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Biases in ESG score used in investment

Evidence from global data

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Abstract

Environmental, Social, and Governance (ESG) factors have become crucial metrics in assessing corporate sustainability and ethical practices within the investment and corporate governance landscape. As the demand for transparent and reliable ESG ratings grows, concerns regarding the fairness and effectiveness of current rating systems have intensified. This research aims to contribute to the ongoing discourse by exploring the intricate relationships between company characteristics, industry dynamics, regional influences, and ESG scores. Through comprehensive regression analyses across various models and regions, the study highlights significant findings. Notably, it uncovers a substantial positive association between company size and ESG scores, indicating a potential size bias in the current rating system. Surprisingly, industry classification shows little to no effect on ESG scores, challenging conventional assumptions and emphasizing the need for nuanced sector-specific assessments. Regional differences emerge as a critical factor, with companies in developing regions consistently receiving lower ESG ratings, suggesting biases favoring developed economies. These results contribute to the debate surrounding the validity and trustworthiness of ESG ratings, underscoring the complexity and potential limitations of current methodologies. Collaboration among stakeholders is essential to enhance the transparency, accuracy, and reliability of ESG assessments for sustainable investing decisions, paving the way for a more equitable and sustainable future.

1. Introduction

1.1 Sustainability and responsibility in investing

In contemporary investment practices, sustainability and ethical responsibility often intertwine with the utilization of ESG scores, serving as a yardstick to measure a company's Environmental (E), Social (S), and Governance (G) performance. These scores, a staple for investors and stakeholders alike, offer a multifaceted evaluation of a company's sustainability and ethical conduct (Thomson Reuters, 2017). The calculation of ESG scores encompasses a spectrum of quantitative and qualitative factors, scrutinizing a company's stance on varied ESG issues such as carbon emissions, labor practices, diversity and inclusion, and board diversity. Traditionally represented on a numerical scale, higher ESG scores typically signal superior performance across ESG domains. Consequently, investors increasingly leverage these scores as a strategic tool for portfolio management and investment decision-making, given their ability to shed light on a company's long-term sustainability and associated risks.

The ascent of ESG investments mirrors a broader shift towards considerations of sustainability, responsibility, and ethical impact within the investment landscape (Matos, 2020; Verma and Shukla, 2021). This trend finds its impetus in a multitude of factors, ranging from the pressing global concern of climate change to evolving societal values, regulatory imperatives, and financial performance considerations. Climate change, propelled by greenhouse gas emissions, predominantly carbon dioxide, has propelled climate and sustainability issues into the limelight, garnering increased media attention and public scrutiny (IPCC, 2007; Pearce et al., 2019). As concerns escalate, there is a notable uptick in the attraction of investors towards sustainable or ESG investing (Matos, 2020; Verma and Shukla, 2021). Concurrently, there's been a palpable cultural shift towards heightened awareness and apprehension concerning the environmental and social impact of businesses (Lewis and Webley, 1994; Camilleri, 2021). This societal awakening translates into a growing preference among investors for companies that prioritize sustainable and ethical practices, especially resonant with younger generations cognizant of the environmental and social ramifications of their investments (Hale, 2016).

Regulatory frameworks further underscore the ascendancy of ESG investments, with governments worldwide enacting laws mandating companies to disclose their ESG practices (European Commission, 2021; Rose, 2020). Notable regulatory measures include the EU's Taxonomy Regulation and the Corporate Sustainability Reporting Directive (CSRD), aimed at steering investment towards environmentally sustainable economic activities while enhancing

sustainability reporting standards (European Commission, 2021; KPMG, 2021). Similarly, in the United States, the Securities and Exchange Commission (SEC) necessitates companies to disclose material information pertaining to ESG issues (Rose, 2020). Compliance with these regulations is imperative for companies and investors alike to ensure alignment with ESG principles.

Moreover, empirical evidence underscores the positive correlation between ESG focus and financial performance over the long term (Giese et al., 2019; Huang, 2021). Companies prioritizing ESG issues are better equipped to navigate associated risks such as climate change and social inequality, while also appealing to customers and employees supportive of sustainable and ethical practices (Henisz, 2019). Consequently, these companies stand poised for long-term success, aligning with investor objectives seeking sustainable returns.

The burgeoning growth of ESG investments, mirrored by a surge in both volume and value, underscores the significance of scrutinizing and researching this domain (Bloomberg, 2021; Hvidkjær, 2017; Gillan et al., 2021). However, disparities in ESG standards and reporting requirements across regions and sectors pose challenges (Arvidsson and Dumay, 2022). Notably, the banking sector faces mounting pressure to demonstrate sustainability and responsible business practices through ESG reporting (Buallay et al., 2021; Timár, 2021). Similarly, the utility sector, a significant emitter of greenhouse gases, grapples with critical ESG considerations in mitigating environmental impacts and adhering to regulations (Hu et al., 2020; Dye et al., 2021).

1.2 Critics of the ESG scoring

The integration of ESG factors into investment decision-making processes has garnered widespread attention and adoption in recent years. However, despite its growing popularity, the ESG scoring framework has faced criticism from various quarters. This chapter explores some of the key critiques leveled against the ESG scoring methodology and its implications.

Lack of consistency and standardization

We can observe the lack of consistency and standardization. Critics argue that one of the fundamental challenges with ESG scoring lies in the lack of consistency and standardization across different rating agencies and methodologies. Pérez et al. (2022) highlight the absence of uniform criteria and metrics for evaluating ESG performance, leading to discrepancies in scores assigned to the same company by different rating providers. This lack of harmonization undermines the reliability and comparability of ESG data, making it difficult for investors to

make informed decisions. Kotsantonis and Serafeim (2019) echo this sentiment, emphasizing the need for greater transparency and disclosure regarding the methodologies employed by rating agencies. Without standardized reporting practices and clear definitions of ESG metrics, there is a risk of misinterpretation and misrepresentation of companies' sustainability efforts.

