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Green Governance: How ESG Initiatives Drive Financial Performance in UK Firms?

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Abstract: In this research endeavor, we investigate the potential influence exerted by ESG performance on the market capitalization of non-financial corporations included within the UK FTSE All-Share Index during the eleven-year period spanning 2010 to 2021. Integrating insights from Resource-Based View and Stakeholder Theory, this research extends the literature by considering the moderating effect of governance on the ESG–market capitalization association. This study analyzes a comprehensive dataset of UK firms, employing robust econometric techniques to substantiate its conclusions. The results demonstrate a robust positive association between the overall ESG pillars and market capitalization. Environmental, social, and governance performances independently contribute to an increased market value. The analysis reveals that firms with superior internal governance structures, characterized by the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure, experience a magnified positive impact from ESG disclosures on market capitalization. Effective governance mechanisms enhance the credibility and effectiveness of ESG initiatives, aligning them with stakeholder expectations and regulatory standards. This alignment fosters trust and cooperation, driving better financial performance and increasing market value. This research adds its voice to the increasingly compelling body of evidence that underscores the financial advantages associated with ESG integration and highlights the critical role of internal governance in amplifying these benefits. The findings have significant implications for policymakers, investors, and corporate managers. They advocate for the strategic incorporation of ESG criteria into corporate governance frameworks to achieve sustainable financial success.

Keywords: ESG; market capitalization; financial performance; internal governance; resource-based view; stakeholder theory; sustainability

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1. Introduction

The imperative for embracing environmental, social, and governance (ESG) principals has become paramount for companies seeking to bolster their market value and secure long-term success. This is exemplified by the significant increase in S&P 500 companies publishing sustainability reports, with the figure exceeding 90% in 2019 compared to a mere 20% in 2011 [1] This shift underscores the growing importance of ESG performance in the eyes of investors, regulators, and the public. As of 2021, global sustainable fund assets have skyrocketed to USD 2.7 trillion, a staggering 53% year-on-year increase [2], raising the question of whether a company's commitment to sustainability and ethical governance translates into tangible financial benefits. This study endeavors to unravel this critical question, focusing on the nexus between ESG practices and a company's market capitalization. The increasing emphasis on ESG performance signifies a shift in business valuation. In fact, companies prioritizing sustainability not only align with societal

expectations but also bolster their long-term success. Moreover, ESG integration correlates with improved financial performance, risk management, and innovation.

Understanding the relation between ESG practices and market capitalization is crucial for corporate managers, policymakers, and investors aiming to foster sustainable value creation. Market capitalization, reflecting investor perceptions of future growth and risk, often increases for firms with strong ESG performance due to anticipated financial benefits from sustainability [3,4]. Moreover, market capitalization, meticulously calculated as the product of a firm's share price and its number of outstanding shares, serves as a critical metric for a company's market valuation. This metric demonstrably influences a firm's ability to raise capital, pursue strategic investments, and attract top talent [3]. This investigation delves into the intricate association between a firm's ESG performance and its market capitalization. The analysis encompasses both the composite ESG score and its constituent environmental, social, and governance subcomponents. We test the following hypotheses: Hypothesis 1: Overall ESG performance positively affects market capitalization. Hypothesis 2: Better environmental performance is positively associated with market capitalization. Hypothesis 3: Improved social performance enhances market capitalization. Hypothesis 4: Effective corporate governance positively impacts market capitalization. Additionally, the study examines how internal governance moderates this association, hypothesizing that strong internal governance—characterized by the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure—strengthens the positive effect of ESG performance on market capitalization. Hypothesis 5 [Moderating Effect]: Internal governance positively moderates the ESG performance to market capitalization association.

The Resource-Based View asserts that a company's competitive edge and performance stem from its unique resources and capabilities [5,6]. This theoretical framework provides a robust foundation for understanding how ESG practices can create competitive advantages. For instance, strong environmental performance can lead to cost savings through energy efficiency, reduced regulatory risk, and enhanced brand reputation. In this framework, ESG disclosure is seen as a strategic asset that boosts a firm's reputation, attracts investors, and enhances capital access [7,8]. Firms with strong ESG disclosure practices possess valuable intangible resources, specifically comprehensive ESG data, reporting expertise, and robust stakeholder associations [9,10]. These resources potentially confer sustainable competitive advantages such as improved risk management and increased innovation. Stakeholder Theory underscores the need to align corporate actions with the interests of all stakeholders, promoting trust and cooperation, which can lead to an improved financial performance and market value [11–14]. Stakeholder Theory complements the Resource-Based View by highlighting the importance of strong stakeholder relationships in driving firm performance, especially in the context of ESG initiatives. Effective governance mechanisms are vital in ensuring ESG initiatives meet stakeholder expectations and regulatory standards. The integration of these theoretical perspectives provides a comprehensive framework for analyzing the complex interplay between ESG performance, governance structures, and market capitalization, offering insights into how firms can leverage ESG practices for long-term value creation.

Existing research has predominantly investigated the association between ESG practices and market value, focusing either on overall ESG performance or individual environmental, social, and governance (ESG) pillars. However, comprehensive studies simultaneously examining overall ESG performance and the impact of individual ESG pillars on market capitalization remain scarce. Additionally, there is a dearth of research exploring how internal governance mechanisms might moderate the association between ESG factors and market valuation. To date, no research has analyzed the combined effects of overall ESG performance and its individual pillars on market capitalization in a single study in the UK. Furthermore, there is insufficient understanding of how ESG factors influence various financial performance indicators, including Return on Assets (ROA), Return on Equity (ROE), Tobin's Q, and the Weighted Average Cost of Capital (WACC). This research

endeavors to bridge this knowledge gap and illuminate rigorous empirical evidence for investors, policymakers, and corporate managers seeking to harness ESG principles for enduring financial success.

The UK FTSE All-Share Index was selected for this study due to its comprehensive coverage of the UK equity market, encompassing a wide range of industries and firm sizes. The United Kingdom, renowned for its leadership in corporate sustainability and ESG reporting, offers an exemplary setting for investigating the relationship between ESG performance and market capitalization. The UK's rigorous regulatory framework, including the UK Corporate Governance Code, the Companies Act 2006, and the Task-force on Climate-related Financial Disclosures (TCFD), mandates comprehensive ESG disclosures, making it an ideal context for this analysis. These well-established corporate governance practices enable a detailed examination of how governance influences financial performance, supported by robust ESG and financial data. Additionally, the UK's diverse corporate environment provides a fertile ground for exploring the association between ESG practices and financial outcomes. Although this study focuses on UK firms, its findings have broader implications for companies in other jurisdictions with similar regulatory and governance structures, contributing valuable insights into the global discourse on ESG reporting and its financial impacts.

The outcomes of this inquiry hold substantial ramifications for both theoretical and practical applications. Theoretically, this study validates the Resource-Based View and Stakeholder Theory within the context of ESG performance, while also offering new insights into the role of internal governance in moderating the association between ESG metrics and market capitalization. This study's exploration of individual ESG dimensions and their unique impacts on financial performance provides a deeper understanding of the specific pathways through which ESG factors can influence financial outcomes. Practically, the findings offer actionable insights for corporate managers, investors, and policymakers. Companies can leverage this study's insights to enhance their ESG practices, improve internal governance structures, and ultimately increase their market value. Investors can use the findings to inform their investment decisions and identify firms with strong ESG performance and governance practices as attractive investment opportunities. Policymakers can draw on this study's evidence to refine regulatory frameworks and promote best practices in ESG reporting and corporate governance.

This research builds upon the existing body of knowledge by considering the moderating effect of internal governance on the ESG–market capitalization association. To do so, it investigates how internal governance structures influence the ESG–performance association throughout multiple financial metrics, including market capitalization, ROA, ROE, Tobin's Q, and WACC.

The subsequent sections of this paper are organized as follows. Section 2 delves into a comprehensive review of the relevant literature and establishes the theoretical framework underpinning this study. Section 3 outlines the research methodology, encompassing sample selection, data collection procedures, variable measurement strategies, and the employed econometric techniques. Section 4 presents the empirical results and key findings, while Section 5 concludes the paper by summarizing its main contributions and offering potential avenues for future research.

2. Building the Foundation: A Review of the Literature, Theoretical Framework Development, and Hypothesis Generation

The relationship between ESG performance and market capitalization has been extensively explored in the academic literature, particularly in the context of non-financial firms. Prior studies have consistently shown a positive association between ESG metrics and financial performance [8,15,16], with a specific focus on overall financial health. However, recent research has begun to investigate this relationship in more detail, particularly in the context of market valuation. For example, ref. [10] identified a positive link between ESG performance and market capitalization, though they suggest an optimal level of environmental

engagement that yields diminishing returns beyond a certain point. In contrast, some studies indicate a more linear relationship, emphasizing the importance of context-specific research in understanding ESG impacts. Additionally, ref. [17] highlighted that firms with strong ESG metrics benefit from lower corporate debt costs within the European Union, which reflects market recognition of ESG initiatives. This suggests that robust ESG practices can enhance market capitalization by reducing the perceived financial risk. The impact of environmental performance, in particular, has been emphasized by [18,19], demonstrating that investments in sustainable practices contribute positively to firm valuation over the long term.

