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ESG Scores, Financial Performance, and Carbon Emissions: Evidence from Southeast Asian Companies

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ABSTRACT

This study examines the relationship between Environmental, Social, and Governance (ESG) scores and financial performance, focusing on Southeast Asia companies while investigating whether variations in carbon emission levels moderate this relationship. The fixed effects model is used to analyze unbalanced panel data of 1,399 observations from 451 listed companies, covering the period from 2019 to 2023. The results show that ESG scores positively influence financial performance, with a stronger effect in low-carbon emission companies. These findings, aligned with stakeholder theory, suggest that firms prioritizing sustainability, particularly through reducing carbon emissions, achieve better financial performance. Companies are encouraged to take proactive and strategic steps in reducing their carbon footprint as part of a broader, comprehensive sustainability strategy, not only to meet growing stakeholder expectations but also to enhance their long-term financial success and competitive advantage.

ABSTRAK

Penelitian ini mengkaji hubungan antara skor Environmental, Social, and Governance (ESG) dan kinerja keuangan, dengan fokus pada perusahaan-perusahaan di Asia Tenggara, serta menyelidiki apakah variasi tingkat emisi karbon memoderasi hubungan tersebut. Model *fixed effects* digunakan untuk menganalisis data panel tidak seimbang yang terdiri dari 1.399 observasi dari 451 perusahaan publik, yang mencakup periode dari tahun 2019 sampai dengan 2023. Hasil penelitian menunjukkan bahwa skor ESG berpengaruh positif terhadap kinerja keuangan, dengan efek yang lebih kuat pada perusahaan dengan emisi karbon yang rendah. Temuan ini, sejalan dengan *stakeholder theory*, menyarankan bahwa perusahaan yang memprioritaskan keberlanjutan, khususnya melalui pengurangan emisi karbon, mencapai kinerja keuangan yang lebih baik. Perusahaan didorong untuk mengambil langkah-langkah proaktif dan strategis dalam mengurangi jejak karbon mereka sebagai bagian dari strategi keberlanjutan yang lebih luas dan komprehensif, tidak hanya untuk memenuhi harapan pemangku kepentingan yang terus berkembang tetapi juga untuk meningkatkan kesuksesan keuangan jangka panjang serta keunggulan kompetitif mereka.

1. Introduction

In recent years, sustainability has increasingly come into the spotlight as businesses around the world face increasing pressure to address environmental, social, and governance (ESG) issues. Among these concerns, carbon emissions are critical due to their direct impact on climate change and long-term environmental sustainability (Abeydeera et al., 2019; J. Li & Xu, 2024). As global efforts to reduce their carbon footprint increase, companies are pressured to integrate more sustainable practices into their operations, with carbon emissions reduction becoming a key aspect of corporate responsibility. Companies that fail to prioritize sustainability risk not only damaging their reputation but also facing potential financial penalties or losing competitiveness in a market that increasingly values green initiatives (Adu et al., 2023; Liu et al., 2023). Companies can focus on long-term resilience and value creation by proactively embracing sustainability.

ESG scores evaluate a company's performance in three key areas: environmental impact, social responsibility, and governance practices (Clément et al., 2023; Escrig-Olmedo et al., 2019). These scores have become critical for assessing how well companies manage sustainability-related risks and opportunities. Rating agencies like MSCI, Sustainalytics, FTSE Russell (LSEG), and Bloomberg assess ESG performance using a combination of company disclosures, public data, and proprietary research. These scores are essential for investors and stakeholders to make informed decisions about a company's long-term sustainability and financial health. Improving ESG performance is vital for companies seeking to ensure future growth and maintain market competitiveness while contributing to global sustainability efforts (Al-Hiyari & Kolsi, 2021; Aydoğmuş et al., 2022; S. Chen et al., 2023).

