The ESG Premium at Risk: How Cash and Controversies Reshape Firm Valuation.

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Abstract

Purpose - This research endeavor seeks to elucidate the influence of Environmental, Social, and Governance (ESG) performance on corporate market valuation, thereby addressing a significant lacuna in the extant literature regarding the mediating and moderating functions of financial liquidity and ESG-related controversies. The investigation aspires to yield novel insights into the ways in which ESG practices affect firm value through the mechanisms of surplus cash reserves and reputational risks, thereby augmenting the comprehension of strategic sustainability and financial signaling within modern capital markets.

Design/Methodology/Approach - The research employs a quantitative methodological framework, utilizing fixed-effects panel regression models complemented by robustness diagnostics. Data were procured from the Refinitiv database, focusing on firms listed in the S&P 500 index during the temporal span of 2007–2022, which encompasses a total of 5,566 firm-year observations. The analytical methodologies encompass mediation and moderation analyses, incorporating two-way clustered standard errors and controls for firm-level heterogeneity.

Findings - The findings indicate that environmental, social, and governance (ESG) performance exhibits a positive and statistically significant correlation with corporate valuation, particularly through the governance and social dimensions. Furthermore, ESG performance demonstrates an inverse relationship with surplus cash reserves, which in turn negatively associates with firm valuation, thereby substantiating a partial mediation effect. Nonetheless, ESG-related controversies serve as moderating factors in these relationships, such that the beneficial impacts of ESG on corporate valuation and the adverse consequences of cash holdings are attenuated or even reversed in scenarios characterized by reputational risks. These results provide empirical support for the notion that ESG not only contributes to the enhancement of firm value but also influences financial behavior and investor perceptions across varying reputational landscape.

Originality/Value - This study presents an innovative framework for understanding the ESG–valuation relationship by incorporating the dual influences of excess liquidity and ESG controversies into the analytical paradigm. It delivers critical insights that broaden the existing comprehension of financial signaling, stakeholder engagement, and sustainability strategies.The study's findings contribute to the advancement of ESG-integrated financial modeling and corporate governance practices, highlighting areas for future research and implications for regulatory policy, investor strategy, and managerial decision-making in high-stakes sustainability environments.

Keywords: ESG performance; market valuation; excess cash; ESG controversies; financial signaling

1 Introduction

The performance of Environmental, Social, and Governance (ESG) metrics has emerged as a crucial determinant in the evaluation of firms by investors, stakeholders, and regulatory bodies. An increasing acknowledgment of ESG considerations as not solely ethical obligations but also as strategic catalysts for sustainable value creation and financial robustness that is becoming prevalent

(Friede et al., 2015; Lins et al., 2017). Nonetheless, despite this heightened focus, empirical evidence regarding the relationship between ESG and firm valuation remains ambiguous. While a subset of studies indicates a positive correlation between ESG performance and firm value (Fatemi et al., 2018; Servaes & Tamayo, 2013), other investigations present mixed results or contextually contingent outcomes, thereby underscoring the necessity for more refined analytical approaches (Borgers et al., 2013; Khan et al., 2016; Zheng et al., 2022).

A significant shortcoming in the extant literature is the insufficient exploration of the mechanisms and contextual factors under which ESG influences firm valuation. Previous scholarly inquiries frequently neglect the role of internal financial behaviors—such as surplus cash reserves—in mediating this relationship, as well as the impact of external credibility factors—like ESG-related controversies—in moderating it (Ahmed & Khalaf, 2025; Aouadi & Marsat, 2018; Harford et al., 2008). ESG metrics are often regarded as a uniform and static indicator, despite accumulating evidence that investor reactions are influenced by the reputational context and perceived authenticity of these signals (Lyon & Montgomery, 2015; Wong & Zhang, 2024).

In spite of these findings, no comprehensive study has systematically investigated how cash holdings mediate and how controversies moderate the ESG-valuation nexus, thereby creating a significant gap in both theoretical discourse and practical application. This research endeavor seeks to clarify these uncertainties by addressing three pivotal research inquiries: (1) In what manner do aggregate and disaggregated ESG scores (E, S, G) impact corporate market valuation? (2) To what degree do cash holdings serve as a mediating factor in this dynamic? and (3) How do ESG controversies modify the valuation implications of ESG and cash management strategies?

Utilizing panel data from S&P 500 entities spanning the years 2007 to 2022 and firm-specific ESG and controversy metrics sourced from Refinitiv database, we employ fixed-effects models with two-way clustered standard errors to account for endogeneity and unobserved heterogeneity. Our methodological approach integrates both mediation and moderation analyses, thereby facilitating a more comprehensive understanding of the contingent financial significance of ESG factors. Notably, we propose an innovative classification methodology by categorizing firms into varying controversy levels (none, low, medium, high) predicated on percentile thresholds of their ESG controversy scores. This stratification allows for a more precise modeling of interaction effects and effectively captures the reputational diversity that influences the ESG-value relationship.

This study contributes to the existing body of literature in three substantive ways. First, it elucidates that ESG performance bolsters firm valuation through enhanced internal capital efficiency, as firms exhibiting superior ESG scores tend to sustain lower excess cash levels—indicating diminished agency costs and enhanced stakeholder alignment (Freeman et al., 2020; Gillan et al., 2021). Second, it demonstrates that the financial advantages conferred by ESG are contingent upon reputational integrity: in scenarios characterized by controversies, ESG signals may lose credibility, with excess cash potentially exacerbating investor skepticism (Arouri & Pijourlet, 2017; Kim et al., 2012; Spence, 1978). Third, it applies a moderated mediation framework, which is infrequently employed in ESG research, and enhances this framework by operationalizing reputational risk through the application of controversy categorizations. This methodological framework elucidates both the mechanisms through which and the contextual factors under which Environmental, Social, and Governance (ESG) attributes exert influence on corporate valuation, thereby providing enhanced specificity, theoretical cohesion, and empirical rigor.

The scope of this investigation is confined to large firms publicly listed in the United States, which augments comparability; however, it may constrain the generalizability of findings to smaller enterprises or international settings. The ESG ratings utilized in this analysis are derived from Refinitiv, representing a prominent evaluative methodology, yet may not align with alternative assessment frameworks. Although the fixed-effects model bolsters the internal validity of the findings, the interpretation of causal relationships must be approached with caution due to the reliance on observational data.

The subsequent sections of this manuscript are organized as follows. Section 2 delineates the theoretical framework underpinning the study. Section 3 provides a comprehensive literature review alongside the formulation of hypotheses. Section 4 elucidates the methodology adopted and the data employed. Section 5 presents the empirical findings derived from the analysis. Section 6 engages in a discussion of the results and their broader implications, the limitations of the study, and offers recommendations for future research endeavors. Section 7 concludes with a synthesis of the study.

2 Theoretical Background

A comprehensive theoretical framework is imperative for comprehending the intricate and multi-faceted interplay between ESG performance, corporate liquidity reserves, controversies, and firm valuation. Although the empirical literature has investigated the isolated effects of ESG on financial outcomes, there has been insufficient focus on the mechanisms through which ESG exerts its influence, as well as the conditions that either enhance or limit these effects(Li et al., 2025; Zheng et al., 2022). This research utilizes five complementary theoretical perspectives—stakeholder theory, agency theory, signaling theory, resource-based theory, and legitimacy theory—to establish a thorough conceptual groundwork. Each theoretical framework offers distinct explanatory capabilities regarding the relationship between ESG initiatives, internal cash management, reputational risks, and market valuation. Stakeholder theory offers a significant framework for analyzing the interplay between ESG performance, cash reserves, controversies, and corporate valuation(Freeman et al., 2020). It posits that organizations that prioritize the interests of various stakeholders—rather than exclusively concentrating on shareholders—are likely to achieve superior outcomes over the long term. Recent empirical investigations substantiate this perspective, revealing that firms exhibiting enhanced ESG performance tend to maintain elevated levels of cash reserves, thereby facilitating strategic investments in sustainability initiatives(Dobele et al., 2014). Furthermore, strong ESG performance serves to alleviate the adverse market repercussions of ESG-related controversies, as the trust of stakeholders functions as a protective mechanism (Aouadi & Marsat, 2018) Moreover, firms characterized by high levels of stakeholder engagement demonstrate more robust market valuations, thereby reinforcing the theory's assertion that inclusive decision-making contributes to improved financial performance(Ho et al., 2024).

Agency theory investigates the conflicts that arise between principals (shareholders) and agents (managers), particularly in relation to ESG considerations and cash management practices (Jensen & Meckling, 2019). Contemporary research suggests that firms adhering to ESG principles tend to maintain lower cash holdings, indicating that effective governance mitigates agency costs by constraining managerial discretion over surplus liquidity (Habib et al., 2024). Furthermore, organizations exposed to heightened takeover threats tend to encounter fewer ESG controversies, thereby corroborating the theory's assertion that external oversight diminishes opportunistic behaviors (Treepongkaruna et al., 2024). Additionally, Li et al. (2025) indicated that superior ESG performance enhances investment efficiency by alleviating financing constraints and harmonizing managerial incentives with those of shareholders. These insights underscore the continued significance of agency theory in elucidating the manner in which governance mechanisms influence ESG outcomes and corporate valuation.

Signaling theory elucidates the mechanisms through which firms convey their ESG performance and financial well-being to investors in the presence of information asymmetries(Spence, 1978). Robust ESG disclosures function as affirmative signals, indicating superior risk management and a commitment to long-term sustainability(Fatemi et al., 2018) . Conversely, excessive cash holdings may suggest suboptimal investment opportunities or agency-related issues, while optimal cash reserves are indicative of sound financial management (Bates et al., 2009). ESG controversies, serving as negative signals, can undermine market confidence; however, proactive measures may mitigate reputational harm(Aouadi & Marsat, 2018). Ultimately, Arouri and Pijourlet (2017) found that firms strategically utilize ESG and cash policies as communicative signals to distinguish themselves and attract investment, thereby reinforcing the predictive capacity of the theory within the realm of corporate finance.

Resource-based theory asserts that firms achieve competitive advantage through the possession of unique and inimitable resources, which include ESG competencies and cash management strategies(J. Barney, 1991). Exceptional ESG performance is conceptualized as an intangible asset that cultivates stakeholder trust and enhances operational resilience(J. B. Barney et al., 2010). When effectively allocated, cash reserves facilitate investments in sustainability initiatives that yield enduring advantages (Surroca et al., 2010). Conversely, Barrutia and Echebarria (2015) Stated that ESG-related controversies can erode reputational capital, highlighting the imperative for robust risk management practices to maintain competitive positioning . Consequently, the theory elucidates the interaction between ESG initiatives and financial resources in driving corporate value and sustainability.

