Does the Market React to Greenwashing? The Impact of Alignment Between ESG Disclosure and ESG Performance on Capital Markets

Abstract

This paper examines whether stock returns and bid-ask spreads are influenced by Environmental, Social, and Governance (ESG) with two measures of ESG: (i) ESG related textual properties of 10-K filings for ESG disclosure; and (ii) Refinitiv scores for ESG performance. Using a U.S sample of 7,454 firm-year observations across all sectors from 2006 to 2021, our findings indicate that where the ESG content of 10-K filings are incongruent with Refinitiv ESG scores for greenwashers, there is a significant negative association with Cumulative Abnormal Returns (CARs). There is no market reaction where the 10-K filings are congruent with Refinitiv ESG scores. Bid Ask Spreads (BASs) are positively associated (i.e., higher uncertainty) with ESG content of modest green firms, but are negatively associated (i.e., lower uncertainty) with ESG content of non-green firms. Taken together, these results suggest stakeholders expect the ESG disclosures to be broadly positive but react significantly to corporate greenwashing as signs of weakness and doubt. Greater uncertainty is associated with modesty in ESG disclosures, but the view of non-green firms is shared more widely amongst investors. Overall, our results shed novel light on the market effects of ESG disclosure and performance with capital market reaction in terms of stock returns and uncertainty.

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1. Introduction

A growing body of literature examines the information content of corporate financial disclosures (Cahan et al., 2016; Davis, Piger, & Sedor, 2012; Davis, Ge, Matsumoto, & Zhang, 2015; Feldman, Govindaraj, Livnat, & Segal, 2010; Li, 2008; Li & Ramesh, 2010; Loughran & McDonald, 2011; Loughran & McDonald, 2014; Hsiao et al., 2022). This research highlights that the textual characteristics of corporate financial disclosures can provide valuable insights to capital markets (e.g., Li, 2010; Lang & Stice-Lawrence, 2015). Corporate social responsibility (CSR) is receiving increasing attention, often as a function of legitimacy and/or stakeholder concerns, but its value to investors is unclear (Cho, Michelon, Patten and Roberts, 2015; Tsang, Frost and Cao, 2023). As awareness of climate change intensifies, Corporate Social Responsibility (CSR) and Environmental, Social, and Governance (ESG) factors are becoming critical elements of corporate strategy, influencing capital market reallocations. Despite the growing importance of CSR and ESG disclosures and their potential economic impact, research on the informativeness of these disclosures, particularly when there is a mismatch between reported CSR/ESG information and actual performance, remains limited to the best of our knowledge. This paper addresses this gap by analysing the textual properties of 10-K reports, focusing on ESG-related content, and Refinitiv ESG scores, evaluating the impact on Cumulative Abnormal Returns (CAR) and Bid-Ask Spread (BAS). Specifically, it investigates scenarios where the ESG information disclosed in 10-K filings aligns or conflicts with Refinitiv ESG performance scores and its impact on capital markets (i.e., CAR and BAS).

From one perspective, Uyar et al. (2022) argue that social reputation significantly drives a firm's CSR and ESG disclosure and performance (Cai et al., 2020; Cuervo-Cazurra et al., 2023), motivating firms to engage in CSR/ESG activities (Gaganis et al., 2021; Huang & Wang, 2022). A strong CSR/ESG reputation serves as an intangible asset that can enhance a firm's expected cash flows, reduce their variability, and lead to higher net income valuation. In line with such a positive resource-based theory, it is anticipated that firms with robust CSR/ESG engagements will enjoy an improved social reputation (Uyar et al., 2022), lower cost of capital, and increase market value (e.g., Bonetti et al., 2023; Robinson et al., 2011; Lourenco et al., 2014). Additionally, such firms are expected to exhibit higher firm value, as indicated by Tobin's Q, particularly when their CSR disclosures contain unexpected information,

which serves as a proxy for the incremental value of these disclosures (Cahan et al., 2016). Similarly, according to stakeholder theory, a firm must create value for different stakeholders (Freeman, 1984), and firms can do well by being good (Bernabou and Tirole, 2010). In some scenarios, CSR disclosures might be consistent with shareholder wealth maximization (Kitzmueller and Shimshack, 2012).

From an alternative perspective, some CSR/ESG activities may fail to achieve their intended objectives if management engages in these practices primarily to enhance their reputation rather than to genuinely improve CSR/ESG performance, potentially leading to allegations of greenwashing and subsequent damage to corporate value (Krüger, 2015; Ferrell et al., 2016; Zhou, 2022). Investment decisions involve both an investor and an investment object, with investors relying on information such as voluntary initiatives related to Socially Responsible Investments (SRI) and commitments to the United Nations Global Compact (Baier, Berninger, & Kiesel, 2020). Recently, corporations have begun adjusting their behavior to align with the increasing focus of investors on SRI, aiming to meet investors' expectations (Sjöström & Welford, 2009). Evidence suggests that a high CSR/ESG ranking is positively associated with both CSR/ESG performance and financial performance (e.g., Kang, Germann, & Grewal, 2016; Kiessling, Isaksson, & Yasar, 2016). However, consistent with greenwashing strategies, firms that engage in CSR/ESG disclosure solely to enhance their social reputation without corresponding improvements in CSR/ESG performance might face higher costs of capital and lower market value, as the market penalizes such greenwashing strategies. To the best of our knowledge, there are no studies investigating whether and if so, how the (mis)alignment of firms' CSR/ESG disclosures and performance influences capital market reactions, such as stock returns and bid-ask spread, in cases of genuine ESG engagement versus greenwashing.

In this study, we utilize a comprehensive dataset comprising: (i) 10-K filings from all U.S. corporations spanning 2006 to 2021; (ii) ESG performance data from the Refinitiv Database; and (iii) financial and stock market data from the Centre for Research in Security Prices (CRSP) and Compustat – Capital IQ. To analyze firms' ESG disclosure strategies, we employ continuous textual measures derived from the 10-K filings, including: (i) the total count of words related to environmental, social, and governance (ESG) factors individually; (ii) the proportion of words related to each of these ESG factors relative to the total word count; and (iii) the ratio of combined ESG-related words to the total

word count. The ESG performance data, covering firm-year observations from 2006 to 2021, is sourced from the Thomson Reuters Eikon/Refinitiv (formerly ASSET4[1]) database. Financial variables are extracted from CRSP and Compustat, including controls and industry classifications. The empirical analysis is based on a robust U.S. dataset consisting of 7,454 firm-year observations across various sectors.

First, we anticipate that (i) corporations that report ESG activities without engaging in greenwashing will use ESG language to clearly communicate their genuine ESG strategies to the market and will have high ESG performance scores from Refinitiv, reflecting a *"congruent pattern"*. whereas (ii) corporations that engage in greenwashing will use ESG language to present a façade of ESG commitment, despite having low ESG performance scores from Refinitiv, indicating an "*incongruent pattern*" or "*greenwashing profile"*. Therefore, we expect that investors will react more favourably to ESG disclosures that align with high ESG performance scores from Refinitiv (i.e., "*congruent pattern*" or "*genuine green profile"*) and more negatively to ESG disclosures that do not align with these scores (i.e., "*incongruent pattern*" or "*greenwashing profile"*).

Second, we anticipate that, beyond the impact on stock prices, the ESG language used in 10-K filings (i.e., ESG disclosures) will influence investors' disagreement based on the alignment with Refinitiv ESG scores (i.e., ESG performance). Specifically, high ESG disclosures that are incongruent with low Refinitiv performance scores may heighten investor uncertainty and disagreement, leading to an increased BAS as investors react more to the perceived mismatch. Conversely, congruent ESG disclosures that align with high Refinitiv performance scores are expected to reduce investors' disagreement, potentially resulting in a reduced BAS, as the alignment of disclosure provides clearer signals about the firm's true ESG performance. Therefore, we expect that investors will react with more volatility to ESG disclosures that do not align with ESG scores (i.e., "*incongruent pattern*" or "*greenwashing profile"*) than to ESG disclosures that do align with ESG scores (i.e., "*congruent pattern*" or "*genuine green profile"*).