Social performance, frequently measured through CSR activities, has also been shown to influence financial outcomes. Studies by [20,21] indicate that strong social practices can mitigate risks and enhance a firm's value. This line of research underscores the role of social initiatives in boosting market capitalization, particularly in sectors where social responsibility is integral to stakeholder expectations. In terms of governance, [22] identified a positive association between stronger shareholder rights and firm value. Effective corporate governance, characterized by board independence and the presence of audit committees, has been linked to a higher market valuation. This aligns with calls for further research into the financial materiality of ESG information, as noted by [23], particularly in contexts where internal governance mechanisms can amplify the positive effects of ESG performance on firm outcomes. Furthermore, studies like [24,25] have explored how internal governance structures, such as board independence and audit oversight, moderate the relationship between ESG performance and market capitalization. This highlights the critical role of governance in enhancing the value derived from ESG initiatives, suggesting a nuanced interaction between sustainability practices and financial metrics.

2.1. ESG Performance and Company Market Capitalization

The association between environmental, social, and governance (ESG) indicators and financial indicators has been the focus of a growing body of research, e.g., [8,15,16]. Strong ESG practices have been linked to positive financial outcomes [10]. However, this association is not necessarily linear; ref. [9] argues that there may be an optimal level of environmental performance that maximizes financial returns, with potential diminishing returns beyond this point.

Building on Corporate Social Responsibility (CSR), ref. [26] disaggregated the concept into its components, revealing industry-specific variations in the financial performance effects of CSR initiatives. Further extending this line of inquiry, ref. [27] set out to explore the impact of disclosing Corporate Social Responsibility (CSR) efforts on a firm's performance in an emerging market, specifically India. Their investigation considers both a company's profitability and its overall value. Ref. [17] finds that firms with strong ESG metrics enjoy lower corporate debt costs within the European Union, which may reflect market recognition of ESG initiatives and the pressure from stakeholders for improved practices. This trend is more pronounced in economies that prioritize stakeholder interests, providing a cost advantage and boosting the market value for firms with robust ESG performance.

Building on these insights, the Resource-Based View (RBV) has been significantly advanced by scholars such as Barney, Peteraf, Rumelt, Teece, and Wernerfelt, establishing a theoretical framework that connects a firm's competitive advantage and performance to its unique resources and capabilities [5,6]. This perspective elucidates performance disparities as a function of a firm's possession of resources that are unique, scarce, inimitable, and non-substitutable. These resources often demonstrate characteristics such as path dependence, causal ambiguity, and social complexity [6,28].

ESG disclosure is considered a strategic asset that enhances a firm's reputation, attracts investors, and improves access to capital [9,10]. Firms with robust ESG disclosure practices possess valuable intangible resources, including comprehensive ESG data, reporting expertise, strong stakeholder associations, and a genuine commitment to sustainability [9,10]. Examining the lens of Corporate Reputation Responsibility (CRR), ref. [8] uncovers a signifi-

cant negative association between adverse ESG-related media coverage and firm valuations. However, investor reactions are moderated by firm-specific attributes, reputation levels, and industry sectors. High ESG scores are often associated with superior financial performance and higher stock prices, emphasizing the importance of integrating ESG principles into corporate strategies. Positive ESG news is associated with favorable market reactions, whereas negative news can trigger a decline in a firm's value [3]. The strategic integration of ESG principles is crucial for long-term value creation and risk mitigation [18,29]. The benefits include improved financial performance, enhanced risk management, increased innovation, and positive environmental and social impacts.

The investigation conducted by [29] focused on the relationship between a company's ESG disclosures and its overall performance across three critical dimensions: operational efficiency (measured by Return on Assets—ROA), financial health (measured by Return on Equity—ROE), and market perception (measured by Tobin's Q). This research aimed to ascertain whether these disclosures exert a positive, negative, or neutral impact on each performance metric.

Based on these insights, the main hypothesis is proposed:

Hypothesis 1. *A positive association exists between a firm's overall ESG performance and its market capitalization.*

2.2. Environmental Performance and Market Capitalization

Understanding the effect of environmental performance on market capitalization is of paramount importance. Early research suggested an inconsistent association between environmental performance and enterprise value [18]. However, the adoption of Tobin's Q as a metric for long-term market worth shifted perspectives towards a positive association between environmental performance and corporate value [19,30]. This shift indicates that investments in environmental initiatives can significantly enhance corporate value over an extended timeframe [31]. Ref. [32] posited an inverted U-shaped relationship, suggesting that enhancements in environmental performance can contribute to increased enterprise value, but only up to a specific point; exceeding this threshold might yield diminishing returns. Refs. [33,34] demonstrated that firms engaged in ESG/CSR activities, particularly those emphasizing environmental concerns, can mitigate crisis risks and augment firm value through environmental disclosure. Studies by [35,36] have highlighted a positive correlation between environmental performance and financial indicators, attributing it to an enhanced corporate reputation and societal commendation. Ref. [37] provided empirical evidence that reductions in greenhouse gas (GHG) emissions enhance financial performance among Japanese manufacturing firms. The empirical landscape regarding the association between environmental performance and financial outcomes remains somewhat unsettled. Ref. [9], employing a panel smooth transition regression model, unveiled an inverted-U shaped association, suggesting an optimal environmental performance level that maximizes financial gains. Conversely, other studies [38,39] highlighted a potential negative correlation due to increased environmental management costs. However, ref. [40] demonstrated that third-party assurance on CSR reporting enhances a firm's environmental reputation, which can positively influence its market value. This aligns with the growing interest in ESG and CSR documented by [23]. Their comprehensive review emphasized the potential for ESG factors, including environmental performance, to influence firm risk and valuation, further supporting a positive association between robust environmental practices and market capitalization.

From these insights, the following hypothesis is derived:

Hypothesis 2. *Improved environmental performance is positively associated with company market capitalization.*

2.3. Social Performance and Market Capitalization

The association between social performance, frequently gauged through Corporate Social Responsibility (CSR) practices, and market capitalization has been a topic of ongoing debate. Early perspectives rooted in shareholder theory [6] viewed CSR as a cost that detracted from profits. However, contemporary research increasingly supports a positive association between robust social practices and market value. Stakeholder Theory [11] provides a framework for understanding this connection. Proponents argue that strong CSR practices can bolster a company's reputation, attract talent and investors, and enhance operational efficiency [6]. This can potentially lead to increased profitability and competitiveness [12,13,20].

Empirical evidence broadly validates this positive association. Ref. [21] indicates that strong CSR practices can mitigate non-systematic risk, further enhancing firm value. Ref. [41] highlights the favorable effect of transparent ESG reporting on market capitalization. Ref. [30] elaborates on how both the strengths and weaknesses of ESG performance influence market valuation, with disclosure acting as a moderating factor. Ref. [22] reinforces the connection between investments in social responsibility, reduced systemic risk, and increased firm value. Furthermore, ref. [26] classifies Corporate Social Responsibility (CSR) into specific dimensions, namely employee relations and community involvement, and observes their differing effects on financial performance across various industries. Building on this, ref. [42] establishes a positive relationship between social reporting and a company's value, emphasizing that improved social performance enhances stakeholder trust and increases firm value. In this context, transparency is identified as a crucial factor influencing this relationship. From a resource-based perspective [5–7], robust ESG disclosure practices can be viewed as a strategic asset. By cultivating a positive reputation, attracting investors, and facilitating access to capital, such practices contribute to a firm's competitive advantage. Companies with strong ESG disclosure capabilities possess valuable intangible assets, including comprehensive data, adept reporting capabilities, and a genuine commitment to sustainability.

