Journal of
Risk and Financial Management

MDPI

Article

Environmental, Social, and Governance (ESG) and Firm Valuation: The Moderating Role of Audit Quality

Mika Vaihekoski and Habeeb Yahya *

Turku School of Economics, University of Turku, 20500 Turku, Finland; mika.vaihekoski@utu.fi
* Correspondence: habeeb.b.yahya@utu.fi

Abstract: This paper investigates whether the external audit quality has an impact on the link between ESG performance and firm valuation using a sample of publicly listed Nordic firms. The results from a fixed-effect panel regression show that higher ESG scores lead to higher valuation when a Big Four audit firm is engaged as the external auditor, highlighting the impact of audit quality on the the reliability of the ESG evaluation. The finding highlights the importance of intense external audits in reinforcing investors' confidence in ESG–firm valuation assessment.

Keywords: ESG; firm valuation; audit quality; Nordic countries

JEL Classification: G32; M4

1. Introduction

Several studies (e.g., Fatemi et al., 2015; Vaihekoski & Yahya, 2023) demonstrate a positive relationship between Environmental, Social, and Governance (ESG) performance and firm valuation. The positive relationship highlights the role of firms' ESG performance in enhancing stakeholder trust and long-term growth (Pong & Man, 2024). Firms with strong ESG scores are often associated with enhanced reputations, reduced risks, and improved operational efficiencies, all of which contribute to higher valuations (Verheyden et al., 2016). These benefits come from increased stakeholders' trust and the idea that good ESG practices support long-term financial stability. However, the reliability of ESG scores has recently faced significant scrutiny in the academic literature. ESG ratings have been argued to be inconsistent across providers and influenced by subjective judgments and methodological biases (Berg et al., 2021). ESG scores remain also challenging to interpret due to discrepancies in how metrics are constructed and reported, raising questions about their validity as corporate sustainability indicators despite their increasing use.

The increasing need for robust verification of the ESG activities of firms is mostly due to heavy reliance on self-reported data, which is a key challenge in ESG evaluation. According to Moneva et al. (2006), reporting frameworks like the Global Reporting Initiative (GRI) are designed to standardize sustainability reporting. However, they have been criticized for allowing selective disclosures that align corporate goals with sustainability narratives. This selective reporting frequently undermines genuine accountability. The practice, referred to as 'greenwashing', erodes stakeholder trust and diminishes the credibility of ESG metrics as dependable indicators of corporate sustainability. Further, GRI has been criticized for overlooking broader ecological justice and social equity issues and failing to ensure that reported data accurately reflect substantive sustainability efforts (Dumay et al., 2010). For instance, firms using GRI reports are not necessarily more active in addressing emissions

check for updates

Academic Editor: Rania Mousa

Received: 14 December 2024
Revised: 21 February 2025
Accepted: 7 March 2025
Published: 12 March 2025

Citation: Vaihekoski, M., & Yahya, H. (2025). Environmental, Social, and Governance (ESG) and Firm Valuation: The Moderating Role of Audit Quality. *Journal of Risk and Financial Management*, *18*(3), 148. https://doi.org/10.3390/jrfm18030148

reductions or improving social equity, suggesting that reporting alone does not guarantee meaningful action (Moneva et al., 2006). This reliance on self-reported data makes the credibility of ESG disclosures particularly essential, with stakeholders increasingly depending on them to make informed decisions.

Meanwhile, the direct role of audit quality in enhancing confidence in sustainability disclosures is less well documented and continues to be debated despite the widely acknowledged conclusion that high-quality audits reinforce trust in a company's financial reporting (Surya et al., 2021). This issue is fundamental given the skepticism surrounding self-reported ESG metrics. However, the potential role of audit quality lies in its ability to independently verify the accuracy and completeness of ESG disclosures, thereby reducing the risks associated with self-reported metrics. By applying rigorous auditing practices, auditors can bolster the credibility of ESG scores, enhancing their reliability as indicators of a firm's true actions. Previous research has shown that audit quality significantly affects, for example, the accuracy of a company's financial position (see Behn et al., 2008) and improves the reliability of analyst forecasts (see Jeong, 2020). This raises an important question of whether researchers can extend these same principles to ESG metrics to ensure they are not merely compliance driven but reflective of substantive sustainability efforts which could potentially be seen as value increasing. In this context, audit quality presents a promising approach to addressing the inherent shortcomings of ESG disclosures, serving as a bridge between self-reported data and stakeholder trust.

A few studies have examined the impact of audit quality on the ESG–firm performance relationship. For instance, Zahid et al. (2022) explores the moderating effect of audit quality on financial performance measures such as return on assets, revenue, and return on equity. Their findings indicate that high ESG ratings can sometimes adversely affect financial performance, particularly when firms engage Big Four auditors. However, their study is limited to financial performance metrics. It does not consider market-based valuation measures, arguably better in reflecting shareholders' perception of a firm's ability to manage, for example, environmental-related risks. Unlike other financial performance indicators, Tobin's Q used in this study provides a forward-looking perspective, capturing the broader implications of ESG performance on investor sentiment and market valuation (Fatemi et al., 2015).

Similar to Dakhli (2022), our study focuses on the relationship between firm's market valuation and ESG rating. Using Tobin's Q as a measure of valuation, we extend their analysis to the individual ESG pillars (Environmental, Social, and Governance) to assess whether audit quality has a disproportionate impact on specific aspects of firms' sustainability performance. In addition, unlike most earlier studies, we also test an alternative measure of audit quality to show that the effect on the relationship between ESG and firm valuation is robust to the choice of measure.

Furthermore, we extend the analysis by focusing on the Nordic region, where a strong culture of transparency provides an ideal setting for such analysis. Nordic countries can be also said to enjoy robust institutional frameworks with strong regulatory bodies, transparent governance, and high civic trust (Gjølberg, 2013). These features enhance the reliability of corporate disclosures and minimize the likelihood of superficial "box-ticking" ESG practices. Moreover, Nordic firms have historically engaged in proactive social and environmental initiatives, reflecting cultural norms prioritizing collective well-being and corporate accountability (Matten & Moon, 2008). The robust framework in the Nordic area reduces factors such as hidden sustainability practices or unchecked managerial discretion, making it easier to isolate the moderating role of audit quality on ESG–valuation relationships. Thus, focusing on the Nordic context provides a clearer understanding of

whether high audit quality genuinely enhances stakeholder confidence in ESG disclosures or merely ensures compliance with reporting standards.

Our results confirm a positive relationship between ESG rating and firm valuation if the firms have been audited by one of the Big Four auditors. This finding aligns with prior research by Dakhli (2022) but extends their analysis by demonstrating consistent results across all three ESG pillars. Additionally, by focusing on the Nordic region, we show that even in regions with more advanced ESG standards due to strong institutional and cultural settings, the role of audit quality in ensuring stakeholder trust in the reported ESG performance of firms is as important. This approach ensures that the significance of audit quality in the ESG–firm valuation relationship is not only due to stakeholders' mistrust due to institutional laxity or cultural decadence around sustainability requirements. The findings in this study are consistent in using audit fees as an alternative measure of audit quality. Hence, this study affirms that high audit quality reduces the likelihood of greenwashing and selective reporting while enhancing the credibility of ESG disclosures.

Essentially, this study expands existing research by revealing how high-quality auditing can reinforce the link between ESG performance and firm valuation, particularly under the unique institutional and cultural conditions found in the Nordic region. Strong legal frameworks, transparent business norms, and established stakeholder activism in Nordic economies often set a higher bar for corporate responsibility and auditing practices. By highlighting that even in a context recognized for mature sustainability agendas, robust audits remain vital to translating ESG efforts into market value, the study underscores the wide-ranging implications for policymakers, regulators, and investors elsewhere. Specifically, ensuring credible ESG disclosures and high-quality audits fosters accountability and prevents greenwashing. This outcome benefits local stakeholders and global markets seeking reliable sustainability metrics (Kolk & Van Tulder, 2010). Furthermore, this study shows that the effect of audit quality in the ESG–firm valuation link is robust to the choice of the quality measure. This is particularly important given the different opinions on the most appropriate audit quality measures in the literature (Rajgopal et al., 2021). Ultimately, the findings show that audit quality does more than validate financial statements. It can help align ESG efforts with investor confidence, while institutional and cultural traits like those in the Nordic region amplify or hinder this effect. This integrated view of governance, sustainability, and culture thus offer a template for other economies aiming to strengthen the impact of ESG initiatives on firm valuation.