[1] de Villiers et al. (2022) describe Thomson Reuters Asset4 (Asset4) as a leading corporate social responsibility (CSR) database often used by practitioners and researchers.

Building on prior research into the role of tone in financial disclosures (Davis et al., 2012; Davis, Ge, Matsumoto, & Zhang, 2015; Feldman et al., 2010), our findings indicate that: (i) ESG content in 10-K filings (i.e., ESG disclosure) that is incongruent with Refinitiv ESG scores (i.e., ESG performance) is negatively associated with Cumulative Abnormal Returns (CARs) when the firm is greenwashing, whereas (ii) ESG content in 10-K filings (i.e., ESG disclosure) that aligns with Refinitiv ESG scores i.e., ESG performance) is insignificantly associated with CAR. Furthermore, using BAS as a measure of investor disagreement, we observe that BASs are positively associated with ESG content when the firm is particularly ESG modest, indicating increased uncertainty. Conversely, BASs are negatively related to ESG content when the firm's strategies are not green, suggesting reduced uncertainty around ESG non-green firms. Assuming market participants generally expect corporations to present an optimistic view on ESG, these results suggest the market prices in incongruencies between ESG disclosures and performance (i.e. it predicts poorer future performance for greenwashing firms). Additionally, given *a priori* beliefs on ESG reporting, investors' opinions are divided for firms providing modest green disclosures, but are in alignment for non-green disclosures. We interpret this as evidence that many investors consider non-green disclosures as a clear signal of a profit maximisation strategy but given the a priori beliefs of bullish ESG disclosure, investors fail to align over modest ESG strategies, which leads to greater dispersion of opinions.

We make several contributions to the existing literature. First, we provide empirical evidence on the relationship between the ESG textual properties of 10-K filings and market reactions to *genuine green* versus *greenwashing profiles*. This area was underexplored, particularly regarding how different measures of ESG content are perceived by the market. Second, while prior research has established that textual properties of public announcements are relevant to capital markets, there is limited understanding of how investors interpret *greenwashing*. Our study advances the ESG literature by demonstrating that *greenwashing*—characterized by a mismatch between ESG content in disclosures and Refinitiv ESG performance scores—is associated with significant negative price reactions, as reflected in cumulative abnormal returns. Third, we find that investors opinions are significantly aligned on ESG disclosures by non-green firms, but modest ESG disclosures reduces the clarity amongst investors. Fourth, our analysis of investors' disagreement adds a new dimension to the study of textual

properties, which has traditionally focused less on how disagreement manifests. By examining BAS as an indicator of investor disagreement, we shed light on a relatively neglected aspect of ESG research, thus providing deeper insights into how market participants respond to ESG disclosures versus ESG performance.

The remainder of the paper is organized as follows: Section 2 provides the theoretical framework and develops the hypotheses. Section 3 details the research methodology. Section 4 describes the data sources and presents the empirical findings. Finally, Section 5 offers a discussion of the results and concludes the study.

2. Prior Research and Research Questions

2.1 Prior Research

The question of whether firms should invest in CSR and ESG activities remains a contentious debate. Some argue that firms should prioritize maximizing shareholder value above all else, as articulated by Friedman (2002). According to this perspective, the primary responsibility of a firm is to generate profits for its shareholders, and investments in CSR or ESG initiatives may detract from this core objective. Other scholars and practitioners advocate for firms to invest in CSR and ESG projects that benefit society, suggesting that such investments can align with broader stakeholder interests and contribute to long-term value creation (Schaefer, 2008; Guay, Hoberg, Samuels, & Taylor, 2016; Hoberg & Phillips, 2016). This view is supported by research suggesting that CSR and ESG activities can enhance a firm's reputation, attract talent, and open-up new market opportunities (Schaefer, 2008; Guay, Hoberg, Samuels, & Taylor, 2016; Hoberg & Phillips, 2016). Proponents argue that engaging in socially responsible and environmentally sustainable practices can lead to competitive advantages and improved financial performance over the long term. Ultimately, the debate centers on balancing short-term financial gains with long-term societal and environmental benefits, and whether integrating CSR and ESG considerations into corporate strategies can contribute to sustainable business success.

2.1.1. CSR and ESG

Three primary theoretical perspectives on the impact of CSR/ESG activities on firm value are often discussed in the literature (Bénabou & Tirole, 2010; Friedman, 2002): (i) *Gradual and Consistent Engagement*, this view posits that corporations benefit more from a steady and consistent approach to CSR/ESG than from sporadic or superficial efforts (e.g., Tang, Hull, & Rothenberg, 2023). According to this perspective, long-term, genuine engagement in CSR activities fosters trust and credibility, leading to sustained positive impacts on firm value; (ii) *Alignment with Shareholder Values*, this perspective suggests that firms benefit by aligning their CSR/ESG activities with the personal values and preferences of their shareholders. This alignment can enhance firm value, particularly as shareholders increasingly influence corporate decisions and submit social proposals during annual meetings (Bénabou & Tirole, 2010). CSR/ESG activities are therefore seen to reflect and support shareholder values, thereby boosting firm value through increased shareholder satisfaction and engagement; (iii) *Managerial Self-Interest*, this view argues that corporations do not gain value from CSR/ESG activities when they are driven by managers' personal ambitions rather than genuine corporate responsibility. This perspective, sometimes referred to as "*CEO narcissism*" (Petrenko, Aime, Ridge, & Hill, 2016), suggests that when CSR/ESG efforts are motivated by managers' desire for personal recognition or prestige, rather than by a true commitment to social responsibility, these efforts have little to no positive effect on firm value and may even be detrimental.

Importantly, using CSR (Corporate Social Responsibility) and ESG (Environmental, Social, and Governance) interchangeably can be misleading because they represent distinct concepts, even though they overlap in some areas (Bénabou & Tirole, 2010). In terms of *Definition and Scope*, CSR is a broader concept that refers to a company's commitment to operate in an ethical manner and contribute to societal goals. ESG is a more specific framework used to evaluate a company's performance and risks in three distinct areas: (i) environmental impact; (ii) social responsibility; and (iii) governance practices. ESG focuses on the integration of these factors into investment analysis and decision-making, with an emphasis on measurable outcomes and metrics. In terms of *Measurement and Reporting*, CSR initiatives are often reported in qualitative terms and can vary widely between corporations in terms of format and content. ESG reporting is more structured and typically follows standardized frameworks

and metrics. Standards like GRI (Global Reporting Initiative) and SASB (Sustainability Accounting Standards Board) guide ESG reporting. In terms of *Purpose and Audience*, the primary audience for CSR initiatives is often the public, including customers, community members, and employees. ESG focuses more on investors and financial analysts, providing them with information to assess a company's risk and opportunities related to environmental, social, and governance factors. ESG data helps in making informed investment decisions and assessing long-term value creation. In terms of *Impact and Focus*, CSR activities may include broad and sometimes vague objectives like improving community well-being or supporting charitable causes. The impact can be harder to measure and is often more qualitative. ESG factors are more closely linked to financial performance and risk management. The focus is on how environmental impact, social policies, and governance practices affect a company's financial health and long-term sustainability. In terms of *Integration in Investment Analysis*, CSR is generally more about a company's broader social contributions and ethical stance. While important, CSR activities are not always directly integrated into financial performance analysis. ESG criteria are specifically used in investment analysis to evaluate how well a company manages risks and opportunities related to environmental, social, and governance factors. ESG integration helps investors gauge a company's long-term sustainability and potential for returns. As a summary, while CSR and ESG are related concepts focusing on ethical and responsible business practices, they serve different purposes and audiences.