From this literature, we propose the following hypothesis:

Hypothesis 3. *Enhanced social performance positively influences company market capitalization.*

2.4. Corporate Governance Performance and Market Capitalization

The successful incorporation of ESG practices can provide a competitive edge by enhancing human resource management, improving corporate reputation, lowering recruitment expenses, and creating new market opportunities. Moreover, advancements in environmental performance driven by ESG initiatives lead to greater operational efficiencies and stimulate innovation, ultimately strengthening overall management capabilities. From a resource-based viewpoint, strong ESG practices facilitate better financial results through strategic resource allocation and responsiveness to regulatory and market changes. Ref. [43] emphasizes the dual advantages of ESG initiatives: internally, they improve resource efficiency and boost employee morale; externally, they enhance the corporate reputation and strengthen relationships with stakeholders [24]. Corporate governance performance, encompassing the mechanisms and processes guiding corporate direction and control, impacts market capitalization. Ref. [42] highlights the value-enhancing effects of strong governance; this study delves into the specific mechanisms through which robust corporate governance practices facilitate effective management and strategic decision-making, particularly regarding environmental, social, and governance (ESG) disclosure. Ref. [25] argues that Corporate Social Responsibility (CSR) practices, which inherently involve governance aspects, strengthen a firm's competitive advantage by bolstering its reputation and internal capabilities. Effective governance plays a pivotal role in managing stakeholder associations and improving overall firm performance.

From this understanding, we formulate the following hypothesis:

Hypothesis 4. *Effective corporate governance positively influences company market capitalization.*

2.5. The Moderating Effect of Internal Governance

A substantial body of research explores the complex link between a firm's ESG performance (environmental, social, and governance) and its financial outcomes, encompassing both the overall score and its individual components. For instance, ref. [44] finds that ESG performance positively affects Return on Assets (ROA), highlighting the pivotal role of governance in financial performance compared to environmental and social dimensions. Similarly, ref. [45] analyzes employee representation on boards, revealing varied investor reactions and emphasizing the board's role in moderating ESG performance. Furthermore, ref. [46] shows a positive association between board independence and financial performance. Using data envelopment analysis, ref. [47] demonstrates a nonlinear association between ESG disclosure and firm efficiency, with governance disclosures exerting the most substantial impact. Ref. [48] establishes a link between ownership structure and financial performance, underscoring the significant influence of ownership concentration on company finances. Moreover, ref. [49] identifies a positive relationship between management shareholding and market value in Greek publicly listed companies. Building on this research, ref. [50] examines how acquiring firms with a strong ESG performance can enhance the market value of the acquirer. Furthermore, ref. [51] studies the effects of auditor tenure disclosure on shareholder voting during auditor ratification, revealing that longer tenures lead to greater shareholder opposition due to concerns regarding auditor independence and audit quality. These findings highlight how internal governance mechanisms can moderate the impact of governance disclosures on market capitalization. Similarly, ref. [52] investigates the effects of integrated reporting and ESG disclosures on the accuracy of analyst forecasts, concluding that higher levels of ESG disclosure, particularly regarding governance, enhance forecast accuracy and positively affect market capitalization. This emphasizes the importance of strong internal governance in improving both market forecast accuracy and capitalization.

Existing research has predominantly examined the association between ESG metrics and market capitalization, often focusing separately on overall ESG performance or individual pillars such as environmental, social, and governance (ESG) factors. However, comprehensive studies that simultaneously explore the combined impact of overall ESG performance alongside individual ESG pillars on market capitalization are limited. Furthermore, there is a notable gap in research investigating how internal governance mechanisms—specifically, the presence of independent board members, board size, an independent audit committee, and the adoption of a split CEO–chair structure—affect these associations.

The current scholarly literature shows an absence of studies that comprehensively analyze the combined effects of overall ESG performance and its individual pillars on market capitalization within a single UK-focused study. Additionally, there remains a lack of understanding of how these ESG factors influence a broader set of financial performance indicators, particularly Return on Assets (ROA), Return on Equity (ROE), Tobin's Q, and the Weighted Average Cost of Capital (WACC), all within the scope of one study. Moreover, the existing literature does not fully address how internal governance mechanisms, such as independent board members, board size, independent audit committees, and a split CEO–chair structure, may moderate the relationships between ESG performance and various financial metrics. This study seeks to address these research gaps by examining the influence of internal governance structures on the ESG–performance relationship across multiple financial metrics, including market capitalization, ROA, ROE, Tobin's Q, and WACC, thereby contributing to a deeper understanding of these dynamics.

Based on these theories, we propose the following hypothesis:

Hypothesis 5. *Internal governance positively moderates the association between ESG performance and market capitalization.*

3. Methodology

3.1. Sample Selection and Data Gathering

This study investigates the impact of sustainability performance on market capitalization using a sample of 351 non-financial companies listed on the UK FTSE All-Share Index. Spanning the fiscal years 2010 to 2021, this research employs a quantitative approach to provide insights into the relationship between sustainability practices and financial performance within the non-financial sector. The sample selection process was rigorous and designed to ensure the robustness and generalizability of our findings. Initially, we included all non-financial firms listed on the UK FTSE All-Share Index during the study period. Financial firms were excluded due to their distinct regulatory environments and reporting requirements, which is a standard practice in corporate finance research. This approach allows for more meaningful comparisons across the sample. To maintain consistency in our analysis, we required firms to have complete ESG data available for the entire study period. Companies with missing financial data for key variables were also excluded to uphold the integrity of our econometric models. To mitigate the impact of outliers, we winsorized continuous variables at the 1st and 99th percentiles, a common practice in financial research to reduce the influence of extreme values without eliminating them entirely.

The study period of 2010–2021 was chosen to capture a decade of evolving ESG reporting practices in the UK, characterized by significant regulatory developments and a growing investor focus on sustainable investments. This timeframe allows for an examination of the post-2008 financial crisis era, during which firms increasingly prioritized ESG performance to regain investor confidence. Additionally, it encompasses substantial advancements in ESG reporting and regulation, particularly within the UK's stringent regulatory framework, including the UK Corporate Governance Code and the Taskforce on Climate-related Financial Disclosures (TCFD). These regulations mandate comprehensive ESG disclosures, making this period ideal for investigating the evolving landscape of ESG integration and its impact on market capitalization.

The data, sourced from reputable databases (specifically, Bloomberg for ESG metrics and Eikon for financial data), include a comprehensive set of variables crucial for the analysis: market capitalization (MC), ESG scores, environmental (EPSD), social (SPSD), and governance (GPSD) pillar scores, firm size (FSIZE), leverage (LEV), board size (BSIZE), CEO duality (Duality), independent audit committee (ACIND), and capital expenditure (CAPEX). Encompassing a ten-year period from 2012 to 2021, the data collection process affords a robust timeframe to assess the long-term influence of ESG disclosures and internal governance practices on market capitalization. To address variability through time and firms, ESG measures were normalized by scaling strengths and concerns relative to the maximum possible values throughout attributes for each firm-year. Additionally, market capitalization (MC) was log-transformed to enhance distributional normalization and statistical robustness. Data integrity was maintained through the meticulous matching of ESG and financial performance metrics alongside internal governance variables, validated using firm identifiers and stock data for systematic risk assessment. The resulting sample of 351 firms provides a comprehensive representation of the UK non-financial corporate sector. This substantial sample size enhances the generalizability of our findings to the broader UK market. This allows for meaningful insights into the relationship between ESG performance and market capitalization within the UK context. This methodological approach, combining a carefully selected sample with comprehensive data collection, provides a solid foundation for our quantitative analysis. It allows us to robustly test our hypotheses regarding the impact of ESG performance on market capitalization, while also considering the moderating effects of internal governance structures.

3.2. Measurement of Variables:

This section lays the groundwork by outlining the variables under investigation and the corresponding measurement methodologies employed in this research (Table 1).

Table 1. Measurement of variables.

Variables	Symbols	Definitions and Sources
Market capitalization	MC	Market capitalization, a key metric in corporate finance, represents the total market value of a company's outstanding shares at the current market price. In simpler terms, it is the product of the share price and the number of outstanding shares. Logarithms were utilized to compute MC in accordance with the methodology outlined by [3].
ESG disclosure	ESG	Drawing on [44] this study utilizes the Bloomberg ESG reporting [4,10,14,53] as a proxy measure of environmental, social, and governance (ESG) performance, with the score (ranging from 0.1 to 100) gauging the comprehensiveness of corporate ESG disclosures.
Environmental Pillar Score	EPSD	
Social Pillar Score	SPSD	
Governmental Pillar Score	GPSD	
Firm size	FSIZE	Consistent with [4,54–56], this study incorporates the natural logarithm of total assets to account for a firm's resource base and its potential influence on ESG activities.
Leverage	LEV	Financial leverage, as measured by the debt to equity ratio (LEV), reflects the composition of a firm's capital structure, specifically the proportion of debt financing relative to equity financing [14].
Board size	BSIZE	Board size refers to the total number of directors who constitute a company's board [57].
CEO duality	Duality	CEO duality denotes a corporate governance structure where a single executive holds both the CEO and chairman of the board positions concurrently [44]. This binary variable represents the split CEO–chair structure. It was coded as 1 if the CEO and board chair roles were combined, and 0 if they were separated.
Independent audit committee	ACIND	Audit committee independence represents the proportion of independent directors on a company's audit committee.
Capital expenditure	CAPEX	Aligned with [14,58], this study incorporates the natural logarithm of the capital expenditure to total assets ratio (Capex/TA) to capture a firm's relative investment intensity. This metric reflects the proportion of a company's total assets dedicated to capital expenditures.
Internal governance	IG	Using PCA involves various factors, specifically the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure [7].