Legitimacy theory posits that firms must align their operations with societal expectations to sustain their "social license to operate"(Dowling & Pfeffer, 1975). ESG disclosures and investments serve as mechanisms to exhibit conformity with the dynamic societal norms (Deegan, 2002). Excessive cash holdings may attract scrutiny unless they are substantiated by expenditures related

to ESG initiatives(Guthrie et al., 2004). Conversely, ESG controversies jeopardize legitimacy, compelling firms to implement corrective actions to restore stakeholder trust as it was mentioned by O'donovan (2002).

In consideration of the theoretical paradigms articulated, exemplary ESG performance may not solely indicate robust stakeholder engagement and governance excellence but also function as a strategic alternative to excessive cash reserves. By diminishing the necessity for precautionary liquidity, enterprises characterized by substantial ESG profiles can redirect financial surplus toward the generation of long-term value, thereby alleviating agency dilemmas and bolstering signaling credibility. Furthermore, the emergence of ESG-related controversies appears to diminish these advantages by eroding stakeholder trust and signaling reputational hazards, ultimately reducing the valuation premium that is customarily linked with ESG performance. These revelations underscore the dualistic function of ESG as both a capability for value enhancement and a potential source of legitimacy risk, contingent upon the firm's exposure to controversy and its resource management methodologies.

3 Literature Review

The intricate relationship between Environmental, Social, and Governance (ESG) performance and Market Value (MV) constitutes a contentious and multifaceted domain of inquiry, with empirical investigations yielding a spectrum of results—ranging from positive, negative, neutral, to non-linear correlations—contingent upon methodological frameworks, geographical contexts, and ESG evaluation criteria (Friede et al., 2015). Importantly, the distinct elements comprising ESG (E, S, G) reveal varied impacts on corporate valuation, thereby indicating that composite ESG scores may obscure intricate interactions (Truong, 2025; Zheng et al., 2022) .

ESG Performance and Market Value: Divergent Perspectives

A considerable corpus of literature substantiates a favorable ESG–MV correlation, attributing this phenomenon to increased investor interest, enhancements in reputation, and operational efficiencies. For example, Tang et al. (2024) elucidates that Chinese corporations exhibiting robust ESG performance garner heightened investor trust, particularly within non-state-owned entities, whereas Fatemi et al. (2018) underscores the significance of transparency in ESG disclosures as a mechanism for augmenting valuation advantages. Meta-analytic findings from Friede et al. (2015), encompassing over 2,000 studies, reinforce this observation. In contrast, certain investigations reveal adverse associations, particularly within industries characterized by high compliance costs (Vance, 1975) or concentrated ownership frameworks (Truong, 2025). Notably, Nguyen and Nguyen (2024) reveals that ESG investments may hinder corporate prosperity in stable real estate markets, suggesting contextual limitations to its value relevance.

The nature of the relationship may also be neutral or contingent upon specific variables. Aupperle et al. (1985) identified a lack of significant correlation between CSR and profitability, while Pramisti and Istiqomah (2024) demonstrated that the impact of ESG on Indonesian energy firms operates independently of mediating financial performance factors. Non-linear dynamics further complicate this domain: Barnett and Salomon (2006) proposes a U-shaped correlation, whereas Ghosh et al. (2023) identifies an inverted U-shaped association, indicating diminishing returns at elevated ESG levels.

Hypothesis 1 (H1): There exists a positive relation between aggregate ESG performance and market value.

Disaggregating ESG: The E, S, and G Dimensions

Environmental (E) performance yields a spectrum of outcomes. While Flammer (2015) correlates environmental CSR with long-term value generation, Syarkani et al. (2024) observes negligible effects of E-scores in Indonesia attributable to insufficient investor prioritization and regulatory enforcement. Conversely, Setiani et al. (2024) indicates that low-carbon enterprises in Southeast Asia outperform their counterparts, suggesting the influence of regional and sectoral contingencies.

Social (S) factors exhibit weaker yet contextually dependent influences. Although Lins et al. (2017) demonstrates that social capital can buffer firms during periods of crisis, its marginal impact is frequently overshadowed by governance and environmental considerations (Zheng et al., 2022). In the Indonesian context, community engagement positively correlates with MV but to a lesser extent compared to other ESG components (Syarkani et al., 2024).

Governance (G) manifests the most consistent positive influence on MV, as effective governance mitigates agency costs and conveys quality in decision-making. Gompers et al. (2003) associate strong governance with elevated Tobin's Q, while Bebchuk et al. (2009) accentuate the significance of particular anti-takeover measures. In emerging markets such as China, governance serves as a mediator of ESG's overall effect on corporate value (Zheng et al., 2022).

H1a: Environmental performance positively relates with market value.

H1b: Social performance positively relates with market value.

H1c: Governance performance positively relates with market value.

The role of cash in the ESG-MV relation

The diverse and sometimes conflicting findings in the literature pertaining to the relationship between Environmental, Social, and Governance (ESG) criteria and market value (MV) highlight the imperative for academic researchers to transcend mere direct correlations and to investigate the mediating and moderating mechanisms that underlie this association. An expanding corpus of scholarly work accentuates the significance of internal financial metrics as essential conduits through which ESG performance exerts its influence on firm valuation.

Significantly, numerous empirical investigations have substantiated that engagement with ESG principles correlates positively with improved financial metrics—such as return on assets (ROA) and profitability—which, in turn, propel market value (Putra & Budastra, 2024; Sumarno et al., 2023; Zhou et al., 2022). This observation implies that financial performance serves as a mediating variable within the ESG–MV framework. In a complementary vein, firms that prioritize ESG considerations typically encounter diminished financing constraints, which subsequently enhance investment efficacy and market valuation (Shang, 2024). Furthermore, it has been empirically demonstrated that robust ESG performance contributes to a reduction in the cost of debt, thereby fortifying corporate financial performance and, ultimately, augmenting firm value (Peng & Zang, 2024). These mediating effects elucidate the financial mechanisms through which ESG initiatives foster enduring shareholder value.

In addition to conventional financial metrics, contemporary scholarly discourse has increasingly concentrated on the mediating function of corporate cash holdings within the ESG–MV nexus. This line of inquiry holds particular relevance in light of the growing scrutiny concerning liquidity management and ESG disclosures from both investors and regulatory bodies. Chang et al. (2019) furnished early evidence indicating that firms exhibiting high corporate social responsibility (CSR) derive superior valuation premiums from their cash reserves compared to firms with lower CSR engagement. Their analysis illustrates that ESG involvement enhances the perceived strategic value of cash, thereby transforming it from a mere passive buffer into an asset that signifies proactive risk management and responsiveness to stakeholder needs.

Building upon this framework, Ho and Lu (2025) conducted an examination across 31 countries, revealing that firms characterized by superior corporate sustainability performance (CSP) tend to amass larger cash reserves. This behavior is interpreted as a strategic maneuver in response to elevated risks of financial distress and more compressed debt maturity structures. Notably, this association is particularly pronounced in industries with high concentration and diminishes among firms operating within robust institutional frameworks or those confronting financing constraints. Through rigorous econometric methodologies—including instrumental variable approaches and Difference-in-Differences regressions—the authors substantiate a causal relationship between CSP and cash holdings, mediated by the firms' risk management strategies.

In contrast, the research conducted by Wong and Zhang (2024) emphasizes the reputational hazards associated with excessive cash reserves amidst ESG scrutiny. They demonstrate that, in scenarios where ESG controversies arise, firms possessing substantial cash balances experience adverse market reactions, particularly when they lack mechanisms for distribution, such as dividends or share repurchases. These findings imply that significant cash reserves, in the absence of transparent payout policies, may exacerbate agency issues during ESG-related crises. Nonetheless, the study also elucidates that refinancing risks may act as a moderating factor by shaping investor perceptions of precautionary cash holdings.

Wang et al. (2024) contributes further nuance by concentrating on the non-financial sector within China. Their findings suggest that heightened ESG performance enhances financial efficiency, which subsequently leads to a reduction in excess cash holdings. From a governance perspective, this indicates that the integration of ESG considerations into financial decision-making processes may yield improved capital allocation and diminish idle liquidity, thereby aligning corporate resource utilization with sustainability goals.

Collectively, these investigations underscore that surplus cash reserves constitute a pivotal financial conduit via which ESG performance affects corporate valuation—either by serving as a strategic buffer that augments market perception or by manifesting as a suboptimal capital allocation that detracts from firm value. The trajectory and intensity of this mediation seem to be dependent on broader contextual variables, including institutional frameworks, distribution policies, and reputational hazards.

H2a: Superior ESG performance is associated with lower excess cash holdings.

H2b: Excess cash holdings mediate the relationship between aggregate ESG performance and market value.

H2c: Excess cash holdings mediate the relationship between individual ESG pillars (E, S, G) and market value.

The lens of controversy.

Environmental, Social, and Governance (ESG) controversies have surfaced as a pivotal determinant influencing corporate financial conduct, particularly concerning the interplay between ESG performance, liquidity management, and firm valuation. Although ESG engagement is predominantly linked to the generation of long-term value and diminished risk exposure, instances of corporate malfeasance, governance failures, and environmental or social transgressions may negate these advantages. Such controversies diminish investor confidence, elevate perceived firm-level risk, and result in a depreciation of market worth (Shakil, 2024).

Empirical investigations consistently substantiate that corporations entangled in ESG controversies witness marked reductions in firm value, which are frequently evidenced by indicators such as Tobin's Q, market capitalization, and price-to-book ratios (Passos & Campos-Rasera, 2024). Market participants typically impose penalties on these firms through capital withdrawal, whereas regulatory entities enact fines and intensified scrutiny. These repercussions culminate in augmented capital costs and reputational risk, particularly within high-sensitivity sectors and jurisdictions characterized by rigorous stakeholder expectations and enforcement standards (Aouadi & Marsat, 2018; Jucá et al., 2024; Shakil, 2021; Vargas-Santander et al., 2025).

Crucially, ESG controversies serve as a significant moderating factor in the nexus between ESG performance and both liquidity decisions and market valuation. Even firms possessing robust ESG credentials may find that recurrent controversies dilute the advantageous effects of ESG by magnifying perceived governance risks and casting skepticism on the genuineness of ESG commitments (Fauser & Utz, 2021; Galletta & Mazzù, 2023). These dynamics are particularly pronounced in sectors vulnerable to environmental risk and regulatory oversight—such as oil and gas or mining—where failures in ESG practices are likely to incite investor backlash and regulatory action (García-Amate et al., 2023).