Previous research has found that ESG scores positively and significantly affect corporate financial performance in Chinese companies (Fu & Li, 2023), German companies (Velte, 2017), European companies (De Lucia et al., 2020), Indian companies (Sinha Ray & Goel, 2023), and Asian emerging market companies (Ahmad et al., 2024). Chen et al. (2023) and Aydoğmuş et al. (2022) used listed companies worldwide, concluding that ESG performance positively influences financial performance. Alam et al. (2022) also explained that companies with high ESG scores tend to have a higher profitability ratio. However, empirical evidence from Makridou et al. (2024) indicates that their ESG performance slightly and negatively impacts the profitability of energy companies in Europe. Duque-Grisales & Aguilera-Caracuel (2021) studied Latin American companies and found that the relationship between ESG scores and financial performance was statistically significantly negative. Giannopoulos et al. (2022) also found that ESG has a negative impact on corporate financial performance in Norway.

The inconsistent relationship between ESG scores and financial performance has led researchers to explore moderation effects in their studies. While some companies may see a positive impact on financial outcomes from high ESG scores, others might experience neutral or negative results, depending on various factors. Bruna & Nicolò (2020) found that the impact of ESG performance on financial performance varies for different levels of ESG scores and company sizes. Candio (2024) studied European companies and found that CSR committees negatively moderate the effect of ESG scores on ROA. Other moderating variables used in research on the relationship between ESG and financial performance are market type (Naeem et al., 2022), executive compensation (Adu et al., 2023), ESG investor (Z. Chen & Xie, 2022), size and age companies (Abdi et al., 2022), and carbon intensity (Ding & Lee, 2024).

Furthermore, research investigating how specific environmental issues, such as carbon emission levels, influence the relationship between ESG scores and financial performance is limited. Ding & Lee (2024) researched companies in China and found that carbon-intensive enterprises positively moderate the association between ESG ratings and corporate financial performance. Carbon-intensive companies generate high levels of carbon emissions due to their operational activities. Persakis (2023) concluded that firms with elevated ESG scores do not inherently manage the effects of climate policy uncertainty on their financial or environmental outcomes more effectively than those with lower ESG scores. Issa (2024) also found that CSR strategy and corporate governance

quality influence the relationship between emission reduction initiatives and financial performance. Adu et al. (2023) examined UK enterprises, revealing a negative correlation between actual carbon and financial performance.

This study examines the relationship between Environmental, Social, and Governance (ESG) scores and financial performance, focusing on Southeast Asia companies while investigating whether variations in carbon emission levels moderate this relationship. This study examines enterprises in Southeast Asia experiencing significant economic growth while also being susceptible to the effects of climate change. The region's distinctive economic development and environmental issues render it an optimal setting for examining the relationship between ESG and financial performance, especially concerning carbon emissions. This research is grounded in stakeholder theory, which asserts that companies should address the needs and interests of all stakeholders (Donaldson & Preston, 1995; Freeman, 1984). Stakeholder theory highlights that by responding to the diverse expectations of stakeholders, firms can improve their long-term financial performance. As environmental concerns become increasingly significant to stakeholders, especially regarding sustainability, it is essential to understand how carbon emissions play a role within the ESG framework (Ding & Lee, 2024; Issa, 2024). Addressing carbon emissions is vital for environmental performance and aligns with broader stakeholder demands, positioning companies for success in sustainable development goals.

Therefore, this research seeks to explore more deeply the relationship between ESG scores, financial performance, and carbon emissions in Southeast Asian companies. The novelty of this research lies in several aspects. First, while previous studies have primarily concentrated on Europe, North America, and China, this research focuses on Southeast Asia, a region undergoing rapid economic growth while facing significant environmental challenges. The region's unique economic and environmental context regarding ESG performance and carbon emissions has been relatively understudied.

Second, although the link between ESG scores and financial performance has been widely examined, this study sheds light on the moderating effect of carbon emission levels on that relationship. By treating carbon emissions as a distinct environmental factor, this research introduces a new perspective to the existing body of literature, addressing an underexplored area. Finally, the study integrates carbon management within the ESG framework, stressing the importance of carbon emission reduction as a core element of corporate ESG strategies. Integrating these elements within the framework of stakeholder theory provides a novel approach, particularly as environmental issues gain increasing attention from stakeholders.

