secondary ESG data may have limitations related to assessment methodologies and reporting variations between companies. Third, this study uses a quantitative approach based on logistic regression, so that the qualitative dynamics related to investment decisions and investor motivations are not fully covered. Future research may consider cross-sector analysis, longer longitudinal data, or a mixed quantitative-qualitative approach to explore ESG factors in greater depth.

BIBLIOGRAPHIC REFERENCES

1. Handayati P, Tham YH, Yuningsih Y, Sun Z, Nugroho TR, Rochayatun S. ESG Performance and Corporate Governance—The Moderating Role of the Big Four Auditors. J Risk Financ Manag. 2025;18. file:///C:/Users/maya/Downloads/jrfm-18-00031.pdf

2. Bai X, Han J, Ma Y, Zhang W. ESG performance, institutional investors' preference and financing constraints: Empirical evidence from China. Borsa Istanbul Rev. 2022;22:S157–68. https://doi.org/10.1016/j.bir.2022.11.013

3. Ellili NOD. Impact of ESG disclosure and financial reporting quality on investment efficiency. Corp Gov Int J Bus Soc. 2022 Jan;22(5):1094–111. https://doi.org/10.1108/CG-06-2021-0209

4. Ho L, Nguyen VH, Dang TL. ESG and firm performance: do stakeholder engagement, financial constraints and religiosity matter? J Asian Bus Econ Stud. 2024;31(4):263–76. file:///D:/Data S3/PDD/Artikel/ESG and Firm Performance.pdf

5. Dorothy P, Endri E. Environmental, social and governance disclosure and firm value in the energy sector: The moderating role of profitability. Probl Perspect Manag. 2024;22(4):588–99.

6. Singh K, Jaiwani M. ESG and share price volatility in energy sector firms: does the development phase of countries matter? Int J Energy Sect Manag. 2024;18(5):956–79.

7. Sugiarto A, Puspani NN, Fathia F. ESG Leverage towards Stock Performance in Indonesia Stock Exchange. Int J Energy Econ Policy. 2023;13(5):593–606.

8. Aich S, Thakur A, Nanda D, Tripathy S, Kim HC. Factors affecting esg towards impact on investment: A structural approach. Sustain. 2021;13(19):1–14.

9. Budsaratragoon P, Jitmaneeroj B. Corporate sustainability and stock value in asian-pacific emerging markets: Synergies or tradeoffs among esg factors? Sustain. 2021;13(11).

10. Lopez-De-silanes F, McCahery JA, Pudschedl PC. ESG performance and disclosure: A cross-country analysis. Singapore J Leg Stud. 2020;2020(December):217–41. file:///D:/Data S3/PDD/Artikel/finallopez-de-silanesmccaherypudschedl_1.pdf

11. Kocmanová A, Dočekalová MP, Meluzín T, Škapa S. Sustainable investing model for decision makers (Based on research of manufacturing industry in the Czech Republic). Sustain. 2020;12(20):1–27. file:///C:/Users/maya/AppData/Local/Mendeley Ltd./Mendeley Desktop/Downloaded/Kocmanová et al. - 2020 - Sustainable investing model for decision makers (Based on research of manufacturing industry in the Czech Repu.pdf

12. Syarkani Y, Subu MA, Waluyo I. Impact of ESG Performance on Firm Value: A Comparison of Emerging and Developed Markets. Commer J Bus Manag. 2024;2(4):204–19. http://dx.doi.org/10.61978/commercium.v2i4.367

13. Nandan MSPK, Sinku DS. The ESG Evolution: Bridging the Gap Between Global Standards and Local Realities in Emerging Markets. Nanotechnol Perceptions. 2024;137–53. http://dx.doi.org/10.62441/nano-ntp.vi.3623

14. Wahyuni PD, Syamsuddin MM. Epistemological Foundation of ESG-Based Investment in Indonesia's Economic Policy. Int J Econ Manag Sci. 2024;1(4):388–400. http://dx.doi.org/10.61132/ijems.v1i4.371

15. Lestari PA, Gangodawilage D. Sustainability Accounting and the Future of ESG Reporting: Investor Insights. Sinergi Int J Account Tax. 2025;3(1):67–78. http://dx.doi.org/10.61194/ijat.v3i1.488