The influence of media framing and investor sentiment further exacerbates the financial repercussions of ESG controversies. Negative media portrayals have been empirically shown to intensify market reactions, yielding increased volatility and eroded investor confidence, notably among institutional investors who may adjust their portfolios in response to ESG-related reputational threats (Barkemeyer et al., 2020; Carberry et al., 2018). Consequently, firms confronted with ESG controversies must adopt robust disclosure practices and crisis management strategies to alleviate reputational and financial harm. Transparent communication and agile governance frameworks can significantly contribute to the restoration of investor trust and stabilization of market anticipations (Nirino et al., 2021; Tamayo-Torres et al., 2019).

A comprehensive understanding of how ESG controversies shape the interaction between ESG performance, liquidity reserves, and market valuation yields essential insights for firms striving to reconcile sustainability aspirations with financial durability. This emphasizes the necessity of not only pursuing excellence in ESG practices but also ensuring consistency, accountability, and alignment with stakeholder interests in ESG implementation.

H3a: ESG controversies exert a significant moderating effect on the relationship between overall ESG performance and market valuation, whereby the beneficial impact of ESG is attenuated in the presence of pronounced controversies.

H3b: ESG controversies moderate the association between corporate cash holdings and market valuation, with elevated levels of controversy exacerbating the negative perception of excessive liquidity.

H3c: ESG controversies differentially moderate the relationships among each ESG pillar (Environmental, Social, and Governance) and market valuation, with the nature and extent of moderation exhibiting variation across dimensions.

4 Methods

4.1 Data and variables

This investigation utilizes data acquired from Refiniti database concerning enterprises within the S&P 500 index spanning the years 2007 to 2022, culminating in a comprehensive dataset of 5,566 observations subsequent to the exclusion of missing data and entries devoid of available values (i.e., NAs). We also excluded the financial sector from analysis as they have special characteristics. The central aim is to scrutinize the interrelation between ESG performance and corporate market value, with a specific focus on the moderating influence of ESG controversies. The principal variables and their respective definitions are delineated as follows:

- **ESG Score**: The logarithm of the aggregate score of a firm, which consolidates its performance across environmental, social, and governance dimensions, excluding any considerations of controversies. Controversies are analyzed independently as a moderating variable.

- **ESG Controversy Score**: This metric delineates the degree of controversy linked to a company's conduct concerning ESG principles. It spans a range from 100 (denoting the absence of controversy) to 0 (representing the utmost level of controversy). we categorize firms into four groups based on their ESG Controversy Score: No Controversy (Score = 100), Low Controversy (Score between the 99th and 66th percentile), Medium Controversy (Score between the 66th and 33rd percentile), and High Controversy (Score <33rd).This quantile-based grouping follows established practices in ESG and reputation literature that employ percentile splits to stratify controversy or ESG scores (Aouadi & Marsat, 2018; Fauser & Utz, 2021).

  To assess robustness, we repeated the analysis using tercile splits and median-based dichotomies, confirming that the significance and direction of results remained unchanged. These robustness checks indicate that the moderating effects observed are not an artifact of the selected classification scheme but reflect consistent empirical patterns across different grouping thresholds.

- **Environmental, Social, and Governance (E, S, G) Scores**: The distinct scores attributed to each of the three pillars of ESG. These variables facilitate an in-depth examination of the specific contributions of each ESG dimension to the overall performance of the firm.

- **Firm Size**: Firm size is quantified through the logarithm of total assets; this variable serves to control for the potential ramifications of firm scale on financial and market performance. It will be abbreviated as TA.

$$\text{Size}_{it} = \log(\text{Total Assets}_{it}) \tag{1}$$

- **Excess Cash**: The excess cash ratio relative to the industry average, this variable signifies whether a corporation possesses a cash reserve exceeding the norm for its sector, which can influence investment strategies and corporate valuation. This variable will be referred to as Excess Cash or Cash interchangeably throughout the study.

- **Cash Ratio**: The cash ratio is articulated as the proportion of cash to net assets. In robustness assessments, this ratio is modified to reflect the ratio of cash to net sales.

$$\text{Cash Ratio}_{it} = \frac{\text{Cash}_{it}}{\text{Net Assets}_{it}} \tag{2}$$

  In robustness checks:

$$\text{Cash Ratio}_{\text{Net Sales},it} = \frac{\text{Cash}_{it}}{\text{Net Sales}_{it}} \tag{3}$$

- **Profitability**: Profitability is represented as the logarithm of return on equity (ROE). ROE signifies the firm's capability to generate profits from shareholders' equity. It will be abbreviated as ROE.

- **Long-Term Debt (LTD)**: Long-term debt is quantified as the logarithm of long-term liabilities.

- **Tobin's Q (TQ)**: Tobin's Q is characterized as the ratio of a company's market value of assets to the replacement cost of those assets.

$$\mathrm{TQ}_{it} = \frac{\text{Market Value}_i}{\text{Replacement Cost}_{it}} \tag{4}$$

- **Research and Development (RD)**: It is articulated as a percentage of net sales. It will be referred to as RD throughout the study.

- **Lagged Tobin's Q (Lag TQ)**: The lagged value of Tobin's Q from the preceding period is incorporated to accommodate time lags in the association between market valuation and corporate performance.

Table I delineates the descriptive statistics for the principal variables utilized in this investigation, derived from a dataset comprising 5,566 firm-year observations. The dependent variable, (TQ), manifests a mean of 0.615 accompanied by a standard deviation of 0.228, revealing a moderate right skewness (0.518), which implies that a majority of firms are clustered around the median value (0.609), whereas a limited subset of firms exhibits significantly elevated market valuations. The ESG-related variables (E, S, G, and composite ESG scores) are characterized by negative skewness (spanning from -1.107 to -1.388), indicating that the preponderance of firms achieves relatively high levels of ESG performance. Among these variables, the Environmental (E) score demonstrates the most pronounced variability (standard deviation = 1.552), signifying substantial heterogeneity in the environmental practices and disclosures of firms.

The cash holdings variable (Cash) is markedly right-skewed (skewness = 3.419) and exhibits leptokurtic properties (kurtosis = 13.978). Firm size (Total assets), Research and Development intensity (RD), and profitability (ROE) manifest distributional attributes that align with extant literature. Notably, RD reveals a distinctly bimodal distribution (mean = 6.785; median = 10.240), encapsulating the divergence between RD-intensive firms and those lacking innovation. To address the potential impact of extreme values and to ensure the robustness of our findings, All variables are winsorized at the 1% level to mitigate the impact of outliers and to ensure the robustness of the empirical findings (Wilcox, 2011). Furthermore, right-skewed variables were log-transformed where applicable to enhance the normality of the data and facilitate parametric estimation.

Table I. Descriptive Statistics of Key Variables

Variable	N	Mean	Std. Dev.	Min	25th Pct.	Median	75th Pct.	Max	Skewness	Kurtosis
TQ	5,566	0.615	0.228	0.122	0.462	0.609	0.740	1.435	0.518	1.088
Total assets (TA)	5,566	16.374	1.364	12.507	15.464	16.466	17.311	19.605	-0.145	-0.024
E Score	5,566	3.219	1.552	0.000	2.937	3.954	4.281	4.542	-1.315	0.153
G Score	5,566	4.001	0.429	2.381	3.845	4.078	4.316	4.556	-1.388	2.183
S Score	5,566	4.013	0.409	2.690	3.805	4.069	4.319	4.562	-1.107	0.963
Cash	5,566	0.086	0.303	-0.241	-0.038	0.000	0.090	1.886	3.419	13.978
ESG	5,566	3.990	0.388	2.605	3.818	4.078	4.267	4.498	-1.340	1.705
RD	5,566	6.785	6.407	0.000	0.000	10.240	12.795	16.101	-0.044	-1.862
Return on Equity (ROE)	5,566	2.920	0.865	-3.912	2.522	2.868	3.348	5.701	-0.437	4.558
lag TQ	5,566	0.615	0.230	0.122	0.463	0.611	0.743	1.435	0.492	1.066
Long term debt (LTD)	5,566	13.486	4.691	0.000	13.577	14.936	15.938	18.127	-2.197	3.657

Table II. Descriptive Statistics by ESG Controversy Group

Group	N	Controversy Score Mean (SD)	ESG Score Mean (SD)	TQ Mean (SD)
High	734	14.53 (9.29)	4.15 (0.33)	0.63 (0.22)
Moderate	529	49.43 (9.83)	4.08 (0.38)	0.64 (0.21)
Low	811	82.73 (8.33)	4.05 (0.37)	0.63 (0.22)
None	3,492	100.00 (0.00)	3.93 (0.39)	0.61 (0.24)

Table II presents the descriptive statistics pertaining to the principal variables across firms categorized by the intensity of ESG controversies. Firms that exhibit no ESG controversies constitute the predominant portion of the sample (3,492 firm-year observations), whereas firms identified

as experiencing low (811), moderate (529), or high (734) levels of controversy represent smaller subgroups. As anticipated, the ESG controversy score escalates in a monotonic manner across the classifications, thereby mirroring the fundamental classification criteria. Notably, firms devoid of ESG controversies demonstrate the lowest average ESG score (3.93), in contrast to firms within the high controversy category, which report the highest mean ESG score (4.15). This trend may imply that firms subjected to increased scrutiny and reputational risk allocate greater resources toward ESG disclosures or initiatives as a strategy for mitigation. In terms of firm valuation, as assessed by Tobin's Q, we discern relatively similar means across the different categories, ranging from 0.61 for firms without controversies to 0.64 for those classified in the moderate controversy group. Table III presents the Pearson correlation coefficients among key variables, offering preliminary insights into the hypothesized relationships. As anticipated, TQ, serving as a proxy for corporate valuation, demonstrates a robust positive correlation with its lagged value (0.79), indicative of the persistence of corporate performance over temporal intervals. Furthermore, TQ exhibits a moderate positive relationship with return on equity (ROE; 0.21) and long-term debt (LTD; 0.30), whereas its correlation with cash reserves is negative (-0.17), implying that firms possessing elevated market valuations tend to maintain relatively diminished levels of cash reserves. With respect to the Environmental, Social, and Governance (ESG) dimensions, the correlations among the environmental (E), social (S), and governance (G) scores are both positive and substantial, particularly notable between the social and governance dimensions (0.87), thereby aligning with the integrated nature of ESG practices. The composite ESG score is strongly correlated with its individual constituents, particularly with the S score (0.87) and G score (0.67), thereby affirming the construct validity of the composite measure.Crucially, none of the observed correlations surpass the established threshold of 0.80, thereby mitigating apprehensions regarding the possibility of multicollinearity complications in the ensuing regression analysis. These results furnish preliminary evidence of significant interrelations among corporate attributes, ESG performance, and corporate value, thereby justifying a more comprehensive multivariate analysis.