2. .Literature Review and Hypothesis Development

Stakeholder Theory

Stakeholder theory, first proposed by Freeman (1984), posits that a company's success is not solely determined by maximizing shareholder value but by balancing the interests of all stakeholders. These stakeholders include shareholders, employees, customers, suppliers, communities, government, and associations (Donaldson & Preston, 1995). The theory argues that companies that account for the needs and expectations of a broad range of stakeholders are more likely to achieve sustainable growth and long-term financial success (Arian & Sands, 2024; Clarkson, 1995). By adopting a broader stakeholder perspective, companies can navigate complex social, environmental, and governance issues more effectively. In the context of this research, stakeholder theory is particularly relevant as it underscores the importance of companies addressing environmental concerns, such as carbon emissions, within their ESG frameworks.

As stakeholders increasingly prioritize sustainability, companies must demonstrate responsible environmental practices to maintain legitimacy and financial viability. This study builds on stakeholder theory by examining how ESG scores, a measure of a company’s commitment to meeting stakeholder expectations, impact financial performance. Furthermore, it investigates whether variations in carbon emission levels moderate this relationship, highlighting the growing importance of environmental responsibility in meeting stakeholder expectations and achieving long-term

financial success. Previous studies have utilized stakeholder theory to explore the link between ESG and financial performance. For instance, Adu et al. (2023), Aydoğmuş et al., (2022), and Naeem et al., (2022) found that companies prioritizing stakeholder interests, such as environmental, social, and governance responsibility often experience better financial performance due to improved risk management and reputation.

ESG Scores and Financial Performance

ESG Scores represent a company's performance across three key areas: Environmental (E), Social (S), and Governance (G). These scores comprehensively assess how well a company manages sustainability-related risks and opportunities (T. T. Li et al., 2021; Zumente & Lāce, 2021). Based on LSEG (2023), the environmental component focuses on a company's emissions, innovation, and resource use. The social aspect covers areas such as community, human rights, workforce, and product responsibility. The governance dimension assesses CSR strategy, management, and shareholders. Terminology utilized in this field of study includes ESG Scores (Clément et al., 2023; D'Amato et al., 2021), ESG performance (Persakis, 2023; Velte, 2017), ESG Rating (J. Li & Xu, 2024; Zumente & Lāce, 2021), ESG risks (Bolibok, 2024; Cohen, 2023), and ESG Disclosure (Z. Chen & Xie, 2022; Khemakhem et al., 2023). The terminology varies throughout studies, necessitating examining the definitions of the utilized variables. High ESG scores in this study suggest high transparency in the public reporting of material ESG data and outstanding relative ESG performance. On the other hand, financial performance refers to a company's overall health, reflected in its profitability, liquidity, and efficiency. Commonly measured using indicators like Return on Assets (ROA), financial performance reflects a company's ability to generate profit relative to its assets (Aydoğmuş et al., 2022; Giannopoulos et al., 2022). ROA is a key profitability metric demonstrating how effectively a company utilizes its assets to produce earnings.

Numerous previous studies have investigated the relationship between ESG scores and financial performance. Several previous studies have found that ESG scores positively and significantly affect corporate financial performance (Ahmad et al., 2024; Aydoğmuş et al., 2022; S. Chen et al., 2023; De Lucia et al., 2020; Fu & Li, 2023). These companies attract socially conscious investors and customers while enjoying lower financing costs and higher employee satisfaction. Conversely, another research group discovered that ESG scores negatively and significantly affect corporate financial performance (Duque-Grisales & Aguilera-Caracuel, 2021; Giannopoulos et al., 2022; Makridou et al., 2024). These costs can reduce short-term profitability, and market skepticism about the overemphasis on ESG initiatives may signal weaker financial discipline, thus negatively affecting financial performance. Moreover, several studies revealed no significant correlation between ESG scores and corporate financial performance (Atan et al., 2018; Narula et al., 2024).

A limited study focuses on Southeast Asian firms to investigate the impact of ESG on financial performance (Gutiérrez-Ponce & Wibowo, 2024). Additionally, variations in regulatory frameworks and market maturity across Southeast Asian countries further complicate the adoption and measurement of ESG practices. Based on the support from stakeholder theory and previous empirical findings, authors argue that companies that effectively manage their stakeholder relationships will likely enjoy stronger reputations, reduced risks, and more excellent financial stability, all contributing to better financial performance. Thus, the first hypothesis in this research is as follows.