Greenwashing and company size bias

Other possible critical angles are greenwashing and manipulation. This prominent criticism of the ESG scoring framework revolves around the phenomenon of greenwashing – the practice of companies overstating or misrepresenting their environmental or social credentials to appear more sustainable than they actually are. Critics argue that the reliance on self-reported data and subjective assessments leaves the door open for greenwashing practices (Yu et al., 2020). Sipiczki (2022) provides a critical examination of the ESG market, highlighting the potential for companies to manipulate their ESG scores through strategic reporting and selective disclosure of information. Baldi and Pandimiglio (2022) further explore the role of ESG scoring in greenwashing risk, emphasizing the need for robust frameworks to detect and mitigate such practices. Some critics raise ethical concerns about the commodification of sustainability and the potential dilution of corporate social responsibility (CSR) principles. Timár (2023) argues for the existence of greenwashing by analyzing the impact of climate change events on public awareness and the stock market, suggesting that certain actions. Aggarwal and Kadyan (2014) discuss the darker side of CSR, warning against the superficiality of green initiatives aimed at enhancing corporate reputations without genuine commitment to social and environmental causes. One prevalent observation in the analysis of ESG scoring is the tendency for larger corporations to receive higher scores compared to their smaller counterparts in some cases (Gregory, 2024). This phenomenon can be attributed to several factors, including greater resources and capabilities for implementing ESG initiatives, enhanced visibility and scrutiny from stakeholders, and the ability to navigate complex regulatory landscapes more effectively. The observed phenomenon of larger corporations receiving higher ESG scores has been documented in the literature. Studies such as Gregory (2024) have investigated the influence of firm size on ESG scores, while Drempetic, Klein, and Zwergel (2020) have scrutinized corporate sustainability ratings, shedding light on the disparities associated with firm size. Additionally, research by Akgun, Mudge, and Townsend (2021) has delved into how biases in ESG scores affect small-cap investors, providing further insights into the complex interplay between company size and ESG assessments. Moreover, larger companies often have dedicated sustainability teams and robust reporting structures, enabling them to demonstrate a stronger

commitment to environmental stewardship, social responsibility, and sound governance practices. This trend scores raises concerns about the potential for greenwashing, wherein companies may strategically emphasize certain ESG metrics to portray a more favorable image without substantial underlying sustainability improvements. While the resources and capabilities of large corporations can facilitate robust ESG reporting and initiatives, there is a risk that superficial commitments may overshadow genuine efforts toward environmental and social responsibility. Hence, it is imperative for investors and stakeholders to scrutinize ESG scores critically, looking beyond surface-level assessments to ascertain the authenticity and impact of corporate sustainability practices.

Profitability or Value bias

Despite claims about the financial benefits of ESG integration, some scholars question the predictive power of ESG scores in assessing future performance. Matos (2020) provides a critical review of responsible institutional investing worldwide, raising doubts about the efficacy of ESG strategies in delivering superior returns. Edmans (2023) goes as far as suggesting the end of ESG, arguing that the focus on ESG metrics may divert attention from more relevant factors driving long-term value creation. The proliferation of ESG reporting requirements and regulations has also drawn criticism from certain quarters. Zhang (2023) explores the inhibitive effects of green finance regulations on companies, highlighting concerns about compliance costs and administrative burdens. Lin et al. (2023) provide evidence of ESG greenwashing and its impact on equity mispricing in China, underscoring the challenges associated with regulatory enforcement and oversight. There exists a pertinent discourse regarding the potential bias of ESG assessments towards profitable companies, as they may possess greater resources to allocate towards advertising and greenwashing efforts. Studies such as Brogi and Lagasio (2019) have examined the relationship between ESG factors and company profitability, shedding light on the intricate dynamics at play. Similarly, Taddeo, Agnese, and Busato (2024) have contributed to this discourse by reevaluating the impact of ESG practices on profitability, considering cross-dimensional substitutability. These studies suggest that profitable companies may wield a competitive advantage in shaping their ESG narratives, potentially influencing ESG assessments and perpetuating biases in favor of financial performance. This underscores the importance of exercising caution when interpreting ESG scores and highlights the need for robust oversight and accountability mechanisms to mitigate the influence of profit-driven agendas on sustainability evaluations. The relationship between ESG practices and company valuation, particularly in terms of book to market ratio or price-to-

earnings (P/E) ratio, is a subject of ongoing research. Kim and Li (2021) delve into the impact of ESG practices in corporate finance, shedding light on the multifaceted dynamics at play. Similarly, Berg, Heeb, and Kölbel (2022) explore the economic implications of ESG ratings, providing valuable insights into the linkages between sustainability performance and financial metrics. These studies contribute to the discourse surrounding the under or overvaluation of companies based on ESG considerations, suggesting that robust ESG practices may potentially influence market perceptions and impact valuation metrics such as book to market ratio or P/E ratio. However, the precise nature and extent of this relationship warrant further investigation to elucidate the nuanced interplay between ESG performance and market valuation. ESG assessments may exhibit a bias towards profitable or overvalued companies, potentially skewing evaluations in favor of financial performance. This bias could arise from these companies' ability to shape their ESG narratives, leading to a distortion of market perceptions and raising concerns about the integrity of sustainability assessments. When a company is overvalued or experiences a market rally, there's a tendency for stakeholders to perceive its performance more positively than reality might dictate. This phenomenon can contribute to a higher ESG score as investors and analysts may be inclined to overlook potential weaknesses or shortcomings in sustainability practices, further exacerbating the bias towards profitable or overvalued companies in ESG assessments.

Industry bias (lack of representation)

The assessment of Environmental, Social, and Governance (ESG) performance reveals industry bias, particularly evident in sectors such as utilities and oil and gas extraction, where companies may not receive low enough scores despite significant environmental impacts. The inherent challenges associated with these industries, including carbon emissions, habitat destruction, and water contamination, are often inadequately captured by ESG metrics. While efforts to implement sustainability initiatives are commendable, the complexities of operations and regulatory landscapes can hinder accurate ESG performance measurement. For instance, research by Garcia, Mendes-Da-Silva, and Orsato (2017) suggests that sensitive industries, including those in emerging markets, may produce better ESG performance, potentially masking underlying environmental and social issues. Moreover, the financial industry, despite its regulatory scrutiny, is not immune to biases in ESG ratings (Crespi & Migliavacca, 2020). Furthermore, the intricacies of each industry can pose challenges in accurately measuring and comparing ESG performance across sectors. The diverse range of activities within industries can result in variations in the materiality of ESG factors, making it difficult to develop

standardized metrics that capture the unique challenges and opportunities faced by each sector (Mooij, 2017). Moreover, the impact of ESG practices on financial performance may vary across industries, with certain sectors benefiting more from ESG initiatives than others (Peiró-Signes & Segarra-Oña, 2013). This disparity underscores the need for a more nuanced evaluation of ESG performance, one that considers industry-specific challenges and standards.