2.1.2. The Impact of CSR and ESG

A comprehensive review of contemporary sustainability accounting research, encompassing 1,283 academic articles published across 54 journals from 2014 to 2020, reveals that sustainability disclosure is among the most extensively studied topics (Hsiao, de Villiers, Horner, & Oosthuizen, 2022). In general, 10-K reports are noted for their inert and formulaic language, which may constrain their informational value (Lehavy & Muslu, 2013). While much of the existing literature focuses on price reactions to disclosures, prior studies have also highlighted that BAS can serve as an indicator of investor disagreement regarding the information content of financial reports (e.g. Copeland & Galai, 1983; Gregariou, Ionnidis & Skerratt, 2005). Notable contributions include research on 10-K reports by

Li (2008), Feldman et al. (2010), and Loughran and McDonald (2014), as well as on earnings announcements by Beaver (1968), Berkman and Truong (2009), Collins, Li and Xie (2009), and Beaver, McNichols and Wang (2018). For instance, Loughran and McDonald (2011) explored how negative language could be employed to gauge the tone of financial texts. Loughran and McDonald (2011) discovered that commonly used word lists from other disciplines often misclassified words in financial contexts. In their study of 10-K filings from 1994 to 2008, they found that nearly three-fourths of the words flagged as negative by the Harvard Dictionary were not perceived as negative in financial contexts. To address this issue, Loughran and McDonald (2011) developed a revised list of negative words, and five additional words list that more accurately captured the tone of financial texts. Their work linked these tailored word lists to various financial metrics, including 10-K filing returns, trading volume, return volatility, instances of fraud, material weaknesses, and unexpected earnings.

First, in the specific context of CSR, several studies highlight the relationship between tone, readability, and investor perception. For instance, Guo, Kim, Yu, and Kim (2021) discovered that CFOs with accounting expertise tend to disclose more CSR-related issues in their 10-K reports, which is beneficial for policymakers and investors, given that CSR disclosures can impact share prices. Similarly, Yu and Garg (2022) found that firms with more readable CSR reports enjoyed higher credit ratings and lower bank loan costs, indicating that rating agencies and banks perceived these firms as having lower default risk. Prospect theory suggests that positive framing can lead investors to evaluate performance improvements relative to reference points, as outlined by Henry (2008). Li (2010) further posits that a positive tone in disclosures reflects managerial optimism, which can positively influence investors' attitudes toward the disclosed information. Kandel and Pearson (1995) note that returns and trading volumes are often uncorrelated (i.e., trading volumes can increase when traders interpret public information differently). Kim and Verrecchia (1994) suggest that differences in private information lead to higher BASs around public announcements. Thus, a modest positive ESG tone might induce a modest price reaction while still causing disagreement among investors. Recent research highlights the strategic benefits of CSR activities for corporations (Doh et al., 2010; Porter & Kramer, 2006). Firms increasingly recognize that engaging in CSR can enhance their legitimacy, which serves as a crucial intangible resource for securing their financial future (Chiu & Sharfman, 2011) and securing a social

license to operate (Curran, 2017; Demuijnck & Fasterling, 2016). CSR activities can also provide access to valuable resources (Waddock & Graves, 1997), support more effective marketing strategies (Jahdi & Acikdilli, 2009) and help attract or retain talented employees (Greening & Turban, 2000). These benefits can translate into financial gains, leading to what is referred to as "*profit-maximizing CSR*" (McWilliams & Siegel, 2001). Such benefits may include increased sales revenue (Lev et al., 2010), improved analyst recommendations (Ioannou & Serafeim, 2015), reduced financing costs (Dhaliwal et al., 2011; Goss & Roberts, 2011; Heinkel et al., 2001), and lower perceived risk (El Ghoul et al., 2011), which can offset the costs associated with CSR initiatives. Cahan et al. (2016) further explore the valuation implications of CSR disclosures, examining how the relationship between CSR disclosures and firm value varies across different countries. Their study finds a positive relationship between unexpected CSR disclosures and firm value, as measured by Tobin's Q. However, discrepancies between CSR performance and CSR disclosure can affect the financial outcomes of CSR activities (Ingram & Frazier, 1980). Some studies show a direct association between CSR performance and disclosure (Cho, Cho & Patten, 2007; Clarkson et al., 2011), indicating that investors' assessments of stock value are influenced by CSR performance (Guiral et al., 2020). Sophisticated investors or those with insider knowledge can often discern whether a firm's disclosures align with its actual performance and may adjust their evaluations accordingly (Banker, Ma, Pomare & Zhang, 2022). Even in cases where investors do not explicitly evaluate CSR performance, they tend to adjust fundamental value estimates in response to negative CSR events (Elliott et al., 2014). Additionally, Bartov et al. (2021) demonstrate that CSR performance can amplify investors' negative reactions to adverse non-CSR events. Research indicates that CSR performance moderates the relationship between CSR disclosure and financial outcomes (Dhaliwal et al., 2011; Elliott et al., 2014). Li et al. (2022) find that CSR-related stakeholder lawsuits are lessened for firms that are genuinely committed to CSR. Furthermore, managers may gain career advantages from CSR disclosures that are supported by strong CSR performance (Dai et al., 2021; Darendeli, Law, & Shen, 2022). Although CSR performance impacts bond pricing, its influence diminishes as bond quality improves (Schneider, 2011).

Second, in the specific context of ESG, several studies provide valuable insights into the relationship between ESG ratings, disclosures, and market reactions. For example, Basu, Vitanza,

Wang, and Zhu (2022) revealed that banks with high ESG ratings issued fewer mortgages in disadvantaged localities compared to banks with lower ESG ratings. Despite the high ESG ratings, there was no significant difference in mortgage default rates between high- and low-ESG banks, suggesting a potential case of "*social washing*" where banks engaged in pro-social rhetoric without making substantial commitments to disadvantaged communities. Dikolli, Frank, Guo, and Lynch (2022) analyzed fund families that are signatories of the United Nations Principles for Responsible Investment (UNPRI) and found that ESG funds from UNPRI families were more likely to support environmental and governance proposals compared to non-ESG funds. Kimbrough, Wang, Wei, and Zhang (2022) examined how US corporations, responding to growing investor and stakeholder demand for transparency, issue ESG reports. Their textual analysis revealed that longer ESG reports were linked to reduced disagreement among ESG raters, while reports with more positive tones or extensive use of "sticky" words were associated with increased disagreement. Lee and Raschke (2023) investigated the role of stakeholder legitimacy in driving ESG performance and financial outcomes. Their findings indicated that firms with lower ESG performance were more prone to greenwashing, though greenwashing itself did not impact financial performance. Ignatov (2023) analyzed over 17,000 10-K reports from U.S. corporations between 2013 and 2019, finding a significant relationship between the ESG textual tone of 10-K filings and stock market returns around filing dates. This study showed how the tone of ESG disclosures affects market perceptions and investor reactions. Baier, Berninger, and Kiesel (2020) used textual analysis to create an ESG dictionary by categorizing words from 10-K reports and proxy statements. Their work aimed to systematically identify and quantify ESG-related language, further contributing to the understanding of how ESG disclosures are framed and perceived.

Third, in the specific context of Green House Gas (GHG) emissions, Datt, Luo, and Tang (2019) found that firms with superior carbon performance tend to disclose a higher volume of carbon-related information. This behavior supports the signaling theory, which posits that firms use detailed disclosures to signal their commitment to carbon management and compliance with the capital markets. Similarly, Thomas, Yao, Zhang, and Zhu (2022) investigated the interplay between pollution and corporate performance disclosures, revealing that U.S. firms often increased pollution levels when they were able to meet or slightly exceed consensus earnings per share (EPS) forecasts. The study also found

that this tendency was more pronounced among firms with higher environmental ratings, indicating that these firms had accumulated regulatory and reputational slack over time.

