



Stock Volatility and ESG Factors: A Study on Merah Putih Cabinet's First Semester of Sustainable Economy

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Abstract. This study aims to analyze the impact of Environmental, Social, and Governance (ESG) performance on the stock volatility of companies operating in Indonesia's blue and green economy sectors. Using a quantitative approach, the study employs a Multivariate Regression Model to assess how ESG factors influence stock volatility. Data were analyzed using Ordinary Least Squares (OLS) regression in a Multivariate Regression framework, employing the classical assumption tests (normality, multicollinearity, heteroskedasticity) prior to estimation. The findings reveal that governance risk significantly affects stock volatility, while environmental and social risks do not have a substantial impact. Additionally, the interaction between social and governance risks contributes to increased stock volatility, highlighting the importance of strong governance structures in mitigating market fluctuations. The results suggest that enhancing ESG practices, particularly governance, can improve stock stability in the blue and green economy sectors, contributing to the long-term sustainability of these industries.

Keywords: *ESG, Stock Volatility, Blue Economy, Green Economy, Governance Risk.*

1. Introduction

The issues of climate change, marine environmental degradation, and socio-economic inequality in coastal areas have become an increasingly urgent global agenda[1]. In the context of sustainable development, an integrative approach through the blue and green economies is promoted as a strategic solution to maintain a balance between economic growth and ecosystem preservation[2]. The blue economy emphasises the sustainable use of marine resources, while the green economy emphasises the transition to low-carbon and socially inclusive production and consumption models[3] [4].

As the world's largest archipelagic country, Indonesia possesses significant economic potential in the blue and green sectors[5] [6] [7]. The Indonesian government has pursued a multifaceted approach to encourage the sustainable utilisation of this potential, with notable policies including Presidential Regulation No. 16 of 2017 concerning Indonesia's Maritime Policy and the nation's commitment to the Sustainable Development Goals (SDGs). However, the adoption of ESG investments by companies in these strategic sectors remains limited and tends to be formal or symbolic (Kossay et al., 2025).

The intricacies of the issue are further compounded by the dynamics of national politics. The transition of national leadership to President Prabowo Subianto has been met with a mixture of hope and uncertainty regarding the future direction of economic and environmental policies[8]. In the initial six months of his leadership tenure, investors exhibited heightened sensitivity to policy signals pertaining to sustainability

and the investment climate[9]. Beemu et al [10] posit that volatility is a tool used to reflect the level of uncertainty and risk inherent in an investment instrument. The potential for increased stock volatility in nature-based sectors is contingent on the direction of ESG policies, given the sensitivity of these sectors to environmental regulations, energy subsidies, and the preference for green investments.

Volatility is frequently employed as a surrogate for risk, reflecting the variability of returns on an investment[11]. Research by Jakobsson and Lundberg[12] ; Broadstock et al [13]; Feng et al [14]; Cagli et al [15]; and [16] describes companies with higher or positive ESG scores as tending to have lower stock volatility. Large companies, which tend to have the resources for ESG implementation and are subject to greater external oversight, actually have a stronger negative relationship between ESG and volatility [17]. Sabbaghi[18] posits that ESG news exerts a substantial influence on stock volatility, exhibiting both positive and negative effects, contingent upon the sentiment of the news. As De Vincentiis[19] elucidates, ESG is also employed as a corporate strategy, with companies frequently leveraging ESG news to manage perceptions of stock volatility, despite the fact that this does not always reflect actual ESG performance. It is widely accepted Friede, Busch & Bassen[20] and Giese et al.,[21] that companies with superior ESG performance are typically regarded as more stable entities. This is due to the fact that they possess robust governance structures, experience minimal legal risk, and demonstrate a higher degree of adaptability in response to environmental regulations[21].

However, Hutama & Budhidharma[22] demonstrate that sustainable policies have a significant impact on abnormal returns and reduce volatility during the pandemic crisis, although this is only evident in specific sectors. In accordance with extant research, elevated stock volatility in enterprises operating within the blue and green economy sectors in insular and coastal regions has the capacity to impede sustainable investment flows, as investors often eschew risks that are not distinctly quantifiable. Conversely, the disclosure and implementation of ESG principles by companies is not yet consistent or standardised, resulting in information asymmetry in the capital market[23].

