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Sustainable Business Innovation in Indonesian Firms ESG Disclosure Profitability and Greenwashing

Ossi Ferli[1*], Noer Azam Achsani[2], Trias Andati[3], Zenal Asikin[4]
[1]Faculty of Economics, STIE Indonesia Banking School, Indonesia
[1,2,3,4]School of Business, IPB University, Indonesia
[1]ossi.ferli@ibs.ac.id, [2]achsani@apps.ipb.ac.id,[3]trias_andati@yahoo.com, [4]zasikin@apps.ipb.ac.id
***Corresponding Author**

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ABSTRACT

This paper aims to investigate the relationships among ESG disclosure score and profitability. **The sample** consist of sustainable companies in Indonesia, based on the Sustainalytics and Bloomberg databases. **Panel regression** analysis was employed to test the study hypotheses. **The results** indicate that ESG disclosure has a negative effect on firm profitability. Specifically, environmental and governance disclosures are negatively associated with profitability. Moreover, both the combined ESG score and the Squared ESG variable exhibit a negative effect on profitability. Net sales show a positive effect on profitability across all models. In contrast, the COVID-19 period was found to reduce firm profitability. This study is limited by the number of samples due to data availability, yet it provides implications for stakeholders by offering insights into how ESG disclosure influences profitability in the long term, particularly in the context of sustainability practices within developing countries. The findings also have significant implications for policymakers, firms, and investors, as these findings offer guidance on managing ESG disclosure to support financial performance while mitigating greenwashing effects. **Finally**, this study raises a critical question about whether ESG compliance and standards will remain instruments for capital market stakeholders or evolve into a transformative paradigm that reshapes stakeholder behaviour. This research contributes to the growing body of literature exploring the relationship between ESG disclosure and profitability by employing a self-developed index from annual report content analysis, thus providing a localized perspective on sustainability performance. Furthermore, it complements the literature on the non-linear relationship between sustainability and profitability.

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1. INTRODUCTION

The stock market serves as an effective indicator of a country's economic condition. Its development can significantly influence the achievement of sustainable economic growth objectives. Economic sustainability refers to the capacity of an economy to support long-term economic production and growth, without causing adverse impacts on the environment, culture, or society [1]. Sustainable finance represents the integration of financial systems, institutions, and markets in supporting sustainable economic growth and the attainment of the Sustainable Development Goals (SDGs). It encompasses not only capital flows, risk management, and

financial processes that incorporate environmental and social considerations, but also emphasizes the long-term stability of financial performance. Accordingly, sustainable finance comprises two key elements:

- Financial participation in sustainable growth and climate change mitigation.
- The enhancement of financial stability through the integration of Environmental, Social, and Governance (ESG) factors into decision-making processes.

An increasing number of firms are striving to engage in sustainability initiatives and contribute to the SDGs. Firms recognize that sustainable development lies at the core of creating long-term business value. Consequently, many have begun to integrate sustainability into their strategic decision-making by embedding it within their corporate purpose, setting ambitious targets, implementing impact management, disclosing and reporting performance outcomes, and reinforcing their commitment through governance practices [2]. Corporate ESG initiatives are increasingly aligned with globally recognized priorities for sustainable development [3]. The ESG framework focuses on how firms manage their ESG responsibilities, while the SDGs provide a universal blueprint for addressing global challenges. For instance, companies promote gender equality in leadership to support SDGs 5 (Gender Equality), encourage fair labor practices and inclusive economic growth to support SDGs 8 (Decent Work and Economic Growth), enhance resource efficiency and waste reduction to support SDGs 12 (Responsible Consumption and Production), and reduce carbon emissions to support SDGs 13 (Climate Action).

According to [4], SDGs can reduce firm risk by improving ESG performance, particularly in firms with higher information asymmetry, greater board gender diversity, and non-state ownership. Firms therefore need to realign their business strategies with the SDGs [5], as alignment with specific SDGs has been shown to generate financial advantages [6]. However, Indonesia is classified as a moderately performing country in SDGs achievement [7], indicating the need to further embed sustainability metrics into corporate governance and business practices. Sustainable finance reinforces economic stability by integrating ESG factors into corporate operations and market valuation [8]. At the firm level, sustainable development emphasizes not only short-term financial performance but also long-term environmental and social impacts. In capital markets, this approach is reflected in Sustainable Investing or Socially Responsible Investment (SRI), which incorporates ESG considerations into investment decision-making processes [9]. Achieving sustainability requires balanced performance across the Triple Bottom Line, environmental, social, and economic commonly referred to as the 3P concept, planet, people, and profit [10]. Accordingly, ESG integration plays a critical role in mitigating climate-related risks while fostering inclusive and resilient economic growth [11].