16. Kossay M, Putra RK, Idris MF. Keberlanjutan Ekonomi dalam Perspektif Hukum: Analisis Regulasi Environmental, Social, and Governance di Indonesia. Perkara J Ilmu Huk dan Polit. 2025;3(1):675–93. http://dx.doi.org/10.51903/perkara.v3i1.2355

17. Meng T, Dato Haji Yahya MH, Ashhari ZM, Yu D. ESG performance, investor attention, and company reputation: Threshold model analysis based on panel data from listed companies in China. Heliyon. 2023;9(10):e20974. https://doi.org/10.1016/j.heliyon.2023.e20974

18. Yazid H, Ismail T, Uzliawati L, Taqi M, Muchlish M, Kalbuana N. The Effect Of Profitability, Corporate Social Responsibility, Corporate Governance Mechanisms, And Firm Size On Debt Policy. Financ Credit Act Probl Theory Pract. 2024;6(59):446–59.

19. Kalbuana N, Taqi M, Uzliawati L, Ramdhani D. The Effect of Profitability, Board Size, Woman on Boards, and Political Connection on Financial Distress Conditions. Cogent Bus Manag. 2022;9(1). https://www.scopus.com/inward/record.uri?eid=2-s2.0-85142247307&doi=10.1080%2F23311975.2022.2142997&partnerID=40&md5=1f721db0b7cf08a0e75c6369fe6eafcb

20. Kalbuana N, Kusiyah K, Supriatiningsih S, Budiharjo R, Budyastuti T, Rusdiyanto R. Effect of profitability, audit committee, company size, activity, and board of directors on sustainability. Cogent Bus Manag. 2022 Dec;9(1):2129354.

21. Kalbuana N, Taqi M, Uzliawati L, Ramdhani D. CEO narcissism, corporate governance, financial distress, and company size on corporate tax avoidance. Cogent Bus Manag. 2023;10(1). https://doi.org/10.1080/23311975.2023.2167550

22. Loang OK. The Road to Sustainable Investing: Corporate Governance, Sustainable Development Goals, and the Financial Market. Institutions Econ. 2023;15(3):33–57. file:///C:/Users/maya/AppData/Local/Mendeley Ltd./Mendeley Desktop/Downloaded/Loang - 2023 - The Road to Sustainable Investing Corporate Governance, Sustainable Development Goals, and the Financial Market.pdf

23. Fometescu A, Hategan CD, Pitorac RI. How Responsible Are Energy and Utilities Companies in Terms of Sustainability and Economic Development? Energies. 2024;17.

24. Veeravel V, Murugesan VP, Narayanamurthy V. Does ESG disclosure really influence the firm performance? Evidence from India. Q Rev Econ Financ. 2024;95:193–202. https://doi.org/10.1016/j.qref.2024.03.008

25. Xu S. The Impact of ESG Performance of Energy Enterprises on Stock Value. Adv Econ Manag Polit Sci. 2024;74(1):122–8. file:///C:/Users/maya/Downloads/071447275ea2415fbf19335eb016f98d.marked_oDAN7HK.pdf

26. Fatemi A, Glaum M, Kaiser S. ESG performance and firm value: The moderating role of disclosure. Glob Financ J. 2018;38:45–64. https://www.sciencedirect.com/science/article/pii/S1044028316300680

27. Al Amosh H, Khatib SFA, Alkurdi A, Bazhair AH. Capital structure decisions and environmental, social and governance performance: insights from Jordan. J Financ Report Account. 2022;22(4):972–89. http://dx.doi.org/10.1108/jfra-12-2021-0453

28. Adeneye YB, Kammoun I, Ab Wahab SNA. Capital structure and speed of adjustment: the impact of environmental, social and governance (ESG) performance. Sustain Accounting, Manag Policy J. 2022;14(5):945–77. http://dx.doi.org/10.1108/sampj-01-2022-0060

29. Alves CF, Meneses LL. ESG scores and debt costs: Exploring indebtedness, agency costs, and financial system impact. Int Rev Financ Anal. 2024;94:103240. http://dx.doi.org/10.1016/j.irfa.2024.103240