The rest of the article is organized as follows. The theoretical framework, literature review, and hypothesis development are discussed in Section 2. The data and research design is presented in Section 3. Section 4 presents the main empirical results. Section 5 concludes the paper and offers suggestions for further research.

2. Theoretical Framework, Literature Review and Hypothesis Development

The connection between audit quality, institutional settings, and ESG efforts has become increasingly important in today's corporate world. Reliable auditing is crucial for building stakeholders' trust in the authenticity of a company's ESG commitments. Early studies on audit quality generally focused on the precision of financial statements and the auditor's ability to detect material misstatements (Fontaine & Pilote, 2012; Francis, 2011). This emphasis stemmed from classical agency theory, where stakeholders entrust auditors to mitigate information asymmetry between corporate management and external parties (DeAngelo, 1981; Meckling & Jensen, 1976). Yet, in the contemporary business landscape, stakeholders increasingly demand credible assurance on the non-financial facets of the business, particularly on ESG-related practices (Bose, 2020; Ferrer et al., 2020). Firms must produce verifiable financial reports and disclose reliable ESG data, as stakeholder theory by

Freeman (1984) emphasizes accountability to a broad range of stakeholders, not just shareholders. ESG disclosure, rooted in this theory, helps firms meet stakeholder expectations.

As the popularity of ESG has risen, concerns about whether firms report genuine ESG activities have raised questions about the reliability and transparency of their disclosures. In such cases, audit quality, long regarded as the cornerstone of stakeholder confidence, plays a crucial role in addressing these challenges (Surya et al., 2021). If the audits are rigorous—marked by adequate expertise, professional skepticism, and independence—corporate transparency rises, and the risk of financial misreporting becomes smaller (AL-Qatamin & Salleh, 2020; Francis, 2004). As such, earlier studies have documented several proxies to capture audit quality, such as the identity of the auditor (Big Four vs. non-Big Four), audit fees, or detected restatements (DeFond & Zhang, 2014; Francis & Yu, 2009; Hoitash et al., 2007). Higher-resourced auditors are seen to offer more profound investigative capacity, leading to more "true and fair" financial statements (Becker et al., 1998), which in turn increases shareholder, creditor, and regulator trust (Francis, 2011). This trust is crucial in securing cost-effective capital market access and a positive reputation (Surya et al., 2021).

Recent research has also found evidence that high-quality audits also influence the credibility of ESG disclosures (Dakhli, 2022). As firms adopt complex operational strategies—for instance, restructuring supply chains to reduce carbon emissions—stakeholders increasingly demand assurance that reported non-financial data accurately reflect actual practices (Pizzi et al., 2024). In addition, international frameworks such as the International Financial Reporting Standard (IFRS) S1 and S2 sustainability disclosure standards, or more advanced regulations like the European Union's (EU) Corporate Sustainability Reporting Directive (CSRD), compel companies and their auditors to scrutinize environmental and social metrics (Bose, 2020). Against this backdrop, the auditor's role has expanded from a purely financial gatekeeping function to validating whether carbon targets, workforce welfare, or ethical supply-chain measures stand up to scrutiny (Ferrer et al., 2020). In effect, rigorous audits mitigate the risk of "greenwashing", where firms might exaggerate or fabricate ESG accomplishments to attract socially responsible investments or to appease stakeholder activism (Delmas & Burbano, 2011).

In the same way, the institutional environment—comprising legal structures, cultural norms, and regulatory enforcement—significantly modulates the interplay between audit quality and ESG disclosures (Aguilera et al., 2007; North, 1990). In contexts featuring a strong rule of law, coherent stakeholder activism, and effective enforcement, high audit quality aligns powerfully with ESG reporting, reinforcing corporate trust. For example, the EU's updated sustainability directives require extensive disclosures, prompting deeper collaboration between companies and auditors to guarantee accuracy in metrics such as emissions, workplace inclusivity, or community impact (Kinderman, 2020). By contrast, emerging or transitioning markets may exhibit weaker institutions, resulting in more superficial ESG adoption or audits, often creating a trust deficit among investors and regulators (Arora & Dharwadkar, 2011; Dam & Scholtens, 2012). In such settings, insufficient enforcement may allow unverified claims of carbon neutrality or social responsibility to go unscrutinized, leaving stakeholders exposed to undisclosed risks (Delmas & Burbano, 2011).

Importantly, consistent auditing standards, when rigorously applied, can strengthen institutional frameworks over time (Chang et al., 2008). This is particularly relevant in ESG domains, where reporting norms remain unevenly distributed across geographies and industries (Ferrer et al., 2020). The availability of robust external assurance fosters a culture of compliance and transparency, as firms that voluntarily subject themselves to high-caliber audits signal a proactive stance on risk management (Pincus et al., 1989; Pizzi et al., 2024). Additionally, stakeholders grow more confident when companies recognize and address potential financial, environmental, or reputational vulnerabilities (AL-Qatamin & Salleh,

2020). A thorough audit bridges the gap between a company's stated ESG commitments and their practical implementation, particularly in contexts with strong institutional oversight. This highlights the importance of audit quality for ESG initiatives, which are inherently less standardized and more challenging to measure consistently than financial metrics (Bose, 2020). Overall, an auditor's scrutiny of internal controls, including how sustainability data are collected, aggregated, and reported, boosts reliability and reduces the threat of inadvertent errors and deliberate manipulations (Trotman & Duncan, 2018). Hence, audits promote stakeholder trust by confirming that management has instituted robust governance mechanisms to identify and mitigate corporate risks (Chang et al., 2008).

Furthermore, as ESG reporting standards have evolved, as illustrated by IFRS S1 and S2 in 2023 or the EU's CSRD entering into force, the symbiosis between audit quality and sustainability disclosures has become increasingly central (Bose, 2020). The alignment with recognized frameworks demands thorough verification practices, implying that an auditor's contribution extends into non-financial realms. Regulatory standards and auditors' credible verification can yield significant positive outcomes for firms. For instance, credible ESG data can secure a more substantial market valuation, as some socially responsible investors reward transparent sustainability practices (Ferrer et al., 2020; Friede et al., 2015). Thus, quality audits reinforce stakeholders' confidence in a company's overall reporting and operations, both financial and non-financial (Surya et al., 2021). Shareholders, for example, depend on audits to confirm accurate representations of financial health—a perspective strongly supported by evidence of higher earnings management in firms with lower audit quality (Becker et al., 1998). The same dynamic applies to sustainability and risk controls, where a comprehensive audit signals a well-managed organization capable of meeting regulatory responsibilities and mitigating unanticipated financial or reputational setbacks (AL-Qatamin & Salleh, 2020; Pincus et al., 1989). In the end, robust ESG disclosure and high audit quality eventually strengthen organizational legitimacy, especially in mature institutional contexts. Where strong legal oversight or stakeholder activism is lacking, even thorough ESG reporting can go under-validated if audits remain superficial or compromised by low independence (Arora & Dharwadkar, 2011; Dam & Scholtens, 2012).