Sustainability reports disclose firms' economic, environmental, and social performance and function as key communication tools for stakeholders. These reports may be published as stand-alone documents or integrated into annual reports containing ESG information, with ESG scores reflecting firm performance across the three dimensions. For investors, sustainability reporting serves as a monitoring mechanism to evaluate firm performance and guide investment decisions, while for other stakeholders such as regulators, consumers, academics, and the media it represents a benchmark of corporate commitment to sustainable development. Overall, sustainability reporting integrates financial and non-financial disclosures to provide a comprehensive assessment of ESG performance in accordance with established standards. ESG-based stock investment has attracted increasing attention, as capital markets remain underutilized in supporting sustainable development [12]. Public concern regarding sustainability performance has intensified following recent crises [13], and achieving the SDGs requires collaboration among governments, the private sector, and society. Accordingly, ESG disclosure benefits not only investors but also firms' broader stakeholder networks [10], a concern that is particularly relevant in developing countries where empirical evidence remains limited compared to developed economies.

Significant challenges remain in integrating ESG principles into investment decisions, particularly in developing countries. Key issues include limited understanding of ESG concepts, inadequate reporting frameworks, and weak regulatory enforcement, which constrain effective ESG investment implementation [14], [15]. Future discussions must therefore focus on harmonizing ESG disclosures and mitigating greenwashing risks [16]. Although developing countries present attractive opportunities for investors concerned with climate and socio-economic issues, greenwashing remains a persistent challenge [17], as many firms self-label their initiatives as sustainable. Such practices undermine the credibility and quality of ESG disclosure, weaken investor confidence, and hinder the development of sustainable capital markets [12], [13].

Global investment trends increasingly favor ESG-oriented assets, attracting both risk-averse and value-driven investors [18]. Indonesia has demonstrated strong commitment to sustainable development through its ratification of the Kyoto Protocol in 2005 and the Paris Agreement in 2015, followed by the issuance of Presidential Regulation No. 59 of 2017 on SDGs implementation and OJK Regulation No. 51 of 2017 mandating phased sustainable finance reporting between 2019 and 2025 [19]. Building on these developments, this study extends prior research by examining the relationship between ESG performance and firms' fundamental financial performance in developing Asian equity markets [20]. Unlike studies relying on external ESG ratings, this research constructs a self-developed ESG index based on firms' own disclosures, providing a context-specific assessment. Given the lack of consensus on ESG value creation and the diversity of measurement approaches [21], this study employs content analysis of annual reports of Indonesia Stock Exchange–listed firms, aligning with approaches used in Hong Kong [15], the Czech Republic [22], and Thailand [10]. This approach leverages detailed corporate disclosures beyond third-party ratings and contributes to advancing ESG research within the Indonesian capital market context [18].

From a behavioral perspective, quantity bias suggests that extensive ESG disclosure can elevate ESG ratings and reduce firms' cost of capital [23]. Consistent with legitimacy theory, such disclosure enhances firms' social acceptance by strengthening market legitimacy, while stakeholder theory emphasizes firms' accountability to a broad range of stakeholders beyond investors. Growing stakeholder attention to ESG practices therefore encourages firms to expand ESG reporting as a means of addressing diverse stakeholder interests and reinforcing legitimacy in both public and market perceptions. In Indonesia, the gradual implementation of mandatory sustainability reporting for all Indonesia Stock Exchange issuers since 2019 has increased data availability for ESG performance measurement. Accordingly, this study utilizes firm disclosure data from 2013–2023 to construct an ESG performance index based on qualitative content analysis, following the approach suggested by [24]. Keywords derived from Global Reporting Initiative (GRI) standards are used to capture ESG-related disclosures, providing a context-specific assessment that complements standardized and rating-based ESG indices [25].

Prior empirical evidence on the relationship between ESG performance and firm financial outcomes remains mixed, with studies reporting positive, negative, and inconclusive results. For example, [26] found that only financially material ESG issues enhance performance, while immaterial issues may yield insignificant or negative effects. Similarly, [27] reported a negative relationship between ESG performance and financial outcomes, with governance as the only significant component, although nonlinear effects suggest long-term benefits when sufficient resources are allocated. Sectoral and regional studies also show varied findings, including positive effects of environmental and social innovation [28], dynamic complementarities over time [29], and positive governance-driven impacts in ASEAN countries [30]. Building on this literature, the present study examines both individual ESG sub-indicators and the combined ESG score, including its squared term, using an ESG index developed from firms' annual reports. By analyzing the impact of ESG disclosure on financial performance while controlling for other firm-level financial factors, this study provides a comprehensive assessment of ESG engagement within the context of a developing capital market.

2. LITERATURE REVIEW

The concept of ESG investment has gained increasing attention in academic literature, emphasizing ESG factors as the core pillars of sustainable investing. ESG-oriented investment aligns with sustainable development objectives, where SRI represents an approach that integrates ESG considerations into investment decision-making [22]. Sustainability-oriented investing involves the assessment and strategic management of ESG-related risks and opportunities, and prior studies indicate that ESG-based investments can enhance shareholder value under both normal and crisis conditions [31]. Moreover, integrating ESG principles into business strategies is increasingly viewed not only as an ethical obligation but also as a strategic necessity for achieving long-term organizational success [32]. Empirical evidence further suggests that ESG factors can improve firm financial performance, as larger firms tend to disclose ESG information more comprehensively to maintain reputation and stakeholder trust, thereby enhancing firm valuation [8]. Such firms also face lower reporting costs due to more advanced organizational systems, consistent with findings that ESG indices positively influence market capitalization. Prior literature highlights the role of sustainability reporting in enhancing corporate transparency and accountability [33], while studies on sustainability indices show that ESG performance and prior sustainability outcomes influence firm inclusion in stock indices [34, 35].