Table III. Correlation Matrix of Key Variables

Variable	Correlation Coefficients										
	TQ	Total Assets	E Score	G score	S score	Cash	ESG	RD	ROE	lag TQ	LTD
TQ	1.00	0.18	0.03	0.09	0.13	-0.17	0.15	-0.17	0.21	0.79	0.30
TA	0.18	1.00	0.52	0.23	0.35	-0.20	0.39	0.03	-0.07	0.15	0.52
E Score	0.03	0.52	1.00	0.37	0.46	-0.09	0.55	0.18	0.08	-0.01	0.41
G Score	0.09	0.23	0.37	1.00	0.38	-0.06	0.67	0.07	0.05	0.06	0.16
S Score	0.13	0.35	0.46	0.38	1.00	-0.05	0.87	0.22	0.09	0.11	0.21
Cash	-0.17	-0.20	-0.09	-0.06	-0.05	1.00	-0.08	0.14	0.05	-0.15	-0.25
ESG	0.15	0.39	0.55	0.67	0.87	-0.08	1.00	0.20	0.09	0.13	0.23
RD	-0.17	0.03	0.18	0.07	0.22	0.14	0.20	1.00	0.10	-0.15	0.00
ROE	0.21	-0.07	0.08	0.05	0.09	0.05	0.09	0.10	1.00	0.19	-0.04
lag TQ	0.79	0.15	-0.01	0.06	0.11	-0.15	0.13	-0.15	0.19	1.00	0.23
LTD	0.30	0.52	0.41	0.16	0.21	-0.25	0.23	0.00	-0.04	0.23	1.00

Notes: Correlation matrix showing Pearson coefficients between all variables. Coefficients are color-coded using a diverging palette where blue indicates positive correlation (darker = stronger), white indicates near-zero correlation, and red indicates negative correlation (darker = stronger).

4.2 Empirical Methodology

To systematically examine the correlation between Environmental, Social, and Governance (ESG) performance and corporate market valuation, this investigation utilizes a firm-level fixed effects (FE) panel regression framework. This quantitative methodology is widely recognized in the ESG scholarly discourse for its efficacy in dissecting the complex and dynamic interrelations between ESG determinants and corporate performance, particularly amid the heightened global focus on ESG matters from 2013 to 2023 (Nian & Said, 2025). The FE model is particularly adept at addressing unobserved, time-invariant firm-specific heterogeneity—such as managerial acumen,

corporate strategy, organizational ethos, or sectoral positioning—that could otherwise lead to biased coefficient estimates if neglected (Hsiao, 2022; Wooldridge, 2010).

By capitalizing on temporal variations within firms, the FE model effectively delineates the influence of ESG metrics and financial indicators on market valuation while accounting for any latent firm-specific attributes. The baseline econometric specification is given as:

$$Y_{it} = \alpha_i + \beta X_{it} + \gamma Z_t + \varepsilon_{it} \tag{5}$$

where Y_{it} denotes the dependent variable (e.g., market value or financial indicator) for firm i at time t; α_i captures firm-specific fixed effects; X_{it} is a vector of time-varying firm-level regressors (e.g., ESG scores, financial mediators); Z_t includes time-specific effects such as macroeconomic shocks or policy changes (Angrist & Pischke, 2009); and ε_{it} is the idiosyncratic error term.

This analytical approach guarantees the reduction of bias stemming from omitted variables that remain constant over time, thereby bolstering the internal validity of the estimations (Baltagi & Baltagi, 2008; Petersen, 2008). In comparison to pooled Ordinary Least Squares (OLS) and random effects models, the FE estimator is preferred due to its ability to provide consistent results even when unobserved heterogeneity correlates with the explanatory variables—a prevalent phenomenon in corporate finance and ESG investigations (Greene, 2018; Stock & Watson, 2020).

To ensure the integrity of statistical inference, we calculate cluster-robust standard errors, employing two-way clustering at both the firm and year levels (Cameron & Trivedi, 2005; Petersen, 2008). This methodology rectifies serial correlation within firms over time as well as contemporaneous correlation among firms within the same year, thus addressing concerns related to heteroskedasticity and autocorrelation (Arellano, 1987; Bertrand et al., 2004; Thompson, 2011). Utilizing conventional OLS standard errors in panel datasets can lead to biased estimates, inflated t-statistics, and potentially erroneous conclusions (Gow et al., 2010; Wooldridge, 2010). To further substantiate the robustness and credibility of our estimation methodology, we undertake a range of diagnostic and specification assessments that are standard in panel data econometrics. Initially, we examine potential multicollinearity among the independent variables utilizing the Variance Inflation Factor (VIF) diagnostic. Elevated multicollinearity can inflate standard errors and compromise the statistical validity of coefficient estimates; however, all VIF metrics in our analysis remain significantly below the traditionally accepted threshold of 10, indicating an absence of severe multicollinearity concerns (Kutner et al., 2005; O'brien, 2007). Subsequently, to appraise the suitability of the fixed effects estimator in contrast to the random effects alternative, we implement the Hausman specification test (Hausman, 1978). This test evaluates whether unobserved individual-specific effects are correlated with the explanatory variables. A statistically significant test statistic serves to reject the null hypothesis of no correlation, thereby favoring the application of the fixed effects model. In our analysis, the Hausman test corroborates that the individual effects exhibit endogeneity, thereby validating the selection of the fixed effects estimator for consistent inference (Baltagi & Baltagi, 2008; Wooldridge, 2010). Thirdly, we conduct the Wald test to ascertain the joint significance of the fixed effects in determining whether the firm-specific effects collectively exert a significant influence on the dependent variable. The outcome of this test rejects the null hypothesis that all fixed effects are jointly zero, thereby indicating that controlling for unobserved firm-level heterogeneity enhances the explanatory capacity of the model (Cameron & Trivedi, 2005; Greene, 2018).To address potential endogeneity of ESG performance, we employed a two-stage least squares (2SLS) approach, using lagged ESG scores as instruments. This approach is widely used in ESG research, based on the premise that past ESG behavior influences current ESG disclosure and performance but is less likely to be directly related to contemporaneous market valuation beyond its effect through ESG channels (Gillan et al., 2021; Lins et al., 2017). The first-stage F-statistic of 7467.4 confirms the strength of the instrument, far exceeding the conventional threshold of 10. The Hausman test further supports the fixed-effects estimator, and the Wald test fails to reject exogeneity ($p = 0.126$), reinforcing the robustness of the baseline model. These diagnostic procedures collectively ensure that our empirical specification is both theoretically sound and statistically robust. In order to ascertain the reliability and applicability of our results, we implement a comprehensive array of robustness examinations. These examinations encompass various alternative model configurations, using other methodology to ensure that the Fixed effect model is suitable, as well as supplementary assessments designed to evaluate the vulnerability of our findings to possible changes in the grouping approach we used in classifying ESG controversy score. A thorough discussion of these methodological exercises is provided subsequent to the presentation of the principal empirical outcomes.

This research utilizes a sequence of fixed effects regression models to investigate the correlation between TQ and Environmental, Social, and Governance (ESG) performance. The primary aim is

to analyze how ESG components, both in aggregate form and through their specific sub-components (E, S, and G), influence corporate market valuation, with an emphasis on the potential mediating and moderating influences of Cash and ESG Controversy.

The relationship between TQ and ESG Score is first estimated with firm-level fixed effects, controlling for key firm characteristics such as Firm Size (TA), Long-Term Debt (LTD), Profitability (ROE), Research and Development (RD), and Lagged Tobin's Q (Lag TQ):

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{ESG Score}_{it} + \beta_2 \text{TA}_{it} + \beta_3 \text{LTD}_{it} + \beta_4 \text{ROE}_{it} + \beta_5 \text{RD}_{it} + \beta_6 \text{Lag TQ}_{it} + \epsilon_{it} \quad (6)$$

Where:

- TQ_{it} is the Tobin's Q of firm i at time t,
- ESG Score_{it} is the total ESG score for firm i at time t,
- TA_{it}, LTD_{it}, ROE_{it}, and RD_{it} are the control variables for firm size, long-term debt, profitability, and research and development, respectively,
- Lag TQ_{it} is the lagged Tobin's Q from the previous period,
- α_i represents firm fixed effects, and
- ϵ_{it} is the error term.

To assess the differential impact of each of the ESG dimensions (Environmental, Social, and Governance), the ESG Score is replaced by its individual components (E, S, G) in separate models:

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{E}_{it} + \beta_2 \text{TA}_{it} + \beta_3 \text{LTD}_{it} + \beta_4 \text{ROE}_{it} + \beta_5 \text{RD}_{it} + \beta_6 \text{Lag TQ}_{it} + \epsilon_{it} \quad (7)$$

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{S}_{it} + \beta_2 \text{TA}_{it} + \beta_3 \text{LTD}_{it} + \beta_4 \text{ROE}_{it} + \beta_5 \text{RD}_{it} + \beta_6 \text{Lag TQ}_{it} + \epsilon_{it} \quad (8)$$

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{G}_{it} + \beta_2 \text{TA}_{it} + \beta_3 \text{LTD}_{it} + \beta_4 \text{ROE}_{it} + \beta_5 \text{RD}_{it} + \beta_6 \text{Lag TQ}_{it} + \epsilon_{it} \quad (9)$$

Where E_{it}, S_{it}, and G_{it} represent the Environmental, Social, and Governance scores, respectively.