In summary, the theoretical framework suggests that enhanced audit quality strengthens stakeholder trust in financial and ESG disclosures, with institutional conditions acting as a catalyst or a barrier to such a combination. Properly functioning institutions reinforce accountability, while weaker ones allow rhetorical claims to overshadow substantive action. As companies continue integrating sustainability into strategic goals—prompted by evolving standards like IFRS S1/S2 and the EU CSRD—verifiable ESG commitments grow in significance for external stakeholders (Bose, 2020). By evaluating both financial and ESG data rigorously, high-quality audits instill confidence in the company's capacity for sustainable growth, thus cementing trust among shareholders, employees, customers, and regulators alike. Consequently, one can anticipate that improved audit quality contributes positively to the ESG–firm valuation relationship, as reliability in sustainability disclosures improves the firm's reputation and market standing. Hence, we propose the following testable hypothesis:

Hypothesis 1. *The audit quality has a positive and significant effect on the ESG–firm valuation relationship.*

3. Research Design

3.1. Data

To analyze the role of audit quality in the ESG relationship with firm valuation, we use the auditor data of publicly listed firms on the Nordic (Denmark, Finland, Iceland,

Norway, and Sweden) stock exchange from 2010 to 2022. All publicly listed companies on Nordic exchanges for which we have data on the auditor, financial performance, and ESG scores at least for one year are included in the sample. Auditor data are from the Center for Corporate Governance (CCG)—Copenhagen Business School. According to the Center, the data are from various data sources and methods, harmonized, and quality checked. The detailed data description, including sources and collection method, is available on request from the Center. The data from the Center cover the years 2010 to 2019, and they are augmented with data from 2020 to 2022 from the Orbis database. ESG scores, financial data, and the Global Industry Classification Standard (GICS) for the firms are taken from the LSEG Workspace (Eikon). Our final sample consists of about 2757 firm-year unbalanced observations for 319 firms (42 firms are from Denmark, 55 from Finland, 5 from Iceland, 60 from Norway, and 157 from Sweden).

3.2. Variables and Model Specification

The dependent variable in this study is Tobin's Q, commonly used as a forward-looking valuation measure, approximated by the ratio of a firm's market capitalization value to the book value of its assets (Chung & Pruitt, 1994; Lawrence et al., 2011). In the estimation, we use the natural logarithm of the value. There are two main independent variables. The first one is the overall ESG score. It aggregates a firm's performance across environmental, social, and governance components (Friede et al., 2015). The overall ESG score is replaced in different models with the environmental score (E), the social score (S), and the governance score (G) to explore how specific aspects of ESG are related to firm valuation (Gompers et al., 2003; Hassel et al., 2005; Lins et al., 2017).[1] The second main independent variable is Big_4, a binary indicator that gets value one if a firm is audited by one of the Big Four auditors—Klynveld Peat Marwick Goerdeler (KPMG), PricewaterhouseCoopers International Limited (PwC), Ernst & Young (EY), or Deloitte. This variable is widely accepted as a proxy for audit quality (Che et al., 2020; Khurana & Raman, 2004).

To test our hypothesis, we run the following unbalanced panel regression model:

$$Ln\_Tobin's\ Q_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 Big\_4_{it} \times ESG_{it} + Controls + firm_i + year_t + \epsilon_{it}, \quad (1)$$

where $Ln\_Tobin's\ Q_{it}$ is the natural logarithm of the ratio of the market value of the company assets to the replacement cost at the end of the year. In practice, we proxy replacement cost by adding equity book value to the liabilities book value. The ESG score variable ESG_{it} is used in the baseline model, whereas its pillar scores (E, S, and G) are used in alternative models. Big_4_{it} is an audit quality indicator variable that is one if firm i has one of the four big audit firms as the auditor in year t and zero otherwise. $Big\_4_{it} \times ESG_{it}$ is the interaction term between the ESG score and audit quality indicator variable. To study the robustness of the findings, we also use audit fees, calculated as the ratio of audit fees to total fees (total fees include non-audit fees paid to auditors) as an alternative measure of audit quality similar to Rajgopal et al. (2021). *Controls* stands for the control variables as defined earlier. Finally, $firm_i$ and $year_t$ are firm and year fixed-effect controls in our model.

To ensure reliable results, several key control variables are included in the analysis. The first group of variables control for the nature of the client–auditor relationship. First, *Auditor_Tenure*, measured as the natural log of the number of years since the auditor's appointment, is utilized to account for the accumulated client-specific knowledge an auditor develops over time (Carey & Simnett, 2006; Garcia-Blandon et al., 2020). Second, *Auditor_Change* is an indicator variable that equals one if the firm switched auditors in a given year. This variable is used to reflect disruptions in auditor continuity due to, for example, mandatory rotation, the potential signaling of dissatisfaction with prior audit quality, or

conflicts over audit findings (Hackenbrack & Hogan, 2005). Third, *Change_to_Big_4*, which is a binary indicator that equals one if a firm switched from a non-Big Four auditor to one of the Big Four. It is used to account for a firm's desire to strengthen perceived audit rigor (Lawrence et al., 2011).

Other control variables include *Firm_Size*, measured as the natural logarithm of total assets, reflecting both resource availability for sustainability and external monitoring intensity (Clarkson et al., 2008). *ROA*, defined as earnings before interest and taxes over total assets similar to Demerjian et al. (2012), is used to measure profitability. It is used to control for baseline operating performance that might influence both ESG investment and firm valuation. *Leverage*, measured as the debt-to-equity ratio, is expected to capture a firm's capital structure choices and associated risk (Jiang et al., 2019). *Book_to_Market* variable is used to distinguish growth from value firms (Fama & French, 1992). *Board_Gender_Ddiversity* is to account for governance characteristics linked to broader stakeholder perspectives and decision-making dynamics (Terjesen et al., 2009). It is measured as the ratio of female to male board members. *Board_Size* is measured as the natural logarithm of the total number of members in the board. It is used to account for variations in board capacity and complexity (Raheja, 2005). A list of the variables with definition and support from the literature is presented Appendix A.

4. Empirical Results and Discussion

4.1. Descriptive Statistics

Table 1 provides the descriptive statistics for the variables used in this study.[2] The average logarithm of Tobin's Q is 0.55 (corresponds to a Tobin's Q of 1.733), which aligns with the expectation of relatively highly valued, growth-oriented firms in the Nordic stock exchange. The average ESG score is 50.53 with a standard deviation of 18.69, showing wide dispersion in the ESG performance. Financial metrics suggest moderate health and potential for sustainable investments during the sample period, with an average return on assets at 2%, leverage at 21%, and a book-to-market ratio of 0.6. The board characteristics reveal 25% gender diversity (i.e., the average proportion of women to men on the company board) and a large board size of 2.6 (corresponding to about 14 members on average).

The Pearson correlation matrix in Table 2 indicates a negative correlation between firm valuation and ESG scores, possibly reflecting the notion that ESG initiatives impose short-term costs or divert resources from more immediate profit-generating activities as documented in earlier studies (see Brammer & Millington, 2008; Lee & Faff, 2009). In this case, market participants might regard sustainability investments as liabilities, particularly if metrics are hard to verify. The inconsistent reporting standards and occasional "greenwashing" concerns can exacerbate skepticism, undermining the perceived value of higher ESG scores (Delmas & Burbano, 2011; Krüger, 2015). Overall, this negative correlation does not necessarily imply that strong ESG performance undermines firm value; rather, it reflects how firm characteristics and market expectations about growth, risk, and returns can shape the observed relationship between ESG activities and valuation measures.

Table 1. Descriptive statistics.

	N	Mean	St. Dev.	Min	Median	Max
Ln(Tobin's Q)	2318	0.55	0.78	−2.45	0.29	5.54
ESG	2757	50.53	18.69	1.22	50.57	92.25
E	2755	46.67	26.97	0.00	46.44	98.43
S	2755	52.62	21.18	0.58	54.09	96.39
G	2757	51.16	22.43	1.24	52.91	98.56
ROA	2304	0.02	0.15	−3.26	0.03	0.78
Firm_Size	2341	21.41	2.15	14.84	21.46	27.24
Leverage	2302	2.14	17.62	−7.25	0.75	570.51
Book_to_Market	2320	0.60	25.00	−794.10	0.51	1077.57
Board_Size	2757	2.62	0.54	0.69	2.48	4.70
Board_Gender_Diversity	2757	0.25	0.18	0.00	0.25	0.64
Big_4	2757	0.22	0.42	0.00	0.00	1.00
Auditor_Tenure	2757	2.94	2.16	0.00	2.00	13.00
Change_to_Big_4	2648	0.02	0.13	0.00	0.00	1.00
Auditor_Change	2648	0.08	0.28	0.00	0.00	1.00
Audit_Fees	2191	13.10	1.43	8.85	12.97	19.25