According to [35], ESG scores are increasingly relevant for active asset management. However, evidence regarding their performance implications remains mixed. During non-crisis periods, ESG funds generally underperform relative to conventional funds [36], yet demonstrate greater resilience during period of financial crisis [37–39]. Conversely, [40] reported no significant change in ESG fund performance during the pandemic, noting that SRI tend to underperform in developing countries while outperforming in developed markets. Furthermore, [31] found that ESG scores were positively associated with buy and hold abnormal returns in the early stages of the pandemic. However, this effect became insignificant after controlling for additional variables, suggesting that ESG considerations were not a primary determinant of investment performance during the crisis.

Although ESG encompasses three distinct dimensions, their internal homogeneity and independence remain debatable. Ideally, firms are expected to demonstrate consistent behavior across these dimensions, regardless of stakeholder interests. In the financial domain, shareholders and creditors are primarily concerned with the firm's capital management, while in the business domain, employees, customers, and suppliers maintain operational relationship with management. Within the social sphere, firms are expected to recognize their broader impact on surrounding communities and the environment. Such awareness reinforces the interconnectedness of ESG dimensions and the need for integrated sustainability practices [41].

The development of ESG-based investments continuous to grow and attract increasing attention from equity market participants worldwide, including in Indonesia. The Indonesian government's commitment to the SDGs has been reflected through initiatives promoting corporate transparency in ESG-related activities, particularly under the Sustainable Roadmap phases 1 and 2 [19], [42]. Previous studies have examined the influence of ESG performance on stock and financial performance. However, most rely on ESG scores or ratings issued by external rating agencies. These scores remain heterogeneous due to limited, non-standardized, and largely qualitative data, which introduces subjectivity in determining the attributes, materials, and weightings that form the ESG performance index [43–46]. Consequently, cross study comparisons are often difficult. To address this limitation, the present study employs content analysis of annual reports to provide a localized perspective on how sustainability reporting contributes to ESG performance measurement and to assess its impact on firm profitability, focusing on Indonesia as developing market context.

ESG investment strong support from exchanges and regulatory bodies through effective communication on its benefits as misconceptions about ESG persist. The implementation of mandatory sustainability disclosure regulations for both listed and unlisted entities is essential [47]. Currently, many Indonesian firms have yet to fully integrate ESG considerations into their core business strategies. Despite growing attention to sustainability, an important question remains insufficiently addressed as to whether ESG disclosure effectively contribute to firm performance and value creation within emerging market context such as Indonesia.

The conceptual framework illustrating the relationship between ESG disclosure and firm profitability is presented in Figure 1. It depicts the interaction among the research variables that constitute the proposed model.

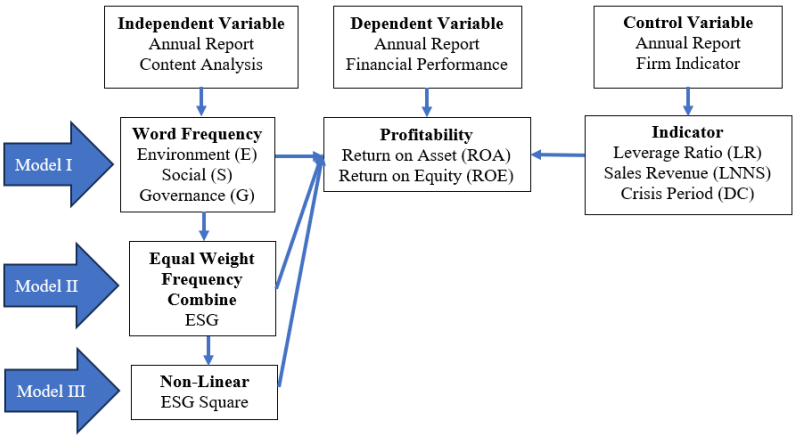

Figure 1. ESG Disclosure and Profitability Framework

Source: author's data processing (2025)

3. METHODOLOGY

This study develops an ESG performance measurement index for listed companies in Indonesia by assessing the extent of ESG disclosures presented in their published annual reports. The content analysis approach follows methodologies applied in previous studies such as [10], [25], [48]. Based on word frequency analysis, the ESG score is constructed [OF8.1]and subsequently examined to assess its relationship with performance.