Fourth, in the specific context of greenwashing, which typically involves corporations using misleading or vague statements to create a façade of environmental or social responsibility while failing to deliver real impact, this can manifest in various ways: (i) *Overstating Environmental Efforts,* firms might highlight minor environmental initiatives while ignoring major pollution or sustainability issues; (ii) *Tokenistic Actions*, implementing superficial or symbolic actions that look good in reports but have minimal real-world impact; and (iii) *Misleading Disclosures*, using ambiguous language or selective reporting in sustainability disclosures to paint a more favorable picture than the actual performance. Christensen, Hail, and Leuz (2021) extensively reviewed literature from accounting, finance, economics, and management to evaluate the economic consequences of CSR and sustainability reporting requirements for U.S. firms. Their findings underscored that greenwashing adversely affects capital markets by eroding investor trust and potentially leading to market inefficiencies. Khan, Bose, Mollik, and Harun (2021) highlighted the implications of greenwashing for policymakers in emerging economies and for banks' policy makers, noting that these contexts often share institutional characteristics with Bangladesh, thus offering valuable insights for similar settings. Li, Li, Seppänen, and Koivumäki (2021) found that the relationship between greenwashing and Corporate Financial Performance (CFP) is complex and somewhat ambiguous. Their research revealed that while greenwashing could positively influence CFP, this effect diminished under stringent environmental regulations and reversed in the presence of low media favorability. Raghunandan and Rajgopal (2022) examined ESG funds and discovered that, compared to other funds managed by the same asset managers, ESG funds were more likely to hold stocks that disclosed carbon emissions performance voluntarily. However, these stocks also had higher carbon emissions per unit of revenue or greenwashing tendencies. The study indicated that ESG scores were associated with the extent of voluntary ESG disclosures but did not correlate with firms' actual compliance or levels of carbon emissions. Zharfpeykan (2021) investigated how corporations enhance their legitimacy through either representative reporting or greenwashing. By analyzing Global Reporting Initiative (GRI) reports from 2011 to 2019, Zharfpeykan found that following the GRI's 2016 clarification on materiality, financial

services corporations' disclosure quality declined further, with a decreased emphasis on environmental issues without corresponding improvements in social disclosures. In contrast, mining and metals corporations maintained consistent reporting practices.

As a summary, while CSR/ESG disclosure and performance and greenwashing are related concepts focusing on ethical and responsible business practices, they serve different purposes and audiences.

2.1.3. The Impact of CSR and ESG on Market Based Measures

Recent ESG-focused research has increasingly examined the impact of ESG disclosures and performance on stock returns, particularly Cumulative Abnormal Returns (CARs). Here are some key insights and trends from recent studies.

First, in relation to *Alignment Between ESG Disclosures and Performance*, research has shown that when there is congruence between ESG disclosures and actual performance, that often leads to positive CARs. Investors tend to reward firms that provide transparent and accurate ESG disclosures that align with their actual performance. Conversely, discrepancies between reported ESG activities and actual performance can lead to negative CARs, as seen in studies like those by Du (2015), which link CSR greenwashing to negative stock returns.

Second, in relation to *Market Reactions to ESG Announcements*, studies have explored how ESG-related announcements affect CARs. Positive ESG announcements generally lead to immediate positive CARs, reflecting investor optimism. However, if the market perceives these announcements as misleading or exaggerated (i.e., greenwashing), it can result in negative CARs once the discrepancies are revealed. For example, a study by Kotsantonis and Serafeim (2019) found that firms with high-quality ESG disclosures tend to experience positive abnormal returns, whereas firms with lower-quality disclosures might suffer.

Third, in relation to *Long-Term vs. Short-Term Effects*, the impact of ESG disclosures on CARs can vary over time. Short-term CARs might reflect initial market reactions to ESG news, while long-term CARs could be influenced by the sustained credibility of a firm's ESG performance. Research by

Krüger (2015) suggests that long-term effects are often dependent on the firm's ability to maintain consistent ESG practices and avoid greenwashing.

Fourth, in relations to the *Role of Investor Perception*, recent research also highlights the role of investor perception in influencing CARs. Studies like those by Cheng, Hong, and Shue (2013) emphasize that investor expectations and perceptions about a firm's ESG performance play a significant role in shaping stock returns. If investors believe a firm is engaging in greenwashing, it can lead to negative CARs once the market corrects its perception.

Fifth, in relation to *Sector-Specific Findings*, the impact of ESG disclosures on CARs can also vary by sector. For instance, research has shown that the effect of ESG disclosures on stock returns may be more pronounced in industries with high environmental or social risks, such as energy or consumer goods. The study by Nguyen and Nguyen (2020) found sector-specific differences in the market reaction to ESG disclosures, highlighting the importance of contextual factors.

In summary, recent ESG-focused research underscores the complex relationship between ESG disclosures and CARs, emphasizing the importance of transparency and consistency in ESG reporting. Discrepancies between reported and actual ESG performance can significantly affect stock returns, both positively and negatively, depending on how the market perceives and reacts to such information.

2.2 Research Questions

As outlined in the literature review, prior research posits that the textual properties of financial disclosures hold significant informational value for capital markets. We anticipate that these properties may correlate with stock price reactions and BAS. However, an opposing viewpoint suggests that such relationships may not exist. Specifically, given the substantial economic implications of 10-K filings, one could argue that these documents are scrutinized to such a degree that there is limited potential for ESG textual characteristics to incrementally impact stock price movements, or BAS. This competing hypothesis raises questions about the efficacy of textual analysis in an environment where investors may already have fully integrated the information contained within these filings.

First, we hypothesize that corporations genuinely committed to ESG principles—those that are not engaging in greenwashing—will use ESG language to effectively communicate their strategies to the market and will receive high ESG scores from Refinitiv (indicating a congruent pattern or genuine focus on sustainability). Conversely, corporations that engage in greenwashing are likely to employ ESG language to project a positive image while receiving low ESG scores from Refinitiv (indicating an incongruent pattern or misleading claims). As a result, we expect that investors will respond more favorably to ESG language that aligns with a company's Refinitiv score (reflecting true ESG disclosure) and react negatively to ESG language that does not align (reflecting deceptive ESG performance). Corporations that manipulate ESG narratives for self-serving purposes will likely use language that is incongruent with their actual Refinitiv score to obscure their true motivations. Consequently, investors are expected to react more negatively to ESG language that misrepresents the company's performance according to its Refinitiv score. Therefore, our first research hypothesis is as follows:

H1 = Capital market reaction (Cumulative Abnormal Return) is positively/negatively associated with the ESG disclosure in 10-K filings congruent/incongruent with ESG performance in Refinitiv.

Second, in addition to influencing stock price reactions, the ESG language used in 10-K filings may affect the level of disagreement among investors, which, in turn, impacts BAS. Previous research has established that BAS reflects the degree of disagreement among investors (e.g. Gregariou, Ionnidis and Skerratt, 2005). If the textual properties of ESG disclosures influence this disagreement, we anticipate finding evidence of this relationship in our analysis of BAS. Specifically, we expect that ESG language that is incongruent with a company's Refinitiv score may obscure the true motivations behind its ESG strategy, leading to heightened uncertainty and, consequently, increased BAS. This incongruence is likely to generate more disagreement among investors, resulting in a rise in trading activity. Therefore, our second research hypothesis is as follows:

H2 = Capital market reaction (BAS) is positively/negatively associated with the ESG disclosure in 10-K filings incongruent/congruent with ESG performance in Refinitiv.

3. Methodology

3.1 Data and Sample

In this study, we obtain: (i) 10-K filings for all U.S corporations from 2006 to 2021; (ii) CSR performance data from the Refinitiv Database[2]; as well as (iii) financial data from CRSP from 2006 to 2021.

First, we develop continuous textual measures of firms' ESG strategies based on their 10-K filings, capturing their orientations toward ESG disclosure in the following ways: (i) the sum of words related to environmental, social, and governance factors separately; (ii) the ratio of the number of words related to each of these factors to the total word count; and (iii) the combined ratio of all three ESG categories relative to the total word count. Specifically, our sample includes 503 corporations listed in the S&P 500 as of December 2021. We collected all 10-K filings dated between January 1, 2006, and December 31, 2021, using an automated script written in Python that interfaces with the publicly accessible Edgar API. This script downloaded the 10-K filings in HTML format, which we then converted to clean text files. To analyze the ESG content, we utilized the word list from Baier et al. (2020) to identify relevant terms in the categories of Environment, Social, and Governance. We also counted the total number of words in each 10-K, ensuring to remove stop words using the standard stop word list from the NLTK package. The ratios for all three ESG components were subsequently calculated (see Appendix A).

Second, our sample encompasses firm-year observations from 2006 to 2021, drawing from the Thomson Reuters Eikon/Refinitiv database (previously known as ASSET4) for information on CSR and ESG performance. The choice of this timeframe was influenced by the availability of ESG data, which has been consistently provided since 2006. Analysts compile ESG data based on over 600 indicators, with 186 being included in the Refinitiv ESG scoring system (Refinitiv, 2022).