3.3. Empirical Models and Econometric Techniques

To analyze the association relating ESG metrics to market capitalization (MC), this study utilizes regression analysis. To account for potential extraneous factors, a set of control variables is incorporated throughout all the models. These control variables include firm size (FSIZE), financial leverage (LEV), board size (BSIZE), CEO duality (Duality), and capital expenditures (CAPEX).

3.3.1. Regression

To examine the relationship between ESG performance and market capitalization, we employ a series of regression models. These models are designed to investigate the impact of overall ESG metrics and individual ESG pillars on financial performance, specifically market capitalization. Our approach allows for a comprehensive analysis of how different aspects of ESG performance influence a firm's market value.

Model 1: The impact of ESG metrics on financial performance

Our first model examines the overall effect of ESG performance on market capitalization. This model includes the composite ESG score as the primary independent variable of interest, along with several control variables known to influence market capitalization.

$$MCit + 1 = \beta 0 + \beta 1ESGit + \beta 2FSIZEit + \beta 3LEVit + \beta 4BSIZEit + \beta 5Dualityit + \beta 6CAPEXit + \epsilon it$$

Model 2: The impact of Environmental Pillar Score on financial performance
This model focuses specifically on the environmental aspect of ESG performance:

$$MCit + 1 = \beta 0 + \beta 1EPSDit + \beta 2FSIZEit + \beta 3LEVit + \beta 4BSIZEit + \beta 5Dualityit + \beta 6CAPEXit + \epsilon it$$

Model 3: The effect of Social Pillar Score on financial performance
This model examines the impact of the social dimension of ESG:

$$MCit + 1 = \beta 0 + \beta 1SPSDit + \beta 2FSIZEit + \beta 3LEVit + \beta 4BSIZEit + \beta 5Dualityit + \beta 6CAPEXit + \epsilon it$$

Model 4: The effect of Governance Pillar Score on financial performance
Our final model focuses on the governance aspect of ESG:

$$MCit + 1 = \beta 0 + \beta 1GPSDit + \beta 2FSIZEit + \beta 3LEVit + \beta 4BSIZEit + \beta 5Dualityit + \beta 6CAPEXit + \epsilon it$$

In all models, market capitalization (MC) serves as the dependent variable. The initial model investigates the influence of a firm's overall ESG performance, along with the designated control variables, on market capitalization. The second model uses the Environmental Pillar Score (EPSD) as the predictor variable along with the control variables. The third model uses the Social Pillar Score (SPSD) as the predictor variable with the same set of controls, while the fourth model uses the Governance Pillar Score (GPSD) along with the control variables. Each model accounts for specific variations in market capitalization, represented by the error term [ε]. These models help in understanding how different aspects of ESG performance—overall, environmental, social, and governance—impact market capitalization, while controlling for other influencing factors, specifically firm size, leverage, board size, CEO duality, and capital expenditures. Despite these controls, there may still be unobserved factors affecting market capitalization that are not captured in these models.

3.3.2. The Moderating Effect

To examine how internal governance structures influence the relationship between ESG performance and market capitalization, we introduce a moderating effect model. This model allows us to test whether the impact of ESG performance on market capitalization is contingent upon the strength of a firm's internal governance.

Model 5: The impact of internal governance on the association between ESG metrics and financial performance

$$MCit = \beta 0 + \beta 1[C.ESG\#C.IGit] + \beta 2FSIZEit + \beta 3LEVit + \beta 4BSIZEit + \beta 5Dualityit + \beta 6ACINDit + \beta 7CAPEXit + \epsilon it$$

In this model, market capitalization (MC) is the outcome variable. The synergy term [C.ESG#C.IGit] regarding ESG disclosure and internal governance is included to assess the moderating effect of internal governance on the association between ESG disclosure and financial performance. Control variables include firm size, leverage, board size, CEO duality, independent audit committee, and capital expenditures. This model helps in understanding the specific role internal governance plays in influencing the effect of ESG reporting on financial performance.

3.3.3. Robustness Check Models (ROA, ROE, Tobin's Q, WACC)

To ensure the robustness of our findings and to provide a more comprehensive understanding of the impact of ESG performance and internal governance on various aspects of financial performance, we employ additional models using alternative dependent variables.

Model 6: The effect of ESG reporting and internal governance on ROA

This model examines how the interaction between ESG performance and internal governance affects a firm's profitability relative to its total assets:

$$ROAit = \beta 0 + \beta 1[\ C.ESG\#C.IGit] + \beta 2FSIZEit + \beta 3LEVit + \beta 4CAPEXit + \epsilon it$$

Model 7: The effect of ESG disclosure and internal governance on ROE

This model investigates the impact on a firm's profitability relative to shareholders' equity:

$$ROEit = \beta 0 + \beta 1[\ C.ESG\#C.IGit] + \beta 2FSIZEit + \beta 3LEVit + \beta 4CAPEXit + \epsilon it$$

Model 8: The effect of ESG disclosure and internal governance on Tobin's Q

This model examines the impact of ESG performance and internal governance on a firm's market valuation relative to its book value:

$$Tobin's\ Qit = \beta 0 + \beta 1[\ C.ESG\#C.IGit] + \beta 2FSIZEit + \beta 3LEVit + \beta 4CAPEXit + \epsilon it$$

Model 9: The effect of ESG disclosure and internal governance on WACC

This model investigates the impact on a firm's cost of capital:

$$WACCit = \beta 0 + \beta 1[\ C.ESG\#C.IGit] + \beta 2FSIZEit + \beta 3LEVit + \beta 4CAPEXit + \epsilon it$$

Models 6 to 9 are robustness checks that examine the effect of ESG disclosure and internal governance on different financial performance metrics (ROA, ROE, Tobin's Q, and WACC). Each model includes the synergy term regarding ESG disclosure and internal governance and control variables, specifically firm size, leverage, and capital expenditures. These models ensure the consistency and reliability of the main findings, showing varied impacts on different financial performance measures while considering other influencing factors.

3.4. Data Reliability and Methodological Rigor in ESG Research

In pursuit of data reliability and methodological rigor, we adopted a thorough approach for data processing and statistical analysis. Our data-cleaning procedures were meticulously designed to manage missing values and outliers effectively. We applied normalization techniques to variables to ensure they were comparable across diverse scales. Companies with incomplete data for the relevant period were excluded to maintain consistency and reliability. Our econometric strategy involved both linear regression and panel data models, incorporating fixed and Random Effects specifications. The Hausman test was utilized to select the most suitable model. To address potential endogeneity concerns, we employed instrumental variable methods and dynamic panel estimators, specifically the Generalized Method of Moments (GMM). We rigorously applied diagnostic tests, including the Breusch–Pagan test for heteroskedasticity, the Wooldridge test for autocorrelation in panel data, and a variance inflation factor (VIF) analysis for detecting multicollinearity. Where necessary, we employed robust standard errors to address issues of heteroskedasticity and autocorrelation. Our robustness checks included alternative measures of environmental, social, and governance (ESG) performance and market valuation, specifically Return on Assets (ROA), Return on Equity (ROE), and the Weighted Average Cost of Capital (WACC). Additionally, we conducted subsample analyses based on firm size and industry to verify the consistency of our findings across different segments of the sample. Sensitivity analyses were also performed by varying the lag structure of our independent variables and employing alternative estimation techniques.

4. Empirical Results and Findings

4.1. Data Description

Our study utilizes a sample of 2251 firm-year observations sourced from Bloomberg (for ESG metrics) and Eikon (for financial data). Table 2 provides summary statistics, including means, standard deviations, and ranges for each variable. Market capitalization (MC) has a mean of 13.715, a standard deviation of 1.615, and ranges from 3.951 to 20.506. ESG performance averages 50.504, with a standard deviation of 19.169, ranging from 0.99 to 94.35. Social Pillar Scores (SPSDs) average 51.677, with a standard deviation of 21.273, ranging from 1.23 to 96.75, while Environmental Pillar Scores (EPSDs) have a mean of 43.943, with a standard deviation of 26.524, ranging from 0 to 98.27. Additional variables include firm size (FSIZE) with a mean of 13.715, a standard deviation of 1.633, and a range from 11.426 to 17.501. The leverage ratio (LEV) averages 0.164, with a standard deviation of 0.175, and ranges from 0 to 0.849. Board size (BSIZE) has a mean of 8.609, a standard deviation of 2.304, and ranges from 5 to 13. CEO duality (Duality) averages 0.925, with a standard deviation of 0.264, and ranges from 0 to 1. Independent audit committee (ACIND) averages 94.283, with a standard deviation of 12.722, and ranges from 33.33 to 100. Capital expenditure (CAPEX) averages 10.069, with a standard deviation of 2.377, and ranges from 3.689 to 15.932. This dataset supports a robust analysis of ESG performance's impact on financial metrics, influenced by internal governance mechanisms.