This study employs a comprehensive methodology by selecting firms listed on the Indonesia Stock Exchange based on their inclusion in the ESG indices of Sustainalytics and Bloomberg for the 2013-2023, ensuring data quality and recognition by reputable rating agencies. According to [49], ESG performance tends to be more significant among large-scale firms, which generally possess greater assets, resources, and capabilities to manage and report sustainability initiatives. The final sample consists of 30 companies representing various industrial sectors across the Indonesia Stock Exchange. The dependent variable in this study is firm profitability, measured using Return on Equity (ROE) and Return on Assets (ROA), both commonly applied in prior research but often yielding mixed results. ROE is calculated as net income divided by total equity, while ROA is calculated as net income divided by total assets. To strengthen the model, several control variables are included namely the Leverage Ratio (LR), measured as total debt to total assets, Net Sales (NS), and a Crisis Period (DC) dummy variable, which equal 1 during 2020-2022 and 0 otherwise.

The explanatory variables in this study are ESG disclosures, measured using a self-developed ESG score derived from content analysis of annual reports, using NVivo software for data processing. The ESG score includes individual dimensions (Environmental, Social, Governance), a combined ESG score, and the squared ESG score to capture potential non-linear effects. Each ESG dimensions is calculated based on the frequency of related disclosure following the Global Report Initiative (GRI) framework. The frequencies are standardized into values ranging from 0 to 1, following the approach of [10]. The combined ESG score is computed as the ratio of total disclosures to the maximum disclosure value within each industry and period, applying an equal weighting scheme across the three ESG dimensions. According to [50], this weighting approach provides more robust short-term performance, given the significant correlation between ESG factors and firm financial outcomes.

The study employs panel data regression analysis to examine the impact of ESG performance on firm profitability, using EViews software for data processing. Specifically, the analysis evaluates the effects of individual ESG dimensions (Environmental, Social, Governance), the combined ESG score, and the squared ESG score on profitability. The following equations present the empirical models used in this study.

Model I: E/S/G

$$ROE_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 LR_{it} + \beta_5 \ln NS_{it} + \beta_6 DC_{it} + \varepsilon_{it} \quad (1)$$

$$ROA_{it} = \alpha + \beta_1 E_{it} + \beta_2 S_{it} + \beta_3 G_{it} + \beta_4 LR_{it} + \beta_5 \ln NS_{it} + \beta_6 DC_{it} + \varepsilon_{it} \quad (2)$$

Model II: ESG

$$ROE_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 LR_{it} + \beta_3 \ln NS_{it} + \beta_4 DC_{it} + \varepsilon_{it} \quad (3)$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 LR_{it} + \beta_3 \ln NS_{it} + \beta_4 DC_{it} + \varepsilon_{it} \quad (4)$$

Model III: ESG Square

$$ROE_{it} = \alpha + \beta_1 ESG_{it}^2 + \beta_2 LR_{it} + \beta_3 \ln NS_{it} + \beta_4 DC_{it} + \varepsilon_{it} \quad (5)$$

$$ROA_{it} = \alpha + \beta_1 ESG_{it}^2 + \beta_2 LR_{it} + \beta_3 \ln NS_{it} + \beta_4 DC_{it} + \varepsilon_{it} \quad (6)$$

4. RESULTS AND DISCUSSION

4.1. Descriptive Analysis

As shown in Table 1, ESG score derived from content analysis range from 0 to 1, with an average combined ESG score of 0.609, indicating a moderate level of disclosure among sampled firms. This reflects ongoing efforts towards transparency, though improvement is still needed to meet stakeholder expectations. The environmental dimension shows the highest average disclosure (28.639), followed by social (14.091) and governance (7.758), consistent with [51], which highlights environmental factors as the most influential in enhancing ESG performance. Individual dimension ESG score suggests a disclosure gap that firms should address. Positive mean values of ROE and ROA indicate efficient equity and asset management, while negative minimum values during crisis periods reflect temporary inefficiencies in profitability.

Table 1. Descriptive Statistics of Research Variables

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Observations
Dependent Variable								
ROA	0.094	0.072	0.454	-0.134	0.095	1.438	5.411	330
ROE	0.191	0.143	1.451	-0.573	0.254	3.052	14.729	330
Independent Variable								
E	28.639	18.000	154.000	0.000	30.292	1.483	5.396	330
S	14.091	13.000	57.000	0.000	10.222	1.292	5.358	330
G	7.758	6.000	32.000	0.000	7.276	1.254	3.997	330
ESG	0.609	0.644	1.000	0.000	0.279	-0.403	2.392	330
Control Variable								
LR	0.491	0.454	6.163	0.103	0.380	10.091	151.150	330
NS	3.45E+13	1.85E+13	3.17E+14	1.02E+12	4.75E+13	2.924	13.021	330
DC	0.273	0.000	1.000	0.000	0.446	1.021	2.042	330

Source: author's data processing (2025)

As shown in Table 2, disclosure for both individual ESG dimensions and the combined ESG score exhibit an overall upward trend throughout the study period. Environmental and governance disclosure increase steadily, supporting [52], which identified these factors as key drivers of sustainability performance and stakeholder satisfaction. Social disclosure and the combined ESG score peaked in 2020, reflecting firms heightened attention to social issues during the pandemic, consistent with [13]. During crisis, ESG initiatives often serve as positive signals to strengthen stakeholder trust and corporate reputation [53, 54]. Meanwhile, average firm profitability showed a downward trend, with the sharpest decline occurring during the pandemic, indicating firms gradually recovery in the post-crisis period.