[2] "Refinitiv, is one of the world's largest providers of financial markets data and infrastructure. Serving more than 40,000 institutions in approximately 190 countries, we provide information, insights, and technology that drive innovation and performance in global markets". Source: https://solutions.refinitiv.com/try-refinitiv-esg-data.

Third, we extracted financial data from the Centre for Research in Security Prices (CRSP), focusing on variables related to a series of control variables and industry classification codes (see Appendix A).

The empirical analysis is based on a comprehensive U.S. dataset comprising 7,454 firm-year observations across all sectors (see Appendix A).

3.2 Dependent Variables: CAR and BAS

We utilize two dependent variables: Cumulative Abnormal Returns (CAR) and Bid Ask Spread (BAS). For detailed definitions, please refer to Appendix A.

First, our primary analyses focus on cumulative abnormal stock returns surrounding the filing date of the 10-K report, specifically within a seven-day window, CAR [−3, +3]. This is computed using the market model as outlined by Fama & French (2008) and French, Schwert, & Stambaugh (1987). The market model parameters are estimated over the period [−241, −41], employing the CRSP value-weighted return as the market index. To ensure robustness, firms must have a minimum of 50 active trading days within the estimation window. In all cases, excess returns are calculated as the firm's buy-and-hold stock return minus the CRSP value-weighted buy-and-hold market index return over a 200-day period.

Second, Bid Ask Spread (BAS) is defined as the difference between the daily ask price quoted by a dealer and the daily bid price quoted divided by the ask price. We calculate this for the trading sample period for all sample firms within the CRSP universe.

3.3 Independent Variables: ESG Disclosure and ESG Performance and Greenwashing

3.3.1 ESG Disclosure in 10-K reports

First, we developed continuous textual measures of firms' strategies based on their 10-K filings to capture their orientations toward ESG disclosures in three key ways: (i) the sum of words related to environmental, social, and governance factors, measured separately; (ii) the ratio of words pertaining to each of these factors relative to the total word count; and (iii) the combined ratio of all three ESG categories against the total word count. The selection of words was informed by the framework

established by Baier, Berninger, and Kiesel (2020). For further details, please refer to Appendix A: Variable Definitions.

3.3.2 ESG Performance in Refinitiv

Second, the sample covers the firm-year observations between 2006 and 2021 listed in the Thomson Reuters Eikon/Refinitiv (i.e., previously known as ASSET4) database[3]. In selecting the period and associated data, the availability of ESG data was crucial, as it has been accessible from 2006 through 2021 (the latest year at the time of data collection in Autumn 2023). Analysts compile ESG data using over 600 indicators, of which 186 contribute to the ESG scoring system (Refinitiv, 2022). Each firm's ESG score is then normalized on a scale of 0 to 100, reflecting its performance relative to others in the same industry (Breuer et al., 2018; Garel & Petit-Romec, 2021). The ESG data is sourced from a variety of materials, including sustainability reports, annual reports, stock exchange filings, news articles, and corporate as well as non-governmental websites (Ioannou and Serafeim, 2012; Refinitiv, 2022). Following the retrieval of the raw dataset, we implemented several data preprocessing steps to prepare the sample for further analysis before testing our hypotheses. For additional details, please refer to Appendix A: Variable Definitions.

[3] Refinitiv Eikon's ESG score evaluates a corporation's ESG operations and performance using publicly available data (e.g., annual reports, corporate websites, stock market filings, news, nongovernmental organization websites, and corporate social responsibility [CSR] reports of respected corporations). Refinitiv Eikon's (formally known as Thomson Reuters Eikon) ESG scoring utilizes 186 essential measurements and contents related to sectors and industries to assess and score corporations' social and environmental performance (de Villiers et al. 2022; Naeem & Cankaya, 2021). Founded in Switzerland, Asset4 has provided cross- country coverage since 2003. In 2009, it was acquired by Thomson Reuters. After the acquisition, Asset4 was gradually integrated into Thomson Reuters' products and indices (e.g., corporate responsibility ratings and indices). In 2017, Thomson Reuters made significant changes in Asset4's rating process and rebranded Asset4 as 'Thomson Reuters Environmental, Social and Governance (ESG) scores' (de Villiers et al. 2022). In 2018, Asset4 was spun off and merged into 'Refinitiv' (de Villiers et al. 2022). In 2021, 'Refinitiv' was sold to the London Stock Exchange Group. Although Asset4's methodology partially changed in 2017, its overall structure remains intact (de Villiers et al. 2022). This CSR database constructs its ratings at four levels: at the first level, there are a large number of data points; at the second level, the data points are combined into indicators; at the third level, these indicators are synthesised into different categories (e.g., 18 categories in 2014) (de Villiers et al. 2022); and at the fourth level, the various categories are composed of few pillars. Before 2017, Asset4 comprised four pillars: (1) environmental pillar, (2) social pillar, (3) corporate governance pillar and (4) economic pillar (de Villiers et al. 2022). In 2017, the economic pillar was removed, leaving three pillars (the environmental pillar, social pillar and corporate governance pillar) (de Villiers et al. 2022). A new pillar was introduced, namely, ESG Controversy, which comprises 23 controversy indicators (e.g., public health controversies) based on media (de Villiers et al. 2022). Moreover, a percentile rank was introduced in 2017. For a firm, its environmental and social categories are benchmarked against the industry- group, and corporate governance categories are benchmarked against other firms in the same country (de Villiers et al. 2022). Lastly, before 2017, for the overall rating (i.e., Integrated Rating), Asset4 was used to normalise the four pillars and combine these on an equal weighted basis (de Villiers et al. 2022). However, after 2017, the overall rating (i.e., ESG Score) is the equal weighted average of indicators of the environmental pillar, social pillar and corporate governance pillar (de Villiers et al. 2022).

3.3.3 Greenwashing and Test (In)Congruency Variables

Third, we test for the degree of ESG disclosure (in)congruency by constructing descriptive statistics and then comparing the degree of corporate ESG disclosure in firms' 10K reports (i.e. reported by management) with ESG performance documented by Refinitiv, assuming that the latter are constructed independently from management. We use the 75% quartile as our split, and create four measures, as follows: (i) *ESG_Genuine Greeners_75* = Congruence disclosure and performance for 75% based on median split, with disclosure = 1 (high) and performance = 1 (high); (ii) *ESG_NotGreener_75* = Congruence disclosure and performance for 75% based on median split, with disclosure = 0 (low) and performance = 0 (low); (iii) *ESG_GreenWashers_75* = Incongruence disclosure and performance for 75% based on median split, with disclosure = 1 (high) and performance = 0 (low); and (iv) *ESG_TooModestGreeners_75* = Incongruence disclosure and performance for 75% based on median split, with disclosure = 0 (low) and performance = 1 (high).

3.4 Control variables

Financial data were extracted from the Centre for Research in Security Prices (CRSP), encompassing variables essential for calculating firm size, profitability, liquidity, solvency, a series of auditing controls, plus fixed effects. The empirical analysis is based on a U.S. dataset comprising 7,454 firm-year observations across various sectors. Our control variables include factors identified in prior literature as influencing market and accounting measures, which may correlate with our main explanatory variables. For the sake of brevity, we do not define these variables here; detailed definitions can be found in the Appendix A.

3.5 Model specifications

We begin by investigating the impact of textual properties on pricing by assessing whether there is a significant association between the ESG textual characteristics of 10-K filings and ESG ratings (i.e., congruency or incongruency) in relation to Cumulative Abnormal Returns (CAR) and Bid Ask Spread (BAS).

$$CAR\ (or\ BAS)_{d,t} = \alpha + \beta \times Congruency_{i,t-1} + \lambda \times Firm_{d,t-1} + \lambda_{year} + \delta_{industry} + \varepsilon_{i,t}$$

Firm indicates firm-level control variables. All regressions include year and industry (2 digit SIC Codes) fixed effects. Regression residuals are clustered at the firm level.