H1: ESG scores positively influence financial performance

Carbon Emission, ESG Scores, and Financial Performance

Carbon emissions release carbon dioxide (CO_2) and other greenhouse gases (GHGs) into the atmosphere, primarily resulting from human activities such as fossil fuel combustion, industrial processes, and deforestation (D. Ding et al., 2023; Luo et al., 2021). Carbon emissions are categorized into three scopes (Abeydeera et al., 2019; D. Ding et al., 2023). Scope 1 is direct emissions from sources owned or controlled by the company, such as emissions from company-owned vehicles, production facilities, or machinery. Scope 2 is indirect emissions from the generation of purchased

electricity, steam, heating, or cooling consumed by the company. Scope 3 is all other indirect emissions in a company's value chain, including upstream and downstream activities, such as supply chain emissions, business travel, and sold product use. From an operational perspective, carbon emissions are directly linked to a company's activities and resource use (Baratta et al., 2023; van Emous et al., 2021). High emissions often indicate inefficient energy consumption and resource management, leading to increased operating costs, especially as regulatory pressures increase globally (Trinks et al., 2020; van Emous et al., 2021). Conversely, companies that successfully manage and reduce their emissions through energy efficiency, renewable energy adoption, and process optimization often benefit from lower operating costs and an improved reputation, positioning them as leaders in sustainability (Baratta et al., 2023; Trinks et al., 2020).

Research investigating how specific environmental issues, such as carbon emissions levels, influence the relationship between ESG scores and financial performance is limited. Numerous research studies have investigated the direct correlation between carbon emissions and financial performance, revealing that carbon positivity has a favorable and significant influence on financial performance and market value (Adu et al., 2023; Liu et al., 2023). Nevertheless, Ding & Lee (2024) researched companies in China and found that carbon-intensive enterprises positively moderate the association between ESG ratings and corporate financial performance. Carbon-intensive companies generate high levels of carbon emissions due to their operational activities. Issa (2024) found that CSR strategy and corporate governance quality influence the relationship between emission reduction initiatives and financial performance. Persakis (2023) also concluded that firms with elevated ESG scores do not inherently manage the effects of climate policy uncertainty on their financial or environmental outcomes more effectively than those with lower ESG scores.

Drawing upon stakeholder theory and previous empirical findings, authors argue that companies with lower carbon emissions are expected to experience a stronger positive relationship between ESG scores and financial performance than those with higher emissions, as their sustainability efforts align more with stakeholder expectations and long-term financial goals. Consequently, the second hypothesis of this study is as follows.

H2: The influence of ESG scores on financial performance is stronger in low-carbon emission companies than in high-carbon emission companies

3. Research Methods

This study uses unbalanced panel data covering 1399 observations from 451 listed companies in Southeast Asia, including Indonesia (IDX), Malaysia (KLSE), Thailand (SET), Singapore (SSE), Philippines (PSE), and Vietnam (HOSE). The sample period spans from 2019 to 2023, covering five years of data. This research relies on the London Stock Exchange Group (LSEG) database, formerly Thomson Reuters Eikon Refinitiv. After performing the Hausman test, the fixed effects model was chosen. J. Li & Xu (2024) and Trinks et al. (2020) also used a fixed effects model and suggested that it is appropriate for an unbalanced panel dataset. The model to test H1 is as follows:

$$FP_{i,t} = \alpha_i + \beta_1 \mathrm{ESG}_{i,t} + \beta_2 \mathrm{Size}_{i,t} + \beta_3 \mathrm{Leverage}_{i,t} + \varepsilon_{i,t} \quad (1)$$

To test H2, this study employs a moderation model and conducts a subsample analysis based on carbon emission levels. The regression results for subsamples of low and high-carbon emission companies are compared. The model to test H2 is as follows:

$$FP_{i,t} = \alpha_i + \beta_1 \mathrm{ESG}_{i,t} + \beta_2 \mathrm{ESG}_{i,t} * \mathrm{CarbonEmission}_{i,t} + \beta_3 \mathrm{SIZE}_{i,t} + \beta_4 \mathrm{Leverage}_{i,t} + \varepsilon_{i,t} \quad (2)$$

The dependent variable is the Financial Performance (FP) of firm i in the year t. FP is measured using ROA (Return on Asset). The independent variable is ESG Scores, which have a value from 0 to 100; the higher this value is, the better the company's ESG performance will be. Carbon emissions are the total CO_2 from Scope 1, Scope 2, and Scope 3 available in the LSEG database. The control variables in this study are Size, measured by the company's total assets, and Leverage, measured by the total debt-to-equity ratio.

