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Scrutinizing Corporate Sustainability Claims. Evidence from NGOs' Greenwashing Allegations and Firms' Responses

Janja Brendel
Chinese University of Hong Kong, JanjaBrendel@CUHK.edu.hk
Corresponding author

Cai Chen
INSEAD, Cai.Chen@INSEAD.edu

Thomas Keusch
INSEAD, thomas.keusch@insead.edu

Standard setters, regulators, and auditors are in the process of devising mechanisms to detect and prevent corporate greenwashing. In this study, we examine whether NGOs can facilitate scrutiny of corporate sustainability claims. We find that advocacy NGOs increasingly campaign against greenwashing, targeting predominantly large, publicly visible firms in the consumer-facing and oil and gas industries. These campaigns mostly accuse firms of making misleading or false statements in communication outlets such as product labels, advertisements, and public relations campaigns about companies' impacts on climate change and consumer health. Shareholders and the media react to NGO campaigns, especially when they allege greenwashing of material environmental or social performance dimensions. Finally, firms facing environment-related greenwashing allegations disclose less environmental information in the future, while companies criticized for climate-related greenwashing reduce future greenhouse gas emissions. Collectively, the findings in this study indicate that NGO scrutiny of corporate sustainability claims can complement the efforts of standard setters, regulators, and auditors who focus on different disclosure outlets than NGOs.

Key words: Greenwashing; ESG; Sustainability; NGOs; Climate Change; GHG Emissions
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1. Introduction

Prior research indicates that investors, employees, customers, and other stakeholders increasingly consider a company's environmental and social (E&S) performance when making their investing, employment, and purchasing decisions (e.g., Balakrishnan et al. 2011; Hartzmark and Sussman 2019; Beyer et al. 2024). However, these decisions may be ill-informed if corporate executives have incentives in equilibrium to misrepresent – or "greenwash" – their firms' E&S performance (Friedman et al. 2021).[1] Consequently, regulators, standard setters, and assurance providers have made it a priority to detect and prevent corporate greenwashing (e.g., SEC 2021; ESMA 2022; GRI 2022; IAASB 2023).

However, identifying corporate greenwashing poses challenges for these institutions and researchers alike, given the difficulty in collecting and verifying or refuting the myriad of sustainability claims that firms make across various communication channels. Thus, we examine in this study whether Non-Governmental Organizations (NGOs) can facilitate scrutiny of corporate sustainability claims. We focus on advocacy NGOs – such as Friends of the Earth or Foodwatch – for several reasons. First, unlike most financial market regulators, financial reporting standard setters, or assurance providers, these NGOs have tracked companies' environmental and social practices for a long time and have accumulated significant resources and experience in scrutinizing corporate sustainability claims. Confirming this, prior research shows that NGO criticism creates significant reputation concerns for companies (e.g., Dyreng et al. 2016; Rauter 2020; Bonetti et al. 2023).[2] Second, NGOs track a variety of corporate communication outlets, such that their scrutiny

[1] Following prior literature, we use greenwashing as an umbrella term to include misrepresentation of the firm's environmental *and* social risks, practices, and impacts so that they appear more favorably than they are (e.g., Lyon and Montgomery, 2015). We use environmental and social (E&S) performance and sustainability performance interchangeably.

[2] For example, NGOs have exposed Volkswagen's fraudulent emissions reporting, ExxonMobil's climate disinformation campaign, and Nestle's misleading claims about the relative health benefits of its baby formula vis-a-vis African mothers' breast milk.

may be complementary to that of regulators, standard setters, and auditors who focus mostly on corporate annual reports and sustainability reports.

Using novel data on 1,198 greenwashing allegations made by various NGOs against 284 publicly listed firms from 24 countries, we first examine which specific E&S performance dimensions NGOs identify as being greenwashed most frequently, which information presentation or obfuscation styles NGOs regard as greenwashing, and which communication channels NGOs screen for greenwashing. To examine whether NGOs can facilitate scrutiny of corporate sustainability claims, we then test whether they target companies that presumably have larger societal impacts, whether shareholders and the media pay attention to their greenwashing allegations, and whether these allegations have implications for target firms' future communications and real activities.

We find that the E&S performance dimensions that NGOs identify as greenwashed most frequently relate to firms' impacts on climate change, consumer health, and waste. According to NGOs, firms greenwash most frequently by misleading consumers (e.g., featuring a healthy fruit prominently on a product label that contains very little fruit), making outright false statements, and taking actions that contradict previously made promises (e.g., financing a new coal-fired power plant after making a net-zero pledge). The corporate communications channels cited most frequently in NGOs' greenwashing allegations include product labels and packaging, advertising material, and public relations (PR) campaigns. By contrast, only 0.5 percent and 0.6 percent of NGO greenwashing allegations refer to sustainability reports and financial reports, respectively, indicating that NGO scrutiny may be complementary to, e.g., sustainability assurance which focuses on sustainability claims in these reports.