Regional bias

Regional differences in ESG scores can be present across markets such as the US, EU, and China, as well as in emerging economies in regions like Latin America, Africa, and others. These differences can stem from varying regulatory frameworks, cultural norms, socioeconomic conditions, and levels of institutional development. Developed countries often have more stringent regulations and better-established governance structures, leading to higher ESG scores due to greater adherence to sustainability practices (Peiró-Signes and Segarra-Oña, 2013). Additionally, developed nations may benefit from more robust data collection and reporting mechanisms, further enhancing their ESG ratings compared to their counterparts in developing regions (Pillai et al., 2024). The rating bias towards developed countries is evident as asymmetries in ESG market efficiency persist, favoring regions with more mature financial systems and greater transparency (Naeem et al., 2023). This suggests that ESG assessments may not fully capture the environmental, social, and governance realities of companies in developing countries, thus potentially underestimating their sustainability performance.

In conclusion, the examination of critics of ESG scoring reveals significant challenges and biases inherent in the methodology. The lack of consistency and standardization across rating agencies, coupled with the risk of greenwashing, undermines the reliability and comparability of ESG data. Moreover, industry bias presents a notable concern, particularly in sectors like utilities and oil and gas extraction, where companies may not receive appropriately low scores despite significant environmental impacts. The financial industry also faces scrutiny, highlighting the need for robust oversight to mitigate biases in ESG ratings. Several questions emerge from the literature and discussions on ESG scoring biases. Firstly, how much of the ESG score is influenced by these biases, such as greenwashing and industry representation? Secondly, what is the impact of company size, profitability, and valuation on ESG scores, and how do these factors contribute to biases? Thirdly, are there significant sectoral differences in ESG scores, and if so, what are the underlying reasons for these variations? Lastly, how much does the region matter in ESG scoring, and is there a regional bias favoring developed countries? In my study I am focusing on these questions. I am trying to further evaluate the effects and

significance of the mentioned biases. Addressing these questions is crucial to ensuring the integrity and effectiveness of ESG scoring frameworks in promoting sustainable and responsible business practices globally. Further research and scrutiny are essential to address these concerns and enhance the credibility of ESG assessments in guiding investment decisions and fostering positive environmental, social, and governance outcomes.

By uncovering biases and understanding their implications, this research contributes to the ongoing discourse on ESG evaluation and promotes more informed decision-making in sustainable investing and corporate governance. Therefore my research aims to investigate the determinants of ESG scores within the corporate landscape. My approach to analyzing the relationship between these variables and ESG scores involves employing Ordinary Least Squares (OLS) regression analysis. By utilizing cross-sectional OLS regressions, I aim to uncover the impact of each variable on the ESG scores assigned to different companies. I explore various factors that could potentially influence these scores, including company-specific variables such as Size, ROE, P/E, and BtM, as well as industry and regional dummies. Through this methodology, I seek to provide insights into the factors driving variations in ESG performance across companies and industries. My initial hypotheses for the effects of the variables in the regression on the ESG score are as follows:

Size: Sometimes it is hypothesized that larger companies may have greater resources and capabilities to invest in environmental, social, and governance initiatives, potentially leading to higher ESG scores. However, in a fair rating system focused solely on environmental, governance, and social factors, Size should have no or only a small effect on ESG scores.

ROE (Return on Equity): Higher ROE may indicate better financial performance, which could correlate with stronger ESG performance due to increased ability to invest in sustainability practices and initiatives. But similarly to Size, in a fair rating system, ROE should have no or negligible effect on ESG scores.

P/E (Price-to-Earnings) ratio: A P/E ratio suggests that whether a company is under- or overvalued this should not be in connection with its ESG rating, so P/E should have no effect on ESG scores.

BtM (Book-to-Market) ratio: Companies with higher BtM ratios may have undervalued assets, however again this should not be in connection with its ESG rating, so BtM should have no effect on ESG scores.

Regions: Regions should ideally have no or only a small effect on ESG scores in a fair rating system because the assessment should primarily focus on universal environmental, governance, and social factors rather than geographical considerations alone. However, it is acknowledged that regional differences in regulatory frameworks, cultural norms, and stakeholder expectations may indirectly influence a company's approach to ESG practices. For example, companies operating in regions with stricter environmental regulations may be incentivized to adopt more sustainable practices, potentially leading to higher ESG scores. Therefore, while regions may have some influence on ESG scores due to contextual factors, in an ideal scenario, the effects should be minimal compared to the core ESG criteria, which are universally, globally applicable and were introduced for comparability regardless of geographical location.

Industry: Specific industries (For example: oil, gas, utilities or mining) inherently have different levels of ESG performance due to the nature of their operations and the associated environmental and social impacts. In a fair rating system, Industry dummies should have an effect on ESG scores, reflecting the varying environmental, governance, and social factors across different industries.

With a focus on uncovering the underlying determinants of ESG scores, my research aims to contribute to the understanding of how environmental, social, and governance factors are evaluated within the corporate sphere. By identifying significant predictors of ESG scores, this study can inform stakeholders, policymakers, and investors about the key determinants of ESG scores, facilitating more informed decision-making and promoting sustainable business practices in the global marketplace.

2. Data and Methodology

2.1 Methodology

The methodology employed in this study involves the use of cross sectional Ordinary Least Squares (OLS) regressions to analyze the relationship between ESG scores and various independent variables. To begin with, the dependent variable in the OLS regressions is the ESG score assigned to each company. The independent variables considered in the regression analysis include natural logarithm of Size, Return on Equity (ROE), Price-to-Earnings (P/E) ratio, and Book-to-Market ratio.

$$ESG = \beta_0 + \beta_{Size}Ln(Size) + \beta_{ROE}ROE + \beta_{P/E}P/E + \beta_{Btm}BtM \quad (1.)$$

Using the natural logarithm of Size (LnSize) in the regression model offers several advantages. Firstly, it helps mitigate the issue of heteroscedasticity, or unequal variance across different levels of company size. By taking the natural logarithm of Size, the scale of the variable is transformed, resulting in a more symmetrical distribution of data points and reducing the impact of extreme values. Additionally, using LnSize allows for the interpretation of the coefficient as an elasticity, providing insights into the proportional change in ESG scores associated with a percentage change in company size. This transformation also facilitates the comparison of relative effects across different independent variables in the regression model, enabling a more meaningful interpretation of the results. Overall, incorporating LnSize enhances the robustness and interpretability of the regression analysis, ensuring more accurate and reliable insights into the relationship between company size and ESG scores. When Size is mentioned in the rest of the study it always refers to the natural logarithm of Size in the regression analysis.