4. Results and Discussion

4.1. Results

Table 1 provides the descriptive statistics for the key variables in the study. The mean financial performance is 0.05, with a standard deviation of 0.08, indicating a relatively small variation in financial performance across companies. The average ESG score is 57.01, with a standard deviation of 15.63, showing some variation in the companies' sustainability practices. Carbon emissions have a high mean of 1,614,253.56 tonnes but a significant standard deviation of 7,013,768.23, reflecting considerable differences in emissions across companies. The range (min and max values) shows significant variability across all variables, especially in terms of carbon emissions and size.

Table 1. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Financial Performance (ROA)	0.05	0.08	-0.94	0.85
ESG Scores	57.01	15.63	6.57	90.90
Carbon Emission (CO_2 in tonnes)	1,614,253.56	7,013,768.23	13.48	197,590,760.0
Size (Total Asset in $)	16,186,105,578.95	49,641,701,461.02	34,930,573.52	559,638,635,850.34
Leverage	0.9	3.25	0.01	117.14

The results of H1 testing in this research are in Table 2. The ESG scores coefficient is positive and statistically significant at the 1% level (Coeff. = 0.016, p-value = 0.000), indicating that higher ESG scores are strongly associated with improved firm performance. This suggests that companies with better ESG practices tend to perform better financially, and the relationship is highly significant. Thus, hypothesis 1 is supported. The control variable Size has a negative and statistically significant effect on firm performance (Coeff. -17.590, p-value 0.000), also significant at the 1% level, implying that larger companies, on average, tend to have lower financial performance in this dataset. Similarly, Leverage exhibits a negative and significant relationship with firm performance (Coeff. -2.090, p-value 0.001), significant at the 1% level, indicating that higher debt levels are associated with worse financial performance. The R-squared value of 0.155 shows that the independent and control variables in the model explain about 15.5% of the variation in firm performance.

Table 2. Regression Results of Firm Performance and ESG Scores

Variables	Coeff.	p-value
Const	142.685	0.000
ESG Scores	0.016***	0.000
Size	-1.590***	0.000
Leverage	-2.090***	0.001
R Squared	0.155	
F Statistics	8.45	
N	1,399	

Note(s): ***Significance at $p < 0.01$, ** at $p < 0.05$, and * at $p < 0.10$

Furthermore, Table 3 presents the results of the H2 test. The interaction term ESG Scores*Carbon Emission has a negative and significant coefficient at the 1% level (Coeff. = -0.027, p-value = 0.002), indicating that as Carbon Emissions increase, the positive relationship between ESG scores and firm performance weakens. This means that for companies with higher carbon emissions, the beneficial impact of ESG practices on financial performance is reduced, supporting the hypothesis that carbon emissions moderate the effect of ESG scores. Consequently, this supports hypothesis 2.

To support H2, a subsample analysis was conducted by dividing the sample into two groups: low-carbon emission companies and high-carbon emission companies. The results are presented in Table 4. For low-carbon emission companies, the ESG Scores coefficient is positive and statistically significant at the 5% level (Coeff. = 0.018, p-value = 0.021). This indicates that higher ESG scores are associated with better firm performance in companies with lower carbon emissions, supporting the hypothesis 2.

Table 3. Regression Results of the Moderating Role of Carbon Emission

Variables	Coeff.	p-value
Const	127.967	0.000
ESG Scores	0.012***	0.000
ESG Scores*Carbon Emission	-0,027***	0,002
Size	0.590***	0.000
Leverage	-0.912***	0.000
R Squared	0.091	
F Statistics	4.020	
N	1,399	

Note(s): ***Significance at p < 0.01, ** at p < 0.05, and * at p < 0.10

In contrast, for high-carbon emission companies, the ESG Scores coefficient is positive but not statistically significant (Coeff. = 0.014, p-value = 0.228). This suggests that ESG practices do not have a significant impact on firm performance in companies with higher carbon emissions.