4. Results

First, we hypothesize that: (i) corporations that genuinely report ESG initiatives without engaging in greenwashing will utilize ESG language effectively to communicate their strategies to the market, resulting in high ESG scores from Refinitiv (indicating a congruent pattern or genuine focus); whereas (ii) corporations that engage in greenwashing will also use ESG language to present their strategies, but will have low ESG scores from Refinitiv (indicating an incongruent pattern or deceptive claims). Consequently, we expect that investors will respond more positively to ESG language that aligns with the Refinitiv score and react more negatively to language that does not align with it.

Second, we anticipate that, beyond influencing stock price reactions, the ESG language used in 10-K filings may either amplify or diminish disagreement among investors, which would subsequently affect BAS.

Table 1 presents the descriptive statistics for ESG disclosures and performance. The mean disclosure scores for environmental, social, and governance factors, as well as the combined ESG score, are 0.002, 0.003, 0.014, and 0.019, respectively. In contrast, the mean performance scores for these same categories are significantly higher: 20.99 for environmental, 26.41 for social, 65.83 for governance, and 58.71 for the combined ESG score. This indicates that while corporate disclosures tend to focus more on social factors, the highest performance scores are associated with governance. Notably, the average scores for environmental factors are the lowest across both disclosures and performance. Collectively, these univariate results suggest limited evidence of congruence between ESG disclosures and performance.

Additionally, Table 1 shows that the mean and median seven-day Cumulative Abnormal Returns (CAR) around ESG disclosures in 10-K filings are 0.004 and 0.003, respectively. Bid Ask Spread (BAS), reflecting investor disagreement in interpreting ESG disclosures, stand at 0.002 and 0.001 respectively. The remainder of Table 1 includes summary statistics for firm-level control variables.

[Insert Table 1 here]

Table 2 displays the correlation matrix, where the correlation coefficients are generally small, though many are statistically significant. Unreported Variance Inflation Factor (VIF) tests indicate values well below the commonly accepted threshold of 10, suggesting that multicollinearity is not a significant concern in our study. This allows us to proceed with confidence in the integrity of our regression analyses.

[Insert Table 2 here]

The results of our analyses examining the effects of ESG content in 10-K filings on Cumulative Abnormal Returns (CAR) and Bid Ask Spread (BAS) are presented in Tables 3 and 4. In these tables, column 1 displays the ESG-greenwashers results, column two the genuine greeners, column three the modest greeners and column four the non-green firms. Overall, our findings indicate that when the ESG content of 10-K filings misaligns with Refinitiv ESG scores, consistent with greenwashing, there is a significant negative association with CARs. These results are consistent with resource-based theory, suggesting that the market exhibits skepticism toward disclosures that contradict underlying performance metrics.

Additionally, our analysis using BAS as a measure of investor disagreement reveals that BAS is positively associated, indicating higher uncertainty, for modest-green firms. Conversely, BAS shows a significant negative relationship indicating reduced uncertainty, for non-green firms. We contend that a priori, the market expects firms to generally be ESG bullish and view non-green ESG as a clear profit maximization strategy but are confused by ESG modesty.

[Insert Table 3 and 4 here]

5. Discussion and Conclusion

This study provides novel evidence regarding the market consequences of corporate activities related to ESG and greenwashing. We analyze: (i) 10-K filings for all U.S. corporations from 2006 to 2021 (representing ESG disclosures); (ii) CSR performance data sourced from the Refinitiv Database (reflecting ESG performance); and (iii) financial data obtained from CRSP and Compustat.

First, we develop continuous textual measures of firms' strategies based on their 10-K filings, capturing their orientations toward ESG disclosure in three ways: (i) the sum of words related to

environmental, social, and governance factors, measured separately; (ii) the ratio of these words relative to the total word count; and (iii) the combined ratio of all three ESG categories against the total word count. Second, our sample includes firm-year observations between 2006 and 2021, utilizing data from the Thomson Reuters Eikon/Refinitiv database (previously known as ASSET4) to provide insights into ESG performance. The selection of this period was influenced by the availability of ESG data, which has been accessible from 2006 to 2021—the most recent year at the time of our data collection. Analysts compile ESG data based on over 600 indicators, with 186 incorporated into the ESG scoring system (Refinitiv, 2022). Finally, financial data are extracted from the Centre for Research in Security Prices (CRSP) and include multiple control variables.

Building on prior research examining the impact of positive versus negative tone in disclosures (Davis et al., 2012; Davis, Ge, Matsumoto, & Zhang, 2015; Feldman et al., 2010), we find the following: (i) ESG content in 10-K filings that is incongruent with Refinitiv ESG scores for greenwashers is negatively and significantly associated with Cumulative Abnormal Returns (CARs); whereas (ii) other categories of ESG content versus Refinitiv ESG scores are positively but insignificantly associated with CAR. Furthermore, our analysis using Bid Ask Spread (BAS) as a measure of investor disagreement reveals that BAS is positively associated with ESG content that is congruent with Refinitiv ESG scores, indicating higher uncertainty, for non-green firms. Conversely, ESG content that aligns with Refinitiv scores is associated with reduced uncertainty for modest green firms. While market participants generally expect corporations to present an optimistic view of their ESG performance, the use of ESG content that contradicts Refinitiv scores for greenwashers can create doubt regarding the company's actual ESG performance and raise concerns about potential greenwashing. Overall, these findings suggest that any incongruency in terms of greenwashing between ESG disclosures and performance is reflected in market pricing, predicting poorer company performance. Additionally, congruence contributes to greater diversity of opinion among investors depending on the strategies of the corporations.

We contribute to literature in several significant ways. First, we provide evidence of the relationship between the ESG textual properties in 10-K filings and market reactions to ESG announcements versus instances of greenwashing. To our knowledge, there is limited research

addressing this crucial aspect of corporate strategy, particularly in distinguishing between genuine ESG content and greenwashing. Second, while prior studies have established that the textual properties of public announcements can be price-relevant for capital markets, they have often overlooked how investors interpret greenwashing. Our findings highlight that greater instance of greenwashing—characterized by incongruent ESG content and Refinitiv ESG scores—are linked to poorer price reactions. Third, our insights into investor disagreement contribute to the literature on textual properties, which typically does not explore the implications for investor sentiment. Specifically, our focus on BAS as a measure of disagreement is relatively sparse in the ESG literature, enhancing our understanding of how textual nuances influence investor behavior.

Some limitations need to be discussed, however. First, given that CSR greenwashing—characterized by a mismatch between disclosures and actual performance—has been previously associated with negative Cumulative Abnormal Returns (CARs) (Du, 2015), it is essential to clearly articulate the unique contributions of our study. This study distinguishes itself by examining not only the direct relationship between ESG disclosures and stock returns but also by integrating BAS as a proxy for investor consensus on sentiment. Additionally, the research utilizes both textual analysis of 10-K filings and Refinitiv ESG scores, offering a comprehensive approach to understanding how congruence or incongruence between ESG disclosures and performance affects market reactions. By addressing these dimensions, the study provides novel insights into the market effects of greenwashing, enhancing the understanding of how discrepancies in ESG reporting influence both stock returns and BAS. Second, the potential correlation between ESG disclosures and Refinitiv performance measures may arise from analysts incorporating these disclosures into their assessments, creating an endogeneity issue. This correlation could significantly affect our study's findings, as the direction of causality between ESG disclosures and performance measures could be unclear. Addressing this endogeneity would be crucial for future research to ensure that the observed associations accurately reflect the impact of greenwashing on investor sentiment and market reactions. Lastly, as a battery of sensitivity tests, we will be collecting additional data and will estimate models using alternative windows, abnormal trading volume as a substitute for BAS, proxies for long run operating performance and the textual properties of associated conference calls.

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Appendix A. Key Variables Sources and Definitions.