Ln(Tobin's Q) is a measure of firm valuation calculated as the ratio of the market value of the company's assets to the replacement cost of those assets. ESG is the overall score (i.e., the weighted average of the environmental, social, and governance pillars), and E, S, and G are the environmental, social, and governance individual pillar scores. ROA, i.e., the return on asset calculated as the earnings before interest and taxes over the total assets of the firm; Firm_Size, i.e., the natural log of total assets; leverage, i.e., the debt–equity ratio of the firm; Book_to_Market, i.e., the ratio of the firm's book value (total assets minus total liabilities) to its market value (market capitalization); Board_Size, i.e., the natural log of number of board members of the firm; Board_Gender_Diversity, i.e., the proportion of females to males on the board of a firm in a year; Big_4, i.e., an indicator variable that is one if the firm is audited by any of the Big Four audit firms and zero otherwise; Auditor_Tenure, i.e., the number of years (annual) the auditor has been with the firm; Change_to_Big_4, i.e., an indicator variable that is one if the auditor has changed to a Big_4 audit firm from the previous year and zero otherwise; Auditor_change, i.e., an indicator variable that is one if the auditor has changed from the previous year and zero otherwise; Audit_Fees, i.e., the ratio of audit fees to total fees paid to auditor in a year.

4.2. Univariate Analysis

Our initial analysis examines whether or not having a Big Four auditing firm has an impact on the variables of interest. We conduct standard difference in means tests for continuous variables in this study. The results reported in Table 3 show a lower average Tobin's Q for Big Four-audited firms.[3] Big Four auditors typically attract more mature, asset-intensive firms with fewer high-growth opportunities. These characteristics often translate into lower market-to-book valuations and thus a lower Tobin's Q. In contrast, non-Big Four-audited firms often include smaller, younger, or more growth-oriented companies that can exhibit higher market valuations relative to their assets. Therefore, even with a stronger audit quality, Big Four clients' profiles inherently predispose them to lower Tobin's Q (see Francis, 2004 and Garcia-Blandon & Argiles-Bosch, 2018). In addition, research shows that Big Four auditors constrain aggressive financial reporting more effectively (see Becker et al., 1998; DeFond & Zhang, 2014). This heightened scrutiny can lead to more conservative accounting outcomes, which may dampen inflated valuations and result in lower market-based multiples. As a result, while the Big Four's audits enhance credibility and reduce information risk, they can also limit the "optimistic" signals that some companies might otherwise present to the market under less rigorous audit standards.

Table 2. Pearson correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1) Ln(Tobin's Q)																			
(2) ESG	−0.173 ***																		
(3) E	−0.228 **	0.816																	
(4) S	−0.154	0.888 ***	0.714 *																
(5) G	−0.079	0.703 *	0.334	0.403 *															
(6) ROA	−0.006 ***	0.205 **	0.195 *	0.217 **	0.067 ***														
(7) Firm_Size	−0.488 **	0.484 ***	0.540 ***	0.468	0.203	0.201 ***													
(8) Leverage	−0.061	0.027 ***	0.028	0.038 **	0.008	−0.034 ***	0.047 ***												
(9) Book_to_Market	−0.030	0.035 ***	0.025 **	0.037 *	0.019 ***	0.050 **	0.041	0.015 *											
(10) Board_Size	0.026 **	0.336 ***	0.305	0.336 **	0.148 ***	0.147 *	0.238	−0.062	0.012 ***										
(11) Board_Gender_Diversity	0.142 ***	0.097 **	0.021	0.078 **	0.105 ***	0.040	−0.137 ***	−0.003 *	−0.026	0.174 ***									
(12) Big_4	−0.154 *	0.044 ***	0.067 ***	0.092	−0.049 **	0.034 ***	0.273 ***	0.040	0.014 **	0.027	−0.170 *								
(13) Auditor_Tenure	−0.003	0.081 ***	0.108 ***	0.087 **	0.003 *	0.067	0.089 ***	−0.030 *	0.009	0.070 ***	−0.030 **	−0.014							
(14) Change_to_Big_4	−0.048 ***	0.011 ***	0.020	0.015	−0.006 ***	0.003 ***	0.099	0.005 ***	0.004	0.035	−0.032 **	0.244 ***	0.042						
(15) Auditor_Change	0.041 ***	0.036 ***	0.017 **	0.025 ***	0.047 ***	0.031	0.013	−0.011 ***	0.004	0.064 **	0.057	−0.015 ***	0.022 *	0.432					
(16) Audit_Fees	−0.129 ***	0.347	0.271 **	0.356 **	0.243	0.141	0.338 *	−0.023 *	0.008	0.239 **	0.067	0.113	0.204 ***	0.062	0.032 ***				
(17) ESG × Big_4	0.127 ***	0.168 ***	0.175 **	0.198	0.039 ***	0.050	0.289 *	0.042	0.011	0.060 ***	−0.159 **	0.947	0.006	0.230	−0.015				
(18) E × Big_4	0.131 **	0.190	0.288 *	0.214	−0.008 **	0.042 ***	0.299	0.035	0.010	0.068 ***	0.148 **	0.862 **	0.011	0.212	−0.012 ***	0.940			
(19) S × Big_4	0.116 **	0.157	0.166 **	0.224 ***	−0.007 **	0.056	0.275 *	0.044	0.012	0.061	−0.150 ***	0.939 **	0.005	0.222 ***	−0.018 *	0.984	0.924		
(20) G × Big_4	0.132	0.144 **	0.092 ***	0.129 ***	0.137	0.035 *	0.274 *	0.044 **	0.008	0.036	−0.160 **	0.905 *	0.002 ***	0.225	−0.012 *	0.942 **	0.815 ***	0.890	

This table shows the correlation between variables in our sample. Variables are defined earlier under the variables subsection. Note that the ESG scores for each firm for year *t* are publicly announced the next year. Significance levels are denoted by *** (1%), ** (5%) and * (10%).

Table 3. Audit quality two-sample *t*-test.

	Firm Characteristics By Audit Quality		
	Big-4	**Non-Big-4**	**Diff in Means**
	(1)	**(2)**	**(1)–(2)**
N.of Obs.	882	1360	
Ln(Tobin's Q)	0.588	1.230	−0.642 ***
			(9.56)
ESG	52.4	44.00	8.40 ***
			(6.99)
E	47.40	36.20	11.20 ***
			(6.93)
S	54.40	43.30	11.10 ***
			(8.34)
G	53.40	49.00	4.40 ***
			(3.25)
Firm_Size	21.20	20.00	1.20 ***
			(9.94)
Leverage	1.61	1.01	0.60
			(1.41)
ROA	0.036	0.031	0.005
			(0.06)
Book_to_Market	0.17	1.32	−1.15
			(1.33)
Board_Gender_Diversity	0.282	0.248	−0.034 ***
			(3.36)
Board_Size	2.60	2.67	−0.07 *
			(1.72)
Audit_Fees	13.20	12.80	0.40 ***
			(4.36)

This table shows the two-sample *t*-test comparing firm sustainability and financial performance variables based on audit quality measured by the type of audit firm, i.e., Big-4 and non-Big-4. Variables are defined earlier under the variables subsection. The third column shows the difference in means with t-statistics in parentheses calculated with firm-level clustered standard errors. *** (*) denotes significance at the 1% (10%) level (two-sided test).

The results also show that firms audited by Big Four auditors have higher overall ESG ratings as well as environmental, social, and governance pillar scores. These findings align with earlier studies (see DeAngelo, 1981; DeFond & Zhang, 2014) suggesting that Big Four auditors might reinforce or align with broader commitments to sustainability, consistent with evidence that rigorous auditing fosters more credible disclosures. In addition, the results show that Big Four audited firms are larger which is in line with the earlier literature suggesting that Big Four-audited firms typically operate at a larger scale, which can help accommodate higher audit fees and maintain more extensive reporting procedures (Khurana & Raman, 2004). Although leverage and profitability remain relatively similar across the two groups, the Big Four-audited companies exhibit greater board gender diversity. This result aligns with the conclusion of Terjesen et al. (2009) that there is potentially a link between rigorous auditing, progressive governance practices, and stakeholder-oriented board composition.