To examine the mediating role of Cash, we test its impact on the relationship between both the total ESG Score and its individual sub-pillars (E, S, G) with Tobin's Q:

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{ESG Score}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 \text{TA}_{it} + \beta_4 \text{LTD}_{it} + \beta_5 \text{ROE}_{it} + \beta_6 \text{RD}_{it} + \beta_7 \text{Lag TQ}_{it} + \epsilon_{it} \quad (10)$$

For individual scores:

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{E}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 \text{TA}_{it} + \beta_4 \text{LTD}_{it} + \beta_5 \text{ROE}_{it} + \beta_6 \text{RD}_{it} + \beta_7 \text{Lag TQ}_{it} + \epsilon_{it} \quad (11)$$

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{S}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 \text{TA}_{it} + \beta_4 \text{LTD}_{it} + \beta_5 \text{ROE}_{it} + \beta_6 \text{RD}_{it} + \beta_7 \text{Lag TQ}_{it} + \epsilon_{it} \quad (12)$$

$$\text{TQ}_{it} = \alpha_i + \beta_1 \text{G}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 \text{TA}_{it} + \beta_4 \text{LTD}_{it} + \beta_5 \text{ROE}_{it} + \beta_6 \text{RD}_{it} + \beta_7 \text{Lag TQ}_{it} + \epsilon_{it} \quad (13)$$

Where Cash_{it} refers to the Excess cash as defined earlier.

To explore the moderating effect of ESG Controversy, We modeled the interaction between ESG Score (and its sub-pillars) and Cash with the ESG Controversy groupings:

$$\begin{aligned} \text{TQ}_{it} = \alpha_i &+ \beta_1 \text{ESG Score}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 (\text{ESG Controversy}_i \times \text{ESG Score}_{it}) \\ &+ \beta_4 \text{TA}_{it} + \beta_5 \text{LTD}_{it} + \beta_6 \text{ROE}_{it} + \beta_7 \text{RD}_{it} + \beta_8 \text{Lag TQ}_{it} + \epsilon_{it} \end{aligned} \quad (14)$$

Interaction of Cash and ESG Controversy Group

$$\begin{aligned} \text{TQ}_{it} = \alpha_i &+ \beta_1 \text{ESG Score}_{it} + \beta_2 \text{Cash}_{it} + \beta_3 (\text{ESG Controversy}_i \times \text{Cash}_{it}) \\ &+ \beta_4 \text{TA}_{it} + \beta_5 \text{LTD}_{it} + \beta_6 \text{ROE}_{it} + \beta_7 \text{RD}_{it} + \beta_8 \text{Lag TQ}_{it} + \epsilon_{it} \end{aligned} \quad (15)$$

Interaction of ESG Controversy with Individual Pillars
For Environmental (E):

$$\begin{aligned} \mathrm{TQ}_{it} = \alpha_i + \beta_1 \mathrm{E}_{it} + \beta_2 \mathrm{Cash}_{it} + \beta_3 (\text{ESG Controversy}_i \times \mathrm{E}_{it}) \\ + \beta_4 \mathrm{TA}_{it} + \beta_5 \mathrm{LTD}_{it} + \beta_6 \mathrm{ROE}_{it} + \beta_7 \mathrm{RD}_{it} + \beta_8 \text{Lag TQ}_{it} + \epsilon_{it} \end{aligned} \tag{16}$$

For Social (S):

$$\begin{aligned} \mathrm{TQ}_{it} = \alpha_i + \beta_1 \mathrm{S}_{it} + \beta_2 \mathrm{Cash}_{it} + \beta_3 (\text{ESG Controversy}_i \times \mathrm{S}_{it}) \\ + \beta_4 \mathrm{TA}_{it} + \beta_5 \mathrm{LTD}_{it} + \beta_6 \mathrm{ROE}_{it} + \beta_7 \mathrm{RD}_{it} + \beta_8 \text{Lag TQ}_{it} + \epsilon_{it} \end{aligned} \tag{17}$$

For Governance (G):

$$\begin{aligned} \mathrm{TQ}_{it} = \alpha_i + \beta_1 \mathrm{G}_{it} + \beta_2 \mathrm{Cash}_{it} + \beta_3 (\text{ESG Controversy}_i \times \mathrm{G}_{it}) \\ + \beta_4 \mathrm{TA}_{it} + \beta_5 \mathrm{LTD}_{it} + \beta_6 \mathrm{ROE}_{it} + \beta_7 \mathrm{RD}_{it} + \beta_8 \text{Lag TQ}_{it} + \epsilon_{it} \end{aligned} \tag{18}$$

5 Results

In order to ascertain the validity of the regression estimates, the presence of multicollinearity among the independent variables was examined through the computation of the Variance Inflation Factor (VIF). As indicated in Table IV, all VIF values remain significantly below the widely recognized threshold of 10 (Hair et al., 2019), implying that multicollinearity does not pose a significant issue within our models. The highest VIF is recorded for Total Assets (VIF = 2.875), succeeded by lagged Tobin's Q (VIF = 2.664). The other variables demonstrate VIF values approaching 1, signifying a markedly low level of collinearity. Alternative model specifications that exclude either Total Assets or lagged Tobin's Q produce qualitatively consistent results, thereby reinforcing the robustness of the conclusions drawn.

Table IV. Variance Inflation Factors (VIF) for Predictor Variables

Variable	VIF	Variable	VIF
TA	2.875	S Score	1.478
lag TQ	2.664	Cash	1.316
E Score	1.890	G Score	1.242
RD	1.862	ESG Score	1.253
LTD	1.593	ROE	1.152

5.1 Main model results

Table V delineates the estimation outcomes of the foundational model that evaluates the impact of Environmental, Social, and Governance (ESG) performance on corporate valuation, as proxied by TQ. The findings are articulated for both fixed effects (FE) and random effects (RE) estimators to ensure methodological rigor and robustness. The estimated coefficient for ESG is not only positive but also statistically significant across both analytical frameworks. Specifically, in the FE model, ESG demonstrates a positive correlation with TQ ($\beta = 0.0438$, $p < 0.01$), indicating that a one-unit enhancement in the ESG score corresponds to an approximate 4.38% augmentation in TQ, while controlling for other variables. This observation persists in the RE model, albeit with a marginal reduction in magnitude ($\beta = 0.0316$, $p < 0.05$), thereby corroborating the robustness of the ESG effect. To ensure the robustness of the estimated standard errors and address potential concerns regarding heteroskedasticity and within-entity correlation, all models are estimated using cluster-robust standard errors clustered at both the firm and year levels following recent recommendations in the ESG-finance literature (Wong & Zhang, 2024) .

Concerning the control variables, Return on Equity (ROE) exhibits a positive and statistically significant influence in both models, which is consistent with existing literature that posits a relationship between elevated profitability and enhanced firm valuation. Research and Development intensity (RD) reveals a negative and marginally significant coefficient in the FE model, potentially indicative of short-term valuation penalties that are associated with expenditures on innovation.

Leverage (LTD) demonstrates a positive and significant relationship with TQ, which may illustrate the disciplining effect of debt within this analytical context. Firm size (TA) shows a weakly negative relationship in the FE model but becomes statistically insignificant in the RE model. As anticipated, lagged TQ exerts a pronounced and highly significant influence on current TQ, signifying persistence in corporate valuation over temporal spans. The overall fit of the models is deemed satisfactory, with within R-squared values of 22.5% (FE) and 14.6% (RE), while the overall R-squared is considerably elevated for the RE model (60.1%), reflecting the incorporation of time-invariant effects. The outcomes of the specification and endogeneity tests are detailed in Table VI. The Hausman test decisively rejects the null hypothesis of no systematic discrepancies between the FE and RE estimates ($\chi^2 = 76.19$, $p < 0.001$), indicating a preference for the FE estimator due to the presence of unobserved heterogeneity that is correlated with the regressors.

Furthermore, the Wald test for exogeneity does not reject the null hypothesis of non-endogeneity ($p = 0.126$), implying that the ESG variable may be regarded as exogenous within this analytical framework. Notably, the first-stage F-statistic (7467.42, $p < 0.001$) substantiates the strength of the instruments utilized in the endogeneity test, significantly surpassing the conventional threshold of 10. The comparison of coefficients between the FE model and the instrumental variables (IV) estimator reveals a negligible disparity (0.132), thereby further endorsing the reliability of the baseline FE estimates. Collectively, these findings furnish compelling evidence that ESG performance exerts a positive and robust influence on corporate valuation (support of the first hypothesis), independent of prospective endogeneity concerns. Moreover, the results demonstrate stability across alternative estimation methodologies, thereby enhancing the validity of the conclusions drawn.

Table V. Comparison of Main Estimation Models

	Fixed Effects		Random Effects	
Variable	Coefficient	(Std. Err.)	Coefficient	(Std. Err.)
ESG	0.0438***	(0.0131)	0.0316**	(0.0140)
	[0.0180, 0.0695]		[0.0042, 0.0590]	
ROE	0.0113***	(0.0035)	0.0175***	(0.0046)
	[0.0044, 0.0181]		[0.0085, 0.0265]	
RD	-0.0066*	(0.0038)	-0.0039***	(0.0013)
	[-0.0141, 0.0010]		[-0.0064, -0.0014]	
LTD	0.0135***	(0.0017)	0.0102***	(0.0020)
	[0.0102, 0.0168]		[0.0062, 0.0141]	
TA	-0.0187*	(0.0109)	-0.0063	(0.0051)
	[-0.0401, 0.0027]		[-0.0163, 0.0036]	
lag TQ	0.2793***	(0.1016)	0.5103***	(0.1006)
	[0.0801, 0.4785]		[0.3132, 0.7075]	
Constant	0.4042**	(0.1652)	0.1172	(0.0782)
	[0.0803, 0.7282]		[-0.0362, 0.2706]	
Observations	5,566		5,566	
R-squared (Within)	0.225		0.146	
R-squared (Overall)	0.445		0.601	
F-statistic	248.94***		721.16***	

Notes: *** p<0.01, ** p<0.05, * p<0.1. 95% confidence intervals in brackets. All models include entity-fixed effects and use clustered standard errors. The F-test for poolability in the Fixed Effects model is 9.1539 ($p < 0.001$).

Table VII delineates the outcomes of fixed-effects models that evaluate the distinct impact of the Environmental (E), Social (S), and Governance (G) dimensions on corporate market valuation, as represented by TQ. This analytical framework facilitates the examination of hypotheses H1a, H1b, and H1c, which investigate whether the three ESG pillars exert a positive influence on corporate valuation when analyzed in isolation.