The inclusion of Size as an independent variable allows for the examination of the impact of company size on ESG scores. Larger companies may have greater resources and capabilities to potentially influencing their ESG scores. Meanwhile, ROE serves as a proxy for profitability, enabling an assessment of the relationship between a company's financial performance and its ESG score. The P/E ratio reflects market valuation, providing insights into how market perceptions of a company's value may affect its ESG score. While the Book-to-Market ratio offers an indication of a company's valuation relative to its book value, helping to identify any biases related to overvaluation or undervaluation in ESG assessments. By conducting OLS regressions with ESG score as the dependent variable and Size, ROE, P/E ratio, and Book-to-Market ratio as independent variables, this study aims to estimate the effects of these variables on ESG scores and identify potential biases in ESG scoring frameworks. If a significant proportion of the variation in ESG scores can be explained by these independent variables, it may indicate biases in ESG assessments, suggesting that ESG scores are influenced not only by sustainability metrics but also by factors such as company size, profitability, and market valuation.

In addition to the base, industry classification variables are included as dummy variables in the regression analysis. The industry categories considered are Industrial, Utility, Transportation, Banking, Insurance, and Other. However, to avoid multicollinearity issues, only five dummy variables representing Utility, Transportation, Banking, Insurance, and Other industries are included in the regression model, with the Industrial category serving as the base case. Each dummy variable takes on a value of 1 if the company belongs to the corresponding industry

category and 0 otherwise. By including these dummy (D) variables in the regression model, the analysis seeks to explore the impact of industry affiliation on ESG scores while controlling for other factors such as company size, profitability, and valuation metrics.

$$ESG = \beta_0 + \beta_{Size}Size + \beta_{ROE}ROE + \beta_{P/E}PE + \beta_{Btm}BtM + D_{Utility} \dots + D_{Othe} \quad (2.)$$

The inclusion of industry dummy variables allows for the examination of sectoral differences in ESG scores, helping to identify any biases associated with industry representation. Moreover, by comparing the coefficients of the dummy variables to the base case (Industrial), insights can be gained into how companies in different industries fare in terms of ESG performance relative to the baseline industry. I applied a classification with the following 6 broad industry categories: Industrial, Utility, Transportation, Banking, Insurance and Other (See the details in the 2.2 Data section). By incorporating industry classification variables into the regression analysis alongside other independent variables, this study aims to provide a comprehensive understanding of the factors influencing ESG scores and the role of industry affiliation in shaping sustainability assessments.

Building upon the previous regression model, the analysis further incorporates regional classification variables as dummy variables to explore the influence of geographical location on ESG scores. Initially, a single dummy variable representing developing regions is introduced, with developed regions serving as the base case.

$$ESG = \beta_0 + \beta_{Size}Size + \beta_{ROE}ROE + \beta_{\frac{P}{E}}PE + \beta_{Btm}BtM + D_{Utility} \dots + D_{Other} + D_{Developing} \quad (3.)$$

Subsequently, separate dummy variables are added for each specific region, including the United States, European Union, Asia, Latin America, and Africa. Among these, the last four regions (EU, Asia, Latin America, and Africa) are included as dummy variables in the regression model, with the United States serving as the base case.

$$ESG = \beta_0 + \beta_{Size}Size + \beta_{ROE}ROE + \beta_{\frac{P}{E}}PE + \beta_{Btm}BtM + D_{Utility} \dots + D_{Othe} + D_{EU} + D_{Chin} + D_{Latam} + D_{Africa} \quad (4.)$$

Each regional dummy variable takes on a value of 1 if the company is located in the corresponding region and 0 otherwise. By including these dummy variables in the regression model, the analysis aims to assess whether there are regional differences in ESG scores while controlling for other factors such as company-specific characteristics and industry affiliation. The incorporation of regional classification variables allows for the examination of

geographical variations in ESG performance, providing insights into the extent to which sustainability practices may differ across regions. Moreover, by comparing the coefficients of the dummy variables to the base case (United States), the analysis can elucidate how companies in different regions fare in terms of ESG performance relative to companies in the United States. By integrating regional dummy variables into the regression analysis alongside industry and other independent variables, this study seeks to enhance understanding of the factors influencing ESG scores and the role of geographical location in shaping sustainability assessments. This approach enables the identification of region-specific patterns and biases in ESG scoring frameworks.

Following the broader regression analysis encompassing all regions, the study proceeds to conduct region-specific regressions to delve deeper into the nuances of ESG scoring within distinct geographical contexts. Specifically, separate ordinary least squares (OLS) regressions are performed for each region, including the United States, European Union, China, Latin America, and Africa.

$$ESG = \beta_0 + \beta_{Size}Size + \beta_{ROE}ROE + \beta_{P/E}PE + \beta_{Btm}BtM + D_{Utility} \dots + D_{Other} \quad (5.)$$

In these region-specific regressions, the dependent variable remains the ESG score, while the independent variables comprise Size and ROE, which were found to be significant in the earlier regression analysis, alongside industry dummy variables. By isolating the analysis to individual regions, the study aims to discern region-specific drivers of ESG performance and identify any unique factors that may influence sustainability ratings within each geographic area.

2.2 Data

The data used in this study were sourced from Refinitiv Eikon, a comprehensive financial database widely utilized by researchers and practitioners in the field (Velte, 2017; Landis and Skouras, 2021). This database offers a rich array of financial metrics and ESG scores that are crucial for conducting empirical analysis and assessing the performance of companies across various regions and sectors. All variables were downloaded for 31.12.2022. to ensure the most comprehensive and historical fact-based dataset available.

The primary variables included in the dataset encompass a range of financial and ESG-related metrics. These variables are essential for evaluating companies' financial performance, market valuation, and sustainability practices. The key variables extracted from the dataset are as follows:

- ESG Score:

The ESG score, obtained from Datastream within the Refinitiv Eikon platform, serves as a pivotal metric for assessing companies' Environmental, Social, and Governance performance. As a measure of a company's performance in key sustainability and ethical areas. It evaluates how well a company manages its environmental impact, treats its employees and stakeholders, and upholds governance standards. ESG scores are typically assigned by rating agencies based on various criteria such as carbon emissions, labor practices, diversity, and board composition. A higher ESG score indicates better performance in these areas, suggesting that the company is more sustainable and socially responsible. Investors often use ESG scores to assess the sustainability and ethical practices of potential investments and incorporate them into their decision-making processes. This score provides the basis for the analysis.

- Shares Outstanding:

Shares outstanding represent the total number of shares issued by a company and are important for calculating market capitalization (Size).

- Unadjusted Price:

Price data reflects the market price of a company's shares and is used for calculating market capitalization (Size). To avoid any bias in the data, when a stock is not denominated in dollars, I used the 31.12.2023. given exchange rate to exchange all data to dollars.