Overall, these findings indicate that ESG and its pillar scores could be influenced by audit quality, thereby potentially influencing firm value. Finding a negative relation between audit quality and firm valuation highlights the need for a more detailed investigation where we control for the possible cross effects that may influence the relationship.

4.3. Audit Quality and the ESG–Firm Valuation Relationship

Our main analysis examines if and how the audit quality influences the relationship between ESG scores and firm valuation if we control for other possible factors using Equation (1).[4] We use an unbalanced panel estimation approach. The Hausman test for fixed vs. random effects models indicates that fixed-effect estimation is appropriate for the model as the null hypothesis of random effects is rejected with *p*-values less than 5%. The results from the fixed-effect estimations are presented in Table 4.

Table 4. Audit quality, ESG, and firm valuation.

	Ln(Tobin's Q)			
	(1)	**(2)**	**(3)**	**(4)**
ESG	0.035			
	(0.381)			
E		−0.062		
		(1.077)		
S			0.050	
			(0.555)	
G				−0.053
				(0.878)
ESG × Big_4	0.238 ***			
	(3.681)			
E × Big_4		0.230 ***		
		(4.129)		
S × Big_4			0.211 ***	
			(3.449)	
G × Big_4				0.209 ***
				(3.367)
Firm_Size	−0.199 ***	−0.194 ***	−0.199 ***	−0.196 ***
	(22.335)	(22.054)	(21.521)	(23.320)
Leverage	−0.001 ***	−0.001 ***	−0.001 ***	−0.001 ***
	(4.201)	(4.014)	(4.325)	(4.022)
ROA	0.380	0.413	0.392	0.387
	(1.394)	(1.475)	(1.410)	(1.420)
Book_to_Market	−0.0002	−0.0002	−0.0002	−0.0002
	(0.214)	(0.211)	(0.227)	(0.202)
Auditor_Tenure	0.035 ***	0.035 ***	0.034 ***	0.034 ***
	(3.001)	(3.111)	(2.916)	(2.935)
Auditor_Change	0.082 *	0.082 *	0.083 *	0.083 *
	(1.694)	(1.687)	(1.721)	(1.720)
Change_to_Big_4	−0.114	−0.112	−0.111	−0.103
	(1.262)	(1.214)	(1.230)	(1.148)
Board_Gender_Diversity	0.121	0.129	0.119	0.128
	(1.468)	(1.602)	(1.435)	(1.554)
Board_Size	0.177 ***	0.183 ***	0.173 ***	0.182 ***
	(4.159)	(4.327)	(4.074)	(4.317)
Firm and Year FE	Yes	Yes	Yes	Yes
Observations	2244	2243	2243	2244
Adjusted R^2	0.249	0.248	0.248	0.248

This table reports the results from the panel regression of Equation (1). Variables are as defined earlier under the variables subsection. The last rows include the firm and year, fixed effects, the number of observations in the model, and adjusted R^2. T-statistics with firm-level clustered standard errors are reported in parentheses. *** (*) denotes significance at the 1% (10%) level (two-sided test). ESG and pillar scores are scaled_down by 100 (%) for reporting.

The results show a mixed relationship between ESG (and its components) and market valuation (Tobin's Q). ESG (pillar) scores are found to have a significant positive relationship on firm valuation only if the firm is audited by the Big Four auditors.[5] Now, given a strong positive relationship with firm valuation across all models, one can draw the conclusion that high ESG performance when coupled with superior audit quality (as signaled by a Big Four auditor) produces a positive effect on valuation for firms.[6] Economically, this means that firms audited by a Big Four can expect a substantial and significant boost in their Tobin's Q from improvements in ESG performance, underscoring the importance of audit quality for translating ESG investments into higher market valuations. This finding follows the expectation that audit quality can positively increase investor confidence in a firm's ESG activities, thereby having a positive effect on firm valuation. These results align with the prior literature, such as Chatterji et al. (2009), which emphasized the importance of third-party validation in enhancing the perceived reliability of ESG-related practices.

The robustness of our findings is confirmed, as the moderating role of audit quality remains consistent across individual ESG pillars (environmental, social, and governance dimensions) and alternative model specifications, even when certain control variables are excluded (results are available upon request). We also consider the effect distribution to understand how the audit quality influences the ESG impact on the value of the firms in our sample, as performed in earlier studies on firm valuation (see Nguyen et al., 2018). The quantile regression results (available in Supplementary Material) indicate that the interaction between ESG and Big_4 auditors has a progressively stronger positive effect on firm valuation (Ln(Tobin's Q)) across the 25th, 50th, and 75th quantiles, with coefficients increasing from 0.034 to 0.151.[7] This suggests that high-quality audits amplify the valuation benefits of ESG performance more significantly for growth firms at higher quantiles of the Tobin's Q variable.

Most control variables, as expected, conform to the standard theoretical predictions. Larger firms tend to report a lower Tobin's Q, consistent with the notion that mature companies face modest growth prospects even when they display higher absolute resource capacity. By contrast, leverage emerges as only weakly negative, indicating that high financial obligations do not dramatically impair market valuations under normal circumstances. This is in line with the conclusion of Fama and French (2002). Profitability (ROA) is positively linked with Tobin's Q, illustrating how robust earnings bolster investor perceptions of long-term viability. Auditor_Tenure and Auditor_Change show small but significant signs, implying that transitions in the auditor relationship or deeper auditor familiarity can modestly influence how stakeholders interpret corporate disclosures. Meanwhile, board gender diversity and board size, governance attributes frequently discussed in corporate governance scholarship (see Gompers et al., 2003; Terjesen et al., 2009), align with the principle that more diversified and sufficiently large boards support more effective oversight, thus reflecting higher valuations. For each model, we conduct the variance inflation factor (VIF) test (results in Supplementary Material) of multicollinearity, which shows factor values lower than five for all the models. This means our results are not biased due to issues of multicollinearity (Hair et al., 2012).

4.4. Additional Consideration and Robustness Test

The validity of any finding requires scrutiny; as such, a test of robustness can either validate or invalidate the study's conclusion. Hence, we consider some alternative approaches to ascertain the strength of our findings.

First, we use an instrumental variable analysis to control for the potential endogeneity. We use ESG score averages (and corresponding individual pillar score averages) for eleven different industry sectors as instruments, as we expect them to influence valuation only

through their impact on individual ESG scores. As such, sector averages can be expected to be important in determining firm-level ESG practices, as they represent sector-wide benchmarks, reflecting the collective behavior of firms within a specific sector. As noted in Matten and Moon (2008), industry (or sector) norms are critical in guiding firm-specific strategies, particularly in areas like corporate social responsibility (CSR), where external legitimacy and adherence to sectoral standards are key. This external pressure makes sector average values highly correlated with individual firm scores, ensuring instrument relevance. Studies such as those by Flammer (2015) demonstrate that industry-wide ESG benchmarks significantly influence firm-level ESG strategies, further validating using these averages as instruments. Finally, Eccles et al. (2014) highlight that while sector ESG norms shape a firm's ESG practices, these norms are not directly tied to a firm's financial performance, as they operate at a broader, non-firm-specific level. The results are provided in Table 5.

Table 5. Instrumental variable analysis.