Table 4. Sub Sample Analysis: Low vs High Carbon Emission Companies

Variables	Low-carbon Emission		High-carbon Emission	
	Coeff.	p-value	Coeff.	p-value
Const	146.674	0.000	147.986	0.000
ESG Scores	0.018**	0.021	0.014	0.228
Size	1.881***	0.000	1.890***	0.000
Leverage	-1.427***	0.000	-2.704***	0.000
R Squared	0.161		0.110	
F Statistics	6,230		3,921	
N	700		699	

Note(s): ***Significance at p < 0.01, ** at p < 0.05, and * at p < 0.10

4.2. Discussions

ESG Scores and Financial Performance

The first hypothesis asserts that higher ESG scores lead to better financial performance for Southeast Asian companies. The regression analysis results support this hypothesis, as indicated by the first model's positive and statistically significant coefficient for ESG scores. These findings suggest that Southeast Asian companies with more robust ESG practices achieve better financial outcomes. Furthermore, by integrating ESG into their core strategies, these companies are better positioned to align with long-term profitability goals, as their practices not only meet the demands of regulators and investors and appeal to consumers who prioritize sustainability. Companies with higher ESG scores support this finding and often benefit from improved reputations, reduced operational risks, and increased investor confidence, all of which contribute to enhanced financial performance (Aydoğmuş et al., 2022; Clément et al., 2023). Additionally, ESG-focused companies are better positioned to attract socially conscious investors, strengthening their competitive advantage and long-term profitability (Z. Chen & Xie, 2022; Zumente & Lāce, 2021).

The results of this study align with the findings of Ahmad et al. (2024), Fu & Li (2023), and (Aydoğmuş et al., 2022), who also found a positive and significant relationship between ESG scores and financial performance. These studies suggest that companies prioritizing ESG practices tend to outperform their peers regarding financial returns, likely due to better risk management and access to capital. In addition, the authors argue that the role of sustainability committees in companies is critical in driving effective ESG integration, as these committees ensure that sustainability objectives are aligned with corporate strategy, monitor the progress of ESG initiatives, and drive accountability at all levels of the organization. This is consistent with research conducted by Bigelli et al. (2023) and (Setiani & Novitasari (2024), who concluded that board characteristics play a significant role in ESG performance. By embedding sustainability in decision-making, companies can better navigate regulatory challenges, increase stakeholder trust, and improve financial performance.

However, these results differ from those of Duque-Grisales & Aguilera-Caracuel (2021) and Giannopoulos et al. (2022), who found that ESG scores negatively affected financial performance. One possible reason for this divergence is the high costs associated with investing in environmentally friendly energy and implementing sustainable practices, which can be substantial for companies in specific industries (Giannopoulos et al., 2022; Makridou et al., 2024). These investments often

require significant capital outlay, and as a result, short-term profitability may be less than optimal as companies allocate resources towards long-term sustainability goals. Furthermore, companies may face challenges in integrating ESG efforts into their core business strategies, which can hinder the full realization of the potential financial returns from these practices. This result may also arise because the costs of implementing ESG initiatives are not fully reflected in a company's financial performance, either due to improper execution or a lack of institutional support (Duque-Grisales & Aguilera-Caracuel, 2021).

This study's findings support stakeholder theory, suggesting that companies that balance the interests of all stakeholders are more likely to attain sustained success over the long term. (Bruna & Nicolò, 2020; Donaldson & Preston, 1995). By enhancing ESG standards, organizations address stakeholder concerns, which helps reduce risks and strengthen their brand image. Meeting stakeholder expectations can improve financial performance, as there is a growing demand for organizations to adopt sustainable and responsible business practices. The findings of this study illustrate that integrating ESG components into business operations, in line with stakeholder theory, contributes to improved financial outcomes.