- Size:

Market capitalization, often referred to as "size," is a fundamental metric used to measure the total value of a company's outstanding shares in the stock market. It is calculated by multiplying the current market price per share by the total number of outstanding shares. Market capitalization provides insights into a company's size and relative importance within the market. Larger companies typically have higher market capitalizations, reflecting their greater influence and scale of operations. Investors often use market capitalization to categorize companies into different size segments, such as large-cap, mid-cap, and small-cap. Size can impact various aspects of investment decision-making, including risk and return considerations. For instance, larger companies may offer more stability and liquidity but could potentially have lower

growth prospects compared to smaller, more nimble firms. Because all the price data was exchanged to dollars previously, the size of the company is also always in dollars. Therefore, they are comparable without any problem in a cross-sectional model.

- Return on Equity (ROE):

ROE is a key financial ratio that measures a company's profitability by calculating the return generated on shareholders' equity. Return on Equity (ROE) is a key financial ratio that measures a company's profitability by evaluating how effectively it utilizes shareholders' equity to generate earnings. It is calculated by dividing net income by shareholders' equity and is expressed as a percentage. ROE indicates the efficiency with which a company generates profits from its equity investment and serves as a measure of management's ability to generate returns for shareholders. A higher ROE typically signifies that a company is effectively utilizing its equity to generate profits, reflecting strong financial performance and management effectiveness. Conversely, a lower ROE may indicate inefficiency in capital utilization or poor financial performance relative to shareholders' equity. Investors often use ROE to assess a company's profitability and compare it with industry peers to evaluate relative performance. Overall, ROE provides valuable insights into the company's financial health and its ability to generate returns for shareholders.

- Price to Earnings Ratio (P/E):

The P/E ratio compares a company's current market price per share to its earnings per share (EPS) and is used to assess its valuation relative to its earnings. Investors utilize the P/E ratio as a valuation tool to gauge whether a stock is overvalued, undervalued, or fairly priced relative to its earnings potential. A higher P/E ratio typically indicates that investors are willing to pay a premium for the company's earnings, reflecting expectations of future growth. Conversely, a lower P/E ratio may suggest that the stock is undervalued or that market sentiment is pessimistic about the company's growth prospects. Overall, the P/E ratio provides valuable insights into investor sentiment and market expectations regarding a company's earnings performance.

- Book to Market ratio (BtM):

This ratio is a financial metric used to evaluate the relationship between a company's market value and its book value. It is calculated by dividing the market price per share by the book value per share. The BtM ratio provides insights into whether a stock is

trading at a premium or discount relative to its intrinsic value as reflected in its accounting books. A BtM ratio greater than 1 suggests that the market values the company at a premium to its book value, indicating potential overvaluation. Conversely, a BtM ratio below 1 implies that the market values the company at a discount to its book value, signaling potential undervaluation. However, it's essential to consider other factors such as industry norms, growth prospects, and market conditions when interpreting the BtM ratio. Additionally, variations in accounting methods and asset valuation practices can affect the accuracy of book values, influencing the reliability of the BtM ratio as a valuation metric. Nonetheless, the BtM ratio remains a valuable tool for investors seeking to gauge the relative attractiveness of a company's stock based on its underlying asset value.

- Industry Classification:

Industry classification categorizes companies into specific sectors or industries based on their primary line of business, facilitating comparisons and analysis within homogeneous groups. In this study, the General Industry Classification (WC06010), which is a broad industry classification system to categorize companies into distinct sectors for analysis. The classification system includes six main industry categories:

1. Industrial
2. Utility
3. Transportation
4. Banking
5. Insurance
6. Other

Using a broad classification system offers several advantages in research analysis. It simplifies the categorization process by grouping companies into broader sectors based on their primary line of business or industry focus. This simplification facilitates easier comparison and interpretation of data across different sectors, allowing researchers to identify overarching trends and patterns more effectively. By encompassing a broad classification system of industries, more robust conclusions can be drawn that are applicable across multiple sectors and market environments.

The dataset encompasses companies listed on major stock exchanges across different regions and countries to capture a diverse range of market dynamics and regulatory environments.

Specifically, the following regions and countries were included:

- United States (NYSE, NASDAQ)
- European Union (Germany, France, Netherlands)
- Asia (China)
- Latin America (Brazil, Argentina, Chile, Colombia, Mexico)
- Africa (South Africa, Nigeria, Egypt)

By incorporating data from these diverse regions and markets, this study aims to provide a comprehensive analysis of ESG performance and financial metrics across various geographical regions on different development levels. Companies with missing values were dropped from the dataset. After that cleaning process, in total the dataset includes the described variables of 9713 companies.

3. Results

The results chapter presents the findings from the previously described series of regression analyses aimed at investigating the determinants of ESG scores across different regions and industries. Through the regressions, I explore the influence of company size, profitability, valuation metrics, industry classification, and regional factors on ESG scores. The analyses tries to provide insights into the extent to which these variables affect ESG scores and highlight potential biases in ESG assessments. The results chapter consist of three stages, each adding layers of complexity to the analysis. I commence with the base model, scrutinizing the relationship between ESG scores and fundamental variables such as company size, profitability metrics, and valuation ratios. Subsequently enhance the model by incorporating industry classifications, shedding light on how sectoral differences impact ESG scores. Finally, extend the model to include regional factors, dissecting the nuances of ESG scoring across diverse geographical landscapes.

3.1 Base model

In the initial stage of analysis, the focus is on the base model, aimed at uncovering the intricate interplay between key independent variables—namely, company size, return on equity (ROE), price-to-earnings (P/E) ratio, and book-to-market (BtM) ratio—and the dependent variable, ESG score. Through rigorous regression analysis, as depicted in Table 1, the goal is to discern the extent to which these fundamental metrics influence the assessment of environmental, social, and governance performance.

1. Table, Base OLS Regression model

	1	2	3	4
Constans	-9.99	-8.44	-6.03	-5.93
t-statistic	-(6.11)	-(5.06)	-(2.51)	-(2.46)
Ln(Size)	3.52	3.42	3.30	3.29
t-statistic	(32.87)	(31.27)	(21.88)	(21.74)
ROE		0.01	0.01	0.01
t-statistic		(4.29)	(2.74)	(1.78)
P/E			0.00	0.00
t-statistic			-(0.70)	-(0.72)
BtM				0.02
t-statistic				(0.69)
R²	0.199	0.200	0.141	0.141

Description: In the table the columns represent different regression models, denoted by numbers. The rows display the coefficients of the independent variables seen in the first column for each regression model, including the constant term. Below them in parentheses are the corresponding corrected t-statistics (the critical value for 5% level of significance is 1.96 and 2.576 for 1%). The final row indicates the coefficient of determination (R^2). Source: own edit.