	Ln(Tobin's Q)			
	(1)	**(2)**	**(3)**	**(4)**
$ESG \times Big\_4$	0.280 ***			
	(2.971)			
$E \times Big\_4$		0.252 ***		
		(2.806)		
$S \times Big\_4$			0.251 ***	
			(3.010)	
$G \times Big\_4$				0.216 *
				(1.745)
Firm_Size	−0.158 ***	−0.164 ***	−0.154 ***	−0.156 ***
	(8.437)	(8.350)	(8.579)	(7.643)
Leverage	−0.0001	−0.0001	−0.0001	−0.0001
	(0.779)	(0.486)	(1.028)	(0.462)
ROA	2.799 ***	2.797 ***	2.769 ***	2.865 ***
	(5.050)	(4.985)	(4.990)	(5.072)
Book_to_Market	−0.058 ***	−0.056 ***	−0.063 ***	−0.053 ***
	(5.967)	(6.024)	(6.690)	(4.304)
Auditor_Tenure	0.022 *	0.022 *	0.020	0.024 **
	(1.756)	(1.796)	(1.628)	(1.964)
Auditor_Change	0.058	0.042	0.058	0.030
	(0.467)	(0.341)	(0.472)	(0.239)
Change_to_Big_4	−0.032	−0.007	−0.032	−0.0002
	(0.235)	(0.053)	(0.236)	(0.001)
Board_Gender_Diversity	0.059	0.059	0.044	0.037
	(0.478)	(0.468)	(0.366)	(0.292)
Board_Size	0.348 ***	0.352 ***	0.341 ***	0.352 ***
	(5.554)	(5.506)	(5.525)	(5.427)
Constant	2.737 ***	2.874 ***	2.674 ***	2.697 ***
	(7.698)	(7.724)	(7.646)	(7.374)
Firm and Year FE	Yes	Yes	Yes	Yes
Observations	2165	2164	2164	2165
Adjusted R^2	0.340	0.372	0.357	0.337

This table reports the two-stage least-square instrumental variable estimation results using annual sector average ESG (and E, S, G) scores as instruments. Ln(Tobin's Q) is a measure of the firm valuation calculated as the ratio of the market value of the company's assets to the replacement cost of those assets. ESG is the overall sustainability score, and E, S, and G are the individual environmental, social, and governance scores. Big_4 is an indicator variable with a value of one if the firm is audited by any of the Big Four auditing firms and zero otherwise. The control variables are as defined earlier. The last rows include the number of observations in the model and adjusted R^2. T-statistics with firm-level clustered standard errors are reported in parentheses. *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). ESG and pillar scores are scaled_down by 100 (%) for reporting.

Overall, the results corroborate our earlier main findings to a large extent.[8] The positive interaction terms, although only marginally significant (at the 10% level) for the governance score, ranging from approximately 0.22 to 0.28, suggest that combining higher ESG scores

(or their components) with a Big Four audit firm significantly enhances the firm's valuation. The control variables also show similar patterns to our baseline result, further reiterating the consistency of our findings.

Our second test considers the fact that some studies (e.g., Lawrence et al., 2011) indicate that the observed differences in audit quality between Big Four and non-Big Four firms can often be attributed to client selection effects rather than auditor practices themselves, suggesting that the "Big Four" status alone may not fully capture the intrinsic audit rigor. Further, other studies (see Francis, 2004) have claimed that even within Big Four auditors, individual office size and partner-specific traits can vary substantially, meaning that the audit outcome may hinge more on local office expertise than on the broader brand label. Hence, we use an alternative measure of audit quality—audit fees—to test Equation (1). Audit fees are calculated similarly to earlier studies (e.g., Rajgopal et al., 2021) as the ratio of audit fees to total fees (total fees include non-audit fees paid to auditors). The results are presented in Table 6.

Table 6. Alternative audit quality measure and ESG–firm valuation relationship.

	Ln(Tobin's Q)			
	(1)	**(2)**	**(3)**	**(4)**
ESG	−0.814 ***			
	(2.647)			
E		−0.835 ***		
		(3.584)		
S			−0.979 ***	
			(3.512)	
G				0.299
				(1.088)
ESG × Audit_Fees	0.039 **			
	(2.050)			
E × Audit_Fees		0.046 ***		
		(2.810)		
S × Audit_Fees			0.045 ***	
			(2.759)	
G × Audit_Fees				0.021
				(1.157)
Firm_Size	−0.185 ***	−0.180 ***	−0.181 ***	−0.195 ***
	(16.141)	(16.049)	(15.168)	(18.086)
Leverage	−0.002 **	−0.001 **	−0.001 **	−0.002 **
	(2.300)	(2.350)	(2.213)	(2.519)
ROA	0.188	0.298	0.249	0.160
	(0.770)	(1.110)	(0.956)	(0.643)
Book_to_Market	−0.00004	−0.0001	−0.00004	−0.0002
	(0.039)	(0.064)	(0.032)	(0.215)
Auditor_Tenure	0.038 *	0.041 *	0.036 *	0.035
	(1.712)	(1.886)	(1.666)	(1.580)
Auditor_Change	−0.086	−0.088	−0.097	−0.081
	(0.596)	(0.624)	(0.687)	(0.551)
Board_Gender_Diversity	0.250 **	0.230 **	0.248 **	0.212 **
	(2.413)	(2.295)	(2.417)	(2.065)
Board_Size	0.072	0.057	0.081 *	0.057
	(1.552)	(1.271)	(1.720)	(1.283)
Firm and Year FE	Yes	Yes	Yes	Yes
Observations	1820	1817	1817	1820
Adjusted R^2	0.198	0.199	0.199	0.195

This table reports the analysis results with Big_4 replaced with Audit_Fees as the audit quality measure. Audit_Fees is the ratio of audit fees to total fees (total fees include non-audit fees paid to auditors). The other variables are defined earlier under the variables subsection. The last rows include the firm and year fixed effects, the number of observations in the model, and adjusted R^2. T-statistics with firm-level clustered standard errors are reported in parentheses. *** (**, *) denotes significance at the 1% (5%, 10%) level (two-sided test). ESG and pillar scores are scaled_down by 100 (%) for reporting.

Contrary to Table 4, the results now show a significant and negative coefficient for the ESG and its pillar scores (except for the Governance pillar score). This results indicate an inverse relationship between the scores and firm valuation which could be explained by the fact that the number of observations has dropped by almost 20 percent from Table 4. In any case, as the interaction term is also significant (except for Governance), one needs to take into account its impact on the slope coefficient as well. In any case (except the Governance pillar score), we can draw the conclusion that the slope is significantly less negative, shown by the direct impact, as auditing fees are always non-negative. In fact, if the auditing fees are high enough, the slope becomes positive, suggesting that firms with high-quality auditing (i.e., firms incurring higher audit costs and presumably undergoing more rigorous oversight) can reassure investors of the authenticity of their ESG commitments.[9] Nevertheless, one should be cautious with drawing too big conclusions from the results. Auditing fees may reflect also issues other than the quality of the process. At minimum, one can say that higher auditing fees influence the relationship between ESG and valuation, and in that sense, the results are in line with our earlier results.

Finally, we test a simple model, where Big_4 is kept as the only main explanatory variable in Equation (1) to study whether the audit quality alone drives the value-enhancing effect. The results (available on request) show this is not the case (the coefficient on Big_4 is 0.074 with t-value 0.785).

5. Conclusions, Limitations, and Future Research

This paper has studied whether audit quality has an impact on the relationship between ESG score and firm valuation. Our analysis shows that the relationship is influenced by high-quality audits. In practice, firms with high ESG scores and audited by the Big Four exhibit higher market valuations which is arguably due to enhanced credibility and investor confidence. For firms that are not audited by the Big Four, there is no significant relationship between ESG scores and firm valuation. The result aligns with the belief that the ESG–firm valuation relationship benefits from high-quality external validation.

Overall, our study emphasizes the critical role of audit quality, especially the presence of Big Four auditors, in strengthening the ESG–valuation link. The results show the importance of comprehensive audit procedures in indirectly supporting the reliability of ESG disclosures. High-quality audits mitigate information asymmetry and enhance transparency by ensuring accurate and reliable reporting, which is essential for investors assessing a firm's sustainability practices. It supports the idea that combining strong ESG practices with reliable audit processes enhances a firm's value.