Table 2. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
MC	2251	13.715	1.62	3.95	20.50
ESG	2251	50.504	19.17	0.99	94.35
SPSD	2251	51.677	21.27	1.23	96.75
EPSD	2251	43.943	26.52	0	98.27
GPSD	2251	58.13	20.27	3.88	98.50
FSIZE	2251	13.715	1.633	11.43	17.50
LEV	2251	.164	0.175	0	0.849
BSIZE	2251	8.609	2.304	5	13
Duality	2251	.925	0.264	0	1
ACIND	2251	94.283	12.72	33.33	100
CAPEX	2251	10.069	2.38	3.69	15.93

4.2. Pairwise Correlations

This study examines pairwise correlations between the variables in the mediation effect model to assess potential multicollinearity issues. Multicollinearity can affect the reliability of the analysis results when the independent variables in the model have strong correlations. The researchers use the Pearson correlation test to examine all the variables in the model. The test results are presented in Table 3. The absolute value of the correlation coefficient between variables is at most 0.847. In general, serious multicollinearity is considered to occur only when the correlation coefficient between independent variables exceeds 0.8. Based on the correlation analysis, the authors conclude that there is no serious multicollinearity problem among the variables in the constructed model. Therefore, the model regression analysis can proceed to the next step.

Table 3. Pairwise correlations.

Variables	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
[1] MC	1.										
[2] ESG	0.577	1.									
[3] SPSD	0.527	0.864	1.								
[4] EPSD	0.545	0.827	0.689	1.							
[5] EPSD	0.545	0.827	0.689	1.	1.						
[6] FSIZE2	0.847	0.601	0.537	0.577	0.577	1.					
[7] LEV_	0.187	0.193	0.167	0.183	0.183	0.256	1.				
[8] BSIZE	0.564	0.499	0.405	0.492	0.492	0.606	0.139	1.			
[9] Duality	0.071	0.066	0.059	−0.5	−0.5	0.088	−0.7	−0.019	1.		
[10] ACIND	0.137	0.133	0.052	0.085	0.085	0.129	−0.029	0.062	−0.021	1.	
[11] CAPEX	0.657	0.518	0.473	0.515	0.515	0.675	0.254	0.430	0.067	0.064	1.

An examination of the variance inflation factors (VIFs) corroborates the initial assessment of minimal multicollinearity based on weak correlations between the independent and control variables. No VIF value exceeded the established threshold, further confirming the absence of a multicollinearity problem that could compromise the reliability of coefficient estimates. Specifically, the correlation between market capitalization (MC) and firm size (FSIZE) is the highest, with a coefficient of 0.847, indicating a strong positive association. The correlation between ESG scores (ESGs) and social pillar scores (SPSDs) is 0.864, and between ESGs and environmental pillar scores (EPSDs) is 0.827, showing significant positive associations, as expected. The correlations between other variables, specifically leverage (LEV), board size (BSIZE), and CEO duality (Duality), are all below 0.8, further confirming the absence of serious multicollinearity.

4.3. The Influence of ESG Disclosure, Social, Environmental, and Governance Metrics on Market Capitalization

The regression analysis in Table 4 explores the influence of ESG performance and its pillars on market capitalization (MC) using Ordinary Least Squares (OLS), Random Effects, and Tobit models. The choice of regression techniques is crucial given the panel data nature of the dataset. OLS regression is employed to explore the associations between variables, ensuring the assumptions of normality and linearity are met. The Random Effects model is adopted, relying on Hausman test results, as it can handle potential heterogeneity throughout different years and provide a more flexible approach to data analysis. Additionally, Tobit regression is used to address the censoring issue, as the dependent variable (MC) is non-negative and censored at zero.

The results in Table 4 reveal a significant positive association between ESG disclosure and market capitalization throughout all the models. Specifically, the coefficient for ESG disclosure (ESG) is 0.936 and highly statistically significant in the OLS, Random Effects, and Tobit models. This finding supports the notion that elevated ESG reporting is related to higher market capitalization. From the Resource-Based View (RBV) perspective, ESG disclosure can be considered a strategic asset that enhances a firm's reputation, attracts investors, and improves access to capital [7,8]. Companies with robust ESG disclosure practices possess valuable intangible resources, specifically comprehensive ESG data, reporting expertise, strong stakeholder associations, and a genuine commitment to sustainability [9,10].

Table 4. The effects of ESG disclosure and social, environmental and governance pillars on market capitalization.

	Model 1			**Model 2**			**Model 3**			**Model 4**		
VARIABLES	**OLS MC**	**Random MC**	**Tobit MC**	**OLS MC**	**Random MC**	**Tobit MC**	**OLS MC**	**Random MC**	**Tobit MC**	**OLS MC**	**Random MC**	**Tobit MC**
ESG	0.936 *** [0.139]	0.936 *** [0.139]	0.936 *** [0.139]									
EPSD				0.368 *** [0.956]	0.385 *** [0.957]	0.368 *** [0.955]						
SPSD							0.743 *** [0.110]	0.755 *** [0.110]	0.743 *** [0.109]			
GPSD										0.130 ** [0.105]	0.130 ** [0.105]	0.130 ** [0.105]
FSIZE	0.473 *** [0.196]	0.473 *** [0.196]	0.473 *** [0.196]	0.499 *** [0.194]	0.494 *** [0.194]	0.499 *** [0.194]	0.483 *** [0.191]	0.481 *** [0.190]	0.483 *** [0.191]	0.519 *** [0.188]	0.519 *** [0.188]	0.519 *** [0.188]
LEV	−1.141 *** [0.115]	−1.141 *** [0.115]	−1.141 *** [0.115]	−1.138 *** [0.116]	−1.129 *** [0.116]	−1.138 *** [0.116]	−1.175 *** [0.115]	−1.166 *** [0.115]	−1.175 *** [0.115]	−1.133 *** [0.117]	−1.133 *** [0.117]	−1.133 *** [0.116]
BSIZE	0.0982 *** [0.0113]	0.0982 *** [0.0113]	0.0982 *** [0.0113]	0.0991 *** [0.0114]	0.0997 *** [0.0113]	0.0991 *** [0.0113]	0.0957 *** [0.0113]	0.0953 *** [0.0113]	0.0957 *** [0.0113]	0.102 *** [0.0114]	0.102 *** [0.0114]	0.102 *** [0.0114]
Duality	0.295 [0.668]	0.295 [0.668]	0.295 [0.667]	0.609 [0.671]	0.676 [0.667]	0.609 [0.670]	0.482 [0.667]	0.517 [0.663]	0.482 [0.666]	0.443 [0.679]	0.443 [0.679]	0.443 [0.678]
ACIND	0.198 [0.148]	0.198 [0.148]	0.198 [0.148]	0.306 ** [0.148]	0.343 ** [0.149]	0.306 ** [0.148]	0.339 ** [0.146]	0.353 ** [0.147]	0.339 ** [0.146]	0.300 * [0.154]	0.300 * [0.154]	0.300 * [0.153]
CAPEX	0.140 *** [0.120]	0.140 *** [0.120]	0.140 *** [0.120]	0.144 *** [0.122]	0.144 *** [0.122]	0.144 *** [0.122]	0.142 *** [0.120]	0.142 *** [0.120]	0.142 *** [0.120]	0.152 *** [0.121]	0.152 *** [0.121]	0.152 *** [0.120]
Constant	4.889 *** [0.230]	4.889 *** [0.230]	4.889 *** [0.230]	4.675 *** [0.234]	4.678 *** [0.235]	4.675 *** [0.233]	4.707 *** [0.222]	4.719 *** [0.224]	4.707 *** [0.221]	4.395 *** [0.222]	4.395 *** [0.222]	4.395 *** [0.222]
Observations	2257	2257	2257	2257	2257	2257	2256	2256	2256	2257	2257	2257
R-squared	0.644			0.640			0.644			0.638		
Number of Years		10			10			10			10	

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In Model 2, the environmental pillar (EPSD) exhibits a significant positive association with market capitalization (MC), with coefficients ranging from 0.368 to 0.385 (all significant at the 1% level). This suggests that companies with stronger environmental performance tend to have higher market capitalization, verifying the hypothesis that higher environmental disclosure is associated with increased market value. These findings align with the growing body of research that links environmental performance to an enhanced market value [19,31,59], as investments in environmental initiatives can be financially beneficial in the long run.