The coefficient for Size is positive and statistically significant across all four regressions. This suggests that larger companies tend to have higher ESG scores. The t-statistic values are all highly significant, indicating a strong relationship between company size and ESG scores. The significant and positive coefficients observed for Size in all four regressions signify a notable effect of company size on ESG scores. The consistent statistical significance, as indicated by the highly significant t-statistic values, underscores the robust relationship between the two variables. This finding suggests that larger companies generally receive higher ESG scores, implying a substantial impact of company size on sustainability assessments. For every 1% increase in the size of the company, the ESG score is expected to increase by approximately $(3.4 / 100) = 0.034$ units. So, for example, if the size of a company increases by 10%, the ESG score is expected to increase by about $3.4 * \text{Ln}(1.10) \approx 0.34$ units. Given that Size is measured in dollars it has a large magnitude. So, this interpretation suggests that even a relatively small

percentage increase in company size can lead to a measurable increase in its ESG score. The coefficient for ROE is positive and statistically significant in the second and third regressions. However, it is not statistically significant in the first and fourth regressions. This indicates that there is a positive relationship between a company's return on equity and its ESG score in some cases, but not in others. The coefficient for P/E is not statistically significant in any of the regressions. This suggests that there is no significant relationship between a company's price-to-earnings ratio and its ESG score. The coefficient for BtM is not statistically significant in any of the regressions. This indicates that there is no significant relationship between a company's book-to-market ratio and its ESG score.

The R-squared values indicate the proportion of variance in the dependent variable (ESG score) that is explained by the independent variables in each regression. The R-squared values range from 0.141 to 0.200, indicating that the independent variables collectively explain between 14.1% and 20.0% of the variance in ESG scores. This suggests that there are other factors not included in the model that also influence ESG scores. Among the four regressions, the second regression appears to be the most robust, as it has the highest R-squared value of 0.200, indicating that the independent variables collectively explain 20.0% of the variance in ESG scores. Additionally, the coefficients for both Size and ROE are statistically significant in this regression. However, it is important to note that the coefficient for ROE, although statistically significant in the second regression, may not be economically significant, as its impact on the ESG score is relatively small compared to Size. While the R-squared values are not particularly high, it is noteworthy that only two variables, Size (and ROE), are capable of explaining up to 20% of the variance in ESG scores. This suggests that company size and profitability play significant roles in determining ESG scores.

Overall, these findings underscore the complexity of ESG scoring and the multifaceted factors that influence sustainability assessments. While Size and ROE appear to be important determinants of ESG scores, further research is needed to explore additional variables that may contribute to the understanding of ESG performance. The significant impact of Size alone on ESG scores, explaining up to 20% of the variance, suggests a notable size bias in ESG assessments. This finding underscores the influence of company size on ESG performance evaluations, with larger companies often receiving higher scores. However, it raises questions about the comprehensiveness of ESG scoring frameworks, maybe firm Size has too big of an influence on the rating.

3.2 Additional Industry model

In this section, the analysis is extended by incorporating industry-specific factors into the regression model to better understand their influence on ESG scores. The results, presented in Table 2, provide valuable insights into how various industries contribute to differences in ESG performance among companies. By including industry dummies in the model, we aim to uncover any sector-specific biases or trends that may affect ESG scoring.

2. Table, OLS Regression model with Industry classification

	1	2	3
Constans	-9.47	-7.83	-4.18
t-statistic	-(5.74)	-(4.65)	-(1.68)
Ln(Size)	3.47	3.37	3.20
t-statistic	(31.98)	(30.37)	(20.64)
ROE		0.01	0.01
t-statistic		(4.37)	(1.89)
P/E			0.00
t-statistic			-(0.76)
BtM			0.01
t-statistic			(0.50)
Utility dummy	0.89	0.92	0.52
t-statistic	(1.44)	(1.50)	(0.74)
Transportation dummy	-0.30	-0.32	-0.56
t-statistic	-(0.54)	-(0.58)	-(0.85)
Banking dummy	-0.34	-0.39	-0.69
t-statistic	-(1.46)	-(1.66)	-(2.69)
Insurance dummy	0.89	0.96	0.85
t-statistic	(2.74)	(2.93)	(2.23)
Other dummy	0.23	0.22	-0.03
t-statistic	(1.16)	(1.11)	-(0.15)
R²	0.201	0.203	0.140

Description: In the table the columns represent different regression models, denoted by numbers. The rows display the coefficients of the independent variables seen in the first column for each regression model, including the constant term. Below them in parentheses are the corresponding corrected t-statistics (the critical value for 5% level of significance is 1.96 and 2.576 for 1%). The final row indicates the coefficient of determination (R^2).

Source: own edit.

Size continues to exhibit a significant positive association with ESG scores across all three regressions, indicating a size bias in ESG assessments. However, while ROE also shows a positive relationship with ESG scores, its economic significance appears limited, as evidenced by its relatively low coefficient values. Furthermore, the lack of significant effects for the BtM and P/E ratios still suggests that market valuation metrics may not significantly influence ESG scores.

Interestingly, the industry dummy variables show little to no effect on ESG scores, with the exception of the Insurance sector, which demonstrates a positive and statistically significant coefficient across all three regressions. This unexpected finding raises questions about the underlying factors driving the relationship between the Insurance sector and ESG scores. It's possible that the Insurance sector's emphasis on risk management and corporate governance practices, along with its regulatory environment, may contribute to its relatively higher ESG scores. The coefficient for the insurance industry dummy variable is 0.89, indicates that, holding all other variables constant, being in the insurance industry is associated with an increase in the ESG score by 0.89 units. The t-statistics suggest that this effect is statistically significant at the 5% level in all three models. Thus, companies in the insurance sector seem to have higher ESG scores compared to the base category (industrial sector) after controlling for company size, ROE, P/E ratio, and Book-to-Market ratio. However, the economic significance of this relationship remains uncertain, as the magnitude (0.89 units) of the coefficient might not translate into meaningful differences in ESG performance. But surprisingly, industry dummies show little to no effect on ESG scores, despite certain industries, such as utilities, having a larger environmental and social impact. This suggests a lack of industry representation in ESG scoring frameworks.

3.3 Regional model

The findings presented in Table 3 shed light on the intricate relationship between regional factors and ESG scores, illuminating potential disparities and patterns across different geographic areas.