Examining the antecedents of greenwashing allegations, we find that NGOs are more likely to target firms that are more visible to shareholders and stakeholders, i.e., firms that are larger,

have higher valuations and greater press coverage, and are consumer-facing. In addition, NGOs are more likely to target oil and gas companies and those with higher greenhouse gas emissions, potentially because these firms' environmental impacts are more visible. While those relations may be driven by NGOs' incentives to maximize public attention to their campaigns, an alternative explanation is that highly visible firms and those with the greatest adverse impacts may also be the ones that have the greatest incentives to greenwash. In line with this interpretation, we also find that NGOs are more likely to target firms whose executives are paid for E&S performance and who thus may also have greenwashing incentives. If NGO scrutiny can counter these incentives to some extent or if NGOs prompt those firms with the largest societal impacts to improve their E&S communications and practices, NGO scrutiny is arguably more beneficial.

Analyses of the stock market and media reactions to greenwashing allegations provide additional evidence that NGOs facilitate scrutiny of corporate sustainability claims. Specifically, we find negative abnormal returns and an increase in E&S-related news articles around the publication of the NGO's allegation. These relations are particularly pronounced if the NGO alleges greenwashing of E&S performance dimensions that are *material* for the firm, in the sense that they are likely to affect future revenues, costs, or risk (Serafeim and Yoon 2022).

As the ultimate goal of advocacy NGOs is to drive changes within target firms, we next examine how these companies respond to greenwashing allegations. We find that target companies respond *directly* to NGOs' greenwashing allegations in about 10 percent of cases, which is consistent with ignoring NGO allegations in public being a viable strategy to avoid raising public attention even further (Wu and Liu 2023). When companies respond, they can do so in a conceding or confrontational way and we find that conceding is less likely if the NGO allegation is more severe, i.e., when the firm is accused of greenwashing material E&S performance dimensions. Turning to *indirect* responses, we find that firms criticized for greenwashing their impacts on

climate change subsequently reduce their greenhouse gas emissions, thereby potentially better aligning their real activities with their sustainability claims. Finally, target firms accused of greenwashing their environmental performance disclose less environmental information in the future, thereby potentially toning down their environmental claims, or "greenhushing" to make themselves less vulnerable to future scrutiny (WEF 2022).

This study has limitations in terms of external and internal validity. NGOs may focus on specific types of firms and greenwashing, and their allegations may sometimes be unjustified. We note that NGOs' tendency to target more visible companies may increase the salience of NGO scrutiny even to less visible firms, thereby potentially amplifying its deterrent effect. Additionally, while the study includes various control variables, it cannot establish causal relations between greenwashing allegations and shareholder, media, or firm responses.

Despite its descriptive nature, this study contributes to the literature on corporate greenwashing. Studies in this area typically focus on a specific disclosure medium and examine a particular type of greenwashing (e.g., Pinnuck et al. 2021; Baker et al. 2023; Bailey et al. 2022; Grewal et al. 2023; Raghunandan and Rajgopal 2022b). For example, Hail et al. (2021) find that corporate executives' discussions of E&S issues in conference calls often involve greenwashing, where climate issues are over-discussed to divert from critical analyst questions, and presented in an excessively positive manner. However, Chava et al. (2021) and Dzieliński et al. (2022) do not find evidence of greenwashing, as they show that increased E&S talk in conference calls is associated with future pollution reduction and higher employee satisfaction ratings. Our study differs from this literature by providing a detailed descriptive analysis highlighting, from the perspective of NGOs, (a) the various specific E&S performance dimensions that firms greenwash, (b) several different disclosure outlets in which greenwashing occurs, and (c) the different

presentation or obfuscation styles through which firms greenwash. These details can rarely be illustrated in prior research given the settings and methodologies used.

The results of this study also have important implications for regulatory efforts to detect and prevent corporate greenwashing. First, our analyses suggest that NGO scrutiny of corporate sustainability claims is effective in identifying and raising attention to corporate greenwashing. Second, the results indicate that NGO scrutiny may be complementary to current regulatory efforts. Specifically, NGOs scrutinize a much broader range of disclosure outlets than financial markets regulators and standard setters usually consider, such as advertising and PR material. These disclosure outlets should be of some interest to financial markets regulators as recent studies show that corporate advertising affects shareholders' capital allocation (Madsen and Niessner 2019; Focke et al. 2020; Liaukonytė and Žaldokas 2022).