Table 2. ESG Disclosure and Financial Performance Through Research Period

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
E	15.233	*14.600*	16.367	20.400	19.300	19.633	30.700	38.700	38.433	44.900	**56.767**
S	*11.000*	12.167	14.033	16.300	12.633	14.033	12.833	**17.400**	13.267	14.467	16.867
G	*5.300*	6.367	7.567	7.533	8.233	7.367	8.000	8.567	7.800	**9.500**	9.100
ESG	*0.508*	0.555	0.555	0.571	0.601	0.625	0.625	**0.678**	0.653	0.658	0.674
ROA	**0.116**	0.109	0.091	0.103	0.106	0.102	0.082	*0.067*	0.090	0.095	0.074
ROE	0.223	**0.224**	0.200	0.211	0.223	0.183	0.166	*0.131*	0.194	0.191	0.157

Source: author's data processing (2025)
Note: Bold indicates the highest value and Italic indicates the lowest

4.2. Correlation

Table 3 presents the correlation matrix illustrating the relationships among firm profitability, ESG-related variables, and control variables. The result show that most ESG disclosure dimensions are negatively correlated with profitability, except for environmental-ROA and social-ROE relationship, which display weak positive association. The combined ESG score also exhibits a negative correlation with profitability. In contrast, net sales show a strong positive correlation with profitability, indicating that sales performance remains the

primary driver of firm's profit. The pandemic period displays a positive correlation with ESG scores, suggesting increased disclosure during the crisis. Overall, these results imply that firms may not yet be implementing ESG activities efficiently enough to translate sustainability efforts into improved profitability.

Table 3. Correlation Matrix

	E	**S**	**G**	**ESG**	**LR**	**NS**	**DC**	**ROA**	**ROE**
E									
S	0.442								
G	0.088	0.312							
ESG	0.449	0.568	0.484						
LR	-0.096	0.109	-0.075	-0.034					
NS	0.165	-0.014	-0.085	-0.053	-0.043				
DC	0.244	0.057	0.073	0.118	-0.034	0.051			
ROA	0.023	-0.034	-0.056	-0.025	-0.177	0.177	-0.065		
ROE	-0.017	0.067	-0.123	-0.028	0.067	0.101	-0.046	0.786	

Source: author's data processing (2025)

Table 3 shows that the Environmental (E), Social (S), and Governance (G) dimensions are positively correlated with each other, with the strongest relationship observed between environmental and social dimensions (r = 0.442), indicating consistency in firms' ESG disclosure practices. The composite ESG score is moderately correlated with its individual components, particularly with the social dimension (r = 0.568) and environmental dimension (r = 0.449). However, ESG-related variables exhibit weak correlations with profitability measures, as the ESG score and its components show weak or negative relationships with ROA and ROE, suggesting that sustainability efforts may not immediately translate into improved financial performance. In contrast, NS demonstrate a positive correlation with ROA (r = 0.177), highlighting sales performance as an important driver of profitability. Additionally, ROA and ROE are strongly correlated (r = 0.786), indicating consistency between accounting-based profitability measures, while other control variables such as Leverage (LR) and Crisis Period (DC) show relatively weak associations with firm performance.

4.3. Panel Regression Analysis

This study examines the effect of ESG disclosure scores on firm financial performance using panel multiple regression analysis, across three model specifications, individual ESG dimensions (E/S/G), the combined ESG score, and the squared ESG score model. The Hausman test results indicate that the Random Effects Model is the most appropriate for all specifications, allowing control for unobserved firm-specific heterogeneity that remains constant over time. A summary of the panel regression results assessing the relationship between ESG disclosure and firm profitability is presented in Table 4.

The result indicated that all models are statistically significant, confirming the firm profitability can be explained by variables included in the analysis. Consistent findings across both profitability measures provide stronger evidence that the financial impact of ESG disclosure extends across multiple dimensions of performance. As shown in Table 4, the regression results consistently reveal a significant negative effect of ESG disclosure scores on profitability across all model specifications.

The model individual ESG dimension (E/S/G) shows that the disclosure frequency of the environmental aspect has a negative effect on profitability, with coefficient of -0.001 (p-value 0.011) for ROE and -0.001 (p-value 0.003) for ROA. This suggests that implementing and reporting on environmental initiatives such as environment, energy, biodiversity, greenhouse, recycle, waste, and water management remain costly for firms. Similarly, governance disclosure has a negative effect on profitability, with coefficient of -0.004 (p-value 0.010) for ROE and -0.002 (p-value 0.022) for ROA, indicating that strengthening governance mechanisms, supply chain management, and sustainability risk management also increases cost. In contrast, social disclosure shows a positive but insignificant effect on profitability. These results are consistent with prior studies such as [21], [55], [56], and [30] that identify environmental and governance dimensions as key yet cost-intensive ESG factors influencing financial performance. However, these findings contrast with [57], which found that each ESG dimension positively and significantly affects profitability through improved transparency and stakeholder trust.