Carbon Emission, ESG Scores, and Financial Performance

The second hypothesis is supported, as the influence of ESG scores on financial performance is more substantial in low-carbon emission companies than in high-carbon emission companies. This result can be explained by the fact that Southeast Asian companies with lower carbon emissions are often more proactive in managing environmental risks and improving operational efficiencies, aligning with sustainability principles. Companies can reduce costs, enhance productivity, and generate lower carbon emissions by optimizing their operational processes. Lower carbon emissions indicate that these companies have likely implemented energy-efficient technologies or have optimized their processes to minimize waste and reduce reliance on fossil fuels (Tsai, 2020). These actions help reduce operational costs in the long term and position the company as a responsible corporate entity, which resonates positively with stakeholders. Thus, the financial performance of low-carbon emitters tends to benefit more from strong ESG practices (Adu et al., 2023; Issa, 2024).

The findings emphasize the importance of companies' efforts to reduce their carbon emissions. In today's market, there is increasing pressure from stakeholders, including governments, consumers, and investors, for businesses to reduce their environmental footprint. Regulatory frameworks such as carbon taxes and emissions trading systems are also becoming stricter, particularly in regions with high environmental awareness (Tsai, 2020; Xu et al., 2023). Furthermore, Ding & Lee (2024) investigated firms in China and discovered that carbon-intensive companies positively influence the relationship between ESG ratings and corporate financial success. Persakis (2023) also explained that companies with high ESG scores do not necessarily mitigate the impacts of climate policy uncertainty on their financial or environmental results more effectively than those with lower ESG scores. Companies that reduce their carbon emissions while integrating ESG practices experience better financial performance due to increased investor confidence and lower exposure to environmental liabilities.

The results of this study can also be understood through the lens of stakeholder theory. In the case of low-carbon emission companies, these firms address critical environmental concerns, a growing priority for many stakeholders. By actively reducing emissions and implementing strong ESG practices, these companies can enhance their reputations, reduce risk, and foster stronger relationships with their stakeholders, all of which contribute to better financial performance (Abeydeera et al., 2019; Liu et al., 2023). In contrast, high-carbon emission companies may face pushback from stakeholders if they are perceived as neglecting environmental responsibilities, resulting in weaker financial performance. Therefore, the results support that companies aligning with stakeholder expectations, particularly around environmental responsibility, are more likely to experience enhanced financial performance. The findings of this study encourage companies to take proactive steps in reducing their carbon footprint as part of a broader sustainability strategy, not only to meet stakeholder expectations but also to ensure long-term financial success.

5. Conclusion

The findings of this study indicate that ESG scores positively affect financial performance, and the influence of ESG scores on financial performance is stronger in low-carbon emission companies. This suggests that companies prioritizing sustainability meet the growing demands of environmentally conscious stakeholders and achieve enhanced operational efficiencies and long-term profitability. Firms that effectively manage their carbon emissions will likely experience reduced regulatory risks and lower costs, further amplifying the benefits of strong ESG practices. In line with stakeholder theory, these results demonstrate that companies that address the concerns of diverse stakeholders, including shareholders, employees, customers, suppliers, communities, government, and associations, by adopting sustainable and responsible business practices tend to perform better financially (Bruna & Nicolò, 2020; Donaldson & Preston, 1995). By reducing carbon emissions and improving ESG scores, companies align with stakeholder expectations, fostering trust, minimizing risks, and enhancing their profitability over the long term.

The findings of this study have several practical implications for both businesses and policymakers. For companies, the results highlight the importance of integrating ESG initiatives into their core strategies, mainly focusing on reducing carbon emissions. Firms that proactively manage their environmental impact will likely experience better financial performance and improve their competitive positioning in the marketplace. Investors can also use ESG scores as a critical metric to assess a company's long-term viability and sustainability. For policymakers, these results reinforce the need to create supportive regulatory frameworks encouraging businesses to adopt sustainable practices, especially in carbon-intensive industries.

Moreover, a limitation of this study is its failure to consider industry-specific differences in ESG practices and financial performance. Various sectors may encounter challenges and opportunities related to implementing ESG initiatives, which could influence the results. Furthermore, future research could extend the geographical scope of this analysis to encompass companies from additional regions. It would also be beneficial for future studies to explore the long-term effects of ESG initiatives, providing deeper insights into how these practices affect financial outcomes over time, particularly in light of the changing global regulatory environment. Additionally, further research could investigate specific sectoral dynamics, focusing on how industries, particularly those with high carbon emissions, can effectively enhance their ESG strategies to balance environmental and financial goals.

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