The increasingly intricate global business ecosystem necessitates the integration of Environmental, Social, and Governance (ESG) principles into business strategies[24]. According to the OECD[2], the term 'ESG' is used to denote the process of incorporating environmental, social, and governance elements into asset allocation and risk decision-making with a view to generating sustainable long-term financial returns. International financial institutions and institutional investors are increasingly allocating capital to companies with high Environmental, Social and Governance (ESG) performance, as it is widely accepted that such entities possess a higher degree of resilience to systemic and reputational risks. [20]

The long-term repercussions of ESG aspects being disregarded in corporate management are not only experienced at the corporate level, but also at the national financial system.[25] It is asserted that fluctuations in the prices of equities in pivotal sectors have the capacity to engender market distortions and diminish the allure of green investment in Indonesia. Consequently, it is imperative to undertake comprehensive research on the ESG approach to stock volatility in the context of the blue and green economy during the initial semester of President of the Republic of Indonesia, a nation characterised by its archipelagic and coastal terrain.

2. Methods

The population under consideration consists of 85 companies that have been assessed by Morningstar Sustainalytics for ESG assessment. The research sample was selected using purposive sampling through the following criteria: The following criteria were applied in the selection of companies: (1) Companies that had adopted Environmental, Social, and Governance (ESG) principles; and (2) Companies from which sustainability data could be obtained from annual reports and sustainability reports published publicly during the observation period October 20, 2024 to April 30, 2025. Although IDX does not formally categorize ‘blue and green economy’ indices, this study classifies companies into these sectors based on their main operational areas and alignment with OECD 2021[2] and UNEP 2019[26] definitions. Companies engaged in marine resource utilization (e.g., fisheries, maritime energy, shipping) were categorized as ‘blue economy’, while those involved in low-carbon industries (e.g., renewable energy, sustainable manufacturing, green finance) were categorized as ‘green economy’.

3. Discussions

a. Descriptive Analysis

The results of the data processing can be described in the following manner:

Table 1. Descriptive Analysis

Company	Stock Code	Average Daily Return	Annual Volatility	Min Return (%)	Max Return (%)	Standard Deviation of Daily Returns (%)
PT Sumber Alfaria Trijaya Tbk	AMRT	0.0008	0.4820	-6.70%	7.10%	3.04%
PT Astra Otoparts Tbk	AUTO	0.0003	0.3140	-5.60%	5.80%	1.98%
PT Bank Rakyat Indonesia (Persero) Tbk	BBRI	0.0010	0.4720	-6.50%	6.90%	2.97%
PT GoTo Gojek Tokopedia Tbk	GOTO	0.0018	0.6010	-8.20%	7.90%	3.79%
PT Vale Indonesia Tbk	INCO	-0.0010	0.4820	-7.70%	6.80%	3.04%
PT Indocement Tungal Prakarsa Tbk	INTP	-0.0005	0.4890	-7.40%	7.20%	3.08%
PT Medco Energi	MEDC	0.0006	0.5210	-7.10%	7.30%	3.28%

Company	Stock Code	Average Daily Return	Annual Volatility	Min Return (%)	Max Return (%)	Standard Deviation of Daily Returns (%)
Internasional Tbk						
PT Perusahaan Gas Negara Tbk	PGAS	0.0004	0.3450	-5.70%	6.10%	2.17%
PT Pertamina Geothermal Energy Tbk	PGEO	0.0009	0.4730	-6.80%	7.20%	2.98%
PT Semen Indonesia (Persero) Tbk	SMGR	-0.0045	0.5780	-8.30%	7.80%	3.64%
PT Chandra Asri Pacific Tbk	TPIA	0.0007	0.8280	-9.10%	8.90%	5.22%
PT Unilever Indonesia Tbk	UNVR	0.0006	0.6290	-7.80%	7.40%	3.96%

Source: Indonesia Stock Exchange (IDX); Data processed by researchers, 2025

The descriptive analysis shows that the twelve companies exhibit varying levels of performance and risk, with most firms recording slightly positive average daily returns and moderate to high volatility. Companies such as TPIA, UNVR, and GOTO display wider return fluctuations, while AUTO and PGAS show more stable daily movements. The range between minimum and maximum returns, along with the standard deviation values, reflects differing risk profiles across the firms during the observation period.

b. Regression Results

The results of the data processing are hereby presented in the following manner:

Table 2. Result Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.205626	0.062373	3.29672	0.0216
X1	-0.000568	0.002103	-0.26999	0.7980
X2	-0.002004	0.003528	-0.56796	0.5946
X3	-0.049843	0.018068	-2.75862	0.0399
X1*X2	-0.001724	0.000630	-2.73764	0.0409
X1*X3	0.002139	0.000960	2.22748	0.0764
X2*X3	0.003104	0.001058	2.93452	0.0325
R-squared	0.768152	Mean dependent var		0.032620
Adjusted R-squared	0.489933	S.D. dependent var		0.008452
S.E. of regression	0.006037	Akaike info criterion		-7.090761

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Sum squared resid	0.000182	Schwarz criterion		-6.807899
Log likelihood	49.54457	Hannan-Quinn criter.		-7.195487
F-statistic	2.760968	Durbin-Watson stat		3.444519
Prob(F-statistic)	0.142404			

Source: Data processed by researchers, 2025

Table 2 presents the regression results, showing that only variables X3, X1X2, and X2X3 have statistically significant effects, while the other variables do not show meaningful influence. The model's R-squared is 0.768, but the adjusted R-squared drops to 0.489, and the overall model is not significant based on the Prob(F-statistic) of 0.142.

c. The Effect of Environmental Risk Value (X1) on Stock Volatility

The regression results indicate that the environmental risk value (X1) exerts no significant effect on stock volatility, with a coefficient value of -0.000568 and a probability of 0.7980, which is greater than 0.05. This finding suggests that fluctuations in environmental risk do not directly impact stock price volatility. Despite the negative coefficient, the value is not significant enough to conclude that environmental risk plays a role in substantially increasing or decreasing stock volatility.

d. The Effect of Social Risk Value (X2) on Stock Volatility

The social risk value (X2) also demonstrates insignificant results on stock volatility, with a coefficient of -0.002004 and a probability of 0.5946, which is greater than 0.05. This indicates that while social risk values have the capacity to influence investor perceptions, there is an absence of compelling evidence to suggest that fluctuations in social risk values directly impact stock volatility. This may be attributable to the absence of transparency on the part of companies in disclosing information pertaining to social aspects, resulting in market volatility.

e. The Effect of Governance Risk Value (X3) on Stock Volatility

In contrast, governance risk (X3) was found to have a significant effect on stock volatility, with a coefficient of -0.049843 and a probability of 0.0399. The findings suggest that an escalation in governance risk may serve to diminish stock volatility, thereby indicating that enterprises characterised by effective governance tend to exhibit heightened stability. The implementation of enhanced governance practices has been demonstrated to engender a reduction in market uncertainty, a phenomenon attributable to the increase in transparency and investor confidence in the company.

f. Interaction between Environmental, Social, and Governance Risk Values on Stock Volatility

The analysis also demonstrates a significant interaction between social risk and governance (X2X3), with a positive coefficient of 0.003104 and a probability of 0.0325. This finding suggests that a combination of elevated social risk and inadequate governance can precipitate heightened stock volatility. Conversely, the interaction between environmental risk and governance (X1X3) shows marginally significant results with a probability of 0.0764, indicating that the combination of the

two can affect stock volatility, although the effect is not as great as the interaction between social risk and governance.

g. Implications for Further Research and Policy

The findings of this study underscore the necessity for additional research to be conducted on the impact of ESG on stock volatility in other sectors, as well as the manner in which government policies can encourage more effective implementation of ESG principles. Further research is required to explore the role of the private sector in adopting more progressive ESG policies and their impact on market stability. Furthermore, subsequent studies could examine other external factors that may influence the relationship between ESG and stock volatility, such as government policies related to environmental and social regulations.

4. Conclusion

This study offers significant insights into the relationship between the application of ESG principles and corporate stock volatility, particularly in Indonesia's blue and green economy sectors. The analysis demonstrates that, while environmental and social risk values do not exert a significant influence on stock volatility, governance risk values and the interaction between social and governance risk values do have a considerable effect. The capacity for good governance to reduce stock volatility is well documented, while the synergy between social and governance risks has the potential to increase volatility. Consequently, the implementation of stringent policies pertaining to governance management and the enhancement of information transparency are imperative for the establishment of market stability within these sustainability-oriented sectors. To improve robustness and minimise disparities, future research should limit the sample to companies listed on ESG-related indices such as SRI-KEHATI, which specifically evaluate sustainability and governance practices. In this study, a broader sample selection aimed to capture variations in ESG adoption across industries.

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