Overall, the results regarding the role of the Big Four auditors is mostly consistent across different robustness tests. However, we do find partly contradictory results when we use audit fees as a measure of audit quality. The results support the idea that there is a direct impact from ESG scores to the valuation and the impact is negative. Further study is need on this issue. In addition, one limitation of our study is its focus on Nordic countries, a region known for high transparency and ESG standards, which may limit the generalization of the results to other geographic areas with different regulatory environments and cultural attitudes toward ESG practices even though it provides an invaluable benchmark. Future studies could extend the sample to firms in other regions to confirm whether the observed effects hold globally. Additionally, exploring potential temporal regulatory changes and their impact on the ESG–audit quality–valuation relationship could offer a deeper understanding of how evolving policies influence the importance of audit quality in ESG reporting. Investigating other dimensions of audit quality, such as auditor expertise in sustainability issues or the role of non-Big Four auditors, may further enrich the literature on the interplay between audit

practices and the valuation relevance of ESG information. Alternative ESG measures could also provide a valuable test for analyzing if the result of this study still holds.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/jrfm18030148/s1, Table S1: VIF Comparison Across Models for Big 4 as Audit Quality Measure. Table S2: VIF Comparison Across Models for Audit Fees as Audit Quality Measure. Table S3: Audit quality, ESG and firm valuation without control variables. Table S4: A quadratic estimation: Audit quality, ESG, and firm valuation. Table S5: Quantile Regression Results for Distributional Effects. Table S6: First-stage Results of Instrumental Variable Regression.

Author Contributions: Conceptualization, M.V. and H.Y.; methodology, M.V. and H.Y.; software, H.Y.; validation, M.V.; formal analysis, H.Y.; investigation, M.V.; resources, H.Y.; data curation, H.Y.; writing—original draft preparation, H.Y.; writing—review and editing, M.V.; visualization, H.Y.; supervision, M.V.; project administration, M.V.; funding acquisition, H.Y. All authors have read and agreed to the published version of the manuscript.

Funding: This research was partly funded by Foundation for Economic Education grant number 230466.

Data Availability Statement: Restrictions apply to the datasets. The data collected from the London Stock Exchange (LSEG) Workspace and the Orbis database is 3rd Party Data and available with their permission. Requests to access the dataset from the Copenhagen Business School—Center for Corporate Governance should be directed to the Center.

Acknowledgments: We appreciate the comments from the anonymous reviewers and the editor. We appreciate and acknowledge the significance of the auditor data from the Center for Corporate Governance—Copenhagen Business School. Yahya appreciates financial support from the Foundation for Economic Education.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A

Table A1. Variables definition and support from the literature.

Dependent variable		
Ln(Tobin's Q)	A measure of firm valuation calculated as the ratio of the market value of the company's assets to the replacement cost of those assets, the replacement cost has been proxied by equity book value plus the liabilities book value.	See Lawrence et al. (2011)
Independent variables		
ESG	The overall environmental, social, and governance score.	See Friede et al. (2015)
E	The environmental pillar score of a firm's ESG.	See Hassel et al. (2005)
S	The social pillar score of a firm's ESG.	See Lins et al. (2017)
G	The governance pillar score of a firm's ESG.	See Gompers et al. (2003)
Moderating variable		
Big_4	Audit quality indicator variable that equals one if a firm is audited by the four largest auditing firms (KPMG, PricewaterhouseCoopers (PwC), Ernst & Young (EY), or Deloitte) during the year in question and zero otherwise.	See Che et al. (2020)
Audit_fees	is the ratio of audit fees to total fees (total fees include non-audit fees paid to auditors) as an alternative measure of audit quality	See Rajgopal et al. (2021)
Control variables		
Auditor_Tenure	The natural logarithm of the years since the auditor has been appointed in a firm.	See Garcia-Blandon et al. (2020)
Auditor_Change	Indicator variable that equals one if the auditor has changed from the last year and zero otherwise.	See Hackenbrack and Hogan (2005)
Change_to_Big_4	Indicator variable that equals one if the auditor has changed from non-Big Four to Big Four from the previous year and zero otherwise.	See Lawrence et al. (2011)
Firm_Size	The natural logarithm of total assets of the firm.	See Clarkson et al. (2008)
ROA	The earnings before interest and taxes over the total assets of the firm is the measure of profitability.	See Demerjian et al. (2012)
Leverage	The debt-to-equity ratio of the firm.	See Jiang et al. (2019)
Book_to_Market	The natural logarithm debt-to-equity ratio.	See Fama and French (1992)
Board_Gender_Diversity	The proportion of females to males on the firm's board in a year.	See Terjesen et al. (2009)
Board_Size	The natural logarithm of the number of board members of the firm in a year.	See Raheja (2005)

Notes

1 Used ESG and component scores vary between 0 and 100, with higher scores indicating a better performance for the firm.
2 Note that the number of observations here differs across variables. Regression estimations use those observations for which all variables are available for a firm in a particular year. It is a standard case in unbalanced panel regressions.
3 Note that reference to 'firms audited by Big-4' refers to only those firms and years when a Big-4 company has audited them.
4 We also estimate the model without the control variables, and the results, available in Supplementary Material , are similar to those reported here.
5 As the coefficient for the direct effect (β_1) is not statistically significant, one can consider its value to be zero, and thus, the net impact (slope) from ESG to value equals to β_2.
6 We also re-estimate the models (results are in the Supplementary Material) using squared terms for ESG (and its pillars) to see if the relationship with the firm value is non-linear. The result is similar to linear models, suggesting that our main results are not just due to the limitations of a linear model.
7 The result available on request shows similar trends across the E, S, and G analysis.
8 Detailed analysis of the results shows that the Hansen J-test for overidentifying restrictions shows p-values greater than 0.10, confirming that the instruments are not correlated with the error term (exogeneity condition). Furthermore, the F-statistic from the first-stage regressions is above the commonly accepted threshold of 10, indicating the instruments are strongly correlated with the endogenous variables (relevance condition). The results are in the Supplementary Material.
9 For example, taking both the direct and indirect impacts into account, for example, the ESG score slope coefficient becomes $-0.814 + 0.039 \times Audit\_Fees$ given the estimates in column (2). If audit fees are larger than 20.90 (the average in Table 1 was 13.10), the coefficient becomes positive, and the ESG rating has a positive impact on the firm valuation.

References

Aguilera, R. V., Rupp, D. E., Williams, C. A., & Ganapathi, J. (2007). Putting the S back in corporate social responsibility: A multilevel theory of social change in organizations. *Academy of Management Review*, *32*(3), 836–863. [CrossRef]

AL-Qatamin, K. I., & Salleh, Z. (2020). Audit quality: A literature overview and research synthesis. *IOSR Journal of Business and Management (IOSR-JBM)*, *22*(2), 56–66.

Arora, P., & Dharwadkar, R. (2011). Corporate governance and corporate social responsibility (CSR): The moderating roles of attainment discrepancy and organizational slack. *Strategic Management Journal*, *32*(3), 182–198. [CrossRef]

Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, *15*(1), 1–24. [CrossRef]

Behn, B. K., Choi, J.-H., & Kang, T. (2008). Audit quality and properties of analyst earnings forecasts. *The Accounting Review*, *83*(2), 327–349. [CrossRef]

Berg, F., Fabisik, K., & Sautner, Z. (2021). Is history repeating itself? The (un)predictable past of ESG ratings. *European Corporate Governance Institute–Finance Working Paper 708/2020*. [CrossRef]

Bose, S. (2020). Evolution of ESG reporting frameworks. In *Values at work: Sustainable investing and ESG reporting* (pp. 13–33). Springer.

Brammer, S., & Millington, A. (2008). Does it pay to be different? an analysis of the relationship between corporate social and financial performance. *Strategic Management Journal*, *29*(12), 1325–1343. [CrossRef]

Carey, P., & Simnett, R. (2006). Audit partner tenure and audit quality. *The Accounting Review*, *81*(3), 653–676. [CrossRef]

Chang, X., Gygax, A. F., Oon, E., & Zhang, H. F. (2008). Audit quality, auditor compensation and initial public offering underpricing. *Accounting & Finance*, *48*(3), 391–416.

Chatterji, A. K., Levine, D. I., & Toffel, M. W. (2009). How well do social ratings actually measure corporate social responsibility? *Journal of Economics & Management Strategy*, *18*(1), 125–169.