In addition, the NGO allegations examined in this study suggest that much corporate greenwashing is targeted at firms' customers, which is an observation that has not received much attention so far in the literature. This seems important because customers switching from less sustainable to more sustainable products and companies is often argued to be a promising (if not the most promising) market mechanism through which companies are incentivized to improve their sustainability performance (Bénabou and Tirole 2010). If customers act on misrepresented sustainability information, this market mechanism is less likely to work. It also seems unlikely that customers can be protected from corporate greenwashing through sustainability reporting standards or assurance which typically focus on annual reports or sustainability reports that customers are arguably less exposed to compared to product labels or advertising campaigns. Rather, our findings suggest that consumer protection agencies have an important role in detecting and preventing corporate greenwashing.

2. Institutional background and hypotheses development

2.1 Background information on NGOs as watchdogs

We propose NGOs as one actor to scrutinize corporate sustainability claims. NGOs typically emerge to address a certain market failure that has not been fixed by regulatory action (Yaziji and Doh 2009). The literature usually distinguishes between two types of NGOs. Service NGOs attempt to address needs that are not fully met by the market or the government. For example, Alcoholics Anonymous, the Salvation Army, Doctors Without Borders, and others provide counseling, food, shelter, clothing, and medical treatment to their beneficiaries. Since service NGOs typically do not campaign against corporations, they do not appear in our sample. Instead, we focus on advocacy NGOs, such as Greenpeace, Friends of the Earth, and FoodWatch, which try to pressure companies and governments to address market failures. These may include negative externalities (e.g., pollution) or the reduction of information asymmetries between market players, such as companies and their consumers.

Advocacy NGOs try to elicit corporate change by discussing perceived corporate wrongdoing with the responsible firm in private; by activating the firm's reputation concerns through public shaming campaigns that can involve leaflets, research reports, press conferences, protests and marches, and social media; by filing shareholder proposals; by alerting regulatory agencies; by suing companies for their wrongdoing; and, in extreme cases, by engaging in civil disobedience or sabotaging the responsible company's operations.

Prior research argues that NGOs have successfully exerted pressure on companies to adopt more socially responsible practices (Doh and Guay 2006; Aldashev et al. 2013; Grewal and Serafeim 2020). For example, Rauter (2020) finds that oil, gas, and mining companies that are forced to start disclosing extraction payments to foreign governments increase their payments to host governments more if they were previously targeted by an NGO shaming campaign. Similarly,

Bonetti et al. (2023) find that fracking operations that are forced to start disclosing water pollutants reduce their pollution more if they are under greater scrutiny by environmental NGOs. Finally, Dyreng et al. (2016) show that a campaign by NGO ActionAid International pressured noncompliant firms in the FTSE 100 to adhere to a rule requiring U.K. firms to disclose the location of all subsidiaries.

2.2 Hypotheses development

In this section, we focus on whether NGOs' scrutiny of corporate sustainability claims can be effective and develop predictions regarding the antecedents of, and responses to, NGO allegations of corporate greenwashing.

2.2.1 NGO greenwashing allegation antecedents

When identifying target firms to campaign against, advocacy NGOs use information about target firms' E&S risks, practices, impacts, and statements from public sources, consumers, and whistleblowers, through laboratory tests of companies' products, or their undercover operations at company sites. However, next to information about corporate wrongdoing, NGOs' target selection decision might also be influenced by their incentives as NGOs' reputation and visibility are essential for attracting financial donations and labor, and enhancing their reach and influence. How much attention the NGO's campaign raises depends, in turn, on the visibility of the target firm with investors and stakeholders, which increases in firm size, valuation, and media coverage (Rowley and Berman 2000; Grewal and Serafeim 2020). In addition, a target firm's visibility to stakeholders is greater if it serves end customers (Lev et al. 2010; Servaes and Tamayo 2013) and if it operates in an industry with greater and more salient societal impacts, such as oil and gas (Desai et al. 2023).

Importantly, NGOs' private incentives to focus on more visible firms need not render their scrutiny of corporate sustainability claims less impactful. On the contrary, NGO criticism of large firms' sustainability practices and claims may incentivize smaller peer companies to improve their practices and communications (Rowley and Berman 2000). In addition, by targeting firms with the largest and most visible environmental impacts, such as firms in the oil and gas industry, NGOs are potentially directing their limited resources to areas where they can facilitate the largest societal benefits. We also note that the most visible firms and those with the largest adverse E&S impacts may have the strongest incentives to greenwash. Thus, we predict that NGO greenwashing allegations are more likely among more visible companies.

H1: NGOs are more likely to target more visible firms.

2.2.2 Shareholder and media responses to NGO greenwashing allegations

To the extent that NGO scrutiny of corporate sustainability claims is effective, shareholders and the media should react to NGO greenwashing allegations. Shareholder responses likely depend on the potential impact of the allegation on a target company's prospects and reputation. Specifically, if these allegations shape the perceptions of customers or employees about the company, greenwashing allegations may impact future cash flows (see, Nyilasy et al. 2014; Newell et al. 1998). In addition, greenwashing allegations can result in legal and regulatory actions that impact cash flows and uncertainty (Matsumura et al. 2014).[3] Finally, shareholders' concerns regarding the information risk associated with greenwashing can further impact stock market reactions (Palmrose et al. 2004; El Ghoul et al. 2013).