The social pillar (SPSD) in Model 3 also exhibits a positive and statistically significant association with MC, with coefficients ranging from 0.743 to 0.755 (all significant at the 1% level). This indicates that companies with better social performance are associated with a higher market capitalization, supporting the hypothesis that higher social disclosure correlates with increased market value. These results are consistent with the literature highlighting the positive impact of social performance on market value [23,33,34].

Moreover, the governance pillar (GPSD) in Model 4 displays a positive and statistically significant association with MC, with coefficients of 0.130 (significant at the 5% level). This suggests that companies with stronger governance performance tend to have a higher market capitalization, verifying the hypothesis that higher governance disclosure is associated with increased market value. As argued by [25,42], effective governance can enhance a firm's value through strategic decision-making and by bolstering a firm's reputation and internal capabilities.

From a resource-based perspective, robust ESG disclosure practices, including those related to governance, can be viewed as strategic assets that cultivate a positive reputation, attract investors, and facilitate access to capital, contributing to a firm's competitive edge [5–7]. Companies with strong ESG practices possess valuable intangible assets, and the effective integration of ESG initiatives can refine human resource management, bolster corporate reputation, reduce recruitment costs, and expand market opportunities [13,43]. Thus, the empirical evidence suggests that companies prioritizing environmental, social, and governance responsibilities are rewarded by the market with a higher market capitalization.

4.4. Regression Analysis: The Moderating Effect of Internal Governance

Table 5 illustrates the moderating influence of internal governance (IG) on the relationship between ESG scores and market capitalization (MC). The synergy term "C.ESG#C.IG" has a positive and statistically significant coefficient of 0.400 evident in three regression models (OLS, Random Effects, and Tobit) at a 1% level. This finding indicates that internal governance moderates the association between ESG scores and market capitalization. The significant positive interaction effect suggests that a higher internal governance quality strengthens the positive association between ESG scores and market capitalization. This finding supports the hypothesis that internal governance mechanisms, specifically the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure, play a crucial role in enhancing the impact of ESG disclosure on a firm's market valuation. Studies by [45,48] further underscore the significance of strong governance in the context of ESG metrics. Ref. [48] found that effective governance disclosures have the most substantial impact on corporate efficiency, a factor likely contributing to a higher market valuation. Similarly, ref. [45] emphasized governance's pivotal role in financial performance compared to environmental and social dimensions. These findings align with our argument that robust internal governance practices can enhance the positive market perception of a firm's ESG efforts, ultimately leading to a higher market capitalization.

The control variables in the model provide additional insights. Firm size (FSIZE) exhibits a positive and statistically significant coefficient, indicating that a larger firm size is associated with a higher market capitalization. This is consistent with the notion that larger firms often have greater resources, visibility, and access to capital markets, which can contribute to their higher market valuations. On the other hand, leverage (LEV)

and independent audit committee (ACIND) have negative coefficients, suggesting that a higher leverage and industry concentration are associated with lower market capitalization. Increased leverage can expose firms to greater financial risk and uncertainty, which may be perceived negatively by investors and lead to lower market valuations. Similarly, a higher industry concentration can reduce competition and limit growth opportunities, potentially resulting in a lower market capitalization. Board size (BSIZE) and capital expenditure (CAPEX) show positive coefficients, indicating that larger boards and higher capital expenditure contribute positively to market capitalization. Larger boards may provide a broader range of expertise and perspectives, which can enhance strategic decision-making and oversight, ultimately benefiting the firm's market performance. Additionally, increased capital expenditure can signal a firm's commitment to growth and innovation, which investors may view favorably. Interestingly, CEO duality (Duality) does not show a significant association with market capitalization in this model, suggesting that the implementation of a split CEO–chair structure may not be a critical factor in determining a firm's market valuation.

Table 5. The moderating effect of internal governance on the association between ESG metrics and firm performance.

	Model 5		
VARIABLES	**OLS MC**	**Random MC**	**Tobit MC**
C.ESG#C.IG	0.400 *** [0.578]	0.398 *** [0.577]	0.400 *** [0.577]
FSIZE	0.506*** [0.183]	0.504 *** [0.182]	0.506 *** [0.182]
LEV	−1.088 *** [0.115]	−1.082 *** [0.115]	−1.088 *** [0.115]
BSIZE	0.119 *** [0.116]	0.119 *** [0.115]	0.119 *** [0.116]
Duality	0.309 [0.670]	0.786 [0.666]	0.309 [0.669]
ACIND	−0.980 *** [0.240]	−0.944 *** [0.243]	−0.980 *** [0.240]
CAPEX	0.148 *** [0.119]	0.149 *** [0.119]	0.148 *** [0.119]
Constant	5.783 *** [0.298]	5.771 *** [0.301]	5.783 *** [0.298]
Observations	2251	2251	2251
R-squared	0.646		
Number of Years		10	

Standard errors in parentheses. *** $p < 0.01$.

4.5. Robustness Check

To assess the robustness of our findings, this research employs various financial indicators (ROA, ROE, Tobin's Q, WACC) while maintaining the synergy term regarding ESG metrics and internal governance. The results, detailed in Table 6, and analyzed using consistent methodologies (aligned with Table 5), elucidate the association between these factors and the moderating role of internal governance.

Table 6. Robustness check.

		Model 6			**Model 7**			**Model 8**			**Model 9**	
VARIABLES	**OLS ROA**	**Random ROA**	**Tobit ROA**	**OLS ROE**	**Random ROE**	**Tobit ROE**	**OLS Tobin_Q**	**Random Tobin_Q**	**Tobit Tobin_Q**	**OLS WACC**	**Random WACC**	**Tobit WACC**
C.ESG#C.IG	0.113 ***	0.113 ***	0.113 ***	0.781 *	0.781 *	0.781 *	0.106	0.106	0.106	−0.578 ***	−0.578 ***	−0.578 ***
	[0.495]	[0.495]	[0.495]	[0.407]	[0.407]	[0.406]	[0.153]	[0.153]	[0.152]	[0.124]	[0.124]	[0.124]
FSIZE	−0.193 ***	−0.193 ***	−0.193 ***	−7.233 ***	−7.233 ***	−7.233 ***	−2.370 ***	−2.370 ***	−2.370 ***	7.160 ***	7.160 ***	7.160 ***
	[0.136]	[0.136]	[0.136]	[1.847]	[1.847]	[1.845]	[0.708]	[0.708]	[0.707]	[0.565]	[0.565]	[0.564]
LEV	−0.992 ***	−0.992 ***	−0.992 ***	−9.911	−9.911	−9.911	0.544	0.544	0.544	131.6 ***	131.6 ***	131.6 ***
	[0.978]	[0.978]	[0.977]	[13.93]	[13.93]	[13.92]	[5.154]	[5.154]	[5.148]	[4.058]	[4.058]	[4.054]
CAPEX	0.442 ***	0.442 ***	0.442 ***	−0.265	−0.265	−0.265	−0.380	−0.380	−0.380	−0.234	−0.235	−0.234
	[0.101]	[0.101]	[0.101]	[1.370]	[1.370]	[1.368]	[0.524]	[0.524]	[0.523]	[0.420]	[0.420]	[0.420]
Constant	0.315 ***	0.315 ***	0.315 ***	131.1***	131.1 ***	131.1 ***	43.34 ***	43.34 ***	43.34 ***	−87.03 ***	−87.03 ***	−87.03 ***
	[0.153]	[0.153]	[0.152]	[20.81]	[20.81]	[20.78]	[7.918]	[7.918]	[7.909]	[6.324]	[6.324]	[6.317]
Observations	2249	2249	2249	2201	2201	2201	2168	2168	2168	2253	2253	2253
R-squared	0.145			0.14			0.12			0.410		
Number of Years		10			10			10			10	

Standard errors in parentheses; *** $p < 0.1$, * $p < 0.1$.

In terms of financial metrics, we selected the Return on Assets (ROA), Return on Equity (ROE), and Weighted Average Cost of Capital (WACC) as key indicators of financial performance. These metrics are widely recognized in the literature as essential measures that reflect a firm's profitability, efficiency, and financial health. ROA provides an insight into how effectively a company utilizes its assets to generate earnings, while ROE measures the return generated on shareholders' equity, indicating management efficiency in using equity capital. The WACC, on the other hand, represents the average rate a company is expected to pay to finance its assets, making it a crucial metric for assessing investment decisions and the firm's perceived risk profile.

By focusing on these specific financial metrics, we aim to provide a comprehensive analysis of how ESG performance influences various aspects of financial health and market perception. This selection enables us to evaluate both the internal efficiency of firms and their external financing costs, thus offering a holistic view of the impact of ESG factors on overall financial performance.