Environmental and governance factors may reduce firm profitability due to ongoing compliance costs and temporary transitional inefficiencies that arise as firms adjust their operations and capital structures. During the research period, the regulatory environment in Indonesia became increasingly stringent, particularly following the implementation of POJK No. 51 year 2017, which mandates listed issuers to adopt sustainable finance practices and disclose related information. The enhance ESG disclosure guidelines introduced in 2020 further strengthened these requirements, providing better access to green finance but simultaneously increasing firms' overhead and compliance costs. Moreover, tighter bank lending standards under sustainable finance policies have elevated financing costs in the short run. Firms have also been required to invest in cleaner technologies to meet new sustainability standards, thereby increasing marginal cots and potentially phasing out less efficient production units. In addition, the enactment of Law No. 7 year 2021 introducing a carbon tax implemented in 2022 has imposed direct compliance costs on energy-intensive firms. Strengthened governance regulations have also raised internal control and reporting costs, which may reduce short-term profitability. However, over the long term, these measures can enhance firm value by lowering risk and improving access to capital and market.

Model with combined ESG score and squared ESG score has a negative effect respectively with a coefficient of -0.066 (p-value 0.021) and -0.049 (p-value 0.057) to ROE, also has a negative but not significant effect to ROA. It indicates that the more firm maintain its sustainability, the more its profitability will decline. This finding is consistent with the results from the individual dimensions ESG scores model. The squared ESG score model suggest a negative u-shaped relationship between ESG performance and firm profitability in the long-run. This implies that as firms initially enhance their ESG performance, profitability tends to improve; however, beyond a certain threshold, further increases in ESG engagement may begin to reduce profitability. The negative curvature indicates that firm sustainability performance may have exceeded the optimal level at which it positively contributes to financial outcomes.

This observation aligns with prior research examining the complex relationship between ESG activities and financial performance. For example, [58] supports the agency theory and resources-based view, suggesting that excessive pursuit of ESG performance can reflect agency problems where managers allocate firm resources inefficiently. Managerial behaviours such as greenwashing may also reduce the credibility of corporate disclosures [13]. Furthermore, limited understanding of ESG reporting standards and inadequate implementation within Indonesia capital markets [14], [15] exacerbate these inefficiencies. As indicated by [26], such results may signal that firms focus on immaterial ESG issues, thereby failing to function effectively as a governance mechanism to mitigate agency conflicts. Consequently, when managers commit to ESG actions that are misaligned with long-term shareholder's interests, these actions may not enhance corporate credibility nor reduce concerns about opportunistic behavior.

Conversely, these findings contradict prior studies such as [29], [56], [59], which, consistent with legitimacy theory and stakeholder theory, argue that sustainability disclosures strengthen public trust, enhance corporate reputation, and ultimately lead to superior performance. Similarly, this result diverges from [27], which identified a positive u-shaped relationship between social performance and financial performance, indicating that the financial benefits of ESG initiatives may depend heavily on contextual and implementation factors.

In the Indonesian context, both channels a direct long term compliance cost associated with adhering to new sustainability regulations and an indirect short term transitional inefficiencies arising from operational adjustments appear to influence firm profitability. Early ESG adoption in Indonesia has been shown to enhance firm performance through improved efficiency and market reputation. As noted by [60], voluntary disclosure can facilitate a corporate sustainability transition that leads to better performance outcomes. However, as ESG compliance and reporting obligations expand, their positive impact on profitability diminishes beyond a moderate threshold, where the marginal costs of ESG spending exceed its marginal benefits. The inverted u-shaped relationship observed for the squared ESG score may thus reflect a transition process from the initial advantages of voluntary ESG engagement to the cost burdens of mandatory ESG compliance.

Table 4. Panel Regression Models

	Model I: E/S/G		**Model II: ESG**		**Model III: ESG Square**	
Variable	ROE	ROA	ROE	ROA	ROE	ROA
C	**-1.065****	-0.318	**-0.744***	-0.204	**-0.749***	-0.208
	(0.020)	(0.122)	**(0.099)**	(0.311)	**(0.099)**	(0.304)

	Model I: E/S/G		Model II: ESG		Model III: ESG Square	
Variable	ROE	ROA	ROE	ROA	ROE	ROA
Independent Variables						
E	**-0.001****	**-0.001****				
	(0.011)	**(0.034)**				
S	0.001	0.001				
	(0.213)	(0.490)				
G	**-0.004*****	**-0.002****				
	(0.010)	**(0.022)**				
ESG			**-0.066****	-0.022		
			(0.021)	(0.117)		
ESG Square					**-0.049***	-0.016
					(0.057)	(0.193)
Control Variables						
LR	0.008	-0.007	0.012	-0.006	0.011	-0.006
	(0.691)	(0.440)	(0.552)	(0.530)	(0.576)	(0.515)
LNNS	**0.042*****	**0.014****	**0.032****	0.010	**0.032****	0.010
	(0.005)	**(0.035)**	**(0.030)**	(0.114)	**(0.033)**	(0.118)
DC	-0.019	-0.010	**-0.028****	**-0.015****	**-0.029****	**-0.015****
	(0.199)	(0.152)	**(0.049)**	**(0.035)**	**(0.043)**	**(0.031)**
Model Fit						
Adjusted R-squared	0.047	0.034	0.030	0.017	0.025	0.015
Prob (F-statistic)	**0.001**	**0.008**	**0.007**	**0.047**	**0.016**	**0.065**
Prob (Hausman Test)	0.992	1.000	1.000	0.445	0.966	0.457