The findings reveal that the Environmental score (E Score) displays a positive and marginally significant correlation with corporate market value ($\beta = 0.0005$; $p < 0.1$). Despite the relatively modest size of the coefficient, this outcome offers partial corroboration for Hypothesis H1a, indi-

Table VI. Endogeneity and Specification Diagnostics

Test	Value	p-value
Endogeneity Tests		
First-stage F-statistic	7467.419	0.000
Wald test for exogeneity	2.341	0.126
Hausman Test		
Fixed Effects vs Random Effects	76.190	2.19e-14
First-stage Results		
R-squared	0.8011	
Instrument coefficient	0.8306	(0.000)
Coefficient Comparison		
FE vs IV difference	0.132	

(1) No endogeneity detected (Wald p = 0.126), (2) Instruments are strong (F > 10), (3) Fixed Effects preferred (Hausman p < 0.001)

cating that environmental practices may positively contribute to corporate valuation, although the strength of this association appears to be less robust in comparison to the other ESG dimensions.

Conversely, the Social score (S Score) presents a statistically significant and economically substantial positive effect on market value ($\beta = 0.0324$; $p < 0.01$). This result strongly substantiates Hypothesis H1b and underscores the significance of corporate social responsibility initiatives—encompassing employee relations, customer satisfaction, and community involvement—in augmenting corporate valuation.

Likewise, the Governance score (G Score) is positively and highly significantly correlated with corporate value ($\beta = 0.0006$; $p < 0.01$), thereby providing compelling support for Hypothesis H1c. This finding reaffirms the pivotal role of effective corporate governance frameworks—including board composition, transparency, and shareholder rights—in enhancing corporate performance and valuation.

These results furnish empirical validation for the overarching Hypothesis H1, which asserts a positive association between ESG performance and corporate market value. Nonetheless, the findings also illuminate significant heterogeneity among the three ESG dimensions. Notably, the Social and Governance components demonstrate stronger and more statistically significant impacts relative to the Environmental dimension, which is only marginally significant.

With respect to control variables, the models consistently indicate that return on equity (ROE), long-term debt (LTD), and lagged Tobin's Q (Lag TQ) are positively and significantly correlated with corporate value, consistent with theoretical predictions. In contrast, intensity (RD) reflects a negative and marginally significant effect, whereas firm size (TA) remains statistically insignificant across the models.

In summary, the findings presented in Table VII underscore that while the aggregate ESG score is positively associated with corporate value, the individual components exert divergent influences, with social and governance practices emerging as particularly influential drivers of value. Furthermore, the models are estimated utilizing firm-fixed effects and cluster-robust standard errors at both the firm and year levels to mitigate potential concerns regarding heteroskedasticity and within-entity correlation.

5.2 Excess cash channel

To investigate the prospective mediating function of cash holdings within the nexus between ESG performance and market value (MV), a comprehensive series of analyses were executed to evaluate Hypotheses H2a through H2d. The findings yield robust evidence in favor of the proposed mechanisms.

Table VIII delineates the empirical results pertaining to the direct correlation between ESG scores and corporate cash holdings. The findings demonstrate a statistically significant inverse

Table VII. Fixed Effects Models by ESG Dimension

	(E) Environment	(S) Social	(G) Governance
Variable	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
E Score	0.0005*	–	–
	(0.0003)		
	$[-2.4 \times 10^{-5}, 0.0010]$		
S Score	–	0.0324***	–
		(0.0125)	
		[0.0079, 0.0569]	
G Score	–	–	0.0006***
			(0.0002)
			[0.0003, 0.0010]
ROE	0.0119***	0.0115***	0.0117***
	(0.0037)	(0.0036)	(0.0035)
	[0.0047, 0.0191]	[0.0045, 0.0185]	[0.0049, 0.0186]
RD	-0.0066*	-0.0068*	-0.0066*
	(0.0039)	(0.0039)	(0.0039)
	[-0.0143, 0.0010]	[-0.0145, 0.0008]	[-0.0142, 0.0011]
LTD	0.0139***	0.0136***	0.0136***
	(0.0017)	(0.0017)	(0.0017)
	[0.0106, 0.0171]	[0.0103, 0.0169]	[0.0104, 0.0169]
TA	-0.0142	-0.0171	-0.0150
	(0.0116)	(0.0109)	(0.0108)
	[-0.0370, 0.0087]	[-0.0384, 0.0043]	[-0.0361, 0.0062]
Lag TQ	0.2882***	0.2820***	0.2850***
	(0.1041)	(0.1026)	(0.1033)
	[0.0842, 0.4922]	[0.0808, 0.4831]	[0.0825, 0.4876]
Constant	0.4864***	0.4198**	0.4757***
	(0.1782)	(0.1653)	(0.1687)
	[0.1371, 0.8357]	[0.0957, 0.7439]	[0.1449, 0.8064]
Observations		5,566	
R-squared (Within)	0.218	0.222	0.223
F-statistic	238.54***	244.29***	245.41***

Notes: *** p<0.01, ** p<0.05, * p<0.1. 95% confidence intervals in brackets. All models include entity-fixed effects and clustered standard errors.

relationship between ESG performance and liquidity reserves ($\beta = -0.0406$, $p < 0.05$). This outcome indicates that entities with elevated ESG scores are inclined to maintain diminished Excess cash levels, thereby corroborating H2a. This result is congruent with the hypothesis that firms characterized by exemplary ESG practices may experience diminished precautionary incentives for cash accumulation, potentially attributable to enhanced stakeholder trust, improved access to external financing, and reduced agency conflicts.

The mediation analysis delineated in Table IX further corroborates the function of cash holdings as a mediating variable within the ESG–MV nexus. The direct influence of ESG on market value persists as positive and significantly substantial both prior to ($\beta = 0.0767$, $p < 0.01$) and subsequent to ($\beta = 0.0744$, $p < 0.01$) the inclusion of the mediator, thereby indicating a state of partial mediation. Notably, the indirect influence of ESG on market value via cash holdings is both positive and statistically noteworthy (indirect effect = 0.0052, 95% CI [0.0028, 0.0082], $p < 0.001$), thereby furnishing robust support for hypothesis H2c. These outcomes imply that a portion of the affirmative effect of ESG performance on firm value transpires through the mitigation of cash holdings, which subsequently amplifies market valuation.

To elucidate the mediation mechanism in greater detail, Table X presents the findings of the mediation analysis categorized by the distinct ESG pillars – Environment (E), Social (S), and Governance (G). The findings consistently reveal substantial negative correlations between cash reserves and market valuation across all three ESG dimensions, with coefficients ranging from -0.0574 to -0.0602 ($p < 0.01$).

The mediation effects attain statistical significance across all pillars, with the most pronounced mediation effect identified within the Social pillar (indirect effect = 0.0036, 95% CI [0.0016, 0.0060], $p < 0.001$). The Environment and Governance dimensions also demonstrate significant, albeit comparatively smaller, mediation effects (indirect effect = 0.0001, $p < 0.01$ for both). These findings underscore that while each ESG pillar plays a role in diminishing cash reserves – consequently enhancing market valuation – social responsibility practices exert the most significant mediating impact.

In aggregate, these results provide robust empirical support for Hypotheses H2a through H2d. Enhanced ESG performance correlates with reduced cash holdings (H2a), which subsequently demonstrates a negative relationship with market valuation (H2b). Cash holdings serve as a partial mediator in the ESG–market value relationship (H2c), and this mediating effect is consistently evident across all ESG dimensions, with the Social pillar exhibiting the most substantial mediation effect (H2d). These results not only reinforce the financial relevance of ESG integration but also illustrate how liquidity behavior serves as a signaling channel in capital markets. The observed mediation implies that firms with strong ESG profiles tend to reduce their reliance on precautionary cash buffers—likely due to greater external financing access and reduced information asymmetry—consistent with signaling and agency theories. This behavioral adjustment appears to be rewarded by investors, as lower cash reserves are associated with higher market valuations. Importantly, these findings highlight that the value relevance of ESG is not purely direct, but operates in tandem with internal financial policy, suggesting that managers may strategically leverage ESG initiatives to optimize liquidity signaling and reduce perceived agency risk.

Table VIII. Effect of ESG Scores on Cash Holdings

Variable	Coefficient	(Std. Err.)
ESG	-0.0406**	(0.0224)
	[-0.0845, 0.0032]	
Constant	0.2481***	(0.0890)
	[0.0737, 0.4225]	
Observations	5,566	
R-squared	0.0034	
F-statistic	17.755***	

Notes: ** p<0.05, *** p<0.01. 95% confidence interval in brackets.

Table IX. Direct Effects and Mediation Analysis

	Direct Effect		Mediation Model	
Variable	Coefficient	(Std. Err.)	Coefficient	(Std. Err.)
ESG	0.0767***	(0.0188)	0.0744***	(0.0183)
	[0.0398, 0.1136]		[0.0386, 0.1103]	
Cash			-0.0555***	(0.0205)
			[-0.0956, -0.0154]	
Constant	0.3087***	(0.0765)	0.3225***	(0.0739)
	[0.1587, 0.4586]		[0.1775, 0.4674]	
Observations	5,566		5,566	
R-squared	0.0275		0.0344	
F-statistic	145.71***		91.733***	
Indirect Effect (a*b)	0.0052 [0.0028, 0.0082] ($p < 0.001$)			

Notes: *** p<0.01. 95% confidence intervals in brackets.

Table X. Mediation Analysis by ESG Dimension

	(E) Environment	(S) Social	(G) Governance
Variable	Coef. (Std. Err.)	Coef. (Std. Err.)	Coef. (Std. Err.)
E Score	0.0004*	–	–
	(0.0002)		
	$[-4.1 \times 10^{-5}, 0.0009]$		
S Score	–	0.0620***	–
		(0.0162)	
		[0.0302, 0.0939]	
G Score	–	–	0.0010***
			(0.0002)
			[0.0005, 0.0014]
Cash	-0.0602***	-0.0574***	-0.0594***
	(0.0217)	(0.0209)	(0.0210)
	[-0.1027, -0.0177]	[-0.0984, -0.0163]	[-0.1006, -0.0181]
Constant	0.5998***	0.3707***	0.5622***
	(0.0120)	(0.0661)	(0.0148)
	[0.5763, 0.6234]	[0.2411, 0.5004]	[0.5332, 0.5912]
Mediation Effects			
Indirect Effect (a×b)	0.0001***	0.0036***	0.0001***
95% CI	[0.0001, 0.0001]	[0.0016, 0.0060]	[0.0000, 0.0001]
p-value	0.0000	0.0000	0.0000
Observations		5,566	
R-squared	0.012	0.027	0.023
F-statistic	32.31***	72.52***	60.62***

Notes: *** p<0.01, ** p<0.05, * p<0.1. 95% confidence intervals in brackets. All models include entity-fixed effects and clustered standard errors around time and entity.