Che, L., Hope, O.-K., & Langli, J. C. (2020). How Big-4 firms improve audit quality. *Management Science*, *66*(10), 4552–4572. [CrossRef]

Chung, K. H., & Pruitt, S. W. (1994). A simple approximation of Tobin's Q. *Financial Management*, *23*, 70–74. [CrossRef]

Clarkson, P. M., Overell, M. B., & Chapple, L. (2008). Environmental reporting and its relation to corporate environmental performance. *Abacus*, *44*(4), 538–568. [CrossRef]

Dakhli, A. (2022). The impact of corporate social responsibility on firm financial performance: Does audit quality matter? *Journal of Applied Accounting Research*, *23*(5), 950–976. [CrossRef]

Dam, L., & Scholtens, B. (2012). Does ownership type matter for corporate social responsibility? *International Review of Applied Economics*, *26*(6), 791–807. [CrossRef]

DeAngelo, L. E. (1981). Auditor independence, 'low balling', and disclosure regulation. *Journal of Accounting and Economics*, *3*(2), 113–127. [CrossRef]

DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, *58*(2–3), 275–326. [CrossRef]

Delmas, M. A., & Burbano, V. C. (2011). The drivers of greenwashing. *California Management Review*, *54*(1), 64–87. [CrossRef]

Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management Science*, *58*(7), 1229–1248. [CrossRef]

Dumay, J., Guthrie, J., & Farneti, F. (2010). GRI sustainability reporting guidelines for public and third sector organizations: A critical review. *Public Management Review*, *12*(4), 531–548. [CrossRef]

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, *60*(11), 2835–2857. [CrossRef]

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, *47*(2), 427–465.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of Financial Studies*, *15*, 1–33. [CrossRef]

Fatemi, A., Fooladi, I., & Tehranian, H. (2015). Valuation effects of corporate social responsibility. *Journal of Banking & Finance*, *59*, 182–192.

Ferrer, E., López-Arceiz, F. J., & del Rio, C. (2020). Sustainability disclosure and financial analysts' accuracy: The European case. *Business Strategy and the Environment*, *29*(8), 2939–2952. [CrossRef]

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? a regression discontinuity approach. *Management Science*, *61*(11), 2549–2568. [CrossRef]

Fontaine, R., & Pilote, C. (2012). Clients' preferred relationship approach with their financial statement auditor. *Current Issues in Auditing*, *6*(1), P1–P6. [CrossRef]

Francis, J. R. (2004). What do we know about audit quality? *The British Accounting Review*, *36*(4), 345–368. [CrossRef]

Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, *30*(2), 125–152.

Francis, J. R., & Yu, M. D. (2009). Big 4 office size and audit quality. *The Accounting Review*, *84*(5), 1521–1552. [CrossRef]

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Cambridge University Press.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210–233.

Garcia-Blandon, J., & Argiles-Bosch, J. M. (2018). Audit partner industry specialization and audit quality: Evidence from spain. *International Journal of Auditing*, *22*(1), 98–108. [CrossRef]

Garcia-Blandon, J., Argilés-Bosch, J. M., & Ravenda, D. (2020). Audit firm tenure and audit quality: A cross-european study. *Journal of International Financial Management & Accounting*, *31*(1), 35–64.

Gjølberg, M. (2013). Nordic companies–global pioneers in CSR. In *CSR and beyond: A Nordic perspective*. Cappelen Damm.

Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate governance and equity prices. *The Quarterly Journal of Economics*, *118*(1), 107–156. [CrossRef]

Hackenbrack, K. E., & Hogan, C. E. (2005). Client retention and engagement-level pricing. *Auditing: A Journal of Practice & Theory*, *24*(1), 7–20.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science*, *40*, 414–433. [CrossRef]

Hassel, L., Nilsson, H., & Nyquist, S. (2005). The value relevance of environmental performance. *European Accounting Review*, *14*(1), 41–61. [CrossRef]

Hoitash, R., Markelevich, A., & Barragato, C. A. (2007). Auditor fees and audit quality. *Managerial Auditing Journal*, *22*(8), 761–786. [CrossRef]

Jeong, K. (2020). The effect of audit quality on analyst following. *Cogent Business & Management*, *7*(1), 1798068.

Jiang, J., Wang, I. Y., & Wang, K. P. (2019). Big N auditors and audit quality: New evidence from quasi-experiments. *The Accounting Review*, *94*(1), 205–227. [CrossRef]

Khurana, I. K., & Raman, K. (2004). Litigation risk and the financial reporting credibility of Big 4 versus non-Big 4 audits: Evidence from Anglo-American countries. *The Accounting Review*, *79*(2), 473–495. [CrossRef]

Kinderman, D. (2020). The challenges of upward regulatory harmonization: The case of sustainability reporting in the European Union. *Regulation & Governance*, *14*(4), 674–697.

Kolk, A., & Van Tulder, R. (2010). International business, corporate social responsibility and sustainable development. *International Business Review*, *19*(2), 119–125. [CrossRef]

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, *115*(2), 304–329. [CrossRef]

Lawrence, A., Minutti-Meza, M., & Zhang, P. (2011). Can Big 4 versus non-Big 4 differences in audit-quality proxies be attributed to client characteristics? *The Accounting Review*, *86*(1), 259–286. [CrossRef]

Lee, D. D., & Faff, R. W. (2009). Corporate sustainability performance and idiosyncratic risk: A global perspective. *Financial Review*, *44*(2), 213–237. [CrossRef]

Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *The Journal of Finance*, *72*(4), 1785–1824. [CrossRef]

Matten, D., & Moon, J. (2008). "Implicit" and "explicit" CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of Management Review*, *33*(2), 404–424. [CrossRef]

Meckling, W. H., & Jensen, M. C. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360.

Moneva, J. M., Archel, P., & Correa, C. (2006). GRI and the camouflaging of corporate unsustainability. *Accounting Forum*, *30*(2), 121–137. [CrossRef]

Nguyen, P., Rahman, N., & Zhao, R. (2018). CEO characteristics and firm valuation: A quantile regression analysis. *Journal of Management & Governance*, *22*, 133–151.

North, D. C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

Pincus, K., Rusbarsky, M., & Wong, J. (1989). Voluntary formation of corporate audit committees among NASDAQ firms. *Journal of Accounting and Public Policy*, *8*(4), 239–265. [CrossRef]

Pizzi, S., Venturelli, A., & Caputo, F. (2024). Restoring trust in sustainability reporting: The enabling role of the external assurance. *Current Opinion in Environmental Sustainability*, *68*, 101437. [CrossRef]

Pong, H. K., & Man, F. L. C. (2024). The influence of environmental, social, and governance (ESG) perception on investor trust and brand relationship quality: A study among retail investors in Hong Kong. *Journal of Risk and Financial Management*, *17*(10), 455. [CrossRef]

Raheja, C. G. (2005). Determinants of board size and composition: A theory of corporate boards. *Journal of Financial and Quantitative Analysis*, *40*(2), 283–306. [CrossRef]

Rajgopal, S., Srinivasan, S., & Zheng, X. (2021). Measuring audit quality. *Review of Accounting Studies*, *26*(2), 559–619. [CrossRef]

Surya, D., Pratiwi, E., Wijaya, G., Permadi, H., & Suryani, I. (2021). Audit quality and its influence on stakeholder trust: A qualitative analysis. *Golden Ratio of Auditing Research*, *1*(1), 34–44. [CrossRef]

Terjesen, S., Sealy, R., & Singh, V. (2009). Women directors on corporate boards: A review and research agenda. *Corporate Governance: An International Review*, *17*(3), 320–337. [CrossRef]

Trotman, A. J., & Duncan, K. R. (2018). Internal audit quality: Insights from audit committee members, senior management, and internal auditors. *Auditing: A Journal of Practice & Theory*, *37*(4), 235–259.

Vaihekoski, M., & Yahya, H. (2023). ESG and firm performance: Evidence from the nordic countries. *Nordic Journal of Business*, *72*(3), 164–189.

Verheyden, T., Eccles, R. G., & Feiner, A. (2016). ESG for all? The impact of ESG screening on return, risk, and diversification. *Journal of Applied Corporate Finance*, *28*(2), 47–55. [CrossRef]

Zahid, R. A., Khan, M. K., Anwar, W., & Maqsood, U. S. (2022). The role of audit quality in the ESG-corporate financial performance nexus: Empirical evidence from Western European companies. *Borsa Istanbul Review*, *22*, S200–S212. [CrossRef]