Source: author's data processing (2025)
Note: *, **, *** significance in $p < 0.10$, $p < 0.05$, $p < 0.01$ (respectively)

Regarding the control variables, net sales exhibit a significantly positive effect on profitability, indicating that revenue growth remains the primary driver of firm performance. The leverage ratio shows a positive association with ROE but a negative one with ROA, though both are statistically insignificant. This suggests that higher leverage may increase firms' risk exposure when viewed from an asset perspective, yet reflects managerial willingness to pursue growth when measured by equity returns. These results align with prior studies [56], which emphasize that firms must enhance efficiency, manage ESg-related risk effectively, and optimize profit opportunities. Larger firms, in particular, tend to operate more efficiently and achieve superior performance outcomes.

Lastly, the crisis period shows significantly negative impact on firm profitability. Although the descriptive analysis indicates that ESG disclosure increased during the crisis period, this enhancement did not translate into improved financial performance. This finding is consistent with [31], which concludes that ESG practices did not immunize firms against declining stock performance during crisis. Conversely, it contrast with [40], which found that ESG policies had no significant effect on firm performance during the pandemic.

4.4. Robustness Test

To ensure the robustness of the main findings that ESG disclosure level are negatively associated with firm financial performance, several robustness tests were conducted [61]. This study adopts an alternative ESG measurement approach in which ESG score are calculated separately based on a checklist of disclosures for each dimension, following the method proposed by [48], as a substitute for the primary explanatory variable. For the combined ESG score, the ratio of the number of disclosures to the maximum disclosure value for each industry in a given period is used, applying a balanced weighting scheme across all ESG dimensions [62]. In addition, the squared ESG score is incorporated to capture non-linear effects in the relationship between ESG disclosure and firm performance [63].

The checklist of disclosure for the ESG dimensions used in this study refers to the list of indicators developed by the GRI. The Environmental factor consists of seven indicators namely recycle management, energy management, water management, biodiversity management, greenhouse management, waste management, and

environment assessment and compliance [64]. The Social factor includes three indicators namely treatment of workers or employee, social or community development, responsibility to customer. The Governance factor is composed of three indicators namely supply chain management, sustainability risk management, and good governance [65].

The result indicate that all models are appropriate under the Random Effects specification and are statistically significant, confirming that firm financial performance is explained by the included variables. The findings remain consistent across alternative model specifications and estimation techniques [66]. As shown in Table 5, ESG disclosure exhibits a consistently significant and negative relationship with profitability across all models. Specifically, results from the individual ESG checklist dimensions (CE/CS/CG) reveal that increased disclosure in environmental and governance aspects will deflate profitability. The contrasting outcome between ROE and ROA, consistent with [67], highlight the need for further investigation into the relationship between non-financial disclosure and financial performance [68]. Similarly, both the combined ESG checklist score and squared ESG checklist score models show a negative effect on profitability, suggesting that extensive sustainability disclosure may reduce short-term profitability potentially signaling greenwashing behavior or inefficiencies in ESG implementation.

Table 5. Panel Regression Robustness Models

	Model I: CE/CS/CG		**Model II: ESGC**		**Model III: ESGC Square**	
Variable	ROE	ROA	ROE	ROA	ROE	ROA
C	**-1.043****	-0.279	**-0.780***	-0.215	**-0.777***	-0.217
	(0.020)	(0.166)	**(0.084)**	(0.286)	**(0.085)**	(0.280)
Independent Variables						
CE	**-0.013*****	-0.003				
	(0.005)	(0.200)				
CS	0.011	-0.003				
	(0.278)	(0.616)				
CG	**-0.023***	-0.007				
	(0.051)	(0.211)				
ESGC			**-0.078*****	**-0.026***		
			(0.009)	**(0.072)**		
ESGC Square					**-0.063****	**-0.020***
					(0.012)	**(0.099)**
Control Variables						
LR	0.010	-0.008	0.010	-0.007	0.009	-0.007
	(0.613)	(0.437)	(0.630)	(0.478)	(0.644)	(0.469)
LNNS	**0.043*****	**0.013****	**0.034****	**0.011***	**0.033****	**0.011***
	(0.004)	**(0.044)**	**(0.022)**	**(0.099)**	**(0.025)**	**(0.099)**
DC	-0.015	-0.011	**-0.029****	**-0.015****	**-0.030****	**-0.015****
	(0.308)	(0.122)	**(0.041)**	**(0.031)**	**(0.037)**	**(0.028)**
Model Fit						
Adjusted R-squared	0.064	0.031	0.034	0.019	0.033	0.0180
Prob (F-statistic)	**0.000**	**0.011**	**0.004**	**0.034**	**0.005**	**0.042**
Prob (Hausman Test)	1.000	0.140	0.971	1.000	1.000	1.000