Building upon the Stakeholder Theory [11] and Resource-Based View [6,7] this research demonstrates how robust internal governance amplifies the financial benefits of superior ESG performance. Effective governance fosters transparency and accountability, ensuring ESG initiatives translate into tangible operational improvements, not merely symbolic gestures. Strong governance frameworks empower management to make strategic decisions that capitalize on sustainability opportunities, potentially leading to cost reductions, resource optimization, and ean nhanced brand reputation—all contributing to a demonstrably higher ROA.

Model 6 delves deeper into the interaction between ESG, internal governance, and Return on Assets (ROA). The consistently positive and statistically significant coefficient [0.113] for the synergy term ["C.ESG#C.IG"] throughout all the models (OLS, Random Effects, Tobit) reveals a captivating synergy: firms with strong internal governance structures excel at transforming robust ESG practices into higher ROAs. This finding underscores a crucial point: effective governance acts as a catalyst, unlocking the financial potential of ESG initiatives. It fosters a virtuous cycle—stronger ESG practices, coupled with good governance, lead to operational efficiency gains (reflected in a higher ROA), bolstering the firm's financial health and potentially attracting further investment in sustainability. This reinforces the strategic value of integrating ESG within a well-governed corporate framework. The detailed results for each model are presented in Table 6.

Building on the findings related to ROA, Model 7 explores the influence of ESG and governance on ROE. Model 7 illuminates the intricate dynamics between ESG performance, internal governance, and Return on Equity (ROE). The synergy term "C.ESG#C.IG" exhibits a robust positive coefficient of 0.781 throughout all the models, achieving statistical significance at the 90% confidence level. This finding underscores a clear link between higher ESG scores and strengthened internal governance and an enhanced ROE. This analysis emphasizes the pivotal role of internal governance quality in moderating the impact of ESG performance on financial outcomes. Effective governance structures empower management to leverage ESG initiatives for strategic financial decisions, encompassing optimizing capital allocation, reducing financing costs, or enhancing investor confidence, ultimately contributing to a higher ROE.

Transitioning from ROE, Model 8 examines the interplay between ESG performance, internal governance, and Tobin's Q. The synergy term "C.ESG#C.IG" reveals a positive coefficient of 0.106 throughout all model specifications (OLS, Random Effects, Tobit). However, the absence of statistical significance prompts a deeper inquiry into the association between these variables. While not statistically conclusive, this positive coefficient suggests a potential, albeit multifaceted, connection. Firms with strong ESG practices, coupled with robust internal governance, might enjoy a slight advantage in terms of market valuation. Despite the statistical nuances, this finding serves as a catalyst for deeper investigation. Future research endeavors could benefit from employing larger datasets or incorporating additional control variables that might influence Tobin's Q.

With Tobin's Q explored, Model 9 uncovers a compelling finding regarding the association between ESG metrics, internal governance, and the Weighted Average Cost of Capital (WACC). The synergy term "C.ESG#C.IG" exhibits a negative and statistically significant coefficient [−0.578] throughout all the regression models. This suggests that firms with elevated ESG scores and robust internal governance structures experience a lower WACC. A lower WACC signifies a reduced cost of capital for a firm, implying that investors perceive companies with strong ESG performance and effective governance as less risky and more attractive long-term investments. Effective governance structures ensure transparency and accountability in ESG initiatives, enhancing investor confidence and reducing perceived investment risks. The specific findings for each model are displayed in Table 6.

4.6. Endogeneity

To address endogeneity concerns, we utilize the dynamic panel Generalized Method of Moments (GMM) estimator. This technique utilizes a variable's past values as instruments, comparing them with current values. This strengthens the model's internal validity by mitigating reverse causality. The GMM estimator relies on two key assumptions: valid instruments and no serial correlation within the error terms. By satisfying these key assumptions, the GMM provides consistent and unbiased estimates, addressing the potential endogeneity issues that may arise in our panel data setting. The dynamic nature of the panel data and the potential for unobserved heterogeneity make this approach a more appropriate choice, as it can effectively control for these factors and provide robust estimates. Table 7 presents the GMM results, which align with the main findings reported in Table 4. The coefficient for ESG disclosure (ESG) remains positive and statistically significant at the 1% level. The GMM estimates in Table 6 mirror the key findings from Table 4, with the ESG disclosure coefficient (ESG) maintaining a statistically significant positive effect at the 1% level. This consistency strengthens the analysis's empirical robustness, suggesting the results are unlikely to be due to endogeneity. This approach effectively addresses the potential endogeneity concerns, strengthening the internal validity of the study and providing confidence in the observed associations. While the GMM technique helps mitigate endogeneity issues, the choice of appropriate instruments and the satisfaction of the underlying assumptions are crucial for the validity of the GMM results.

Table 7. GMM.

VARIABLES	**GMM** **MC**
ESG	0.311 ***
	[0.271]
FSIZE	0.996 ***
	[0.378]
LEV	0.338 **
	[0.222]
BSIZE	0.278
	[0.220]
Duality	−0.447 ***
	[0.130]
ACIND	0.637 **
	[0.287]
CAPEX	−0.112 ***
	[0.234]
Constant	13.04 ***
	[0.442]
Observations	1865
R-squared	0.022

Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$.

5. Conclusions

This study examines the impact of environmental, social, and governance (ESG) performance on the market valuation of non-financial firms listed on the UK FTSE All-Share Index over an eleven-year period from 2010 to 2021. Additionally, we investigate how internal governance mechanisms moderate this relationship. Specifically, we analyze the moderating effects of board independence, board size, the presence of an independent audit committee, and the separation of the CEO and chairperson roles. The key findings reveal a robust positive association between ESG metrics and market capitalization, with higher ESG ratings correlating with higher market values. Internal governance structures, specifically the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure, significantly enhance this positive effect, indicating that firms with robust internal governance can better leverage ESG initiatives to boost their market value.

Having established the key findings, the study now turns to exploring the implications of these results for both the theoretical and practical domains. Our findings empirically validate and extend the Stakeholder Theory and Resource-Based View (RBV) within the context of ESG performance. The RBV posits that a firm's competitive edge stems from leveraging valuable assets and cultivating unique competencies; specifically, strong ESG practices can provide a competitive advantage. Stakeholder Theory suggests that firms engaged in responsible practices enhance stakeholder associations, leading to improved financial performance. This study's positive association between ESG and market value not only aligns with both theories but also demonstrates their complementary nature in explaining the financial benefits of ESG practices. By integrating these theories, we demonstrate that ESG practices can enhance a firm's reputation, attract investors, and improve financial performance. Furthermore, our research extends these theoretical frameworks by highlighting the critical role of internal governance in moderating the ESG–market capitalization relationship, suggesting a potential new theoretical perspective that we might term "Governance-Enhanced ESG Value Theory".

This study addresses a significant research gap by being the first to examine the combined effects of overall ESG performance and its individual pillars on market capitalization in the UK context. By doing so, it offers new theoretical insights and practical implications for the fields of sustainable finance and corporate governance. The UK's well-developed ESG reporting framework and strong corporate governance practices provide a unique setting for this research, offering valuable insights that may be applicable to other markets with similar structures. This comprehensive approach not only advances our understanding of ESG impacts in the UK but also sets a precedent for similar analyses in other markets, potentially spurring a new wave of research in sustainable finance.

Moreover, this study offers new theoretical insights by demonstrating the critical role of internal governance in moderating the association between ESG metrics and market capitalization. This underscores the importance of considering governance structures when evaluating the effectiveness of ESG initiatives. Further, this study extends the application of Institutional Theory by demonstrating how robust internal governance mechanisms, specifically the presence of independent board members, board size, an independent audit committee, and the implementation of a split CEO–chair structure, can enhance the legitimacy and credibility of ESG practices. Firms with strong internal governance are better able to align their ESG initiatives with institutional norms and stakeholder expectations, leading to improved financial outcomes.

Moreover, these findings contribute to the emerging field of Sustainable Finance Theory through an empirical investigation of the relevance of ESG performance and the role of internal governance in amplifying its financial benefits. This aligns with the growing recognition that firms prioritizing sustainability and social responsibility can generate lasting value for themselves and their stakeholders. This study's exploration of both the overall ESG score and the individual pillars of ESG (environmental, social, and governance)

on market capitalization in the UK—a relatively unexplored area in sustainable finance research—offers new theoretical insights.