3. Table, OLS Regression model with Industry classification and Regions

	1	2	3	4	5
Constans	-29.01	-27.68	-29.99	-28.84	-36.04
t-statistic	-(16.61)	-(15.49)	-(17.71)	-(16.64)	-(18.41)
Ln(Size)	5.10	5.02	5.05	4.97	5.48
t-statistic	(41.75)	(40.18)	(42.67)	(41.15)	(40.12)
ROE		0.01		0.01	0.00
t-statistic		(3.31)		(3.01)	(2.34)
Utility dummy	0.47	0.49	-0.05	-0.03	0.16
t-statistic	(0.81)	(0.85)	-(0.09)	-(0.05)	(0.28)
Transportation dummy	-0.48	-0.50	-0.53	-0.53	-0.54
t-statistic	-(0.92)	-(0.95)	-(1.04)	-(1.06)	-(1.08)
Banking dummy	-0.70	-0.73	-0.54	-0.57	-0.36
t-statistic	-(3.18)	-(3.32)	-(2.54)	-(2.67)	-(1.68)
Insurance dummy	0.32	0.39	0.20	0.26	0.23
t-statistic	(1.05)	(1.25)	(0.67)	(0.87)	(0.76)
Other dummy	0.46	0.45	0.14	0.13	0.08
t-statistic	(2.47)	(2.42)	(0.77)	(0.73)	(0.44)
Developing dummy	-15.97	-15.85			
t-statistic	-(24.19)	-(23.97)			
EU dummy			13.49	13.40	13.41
t-statistic			(15.77)	(15.66)	(15.79)
China dummy			-16.82	-16.72	19.13
t-statistic			-(22.96)	-(22.80)	(4.07)
Latam dummy			-10.53	-10.40	26.62
t-statistic			-(10.61)	-(10.48)	(5.44)
Africa dummy			-5.74	-5.70	29.53
t-statistic			-(4.10)	-(4.07)	(6.19)
Developing Interaction					-2.19
t-statistic					-(7.72)
R²	0.296	0.296	0.345	0.345	0.354

Description: In the table the columns represent different regression models, denoted by numbers. The rows display the coefficients of the independent variables seen in the first column for each regression model, including the constant term. Below them in parentheses are the corresponding corrected t-statistics (the critical value for 5% level of significance is 1.96 and 2.576 for 1%). The final row indicates the coefficient of determination (R^2). Source: own edit.

Firstly, the positive and statistically significant coefficient for Size across all five regressions reaffirms the presence of a possible size bias in ESG assessments. Regarding industry

classification, the coefficients show mixed results similarly to the previous case without the regional control variables. Again, the Insurance sector demonstrates a positive and statistically significant coefficient across all regressions, but it still lacks economic significance. Other sectors again show less consistent and statistically significant effects on ESG scores, indicating little to no effect on ESG scores.

The regional dummy variables provide insights into the influence of geographical location on ESG scores. The dummy variable for Developing countries exhibits a negative and statistically significant coefficient across all regressions. Interpreting this, the negative coefficient suggests that, on average, companies operating in developing countries tend to have lower ESG scores compared to those operating in developed countries. The magnitude of -15.97 means that being located in a developing country is associated with a decrease in the ESG score by approximately 15.97 units, all else being equal. This implies a substantial impact of the country's developmental status on the ESG performance of companies operating within its borders. Additionally, region-specific dummy variables for the European Union, China, Latin America, and Africa show varying effects on ESG scores. Notably, China, Latin America, and Africa exhibit negative coefficients, suggesting lower ESG scores compared to the base case (the United States). The coefficients for the European Union dummy are positive and statistically significant, indicating higher ESG scores for companies in the EU relative to the US. Overall, the regression results highlight the complex interplay between industry classification and regional factors in shaping ESG scores. While size and regional factors appear to exert significant influences on ESG scores, the expected impact of industry classification is missing.

The last regression (number 5 in Table 3) includes an interaction term between the Developing dummy and Size, provides valuable insights into the differential impact of company size on ESG scores across developed and developing countries. The negative and statistically significant coefficient for the Developing Interaction term indicates that the effect of size on ESG scores is attenuated in developing countries compared to developed ones. This finding suggests that while larger companies generally receive higher ESG scores, this relationship is less pronounced in developing regions. The interaction effect underscores the importance of considering contextual factors such as institutional frameworks, regulatory environments, and socio-economic conditions. It also highlights the need for tailored sustainability strategies that account for the unique challenges and opportunities present in different regions, ensuring more effective and equitable ESG practices globally.

3.4 Region by Region analysis

The industry model, which also includes Size, ROE, P/E, and BtM as independent variables, is further expanded to encompass regional variations. The regressions similar to in Table 2 is rerun but region by region in this case. This comprehensive approach enables us to explore how industry classifications interact with regional factors to shape ESG scores. By incorporating Size, ROE, P/E, and BtM alongside industry categories within each region (See results in Table 4), we gain deeper insights into the nuanced relationships between financial metrics, industry dynamics, and regional influences on sustainability performance.

4. Table, OLS Regression model with Industry classification by Region

	US	EU	China	Latam	Africa
Constans	-44.61	-32.10	-100.61	21.04	-59.37
t-statistic	-(13.98)	-(5.10)	-(9.43)	(2.57)	-(3.07)
Ln(Size)	6.14	6.29	8.38	1.60	6.82
t-statistic	(29.42)	(14.63)	(13.08)	(3.43)	(5.79)
ROE	0.01	-0.03	-0.07	0.02	-0.04
t-statistic	(1.28)	-(0.84)	-(2.07)	(0.39)	-(0.36)
P/E	0.00	-0.04	-0.01	-0.03	0.00
t-statistic	-(0.71)	-(1.79)	-(1.17)	-(2.85)	-(0.26)
BtM	-0.03	-0.25	-0.72	-0.35	-1.28
t-statistic	-(1.21)	-(1.31)	-(3.38)	-(1.52)	-(1.68)
Utility dummy	0.32	-7.13	-0.98	3.13	-7.62
t-statistic	(0.39)	-(3.75)	-(0.70)	(1.84)	-(1.63)
Transportation dummy	-1.26	-0.27	-3.00	0.64	-0.78
t-statistic	-(1.74)	-(0.16)	-(2.36)	(0.27)	-(0.28)
Banking dummy	-0.65	1.29	-1.92	2.15	-3.85
t-statistic	-(2.53)	(1.16)	-(2.62)	(1.97)	-(2.82)
Insurance dummy	-0.38	0.71	-1.83	0.44	-1.74
t-statistic	-(1.00)	(0.79)	-(1.30)	(0.31)	-(1.13)
Other dummy	-0.71	-1.10	0.86	0.30	-0.06
t-statistic	-(2.35)	-(2.04)	(2.17)	(0.45)	-(0.07)
R²	0.408	0.458	0.227	0.107	0.231

Description: In the table the columns represent different regression models, denoted by numbers. The rows display the coefficients of the independent variables seen in the first column for each regression model, including the constant term. Below them in parentheses are the corresponding corrected t-statistics (the critical value for 5% level of significance is 1.96 and 2.576 for 1%). The final row indicates the coefficient of determination (R^2). Source: own edit.