Media reactions to NGO greenwashing allegations are also important for the question of whether NGO scrutiny of corporate sustainability claims is effective. First, media coverage

[3] Businesses that engage in greenwashing or violate sustainability laws now face the risk of substantial fines, often amounting to millions of dollars. The highest fines so far were paid by Volkswagen with $34bn, Toyota with $150m and DWS with $25m.

provides credibility to NGO allegations. Second, the media can play a vital role in disseminating the allegations. Media coverage of NGOs has indeed increased dramatically over time (Yaziji and Doh 2009) as NGOs strategically engage the media to exert public pressure on companies (e.g., Dale 1996; Deegan and Islam 2014; Powers 2014; Couttenier and Hatte 2016) and NGOs have emerged as a prevalent news source for the media (Fenton 2010). Thus, we expect NGO greenwashing allegations to trigger reactions from shareholders and the media:

> *H2a: The stock market reacts negatively to NGO greenwashing allegations.*
> *H2b: A firm's media coverage increases following NGO greenwashing allegations.*

NGO greenwashing allegations are likely more impactful if they allege misrepresentation of environmental or social issues that are financially important, or "material" to the target firm, i.e., issues that likely affect the firm's revenues, costs, and risk significantly in the future. Supporting the claim that NGOs focus on important E&S issues, more than 50% of NGO greenwashing allegations cover material issues in our sample. The influence of greenwashing allegations on shareholders' perceptions about the target company is likely more severe when the NGO alleges greenwashing of E&S issues that are financially material. In addition, since material issues usually link to the company's core business activities, greenwashing allegations may also have a greater impact on the perceptions of key stakeholders (e.g., customers and employees) and attract greater public and media attention if they are related to material E&S issues (Grewal et al 2021; Serafeim and Yoon 2022). Thus, we predict stronger reactions from shareholders and the media to allegations of material greenwashing:

> *H3a: The stock market reaction to NGO greenwashing allegations is stronger for material allegations.*
> *H3b: The media reaction to NGO greenwashing allegations is stronger for material allegations.*

2.2.3 Target firm responses to NGO greenwashing allegations

The question of whether NGO scrutiny of corporate sustainability claims is effective also calls for an examination of target firm reactions to greenwashing allegations. One strategy would be for target firms to ignore the NGO's allegations altogether to avoid attracting attention and signaling that the allegation may be important (Brendel and Ryans 2021; Wu and Liu 2023). Second, target firms may reply directly to the allegation either in a conceding or a confrontational manner.[4] Concessions may involve promises to eliminate greenwashing or to improve E&S practices in the future. However, such promises may themselves turn out to be greenwashing (Cai et al. 2024). Third, target firms may react indirectly to greenwashing allegations in several ways that are not mutually exclusive: target firms may reduce the level of sustainability disclosure, potentially to avoid future scrutiny, which is sometimes called "greenhushing" (Rogers and Van Buskirk 2009; WEF 2022); they may better align their sustainability claims with their real activities, for example by adopting sustainability disclosure standards or by having their sustainability claims verified; or firms may leave their sustainability claims unchanged but better align their real activities with these claims.

Recognizing that some of the potential target firm reactions to NGO greenwashing allegations are inherently unobservable or can only be inferred, we focus on companies' direct responses in the media, changes in their greenhouse gas emissions, and changes in their sustainability disclosure practices. Considering the many different response strategies outlined above, some of which may be complementary while others may be substitutes, we do not formulate hypotheses for specific target firm reactions to greenwashing allegations. We also note that

[4] As an example, for a direct response, Greenpeace accused Adidas of greenwashing in 2011 regarding its commitment to Detox its supply chain. Greenpeace claimed that Adidas had failed to provide local people with details about the uses and discharges of hazardous chemicals to the environment, facility-by-facility, year-by-year. Additionally, Greenpeace criticized Adidas for committing to phasing out only one type of PFC by 2015. Adidas responded directly acknowledging the concerns raised by the environmental pressure group regarding pollution in the aquatic environment, particularly in less developed countries and emerging market economies. However, it disagreed with some of Greenpeace's claims and emphasized that it had been working for several years to reduce and gradually eliminate hazardous chemicals from its supply chain.

shareholders, the media, and target firms might not react to NGO greenwashing allegations at all if they regard NGOs and their claims as unreasonable, unsubstantial, or motivated by NGOs' opportunistic desires to attract attention to themselves.