By highlighting the critical role of internal governance structures as moderators, this study underscores the importance of considering governance frameworks when assessing the effectiveness of ESG initiatives. This contributes to Sustainable Finance Theory by demonstrating that ESG efforts, particularly when supported by robust governance, can enhance financial outcomes and align with Institutional Theory in legitimizing corporate ESG practices. These insights offer a clearer understanding of how each ESG pillar uniquely impacts financial performance, advancing theoretical frameworks in sustainable finance and corporate governance. This granular analysis helps to elucidate the specific pathways through which different ESG factors can influence financial performance, informing the development of more multifaceted theoretical frameworks. These theoretical contributions illuminate the intricate associations between ESG performance, internal governance structures, and market value. This paves the way for significant advancements in the field of sustainable and responsible business practices.

From a theoretical perspective, our findings both extend and challenge existing theories in corporate finance and sustainability. By demonstrating the critical role of internal governance in moderating the ESG–market capitalization relationship, we extend the Resource-Based View to include governance structures as key organizational resources that can enhance the value of ESG initiatives. This suggests a potential new theoretical framework that integrates ESG performance, governance structures, and market valuation, which we might term "Governance-Enhanced ESG Value Theory." This framework could provide a more comprehensive explanation of how firms create and capture value through their ESG and governance practices in the modern business environment.

Transitioning to practical implications, corporate managers can leverage these findings to enhance their strategic decision-making processes. Corporate managers should develop a comprehensive ESG strategy that aligns with the company's core business objectives, setting specific, measurable, and time-bound ESG targets. They should implement regular ESG performance assessments and establish clear Key Performance Indicators (KPIs) for each ESG pillar, integrating them into executive compensation structures. Enhancing board diversity and independence to improve ESG oversight and decision-making, and considering factors such as gender, ethnicity, and expertise in sustainability, is crucial. Investing in ESG-related training and development programs for employees at all levels, fostering a culture of sustainability throughout the organization, is also recommended. Establishing a dedicated ESG committee at the board level to oversee and guide the company's sustainability initiatives can further strengthen ESG integration. By integrating ESG criteria into their corporate governance frameworks, managers can improve their firms' market value and achieve sustainable financial success.

To illustrate how companies can strategically leverage ESG performance and strong internal governance to enhance their market value, several case studies provide compelling evidence. For instance, renewable energy initiatives by corporations like Google and Amazon have significantly increased their market value through commitments to carbon neutrality and ambitious renewable energy targets. These substantial investments not only align with ESG objectives but also lower their long-term operational costs, thereby fostering positive investor sentiment, enhancing brand loyalty, and driving market valuation.

In the realm of governance excellence, Unilever serves as an example of how a diverse and experienced board can enhance decision-making and risk management. By prioritizing board diversity and embedding ESG considerations into its corporate strategy, Unilever has strengthened investor trust, mitigated risks, and improved stock performance. Similarly, companies like Starbucks exemplify social responsibility through initiatives such as fair wages and improved labor conditions, which enhance their brand reputation, customer loyalty, and employee retention, ultimately boosting their long-term profitability. Furthermore, firms in heavy industries demonstrate policy compliance and risk mitigation by proactively adhering to ESG-related regulations, such as the EU's Green Deal. Investments

in emissions reduction technologies not only avoid regulatory fines but also enhance their market standing as responsible entities. These cases collectively highlight the tangible financial and reputational benefits of integrating ESG and governance frameworks into corporate strategies, offering valuable insights for corporate managers, investors, and policymakers dedicated to sustainable value creation.

Policymakers can utilize these findings to inform the development of regulations and guidelines that promote transparency and accountability in corporate practices. Policymakers should establish a standardized ESG reporting framework to ensure consistency and comparability across firms, potentially aligning with international standards such as the Global Reporting Initiative (GRI) or Sustainability Accounting Standards Board (SASB). Introducing tax incentives or grants for companies that demonstrate significant improvements in their ESG performance, particularly in areas aligned with national sustainability goals, can drive positive change. Developing sector-specific ESG guidelines to address industry-specific challenges and opportunities, recognizing the varying materiality of ESG factors across different sectors, is essential. Creating a national ESG database to facilitate research, inform policy decisions, and promote transparency in corporate sustainability practices can enhance overall market efficiency. Implementing mandatory ESG disclosure requirements for listed companies, with a phased approach for smaller enterprises, can ensure comprehensive ESG integration across the market. Investors can apply these findings to refine their investment strategies by developing ESG-integrated investment approaches that consider both financial and non-financial factors, potentially using ESG scores as screening criteria or tilting factors in portfolio construction. Engaging proactively with companies to encourage improved ESG disclosure and performance, using shareholder resolutions and proxy voting as tools for influence, can drive positive change. Incorporating ESG metrics into risk assessment models to better evaluate long-term investment prospects, considering both the opportunities and risks associated with ESG factors, can lead to more informed investment decisions. Accounting professionals, including financial analysts, auditors, and sustainability reporting experts, can play a critical role by developing standardized methodologies for ESG data collection, verification, and reporting, ensuring consistency and reliability in non-financial disclosures. Integrating ESG considerations into traditional financial auditing processes and developing expertise in assessing the materiality and accuracy of ESG-related information is crucial. Providing ESG-related advisory services to help companies improve their sustainability performance and reporting, including gap analysis and benchmarking against industry peers, can further enhance the quality of ESG practices and disclosures.

Building upon the robust findings of this study, several policy recommendations emerge to further enhance the integration of environmental, social, and governance (ESG) practices and bolster their positive impact on market valuation. Firstly, policymakers should advocate for stricter ESG reporting standards to ensure a transparent and comprehensive disclosure of environmental, social, and governance performance. This will empower investors to make informed decisions, thereby driving sustainable investment practices. Secondly, robust corporate governance regulations emphasizing board independence, diversity, and the role of audit committees should be implemented to prioritize long-term sustainability and ethical behavior. Thirdly, incentivizing ESG investments through tax incentives and incorporating ESG factors into public procurement processes can stimulate demand for sustainable products and services. Fourthly, investing in ESG education and training programs for corporate executives, investors, and the general public is crucial to fostering a culture of sustainability and responsible business practices. Finally, policymakers should encourage long-term investment horizons by adjusting capital gains tax rates to favor longer-term holdings, aligning investor interests with the long-term benefits from ESG investments. By implementing these policy recommendations, governments can create a more sustainable equitable future while driving economic growth innovation.

While this study has made significant strides in understanding the relationship between ESG performance, internal governance, and market capitalization, it is important to

acknowledge certain limitations. One key concern is the potential endogeneity between ESG performance and financial outcomes, which may introduce bias in our findings. This issue could affect the observed associations, particularly in terms of reverse causality between ESG initiatives and firm performance. Additionally, while its statistical significance was limited, the positive coefficient in Model 8 suggests a potential association between ESG metrics, internal governance, and Tobin's Q. This finding serves as a catalyst for further inquiry, urging deeper exploration into the complex synergy between these critical corporate elements. Although these results are inconclusive, they contribute to the ongoing discourse on ESG performance, internal governance, and market valuation, emphasizing the need for further investigation to achieve a more comprehensive understanding of these associations.

Building on these findings, future research should explore the potential association between ESG performance, internal governance, and Tobin's Q, utilizing larger datasets, examining specific governance mechanisms, and conducting longitudinal analyses to establish causality. Advanced econometric techniques, such as instrumental variable (IV) methods, panel data models with fixed effects, or two-stage least squares (2SLS) regression, could be employed to address endogeneity concerns and enhance the robustness of the results. Expanding the scope of analysis to include different sectors and regions would enhance the generalizability of the findings and provide insights into the sustainability benefits over time. Additionally, incorporating a broader range of ESG metrics and examining the impact of specific ESG initiatives on firm performance could yield deeper insights into the complex dynamics between ESG practices and financial outcomes. By leveraging diverse industry contexts, future studies can contribute to a more nuanced understanding of how effective governance mechanisms amplify the financial benefits associated with a strong ESG performance. This research will not only enrich academic discourse but also offer valuable guidance for policymakers, investors, and corporate leaders on optimizing ESG practices to drive market valuation and achieve sustainable financial success.

Implementing these recommendations could transform accounting practices, fostering resilient and sustainable business models. Integrating ESG performance and internal governance into financial strategies can significantly boost market values and sustainable growth. This study not only offers insights for academics but also guides corporate managers, policymakers, investors, and accounting professionals toward leveraging ESG integration for sustainable value creation. Accounting professionals, including financial analysts, auditors, and sustainability reporting experts, play a crucial role in developing comprehensive ESG reporting frameworks. These frameworks ensure accurate ESG data communication, facilitating informed decision-making and enhancing trust in the reported information. Embracing ESG and governance metrics in practice can contribute to a more sustainable financial system, driving positive business landscape changes. While this study's findings on the association between ESG, internal governance, and Tobin's Q were inconclusive, the positive coefficient suggests a potential connection that warrants further investigation. Advancing research in this area can offer valuable insights for stakeholders on the complex dynamics between these critical corporate elements, fostering a more comprehensive understanding of this important association.

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