Source: author's data processing (2025)

Note: *, **, *** significance in $p < 0.10$, $p < 0.05$, $p < 0.01$ (respectively)

All control variables exhibit similar patterns to the main models. Net sales show a significant positive effect on profitability, indicating that firms can enhance profit primarily through efficient revenue generation. Leverage ratio remains statistically insignificant, suggesting limited influence on profitability within sample. Finally, the crisis period variable demonstrates a significant negative impact, confirming that firm profitability declined notably during the pandemic period.

5. MANAGERIAL IMPLICATIONS

The empirical results of this study indicate that ESG disclosure particularly environmental and governance dimensions has a negative effect on firm profitability in the Indonesian context. This finding implies that managers should recognize ESG implementation as a cost-intensive process, especially during the transition toward mandatory sustainability reporting. Therefore, ESG disclosure should not be pursued solely to increase reporting intensity or visibility, but should be carefully managed to ensure that sustainability initiatives are aligned with firms' operational capacity and financial conditions. Managers need to focus on improving the efficiency of ESG implementation, rather than expanding disclosure volume, to avoid short-term profitability deterioration that may arise from high compliance and operational costs.

In addition, the negative non-linear relationship between ESG disclosure and profitability suggests that excessive ESG engagement beyond an optimal level may reduce financial performance. This implies that managers should identify a balanced level of ESG disclosure that meets regulatory requirements while avoiding overinvestment in ESG activities that do not generate proportional economic value. Given that net sales consistently show a positive impact on profitability, ESG strategies should be integrated with firms' revenue-generating activities and operational efficiency improvements. Such an approach may help firms minimize transitional inefficiencies, reduce the risk of greenwashing, and ensure that ESG disclosure supports long-term sustainability without undermining financial performance.

6. CONCLUSION

Despite extensive prior research, the relationship between sustainability practices and firm financial performance remains inconclusive. This study contributes to the literature by developing an independent ESG index based on content analysis of firms' annual reports over a long observation period from 2013 to 2023, focusing on heterogeneous firms within a developing country context, namely Indonesia. The findings demonstrate that ESG disclosure exhibits a nonlinear relationship with profitability, providing deeper insights into ESG performance dynamics in emerging markets.

The empirical results indicate that environmental and governance disclosures negatively affect firm profitability, suggesting that ESG-related activities remain costly and may lead to inefficiencies in cost management, even in the long term. Governance emerges as the most influential ESG component, reflecting firms' stronger emphasis on governance and environmental disclosures. However, given substantial industrial heterogeneity, not all ESG indicators are equally relevant across sectors, and the relative importance of ESG dimensions varies by industry. Overall, ESG disclosure is associated with a decline in profitability, indicating potential agency problems and symbolic disclosure practices. The nonlinear analysis further confirms a negative U-shaped relationship, implying that ESG disclosure among Indonesian listed firms may have exceeded its optimal level, thereby weakening its intended financial benefits.

These findings offer important implications for regulators, firms, and investors. Policymakers are encouraged to strengthen ESG reporting standards, verification mechanisms, and enforcement to enhance disclosure consistency, credibility, and comparability, while also providing transitional support to mitigate short-term profitability pressures. Firms should ensure that ESG initiatives are strategically integrated into core business operations through measurable targets, accountability mechanisms, and strong board and audit committee oversight, rather than serving merely symbolic purposes. Investors are advised to adopt a more critical, evidence-based evaluation of ESG information and actively engage with firms to promote substantive sustainability practices. This study is subject to limitations related to sample size, reliance on a self-developed ESG index, and the use of accounting-based performance measures. Future research is encouraged to explore sector-specific patterns, apply alternative sustainability frameworks, incorporate lagged and dynamic ESG effects, address potential endogeneity issues, and examine complementary factors such as digital transformation that may enhance the effectiveness and credibility of ESG disclosure in emerging capital markets.

7. DECLARATIONS

7.1. About Authors

Ossi Ferli (OF) https://orcid.org/0009-0003-1180-344X

Noer Azam Achsani (NA) https://orcid.org/0000-0002-1478-8586

Trias Andati (TA) https://orcid.org/0000-0002-5335-2451
Zenal Asikin (ZA) https://orcid.org/0000-0003-2213-6067

7.2. Author Contributions

Conceptualization: OF; Methodology: OF; Software: OF; Validation: NA and TA; Formal Analysis: OF, NA, and TA; Investigation: OF; Resources: OF; Data Curation: ZA; Writing Original Draft Preparation: OF and NA; Writing Review and Editing: OF; Visualization: OF and ZA; All authors, OF, NA, TA, and ZA, have read and agreed to the published version of the manuscript.

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The data presented in this study are available on request from the corresponding author.

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7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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