Dependent Variables	
CAR [-3, +3]	Seven-day cumulative abnormal return around the acquisition announcement, calculated using the market model. The market model parameters are estimated over the period (-241, -41), with the CRSP value-weighted return as the market index. Firms should have at least 50 active trading days in the estimation window.
BAS	(Ask price minus bid price) divided by ask price.
Disclosure measures and performance measures for ESG	
Disclosure	**Disclosure**
e_words_sum, s_words_sum, g_words_sum	The sum of words related to environment, social and governance factors separately
ratio_e, ratio_s, ratio_g	The ratio of the number of words related to environment, social and governance factors separately divided by the total number of words
ratio_esg	The ratio of environment, social and governance factors groups together divided by the total number of words
	Topics, categories and subcategories of the ESG word list from Baier, Berninger, and Kiesel (2020) are below.

Governance

Corporate governance	Business ethic	reporting
Audit and control	Bribery and corruption	Disclosure and reporting
Board structure	Political influence	Stakeholder engagement
Remuneration	Responsible marketing	UNGC compliance
Shareholder rights	Whistle-blowing system	Governance of sustainability issues
Transparency		
Talent		

Environmental

Ecosystem service	Climate change	Environmental management
Access to land	Biofuels	Environmental standards
Biodiversity management	Climate change strategy	Pollution control
Water	Emissions management and reporting	Product opportunities
		Waste and recycling
		Supply chain environmental standards

Social

Public health	Human rights	Labour standards
Access to medicine	Community relations	Diversity
HIV and AIDS	Privacy and free expression	Health and safety
Nutrition	Security	ILO core conventions
Product safety	Weak governance zones	Supply chain labour standards
Society		
Charity		
Education		
Employment		

Performance	**Performance**
revitiv_esg	Score from Thomson Reuters Eikon/Refinitiv (previously known as ASSET4) database. In the selection of the period and associated data, the availability of the ESG data played an important role, which was available from 2010 onward until 2022 (the latest year of the period at the time of the data collection stage). Analysts collect ESG data based on more than 600 ESG indicators, out of which 186 are counted in the ESG scoring system (Refinitiv, 2022). Then, the ESG score for each firm is normalized between 0 and 100 by considering a firm's relative score with the affiliated industry (Breuer et al., 2018; Garel & Petit-Romec, 2021). The ESG data is collected from several sources, such as sustainability reports, annual reports, stock exchange filings, various news sources, and corporate and non-governmental websites (Ioannou and Serafeim, 2012; Refinitiv, 2022). After retrieving the raw data set, we follow various data pre-processing steps to prepare the sample for further analysis before testing the hypotheses.
Congruency	
ESG_Genuine Greeners_75	Congruence disclosure and performance for 75% based on median split, with disclosure = 1 (high) and performance = 1 (high).
ESG_NotGreener_75	Congruence disclosure and performance for 75% based on median split, with disclosure = 0 (low) and performance = 0 (low).
ESG_GreenWashers_75	Incongruence disclosure and performance for 75% based on median split, with disclosure = 1 (high) and performance = 0 (low).
ESG_TooModestGreeners_75	Incongruence disclosure and performance for 75% based on median split, with disclosure = 0 (low) and performance = 1 (high).
Firm-level controls	

SIZE	Natural logarithm of total assets
ΔASSETS	Change in total assets, scaled by total assets
ROA	Return on assets
CFO	Cash flow from operations, scaled by total assets
CR	Ratio of current assets and current liabilities
FCA	Foreign currency adjustment, scaled by total assets
R&D	Research and development expenses, scaled by total assets
INT	Intangibles, scaled by total assets
LEV	Leverage, measured total debt, divided by total assets
ZSCORE	Altman's (1968) Z-score
LOSS	Dummy variable, coded as 1 if net income is less than 0, otherwise 0
AUDITFEES	Natural logarithm of audit fees
NAS	Sum of non-audit fees, divided by audit fees
BIG4	Dummy variable, coded as 1 if the auditor belongs to the Big4, otherwise 0

Table 1. Summary Statistics.

Panel A: Descriptive statistics for continuous variables

Variables	*N*	*Mean*	*SD*	*Min*	*25%*	*Median*	*75%*	*Max*
CAR	7,454	0.004	0.065	-0.176	-0.031	0.003	0.040	0.191
BAS	7,454	0.002	0.005	0.000	0.000	0.001	0.001	0.158
SIZE	7,454	7.974	1.827	0.795	6.813	8.026	9.207	11.491
ΔASSETS	7,454	0.172	0.481	-0.610	-0.006	0.061	0.181	4.541
ROA	7,454	-0.002	0.244	-4.877	-0.001	0.042	0.083	0.341
CFO	7,454	0.058	0.195	-2.946	0.046	0.087	0.134	0.354
CR	7,454	2.653	2.938	0.085	1.186	1.770	2.867	21.443
FCA	7,454	0.000	0.002	-0.011	0.000	0.000	0.000	0.008
R&D	7,454	0.052	0.124	0.000	0.000	0.002	0.044	1.271
INT	7,454	0.230	0.218	0.000	0.029	0.174	0.378	0.799
LEV	7,454	0.906	3.862	-17.953	0.173	0.615	1.273	19.888
ZSCORE	7,454	4.510	7.027	-50.687	1.587	2.946	4.858	52.485
AUDITFEES	7,454	0.897	1.126	-4.423	0.233	0.906	1.649	3.168
NAS	7,454	0.198	0.237	0.000	0.036	0.121	0.275	1.394

Panel B: Descriptive statistics for congruency variables

Variables	*N*	*=0*	*=1*
Congruency (ESG_GreenWashers_75)	7,454	5,740	1,714
Congruency (ESG_GenuineGreen_75)	7,454	7,054	400
Congruency (ESG_TooModestGreen_75)	7,454	6,068	1,386
Congruency (ESG_NotGreeners_75)	7,454	3,500	3,954

Panel C: Descriptive statistics for ESG variables

Variables	*Min.*	*Median*	*Mean*	*Max.*	*Sd.*
Ratio E (%)	0.000	0.001	0.002	0.018	0.002
Ratio S (%)	0.001	0.002	0.003	0.028	0.003
Ratio G (%)	0.005	0.014	0.014	0.032	0.003
Ratio ESG (%)	0.007	0.019	0.019	0.004	0.005
Environment performance %	0.000	12.03	20.99	23.10	23.10
Social performance (%)	0.019	20.43	26.41	21.33	31.33
Governance performance (%)	0.001	64.64	65.83	14.59	14.59
ESG performance (%)	0.000	56.77	58.71	14.77	14.77

Note: This table shows the descriptive statistics for the main variables in our models. All financial items in the table are in USD. Please see *Appendix A-Key Variables Sources and Definitions* for details on the variables above.

Table 2: Correlation Matrix.

	CAR	*BAS*	*ESG_ Green Washers _75*	*ESG_ Genuine Greeners _75*	*ESG_ TooModest Greeners_ 75*	*ESG_ NotGreeners _75*	*SIZE*	*ΔASSETS*	*ROA*	*CFO*	*CR*	*FCA*	*R&D*	*INT*	*LEV*	*ZSCORE*	*LOSS*	*AUDITFEES*	*NAS*
BAS	0.017																		
ESG_GreenWashers_75	-0.019	0.155***																	
ESG_GenuineGreeners_75	0.009	-0.050***	-0.130***																
ESG_TooModestGreeners_75	0.012	-0.131***	-0.261***	-0.114***															
ESG_NotGreeners_75	0.003	-0.006	-0.581***	-0.253***	-0.508***														
SIZE	0.004	-0.373***	-0.430***	0.158***	0.452***	-0.061***													
ΔASSETS	-0.042***	-0.031***	0.159***	-0.036***	-0.095***	-0.044***	-0.158***												
ROA	0.002	-0.211***	-0.321***	0.054***	0.123***	0.150***	0.416***	-0.060***											
CFO	0.012	-0.211***	-0.330***	0.047***	0.120***	0.163***	0.411***	-0.079***	0.882***										
CR	-0.007	0.147***	0.349***	-0.071***	-0.173***	-0.127***	-0.433***	0.314***	-0.219***	-0.259***									
FCA	-0.009	-0.005	0.027**	0.009	0.024**	-0.046***	0.044***	0.024**	0.011	0.007	0.014								
R&D	-0.005	0.146***	0.374***	-0.050***	-0.109***	-0.208***	-0.441***	0.072***	-0.721***	-0.725***	0.307***	-0.013							
INT	-0.016	-0.074***	-0.213***	0.034***	0.048***	0.127***	0.212***	-0.018	0.159***	0.147***	-0.235***	-0.007	-0.202***						
LEV	0.003	-0.024**	-0.020*	0.020*	-0.018	0.021	0.056***	-0.008	0.007	-0.001	-0.052***	0.013	-0.038***	0.022					
ZSCORE	-0.038***	-0.011	0.146***	-0.012	-0.085***	-0.052***	-0.208***	0.249***	0.179***	0.168***	0.528***	0.007	0.009	-0.134***	-0.067***				
LOSS	0.024**	0.193***	0.281***	-0.077***	-0.154***	-0.082***	-0.400***	0.121***	-0.551***	-0.492***	0.306***	-0.017	0.423***	-0.155***	-0.004	-0.025**			
AUDITFEES	0.006	-0.333***	-0.407***	0.110***	0.442***	-0.051***	0.824***	-0.174***	0.316***	0.310***	-0.404***	-0.008	-0.315***	0.257***	0.044***	-0.225***	-0.302***		