3. NGO greenwashing allegations data and sample

3.1 NGO data and sample

We obtain data on NGOs' greenwashing allegations from SigWatch, which is a European data analytics company that specializes in monitoring and analyzing NGO activism campaigns. From public sources such as NGOs' websites, press releases, and research reports, SigWatch built a unique dataset that covers about 11,000 activist groups worldwide in over 75,000 campaigns involving over 20,000 publicly listed and privately held target firms since 2011. For each NGO campaign, the information that SigWatch provides includes characteristics of the NGO and the target company, a summary of the NGO's allegations against the company, as well as web links to the source documents. Given the historical nature of the data, these links are sometimes no longer valid, and considering the international coverage, the source documents are often written in languages other than English. SigWatch clients include corporate and institutional investors who are interested in assessing their (or their portfolio companies') reputation risk stemming from NGO campaigns. Other SigWatch clients include audit and consulting firms, the OECD, and academics.[5]

We focus on those NGO campaigns that allege corporate greenwashing. Broadly speaking, we regard a particular corporate statement or claim as greenwashing if it portrays a specific E&S risk, practice, or impact of the firm, its products, or its services more favorably than it is. To identify greenwashing allegations, we preselect campaigns based on fields in the SigWatch database that specify what the campaign is about and then we manually read the summaries of

[5] See Koenig (2017) for a detailed description of the SigWatch data. According to SigWatch, most users consist of corporates (70 percent non-banks and 30 percent banks), highlighting the importance and interest in NGOs' activities.

these pre-selected campaigns to identify whether the NGO's allegation is actually about greenwashing. Then we manually classify each campaign according to the E&S issues that are greenwashed according to the NGO. The environmental dimension (*Environmental Allegation*) may relate to statements about the firm's contribution to climate change, its generation of solid or chemical waste, its impact on biodiversity, or statements about other environmental issues. The social dimension (*Social Allegation*) may relate to claims about consumer health, the transparency of product pricing in the form of advertised discounts, statements about other consumer issues or other product quality issues, claims about animal welfare, claims about employee rights, health, and safety, and statements about other social issues.

Next, we manually classify allegations according to the presentation/obfuscation style through which the company (allegedly) greenwashes. A *Misleading Claim* is one about the company's or its projects', products', services' E&S practices, and impacts that is not necessarily incorrect but is likely to give the audience the wrong impression. For example, an energy company emphasizes its focus on renewable sources while 95 percent of its investments are still in oil and gas exploration. *Talk vs Action* means companies' practices and outcomes are inconsistent with publicly announced pledges or promises, according to the NGO. A *False Claim* is factually incorrect. Examples of companies advertising practices that are – according to the NGO – unworkable, ineffective, or unrealistic *False Solutions* to societal problems include the company claiming to reduce its carbon footprint through offsets such as planting trees. Examples of *Information Omitted* include a cosmetics company failing to disclose required information on perfumes in personal care products for children. Finally, *Information Hidden* means that relevant information is presented in a way that makes it difficult for the audience to read or hear. Examples include companies presenting unfavorable information on product labels (e.g., alcohol content) in small font and against a background that is of similar color as the text.

We manually gather information (if accessible) on the communication channels implicated in greenwashing according to the NGO. These channels include advertisements, environmental commitments (such as net zero pledges), various CSR commitments, published certifications such as those from the Roundtable on Sustainable Palm Oil (RSPO), corporate websites, financial reports or presentations, impact assessments during project approval stages, product labels or packaging, other product information, public relations campaigns, corporate sponsorships (e.g., oil and gas companies sponsoring the COP), and sustainability reports.

In addition, we collect information from SigWatch on the sentiment of the allegation, that is, whether the criticism is strong or mild (*Allegation Sentiment*). We also use a SigWatch variable capturing the NGO's reach and influence where higher values indicate broader geographic reach and influence through greater and more international operations and coalitions (*NGO Influence*). From SigWatch and Factiva, we hand-collect target companies' direct responses to NGOs' allegations within two months (*Corporate Press Response*). Typically, these responses occur as comments made by the company in a journalist's news article. We classify the collected responses according to whether the target company denies the allegations (*Press Response Resistance*) or concedes at least partially (*Press Response Concession*).

After requiring that target firms publish sustainability reports and have non-missing data on certain control variables (see below), the final NGO campaign sample includes 1,198 unique greenwashing allegations against 284 firms between 2011 and 2022. Consistent with the U.S. having the most publicly listed companies and the most NGOs in the world (Hatte and Koenig 2020), almost 47 percent of greenwashing allegations are targeted at U.S. firms. The second most prominent country in our sample is France (11.8 percent), followed by the UK (8.4 percent), Switzerland (7.6 percent), Germany (5.3 percent), and Japan (4.2 percent). Appendix A lists the names of companies that are targeted at least ten times with greenwashing allegations and

Appendix B lists the names of the NGOs that made at least ten allegations. Several of our analyses are performed within this sample of individual NGO greenwashing allegations, for example, analyses of the characteristics of greenwashing allegations, the media and share price reaction following these allegations, and direct corporate responses in the press.