Notably, there are significant differences in the coefficients and t-statistics across regions, indicating varying impacts of these factors on ESG scores. In the US, company size (Size) has a strong positive effect on ESG scores, with a coefficient of 6.14 and a highly significant t-statistic of 29.42. This suggests that larger companies in the US tend to receive higher ESG

scores, indicating a potential size bias in ESG assessments within this region. Additionally, the R^2 value of 0.408 indicates that the independent variables explain approximately 40.8% of the variation in ESG scores in the US, suggesting a relatively strong model fit.

Conversely, in the EU, while Size remains positively associated with ESG scores, the coefficient is slightly higher at 6.29, but with a lower t-statistic of 14.63. This suggests that the relationship between company size and ESG scores is significant. The R^2 value of 0.458 suggests that the independent variables collectively explain approximately 45.8% of the variation in ESG scores in the EU, indicating a relatively strong model fit similar to the US.

In China, the coefficient for Size is notably higher at 8.38, indicating a stronger positive association between company size and ESG scores compared to both the US and EU. However, the constant in this case is much lower so although size seems to have a bigger impact the overall score still might be lower. Additionally, the low R^2 value of 0.227 indicates that the independent variables explain only 22.7% of the variation in ESG scores in China, suggesting a weaker model fit.

In Latin America and Africa, the coefficients for Size are considerably lower compared to the other regions, indicating a weaker positive association between company size and ESG scores. Moreover, the relatively low R^2 values of 0.107 for Latin America and 0.231 for Africa suggest that the independent variables explain only a modest proportion of the variation in ESG scores, indicating a weaker model fit compared to the US and EU. Overall, the regression results highlight significant regional variations in the determinants of ESG scores, underscoring the importance of context-specific approaches to sustainable investing and corporate responsibility.

In summary of the result, it is evident that Size emerges as the sole company-specific variable with an impact on the ESG score. The fact that Size alone can account for 20% of the variance in the ESG score raises questions about the realism of this and prompts questions into potential biases favoring larger companies within the current rating system. Surprisingly, industry classifications exhibit little to no effect on the score, contradicting the initial hypothesis that certain sectors, especially utilities, would have a more pronounced negative impact on the environment and society, resulting in lower average scores. On the other hand, regional factors have significant influence, with companies in developing regions consistently showing significantly lower ESG scores. This observation sparks the question about fairness and potential biases inherent in ESG rating systems that favor developed economies.

My results are mostly in line with the previous literature. In case of firm size Drempetic, Klein, and Zwergel (2020) also find a significant positive effect. They raise the question of whether the way the ESG score measures corporate sustainability gives an advantage to larger firms with more resources while not providing SR investors with the information needed to make decisions based on their beliefs. My results support this idea. However, Gregory (2024) Argues that while a uniform positive relationship is found between firm size and ESG over ratings agencies, its strength varies by agency, calling into question the explanation of organizational legitimacy. Controlling for industrial sector and ratings agency, it is found that for many combinations that there is no significant relationship between firm size and ESG rating. In my research I used one of the most popular ESG scores from Datastream but based on Gregory (2024) results might differ for different rating agencies. This disparity between agency ratings again undermines the legitimacy and trustworthiness of the ESG score. For profitability and relative valuation there is no well documented evidence in the literature either. So, studies show an inverse relationship, meaning that good ESG practices over time can lead to increased profitability or value (Brogi and Lagasio, 2019; Taddeo, Agnese, and Busato, 2024). In the results we can see a lack of industry effect on ESG, which is also present in the literature, only small or very specific effects are found (Garcia, Mendes-Da-Silva, and Orsato; 2017; Crespi and Migliavacca, 2020). In terms of regional differences other studies (Peiró-Signes and Segarra-Oña, 2013; Pillai et al., 2024) also documented some effects, but they have not done analysis this deep. My results for regional differences are very robust for different methods and with control variables, indicating a potential bias against developing regions. Overall, the results are strong, and they indicate some possible biases in the current ESG rating system.

4. Summary and Conclusion

In the contemporary landscape of investment and corporate governance, Environmental, Social, and Governance (ESG) factors have emerged as critical metrics for assessing the sustainability and ethical practices of companies. As stakeholders increasingly prioritize responsible investing, the demand for transparent and reliable ESG ratings has grown substantially. However, the effectiveness and fairness of current ESG rating systems have come under scrutiny, prompting researchers to delve deeper into the intricate interplay of factors influencing these assessments.

This research endeavors to contribute to the ongoing discourse surrounding ESG rating methodologies by examining the multifaceted relationships between company characteristics, industry dynamics, regional influences, and ESG scores. Through rigorous regression analyses

across various models and regions, the study sheds light on the nuances and potential biases inherent in existing ESG rating frameworks. One of the central findings of this research is the significant positive association between company size and ESG scores. Across different regression models and regions, larger companies consistently receive higher ESG scores, suggesting a size bias within the current rating system. This raises questions about the realism and fairness of ESG assessments, as smaller companies may face challenges in achieving comparable scores despite their sustainability efforts. Contrary to initial hypotheses, the study reveals little to no effect of industry classification on ESG scores. While certain sectors, such as utilities, were expected to have a more pronounced impact on environmental and social factors, the analysis suggests that industry distinctions do not significantly influence ESG ratings. This challenges conventional assumptions and underscores the need for more nuanced approaches to sector-specific sustainability assessments. However, regional differences emerge as another crucial aspect influencing ESG scores, with companies in developing regions consistently receiving lower ratings. This observation highlights potential biases in ESG rating systems that may favor developed economies and raises important considerations for global sustainable investing practices. Context-specific approaches tailored to regional challenges and opportunities are essential for promoting equitable and effective ESG strategies worldwide.

These results contribute to the ongoing debate regarding the validity and trustworthiness of ESG ratings. Disparities between ratings from different agencies, as well as the lack of consistent findings regarding the relationship between firm size, industry, region, and ESG scores, underscore the complexity and potential limitations of current methodologies. Addressing these challenges requires collaboration among policymakers, investors, and corporate stakeholders to enhance the transparency, accuracy, and reliability of ESG assessments.

In conclusion, while ESG rating systems play a vital role in promoting sustainable investment practices and corporate responsibility, they are not without limitations. This research underscores the need for continuous scrutiny and refinement of ESG methodologies to ensure that they accurately reflect corporate sustainability performance and provide meaningful guidance for decision-making. By unraveling the complexities of ESG rating systems and addressing inherent biases, we can pave the way for a more sustainable and equitable future for businesses and society as a whole.

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