NAS	0.012	-0.067***	-0.105***	0.024**	0.067***	0.026**	0.136***	0.046***	0.045***	0.041***	-0.065***	-025**	-0.036***	0.128***	0.023**	-0.032***	-0.091***	0.045***	
BIG4	0.015	-0.314***	-0.184***	0.068***	0.167***	-0.005	0.462***	-0.143***	0.175***	0.179***	-0.211***	-0.001	-0.105***	0.093***	0.029**	-0.133***	-0.157***	0.493***	0.101***

Note**.** Coefficients in bold type are significant at the 5%, or better. Please see *Appendix A-Key Variables Sources and Definitions* for details on the variables above.

Table 3: ESG congruency disclosures and CAR.

	Model 1 (ESG_Greenwashers)	*Model 2 (ESG_Genuinegreeners)*	*Model 3 (Modest greeners)*	*Model 4 (ESG)_not greeners)*
Variables	*CAR [-3,3]*	*CAR [-3,3]*	*CAR [-3,3]*	*CAR [-3,3]*
Congruency	-0.006	0.002	0.003	0.001
	(-2.337)**	(0.430)	(1.142)	(0.694)
SIZE	0.001	0.001	0.001	0.001
	(0.768)	(1.004)	(0.772)	(1.126)
ΔASSETS	-0.005***	-0.005***	-0.005***	-0.005***
	(-2.784)	(-2.881)	(-2.859)	(-2.902)
ROA	-0.004	-0.004	-0.004	-0.004
	(-0.545)	(-0.541)	(-0.518)	(-0.555)
CFO	0.018**	0.019**	0.019**	0.018**
	(2.066)	(2.102)	(2.112)	(2.082)
CR	0.001	0.000	0.000	0.000
	(1.335)	(1.185)	(1.190)	(1.181)
FCA	-0.268	-0.292	-0.306	-0.283
	(-0.540)	(-0.589)	(-0.616)	(-0.570)
R&D	0.004	0.002	0.001	0.002
	(0.351)	(0.161)	(0.128)	(0.220)
INT	-0.013***	-0.012***	-0.012***	-0.013***
	(-2.963)	(-2.807)	(-2.713)	(-2.870)
LEV	0.000	0.000	0.000	0.000
	(0.543)	(0.527)	(0.575)	(0.517)
ZSCORE	-0.001***	-0.001***	-0.001***	-0.001***
	(-3.791)	(-3.848)	(-3.864)	(-3.784)
LOSS	0.006***	0.006**	0.006**	0.006**
	(2.604)	(2.556)	(2.579)	(2.528)
AUDITFEES	-0.001	-0.001	-0.001	-0.001
	(-0.602)	(-0.490)	(-0.620)	(-0.464)
NAS	0.003	0.003	0.003	0.003
	(0.824)	(0.982)	(0.942)	(0.968)
BIG4	0.002	0.002	0.002	0.001
	(0.617)	(0.574)	(0.666)	(0.542)
Intercept	-0.004	0.009	0.010	0.008
	(-0.171)	(1.190)	(1.327)	(1.079)
Firm Fixed Effects	No	No	No	No
Ind. Fixed Effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	7,453	7,453	7,453	7,453
Adjusted R^2	0.021	0.021	0.021	0.021

Note: All tests are two-tailed. *, **, and *** represent statistical significance at * $p<0.05$, ** $p<0.01$ and *** $p<0.001$. Standard errors are in parentheses. Please see *Appendix A-Key Variables Sources and Definitions* for details on the variables above. Model 1 is for *ESG_GreenWashers_75,* Model 2 is for *ESG_GenunieGreeners_75,* Model 3 is for *ESG_TooModestGreeners_75* and finally Model 4 is for *ESG_NotGreeners_75* (see Appendix A for more details). All regressions include year and industry (2 digit SIC Codes) fixed effects. Regression residuals are clustered at the firm level. All regressions include year and industry (2 digit SIC Codes) fixed effects. Regression residuals are clustered at the firm level.

Table 4: ESG congruency disclosures and BAS.

	Model 1	*Model 2*	*Model 3*	*Model 4*
	(ESG_Greenwashers)			
Variables	BAS	BAS	BAS	BAS
Congruency	-0.000	0.000	0.001***	-0.000**
	(-1.328)	(0.337)	(3.661)	(-2.008)
SIZE	-0.001***	-0.001***	-0.001***	-0.001***
	(-12.389)	(-12.300)	(-12.829)	(-12.475)
ΔASSETS	0.000***	0.000***	0.000***	0.000***
	(-2.977)	(-3.030)	(-2.926)	(-3.032)
ROA	-0.001	-0.001	-0.001	-0.001
	(-1.274)	(-1.272)	(-1.195)	(-1.236)
CFO	-0.001**	-0.001	-0.001*	-0.001*
	(-2.016)	(-1.995)	(-1.957)	(-1.950)
CR	0.000**	0.000**	0.0000**	0.000**
	(2.398)	(2.319)	(2.380)	(2.268)
FCA	0.011	0.010	0.008	0.008
	(0.347)	(0.320)	(0.238)	(0.256)
R&D	-0.002***	-0.002***	-0.003***	-0.003***
	(-3.541)	(-3.661)	(-3.767)	(-3.820)
INT	0.000	0.000	0.000	0.000
	(0.625)	(0.719)	(0.997)	(0.944)
LEV	-0.000	-0.000	-0.000	-0.000
	(-0.791)	(-0.791)	(-0.647)	(-0.745)
ZSCORE	-0.000***	-0.000***	-0.000***	-0.000
	(-5.696)	(-5.729)	(-5.827)	(-5.831)
LOSS	0.000	0.000	0.000	0.000
	(1.284)	(1.260)	(1.368)	(1.294)

AUDITFEES	-0.000	-0.000	-0.000	-0.000
	(-0.491)	(-0.426)	(-0.836)	(-0.521)
NAS	-0.000	-0.000	-0.000	-0.000
	(-0.240)	(-0.152)	(-0.281)	(-0.105)
BIG4	-0.002***	-0.002***	-0.002***	-0.002***
	(-12.967)	(-12.992)	(-12.665)	(-12.883)
Intercept	0.011***	0.011***	0.011***	0.011***
	(21.172)	(21.533)	(21.844)	(21.606)
Firm Fixed Effects	No	No	No	No
Ind. Fixed Effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	7,453	7,453	7,453	7,453
Adjusted R^2	0.197	0.196	0.198	0.205

Note: All tests are two-tailed. *, **, and *** represent statistical significance at * p<0.05, ** p<0.01 and *** p<0.001. Standard errors are in parentheses. Please see *Appendix A-Key Variables Sources and Definitions* for details on the variables above. Model 1 is for *ESG_GreenWashers_75,* Model 2 is for *ESG_GenunieGreeners_75,* Model 3 is for *ESG_TooModestGreeners_75* and finally Model 4 is for *ESG_NotGreeners_75* (see Appendix A for more details).