3.2 Control group construction for firm-year analyses

For our firm-year-level analyses of the antecedents of greenwashing allegations and target companies' future disclosure choices and carbon emissions, we need a control group. Ideally, we would select firm-years that NGOs investigated for greenwashing without finding any evidence for it. Unfortunately, we cannot observe NGO investigations that did not lead to greenwashing allegations but only those that did. Thus, we need to ensure that every firm year in the sample could have been the target of an NGO greenwashing investigation. To this end, we first restrict the universe of publicly listed firm-years in WorldScope since 2011 (the first year for which we have NGO data) to those for which there are sustainability reports in Corporate Register. This ensures that every sample firm provides a substantial amount of sustainability information in each year that it is in the sample, which is important because firms that disclose less sustainability information are less likely to greenwash all else equally.

To make the costs of the Corporate Register data purchase and the manual data collection effort (information about NGO campaigns) manageable, we further restrict the sample. Specifically, we retain only those firm-years that (i) are in the sample of Chen (2023) for which we already had sustainability report information (e.g., whether the report is assured) from Corporate Register, or (ii) are targets of any kind of NGO campaign (i.e., relating to greenwashing or other E&S-related misconduct) during the sample, implying that these firms are on the radar of NGOs, or (iii) are among the largest firms in their country because NGOs tend to target large local

firms.[6] The result is an unbalanced firm-year panel between 2011 and 2022, of large firms that issue sustainability reports and are on NGOs' radar. The maximum number of distinct firm-years in this panel is 11,919 of which 655 firm-years are subject to greenwashing allegations (5.5 percent). The number of unique firms in the sample is 1,198; 284 of which are exposed to greenwashing allegations (23.7 percent).[7]

The key variable in our firm-year analyses is an indicator (*Greenwashing*) that is equal to one if the firm experiences a greenwashing allegation in a given year and equal to zero for the control group. We also create separate indicator variables for greenwashing allegations that relate to environmental issues (*Environmental*), social issues (*Social*), or climate issues (*Climate*), which is a subset of *Environmental*.

3.3 Other variables

For our allegation-level analyses, we collect the three-day buy-and-hold market-adjusted return of the target firm from the day before to the day after the NGO allegation (*Stock Market Reaction*). In addition, we capture the percentage difference in the number of environmental and/or social news articles in RepRisk about the target firm between the three days following the greenwashing allegation and the three days prior (*E&S News Coverage Change*). In those analyses, we control for prior E&S news coverage (*E&S News Coverage Before Allegation*), and the rating of the firm's ESG reputation risk that is also estimated based on news articles (*RepRisk Rating*).

To identify financially material allegations, we rely on the industry-specific materiality map provided by the Sustainability Accounting Standards Board (SASB). The degree of materiality is assessed first based on keyword searches of tens of thousands of publicly-available company documents, which reveals how often a particular E&S issue arises in a certain industry. Second,

[6] In step (iii), the number of firms per country is determined based on the proportion of firms in that country targeted by NGOs.
[7] Sample sizes in the analyses are smaller than 11,919 due to non-overlapping samples across different analyses.

the economic impact of these issues is assessed by evaluating whether management (or mismanagement) of these issues affects analysts' and investors' valuation models. SASB materiality information has been widely used in recent studies (e.g., Bochkay et al. 2021; Matsumura et al. 2022; Serafeim and Yoon 2022). According to SASB, financially material issues are those that generate substantial interest from various user groups (e.g., shareholders, industry experts) and have an impact on the companies in a specific industry concerning their future revenues, costs, or risk exposure. Using a dictionary that identifies material E&S topics in each industry (Bochkay et al. 2021), we perform a fuzzy match between the allegation topic and the keywords of the material SASB industry topics relevant to the industry. The outcome of this matching process is represented by an indicator variable that is equal to one if the NGO alleges greenwashing of a material E&S topic (*Material*).

For our firm-year analyses, we collect data on companies' (annual change in) carbon emissions from TruCost (*GHG Emissions*; *GHG Emissions Change*) as well as an indicator for whether these emission numbers were reported by the company or estimated by TruCost (*GHG Emissions Estimated*). We further obtain Bloomberg scores for the amount of E&S data that firms publicly disclose (*E Disclosure Score*; *S Disclosure Score*), and information from Corporate Register about whether companies follow Global Reporting Initiative (GRI) standards when preparing their sustainability reports (*GRI Standards*) and whether they have these reports assured (*Assurance*).

To capture a company's visibility, we measure firm size (*Assets*) and valuation (*Tobin's Q*) using data from Worldscope, media coverage (*News Articles*) from Ravenpack, and membership in consumer-facing industries (*Consumer Goods*, *Consumer Services*) or in the oil and gas sector (*Oil & Gas*) using Industry Classification Benchmark (ICB) codes.