30. Yu Z, Farooq U, Alam MM, Dai J. How does environmental, social, and governance (ESG) performance determine investment mix? New empirical evidence from BRICS. Borsa Istanbul Rev. 2024;24(3):520–9. http://dx.doi.org/10.1016/j.bir.2024.02.007

31. Bissoondoyal-Bheenick E, Brooks R, Do HX. ESG and firm performance: The role of size and media channels. Econ Model. 2023;121:106203. http://dx.doi.org/10.1016/j.econmod.2023.106203

32. Dobrick J, Klein C, Zwergel B. Size bias in refinitiv ESG data. Financ Res Lett. 2023;55:104014. http://dx.doi.org/10.1016/j.frl.2023.104014

33. Abdi Y, Li X, Càmara-Turull X. Exploring the impact of sustainability (ESG) disclosure on firm value and financial performance (FP) in airline industry: the moderating role of size and age. Environ Dev Sustain. 2021;24(4):5052–79. http://dx.doi.org/10.1007/s10668-021-01649-w

34. Cristea M, Noja GG, Thalassinos E, Cîrciumaru D, Ponea C Ștefan, Durău CC. Environmental, Social and Governance Credentials of Agricultural Companies—The Interplay with Company Size. Resources. 2022;11(3):30. http://dx.doi.org/10.3390/resources11030030

35. Aydoğmuş M, Gülay G, Ergun K. Impact of ESG performance on firm value and profitability. Borsa Istanbul Rev. 2022;22:S119–27. http://dx.doi.org/10.1016/j.bir.2022.11.006

36. Rastogi S, Singh K, Kanoujiya J. Firm's value and ESG: the moderating role of ownership concentration and corporate disclosures. Asian Rev Account. 2023;32(1):70–90. http://dx.doi.org/10.1108/ara-10-2022-0266

37. Rau PR, Yu T. A survey on ESG: investors, institutions and firms. China Financ Rev Int. 2023;14(1):3–33. http://dx.doi.org/10.1108/cfri-12-2022-0260

38. Al Azizah US, Haron R. The sustainability imperative: evaluating the effect of ESG on corporate financial performance before and after the pandemic. Discov Sustain. 2025;6(1).

39. Xue R, Wang H, Yang Y, Linnenluecke MK, Jin K, Cai CW. The adverse impact of corporate ESG controversies on sustainable investment. J Clean Prod. 2023;427:139237.

40. Chams N, García-Blandón J. Sustainable or not sustainable? The role of the board of directors. J Clean Prod. 2019;226:1067–81.

41. Li Q, Tang W, Li Z. ESG systems and financial performance in industries with significant environmental impact: a comprehensive analysis. Front Sustain. 2024;5.

42. Cardillo MA dos R, Basso LFC. Revisiting knowledge on ESG/CSR and financial performance: A bibliometric and systematic review of moderating variables. J Innov Knowl. 2025;10(1). file:///D:/Data S3/PDD/Artikel/Discussion/Revisiting knowledge on ESG_CSR and financial performance_ A bibliometric and systematic review of moderating variables.pdf

43. Al Frijat Y, Altawalbeh M, Al-Hajaia M. The role of environmental sustainability as a mediator in the relationship between green accounting and corporate performance in Jordan. Probl Perspect Manag. 2025;23(2):236–51. https://doi.org/10.21511/ppm.23(2).2025.16

44. Al-Shaer H, Zaman M. Board gender diversity and sustainability reporting quality. J Contemp Account Econ. 2016;12(3):210–22. file:///D:/Data S3/PDD/Artikel/Discussion/Board_Gender_Diversity_and_Sustainability_Reporting_Quality20190911-80796-1aieg9w-libre.pdf

45. Nareswari N, Tarczynska-Luniewska M, Al Hashfi RU. Analysis of Environmental, Social, and Governance Performance in Indonesia: Role of ESG on Corporate Performance. Procedia Comput Sci. 2023;225:1748–56. https://doi.org/10.1016/j.procs.2023.10.164