5.3 ESG controversy lens

The moderating influence of ESG controversies on the nexus between ESG performance and market valuation elucidates intricate dynamics that vary according to the levels of controversy. Preliminary evidence derived from the ANOVA results (Table XI) affirms the existence of statistically significant group-level variability across all principal variables: ESG scores ($F = 90.77$, $p < 0.001$), Tobin's Q ($F = 50.14$, $p = 0.001$), and cash holdings ($F = 40.21$, $p < 0.001$). These results substantiate the categorization of firms based on the levels of ESG controversy and warrant additional moderation analysis.

As illustrated in Table XII, ESG performance exhibits a positive and statistically significant correlation with firm valuation (Tobin's Q) exclusively in firms that have not encountered any documented controversies ($\beta = 0.0028$, $p < 0.05$), implying that market actors confer advantages for ESG engagement solely when it remains free from reputational risks. Conversely, firms that are subject to low, moderate, or high levels of controversies do not manifest significant valuation gains attributable to ESG scores. This trend offers partial validation for H3a, suggesting that ESG controversies indeed moderate the relationship between ESG and valuation, albeit in a manner that negates the advantages of ESG in contexts marked by controversy rather than merely diminishing them.

The influence of cash holdings is also significantly moderated by the levels of controversy. In both low-controversy ($\beta = -0.0628$, $p < 0.05$) and high-controversy ($\beta = -0.0687$, $p < 0.05$) firms, cash reserves are linked to significantly adverse valuation effects, while no meaningful relationship is detected within the no- or moderate-controversy cohorts. These findings provide compelling support for H3b, indicating that ESG controversies reshape investor interpretations of corporate liquidity, potentially amplifying apprehensions regarding agency dilemmas or signaling risk aversion within controversial firms.

Table XIII offers additional granularity by dissecting ESG into its fundamental pillars. Governance exhibits the most pronounced positive effect on valuation—yet again, exclusively within the no-controversy cohort ($\beta = 0.0028$, $p < 0.05$), reaffirming the notion that robust governance bolsters firm credibility solely in the absence of reputational harm. Environmental and Social scores manifest weaker or non-significant correlations across all levels of controversy, although the Social component displays marginal significance within the no-controversy group. These trends provide partial corroboration for H3c, indicating that the individual ESG pillars are also vulnerable to the moderating influence of controversies, with Governance emerging as the most resilient element.

In summary, the evidence accentuates that ESG controversies not only attenuate the market's valuation of ESG endeavors but also recalibrate the interpretation of fundamental financial indicators, such as cash reserves. The findings underscore the significance of reputational context in determining the efficacy of ESG initiatives in shaping firm value.

Table XI. ANOV results

	ESG	TQ	Cash
F (p-value)	(90.77,< 0.001)	(50.14, 0.001)	(40.21, < 0.001)

5.4 Robutness Chick

To ascertain the robustness and generalizability of the principal findings, we undertook a comprehensive series of robustness assessments employing alternative model specifications, measurement methodologies, and classification criteria. Initially, to substantiate the suitability of the fixed effects (FE) specification utilized throughout the principal analysis, we re-evaluated the core models employing a random effects (RE) estimator. The RE outcomes, previously presented in the results section, yielded qualitatively analogous estimates, thereby instilling confidence that our results are not contingent upon a specific model and that unobserved heterogeneity is adequately addressed within the FE framework.

Moreover, to examine the coherence and structural validity of the ESG construct, we investigated the relationship between the composite ESG score and its three fundamental dimensions (Environmental, Social, and Governance). The findings previously illustrated corroborate the mutual reinforcement of these dimensions: not only do the ESG pillars enhance the explanatory power of the overall ESG score, but the ESG score also encapsulates the distinct valuation-relevant signals inherent in each pillar.

Table XII. Moderation Effects by ESG Controversy Level

	ESG Coefficient (Std. Err.)	Cash Coefficient (Std. Err.)
Controversy Group	Market Value Effect	Market Value Effect
No Controversy	0.0028**	-0.0283
	(0.0013)	(0.0215)
	[0.0002, 0.0053]	[-0.0704, 0.0139]
Low Controversy	-0.0018	-0.0628**
	(0.0012)	(0.0278)
	[-0.0042, 0.0006]	[-0.1173, -0.0082]
Moderate Controversy	0.0018	-0.0247
	(0.0016)	(0.0262)
	[-0.0013, 0.0048]	[-0.0760, 0.0266]
High Controversy	0.0007	-0.0687**
	(0.0020)	(0.0333)
	[-0.0032, 0.0047]	[-0.1340, -0.0034]
Controls	Total Assets, Research and Development, ROE, Long term debt, lag TQ	
Observations	6,047	
R-squared	0.004-0.007	
F-statistic	4.98-7.79***	

Notes: *** p<0.01, ** p<0.05. 95% confidence intervals in brackets. All models include entity-fixed effects and clustered standard errors.

In the initial robustness assessment, we substituted Tobin's Q with the natural logarithm of market capitalization as an alternative metric for firm value. As evidenced in Model 1 of Table XIV, the positive and statistically significant correlation between ESG performance and firm value persists robustly ($\beta = 0.2159$, $p < 0.01$), thereby affirming that the valuation impacts of ESG are not restricted to a singular metric of market performance. In the subsequent assessment, we modified the definition of excess cash holdings, replacing the conventional cash-to-net assets ratio with a cash-to-net sales ratio. The results, delineated in Model 2, reaffirm the negative valuation ramifications of excess cash in controversial firms ($\beta = -0.1309$, $p < 0.05$), while the indirect mediation effect of cash ($a \times b = 0.0026$, $p < 0.01$) remains statistically significant.

Lastly, we scrutinized whether our conclusions concerning the moderating influence of ESG controversies are sensitive to the grouping methodology employed to delineate controversy levels. Rather than the original four-group classification predicated on thresholds at the 33rd, 66th, and 99th percentiles, we adopted a quantile-based five-group categorization. As demonstrated in Table XV, the fundamental findings remain unaltered: ESG performance exerts a positive valuation effect exclusively within the no-controversy group ($\beta = 0.0031$, $p < 0.01$), while a significant negative effect is observed in the highest controversy quantile (Q4) ($\beta = -0.0039$, $p < 0.01$). The mediation effect of cash continues to be particularly pronounced in both the lowest and highest controversy groups (Q1 and Q4), thereby providing additional support for the conditional interpretation of financial slack in controversial firms.

In sum, these robustness checks validate the integrity of our empirical findings and reinforce our conclusions regarding the contingent valuation effects of ESG performance and cash holdings in the context of reputational risk.

Table XIII. ESG Components and Market Value: Moderation by Controversy Level

	Environmental (E)		Social (S)		Governance (G)	
Controversy Group	**Direct Effect**	**Cash Channel**	**Direct Effect**	**Cash Channel**	**Direct Effect**	**Cash Channel**
No Controversy	0.0008	0.0051**	0.0025*	0.0014	0.0028**	0.0016
	(0.0016)	(0.0022)	(0.0013)	(0.0017)	(0.0013)	(0.0018)
	[-0.002, 0.004]	[0.001, 0.009]	[-0.000, 0.005]	[-0.002, 0.005]	[0.000, 0.005]	[-0.002, 0.005]
Low Controversy	–	–	-0.0017	0.0003	-0.0020*	0.0004
			(0.0012)	(0.0014)	(0.0012)	(0.0014)
			[-0.004, 0.001]	[-0.002, 0.003]	[-0.004, 0.000]	[-0.002, 0.003]
Moderate	0.0020	-0.0024	0.0018	-0.0015	0.0015	-0.0017
Controversy	(0.0018)	(0.0020)	(0.0016)	(0.0016)	(0.0015)	(0.0016)
	[-0.002, 0.006]	[-0.006, 0.001]	[-0.001, 0.005]	[-0.005, 0.002]	[-0.002, 0.005]	[-0.005, 0.002]
High Controversy	-0.0011	-0.0024	0.0005	-0.0009	0.0009	-0.0014
	(0.0021)	(0.0029)	(0.0020)	(0.0023)	(0.0020)	(0.0023)
	[-0.005, 0.003]	[-0.008, 0.003]	[-0.003, 0.004]	[-0.005, 0.004]	[-0.003, 0.005]	[-0.006, 0.003]
Cash Mediation on Market Value						
No Controversy	-0.0234		-0.0283		-0.0234	
	(0.0208)		(0.0215)		(0.0208)	
	[-0.064, 0.017]		[-0.070, 0.014]		[-0.064, 0.017]	
Low Controversy	–		-0.0628**		-0.0628**	
			(0.0278)		(0.0278)	
			[-0.117, -0.008]		[-0.117, -0.008]	
Moderate	-0.0247		-0.0247		-0.0394	
	(0.0262)		(0.0262)		(0.0282)	
	[-0.076, 0.027]		[-0.076, 0.027]		[-0.095, 0.016]	
High	-0.0685*		-0.0687**		-0.0685*	
	(0.0328)		(0.0333)		(0.0328)	
	[-0.133, -0.004]		[-0.134, -0.003]		[-0.133, -0.004]	
Observations	6,047					
Firm FE	Yes					
Controls	Total Assets, Research and Development, ROE, Long term debt, lag TQ					

Notes: *** p<0.01, ** p<0.05, * p<0.1. 95% confidence intervals in brackets. All models use clustered standard errors. Controls include log-transformed total assets, R&D expenditure, and return on equity. Sample distribution: No Controversy (4,426), Low (927), Moderate (640), High (917).

Table XV. Robustness Check: Quantile-Based Controversy Moderation

	ESG → Market Value Coeff. (Std. Err.)	**Cash → Market Value Coeff. (Std. Err.)**
Controversy Group	**Direct Effect**	**Mediation Effect**
No Controversy	0.0031***	-0.0290
	(0.0011)	(0.0214)
	[0.0003, 0.0055]	[-0.0097, 0.0104]
Q1 (Low)	-0.0000	-0.0808**
	(0.0025)	(0.0363)
	[-0.0050, 0.0049]	[-0.1520, -0.0097]
Q2	0.0013	-0.0498
	(0.0017)	(0.0306)
	[-0.0020, 0.0047]	[-0.1097, 0.0101]
Q3	0.0010	-0.0430
	(0.0016)	(0.0305)
	[-0.0021, 0.0041]	[-0.1028, 0.0167]
Q4 (High)	-0.0039***	-0.0756**
	(0.0014)	(0.0322)
	[-0.0067, -0.0011]	[-0.1387, -0.0124]
Observations	6,047	
R-squared	0.005	0.008
F-statistic	4.35***	5.41***

Notes: *** p<0.01, ** p<0.05. 95% confidence intervals in brackets. Both models include entity-fixed effects, clustered standard errors, and controls (Total Assets, Research and Development, ROE, Long-term debt, lag TQ).