As further potential antecedents of greenwashing and greenwashing allegations, we consider whether companies link executive compensation to E&S performance dimensions (*E&S Comp*), the fraction of outstanding shares held by institutional investors (*Institutional Ownership*), the above-mentioned *RepRisk Rating*, and environmental and social performance scores that Refinitiv creates based on corporate disclosures (*E Score Refinitiv*; *S Score Refinitiv*). Finally, since NGO activity differs across countries, we also measure the number of any allegations – whether related to greenwashing or not – per country year (*NGO Activity*).

We define all variables in Appendix C and Table 1 provides descriptive statistics for firm-year level variables in Panel A and for allegation-level variables in Panel B.[8] While we do not discuss these summary statistics in detail for brevity, Panel A shows that many variables have different average values for firm-years with greenwashing allegations compared to firm-years without allegations, which is why we use a long list of control variables in the firm-year analyses.

4. Results

4.1 Characteristics of greenwashing allegations

4.1.1 E&S issues that are greenwashed according to NGOs

To better understand the role of NGOs in monitoring greenwashing activities, we start by examining the specific E&S issues that NGOs claim are greenwashed. Table 2 shows that the 1,198 NGO greenwashing campaigns are split almost evenly between environmental (49.1 percent) and social (50.9 percent) issues. Unsurprisingly, on the environmental side, firms are most frequently criticized for greenwashing their risks, practices, and impacts concerning climate change (e.g., actions being inconsistent with carbon pledges, 30.1 percent), followed by waste (e.g., chemicals or solid waste, 11.3 percent), biodiversity (flora and fauna, 3.3 percent), and other environmental

[8] On the right side of Table 1 Panel A, the mean values for *Environmental* and *Social* do not sum to 1 because a firm can be subject to different NGO campaigns in the same year. *Climate* is a subset of *Environmental*.

issues (4.4 percent). On the social dimension, greenwashing allegations by NGOs are most prominently related to consumer health (e.g., advertising questionable health benefits, 22.0 percent), the transparency of product/service pricing (e.g., hidden price increases, 8.5 percent), other product quality issues (i.e., unrelated to consumer health, 5.8 percent), other consumer issues (5.3 percent), animal welfare (e.g., how chickens are treated on farms, 4.2 percent), employee rights and safety (e.g., whether employees across the supply chain are paid a living wage and operate in safe environments, 3.6 percent), and other social issues (1.4 percent).

The high number of consumer-related greenwashing allegations is notable since prior research pays little attention to greenwashing targeted at customers, perhaps because, as we show later, this takes place mostly in disclosure outlets such as advertising material or product labels that accounting researchers usually do not examine. However, greenwashing aimed at influencing customers is crucial because previous studies highlight the importance of customers' sensitivity to a firm's E&S practices and impacts as perhaps the most important way through which a firm's E&S performance can influence its financial performance (Bénabou and Tirole 2010; Servaes and Tamayo 2013).

4.1.2 Presentation or obfuscation tactics that NGOs criticize as greenwashing

Next, we examine the presentation or obfuscation styles that NGOs regard as greenwashing, which can deliver insights into how firms greenwash. Table 3 shows that 434 of the 1,198 (36.2 percent) NGO campaigns allege that companies make misleading claims or statements about the company's (and/or its products or services') E&S-related risks, practices, and impacts. 26.5 percent of these relate to environmental issues, for example, an energy company claiming to focus on renewable sources while 95 percent of its investments are still in oil and gas exploration. The rest relates to social issues, for example, the company prominently features a healthy fruit on the label of a product that hardly contains any fruit.

The second-most prominent style is talk vs. action, which means companies' practices and outcomes are inconsistent with publicly announced pledges or promises, according to the NGO (164 cases, 13.7 percent). 80.5 percent of these relate to environmental issues, for example, a bank's financing of a new coal-fired power plant being inconsistent with its previously made carbon pledge. Those relating to social issues include, for example, a firm failing to realize promised improvements in supply chain labor conditions.

In 163 cases (13.6 percent), the NGO alleges that the firm is making outright false statements. 46.6 percent of these are related to environmental issues, such as the firm denying the existence of climate change. The remainder concerns social issues like companies claiming that their food products are 100 percent natural while they contain chemicals from herbicides or pesticides.

The next most frequent greenwashing style relates to NGOs criticizing companies for advertising the use of what the NGO thinks are false solutions (91 cases, 7.6 percent). Unsurprisingly, most of these relate to environmental issues (85.7 percent), for example, the company claiming to reduce its carbon footprint through offsets such as planting trees. Examples of the social dimension include nutrition labels developed by food companies themselves that fail to educate consumers about whether a product is healthy.

In 85 cases (7.1 percent), the NGO alleges that the company is hiding relevant information so that it is difficult for the receiver of the corporate communication to read or hear. All of these relate to the social dimension, for example, companies presenting information on product labels (e.g., alcohol content) in small font and against a background that is of similar color as the font.