46. Nasta L, Magnanelli BS, Ciaburri M. From profits to purpose: ESG practices, CEO compensation and institutional ownership. Manag Decis. 2024;62(13):93–115. file:///C:/Users/maya/AppData/Local/MendeleyLtd./MendeleyDesktop/Downloaded/Nasta,Magnanelli,Ciaburri-2024-romprofitstopurposeESGpractices,CEOcompensation and institutional ownership.pdf

47. Gerged AM, Matthews L, Elheddad M. Mandatory disclosure, greenhouse gas emissions and the cost of equity capital: UK evidence of a U-shaped relationship. Bus Strategy Environ. 2021;30:908–30. file:///D:/Data S3/PDD/Artikel/Discussion/Mandatory disclosure, greenhouse gas emissions and the cost of equity capital_ UK evidence of a U-shaped relationship.pdf

48. Narula R, Rao P, Kumar S, Matta R. ESG scores and firm performance- evidence from emerging market. Int Rev Econ Financ. 2024;89:1170–84. https://www.sciencedirect.com/science/article/pii/S1059056023003441

49. Doni F, Corvino A, Bianchi Martini S. Corporate governance model, stakeholder engagement and social issues evidence from European oil and gas industry. Soc Responsib J. 2022;18(3):636–62. file:///C:/Users/maya/AppData/Local/MendeleyLtd./MendeleyDesktop/Downloaded/Doni,Corvino,BianchiMartini-2022-Corporategovernancemodel,stakeholderengagementandsocialissuesevidencefromEuropeanoil.pdf

50. Jin X, Qi H, Huang X. Green financial regulation and corporate strategic ESG behavior: Evidence from China. Financ Res Lett. 2024;65(May). file:///D:/Data S3/PDD/Artikel/Discussion/Green financialregulationandcorporatestrategicESGbehavior_EvidencefromChina.pdf

51. Friede G, Busch T, Bassen A. ESG and financial performance: aggregated evidence from more than 2000 empirical studies. J Sustain Financ Invest. 2015;5(4):210–33.

52. Sulaiman N, Halid S, Isa NSM, Omar N, Rahman RA. Financial Performance as a Driver of ESG Disclosure: Evidence from Malaysia. Int J Res Innov Soc Sci. 2025;9(1):3527–34. https://econpapers.repec.org/RePEc:bcp:journl:v:9:y:2025:i:1:p:3527-3534

53. Wang Z, Sarkis J. Corporate social responsibility governance, outcomes, and financial performance. J Clean Prod. 2017;162:1607–16. https://www.sciencedirect.com/science/article/pii/S0959652617313112

54. Chen YC, Hung M, Wang Y. The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. J Account Econ. 2018;65(1):169–90. https://www.sciencedirect.com/science/article/pii/S0165410117300757

55. Drempetic S, Klein C, Zwergel B. The influence of firm size on the ESG score: corporate sustainability ratings under review. J Bus Ethics. 2020;167(2):333–60. https://doi.org/10.1007/s10551-019-04164-1

56. Bani-Khaled S, Azevedo G, Oliveira J. Environmental, social, and governance (ESG) factors and firm value: A systematic literature review of theories and empirical evidence. AMS Rev. 2025; https://doi.org/10.1007/s13162-025-00303-2

AVAILABILITY OF DATA AND MATERIALS

The data used in this study is secondary data obtained from annual reports, sustainability reports, and official company publications available on the Indonesia Stock Exchange website (www.idx.co.id) and the official websites of each company. All data is public and freely accessible to other researchers for academic purposes and study replication.

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CONFLICT OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

AUTHORSHIP CONTRIBUTION

Conceptualization: Hermaya Ompusunggu, Helmi Yazid, Lia Uzliawati, Imam Abu Hanifah.
Investigation: Hermaya Ompusunggu.
Supervision: Helmi Yazid.
Validation: Helmi Yazid, Lia Uzliawati Imam Abu Hanifah.
Methodology: Lia Uzliawati, Imam Abu Hanifah.
Writing - original draft: Hermaya Ompusunggu, Helmi Yazid, Lia Uzliawati.
Writing - review and editing: Hermaya Ompusunggu, Helmi Yazid, Lia Uzliawati, Imam Abu Hanifah.