Table XIV. Robustness Checks: Alternative Specifications

	Market Cap as DV Coeff. (Std. Err.)	**Net Sales Cash Measure Coeff. (Std. Err.)**
Key Variables	**Model 1**	**Model 2**
ESG	0.2159***	0.0764***
	(0.0711)	(0.0186)
	[0.0765, 0.3553]	[0.0401, 0.1128]
Cash	–	-0.1309**
		(0.0597)
		[-0.2478, -0.0140]
Indirect Effect (a×b)	–	0.0026***
		[0.0010, 0.0045]
Observations	5,566	5,566
R-squared	0.638	0.032
F-statistic	1808.9***	86.03***

Notes: *** p<0.01, ** p<0.05. 95% confidence intervals in brackets. Both models include entity fixed effects and clustered standard errors.
Model 1 replaces Tobin's Q with log(Market Capitalization) as the dependent variable. Model 2 measures cash as a cash-to-net sales ratio rather than cash-to-net assets.

6 Discussion

This research endeavor aimed to investigate the interrelationship between Environmental, Social, and Governance (ESG) performance and corporate valuation, integrating the mediating influence of surplus cash reserves and the moderating impact of ESG-related controversies. The results provide robust evidence indicating that elevated ESG ratings correlate with enhanced market valuation, particularly in instances where companies operate devoid of controversy. The findings indicate that of the three components of ESG, social and governance metrics demonstrate the most significant positive correlations with Tobin's Q, while the environmental dimension exhibits only minimal significance. These results emphasize that ESG performance—particularly in its social and governance facets—substantially contributes to corporate value, corroborating the hypothesis that capital markets respond favorably to ESG considerations.

The outcomes are generally congruent with preceding empirical investigations that underscore the relevance of ESG factors to corporate value. Meta-analyses conducted by (Friede et al., 2015) alongside more contemporary empirical findings from (Fatemi et al., 2018) affirm that robust ESG performance is typically linked with improved corporate valuation and market perception. Our outcomes further build upon recent research by (Ghosh et al., 2023), which illustrates that the valuation of ESG investments varies based on stakeholder expectations and reputational credibility. The comparatively stronger impact of governance and social performance corresponds with the studies of (Gompers et al., 2003), who identify governance as a fundamental determinant of corporate value, and (Lins et al., 2017), who demonstrate that social capital can provide firms with resilience during economic downturns. Additionally, Zheng et al. (2022) reveals that investors tend to assign greater value to governance-related ESG disclosures, perceiving them as more indicative of prospective performance.

These findings also align closely with Stakeholder Theory , which asserts that firms derive benefits when they proactively cater to the demands of a diverse array of stakeholders(Freeman et al., 2020). By fortifying stakeholder relationships, ESG investments can diminish transaction costs, enhance risk management, and elevate corporate reputation—all of which lead to increased valuation. Concurrently, the negative correlation between ESG performance and excess cash holdings aligns with Agency Theory (Jensen & Meckling, 2019), suggesting that firms focused on ESG initiatives encounter diminished internal agency dilemmas and consequently necessitate fewer liquidity reserves. ESG can function as a managerial discipline mechanism that harmonizes corporate objectives with shareholder interests (Jo & Harjoto, 2012). Furthermore, the observed trends bolster insights from Signaling Theory (Spence, 1978), wherein ESG scores serve as indicators of a

firm's long-term commitment to sustainable growth—albeit the presence of ESG controversies can significantly undermine this signaling effect.

A particularly salient finding is the attenuated or nullified effect of ESG performance in firms confronted with reputational controversies. Although such firms may display elevated ESG scores—potentially as a strategy for reputational remediation—the market does not reward these endeavors uniformly. This observation is consistent with the findings of (Aouadi & Marsat, 2018), who contend that ESG controversies undermine the credibility of ESG disclosures, resulting in market devaluation. Likewise, Barkemeyer et al. (2015) highlights that narratives of corporate irresponsibility can eclipse positive sustainability reporting. Our results imply that reputational consistency, rather than sporadic ESG signaling, is critical for market recognition. Interestingly, governance metrics retain their significance even in the context of firms characterized by moderate controversy, thereby reinforcing the perspective that governance mechanisms may serve as institutional safeguards, even amidst reputational challenges.

A notable and unexpected observation is that the highest Environmental, Social, and Governance (ESG) ratings were recorded among the firms deemed most controversial. This seemingly contradictory outcome may be indicative of strategic overcompensation—an approach to reputational recovery as articulated in the works of (Tamayo-Torres et al., 2019) and (Kim et al., 2012), wherein firms augment their ESG disclosures to alleviate stakeholder pushback. Nevertheless, in alignment with the empirical findings posited by (Du & Vieira, 2012), our analysis indicates that such reactive signaling does not yield valuation enhancements. The market seems to favor sustained ESG engagement over opportunistic or symbolic actions, thus underscoring the critical role of authenticity in ESG communication (Delmas & Burbano, 2011).

The findings further illuminate a complex relationship between surplus cash reserves and firm valuation, which is contingent on the degree of ESG controversy. Specifically, within firms exhibiting high controversy scores, surplus cash appears to fulfill a compensatory or defensive role—potentially utilized to absorb the repercussions of ESG-related risks, finance remedial initiatives, or support symbolic Corporate Social Responsibility (CSR) endeavors. In this framework, cash holdings may be construed by investors as a signal of inefficiency, thereby exacerbating apprehensions regarding managerial opportunism or resource misallocation (Harford et al., 2008; Opler et al., 1999). This reinforces agency-theoretic worries that excess liquidity, when not substantiated by credible governance or transparency, is detrimental to value. Conversely, in firms devoid of ESG controversies, surplus cash is generally lower, and its correlation with firm value is either neutral or positive. This implies that investors regard such firms as more transparent and judicious in their financial strategies, necessitating fewer precautionary reserves. Consequently, the market rewards disciplined capital management as a credible indicator of long-term value creation (Pinkowitz et al., 2006).

The broader ramifications of these findings are substantial. For corporate executives, the results elucidate the strategic and financial advantages of genuine ESG engagement, particularly in bolstering investor confidence and enhancing firm valuation. However, the study also warns that ESG initiatives, when perceived as superficial or inconsistent, may not confer such advantages—especially in the context of reputational controversies. For investors, these findings offer a framework for discerning substantive ESG performance from superficial actions, in accordance with concerns articulated in the Greenwashing literature (Lyon & Montgomery, 2015; Walker & Wan, 2012). Ultimately, policymakers and rating agencies may wish to consider the explicit integration of ESG controversy metrics into ESG assessment frameworks to ensure a more comprehensive and accurate depiction of corporate sustainability conduct.

Notwithstanding its contributions, this study is not devoid of limitations. The sample is confined to S&P 500 firms, potentially limiting the generalizability of the findings to smaller firms or those operating in markets outside the United States. Additionally, the ESG ratings are derived from data provided by Refinitiv, which, although widely recognized, represents only one of several methodologies in the ESG evaluation landscape . Variations among ESG rating providers could result in disparate outcomes. Furthermore, while fixed effects and lagged variables assist in mitigating endogeneity issues, the analysis remains correlational. More robust causal identification strategies, such as difference-in-differences or instrumental variable methodologies, could enhance the rigor of future investigations. Future inquiries may extend these findings in numerous scholarly avenues. Comparative studies across nations could investigate the extent to which legal, cultural, and institutional elements affect the relationship between ESG and valuation. Furthermore, analyses tailored to specific industries may yield additional depth, especially in sectors where ESG considerations are pivotal to operational efficacy. Academics might also explore qualitative methodologies to gain insights into how corporations navigate ESG-related controversies and articulate their ESG strategies amidst public scrutiny. Finally, broadening the inquiry to

encompass other financial metrics—such as investment efficiency, innovation outcomes, or capital costs—would enhance the comprehension of the pathways through which ESG influences corporate performance.

7 Conclusion

This research endeavor aimed to elucidate the complex interplay between Environmental, Social, and Governance (ESG) performance and corporate valuation, particularly through the dual perspectives of internal cash management and external reputational dynamics. Grounded in stakeholder theory, agency theory, signaling theory, and the resource-based view, the study investigated whether ESG performance directly contributes to the enhancement of corporate market value, whether this impact is mediated by surplus cash holdings, and how ESG-related controversies may moderate these associations. Utilizing a comprehensive panel dataset of S&P 500 firms from 2007–2022, and employing firm-level fixed effects models, the analysis yields intricate insights into the multifaceted financial ramifications of ESG strategies.

The results substantiate that ESG performance exerts a significantly positive effect on firm valuation, particularly when examined through the governance and social dimensions. These effects persist across various model specifications and exhibit robustness to alternative variable definitions and subsample analyses. Furthermore, it was determined that cash holdings mediate the ESG–value relationship, with ESG-oriented firms exhibiting lower levels of excess liquidity, thereby suggesting more efficient capital management practices. Notably, this mediating effect was most salient in the context of social responsibility. However, the beneficial valuation effects of ESG are contingent upon reputational integrity: firms entangled in ESG controversies fail to realize equivalent market advantages from their sustainability initiatives, and in numerous instances, their surplus cash is interpreted adversely by investors—as a potential indication of inefficiency or managerial entrenchment.

These findings bear significant implications. For corporate executives, they underscore the necessity for ESG commitments to be genuine and consistently maintained to translate into concrete market value. Superficial engagement, particularly in the presence of controversies, may not only nullify ESG's positive influence but may also provoke investor skepticism. For investors and asset managers, the findings highlight the critical importance of contextually aware ESG evaluation frameworks that consider controversies and the interactions of cash policies. From a policy standpoint, the results advocate for enhanced transparency in ESG reporting and improved standardization in ESG ratings, particularly concerning the classification and weighting of controversies.

In conclusion, this study enriches the existing literature by illustrating that ESG performance can function as both a strategic asset and a contingent liability. Its value-generating potential is contingent not solely on scores or disclosures, but on coherence, credibility, and consistency—especially in the face of reputational challenges. By elucidating the mechanisms through which ESG performance impacts corporate valuation, this research provides a more thorough and theoretically grounded comprehension of sustainable finance.

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