In 80 cases (6.7 percent), the NGO criticizes the firm for omitting relevant information from a statement or claim that it is making. For the environmental dimension (51.3 percent), this includes companies allegedly failing to provide energy efficiency labels for the electric appliances

that they sell. Examples of the social dimension include, for example, cosmetics companies failing to disclose required information on perfumes in personal care products for children.

The description of different greenwashing tactics alleged by NGOs complements prior research on greenwashing styles. These include (a) spending excessive time discussing climate issues during conference calls to control the narrative (Hail et al. 2021), (b) discussing climate issues in an overly positive manner (Hail et al. 2021), (c) emphasizing employee diversity beyond actual numbers (Baker et al. 2023), (d) reporting false gender pay gap figures (Bailey et al. 2022), (e) selectively disclosing smaller negative environmental impacts while omitting larger ones (Marquis et al. 2016; Grewal et al. 2023), and (f) failing to fulfill promises or pledges (Bebchuk and Tallarita 2022; Raghunandan and Rajgopal 2022a, 2022b). While some of these tactics align with prior research, others are newly identified in this study.

4.1.3 Communication outlets that NGOs scrutinize for greenwashing

For most greenwashing allegations, we can identify the corporate communication outlet that is greenwashed according to the NGO. Table 4 shows that in 271 of these cases (25.5 percent), that is the product label or product packaging. 33 of these relate to environmental claims such as misleading information about energy consumption presented on the packaging of light bulbs. The remaining 238 cases are about social issues like food ingredients. A similar category is greenwashing of product information that is not occurring on labels or packaging (140 cases, 13.2 percent), most of which relates to social issues.

Two related prominent categories are advertising campaigns (247 cases, 23.2 percent) and PR campaigns (142, 13.3 percent). While there is a fine line between an advertising campaign and a PR campaign, greenwashing in the former more frequently occurs with social issues (61.5 percent) such as advertising a product's health benefits as was the case when Nestlé set out to convince African mothers that its baby formula was healthier than breast milk. In contrast,

greenwashing in PR campaigns relates more often to environmental issues (76.8 percent), for example, oil and gas companies trying to convince politicians, regulators, and the public that fossil fuels are not harming the environment.

In 84 cases (7.9 percent) the disclosure is the revelation of a corporate sponsorship. Most of these are environmental, for example, an oil company sponsoring (and potentially interfering in) the United Nations Climate Change Conference. Examples of the social dimension include the NGO criticizing that companies whose products lead to obesity sponsor sports events.

In 88 cases (8.3 percent) the disclosure is an environmental commitment such as a carbon pledge (or climate pledge) and in another 30 cases (2.8 percent) a more general corporate social responsibility (CSR) commitment that may include environmental and/or social aspects.

In 38 cases (3.6 percent) the allegation is that the company obtains product certifications that use weak environmental or social standards and/or have poor mechanisms for enforcing compliance. 60.5 percent of these relate to environmental issues, for example, certifications for Reduced Emissions from Deforestation and Forest Degradation (REDD), and the rest relate to social issues, for example, from the Roundtable on Responsible Soy (RTRS).

Corporate websites, sustainability reports, project impact assessments, and financial reports or presentations contain a maximum of ten greenwashing allegations each. However, this does not rule out the possibility that the E&S claims made by companies on product labels, in advertising material, or through net zero pledges are not replicated in their sustainability reports. Nevertheless, the data highlights the importance for regulators to consider disclosure outlets beyond those that directly target investors when scrutinizing corporate sustainability claims.

4.2 Antecedents of NGO greenwashing allegations

To test the prediction that NGOs are more likely to target more visible firms (Hypothesis 1), and to provide some initial descriptive evidence on the antecedents of NGO greenwashing

allegations, we estimate equation (1) below using OLS (i.e., a linear probability model) with standard errors adjusted for clustering at the firm level. The unit of analysis is the firm-year.

$$Allegation_{i,t} = \Phi \times Industry\ groups_{ICB} + \beta \times Ln(Assets)_{i,t-1} + \eta \times Tobin's\ Q_{i,t-1} + \theta \times Ln(News\ Articles)_{i,t-1} + \Omega \times Controls + \alpha_{Country} + \alpha_t + \varepsilon_{i,t} \quad (1)$$

Allegation refers to indicator variables for the different kinds of greenwashing allegations (*Greenwashing*), *Environmental*, *Social*, or *Climate*, which indicate whether companies are subject to NGO campaigns that allege greenwashing of environmental, social, or climate issues in a given year, respectively. *Industry groups* is a vector of indicator variables for the consumer goods, consumer services, and oil and gas industries. *Controls* is a vector of firm-year and country-year level control variables. The other variables are defined in Section 3 and Appendix C.

Across various specifications shown in Table 5, we find consistent support for Hypothesis 1. The likelihood of greenwashing allegations is significantly higher for more visible firms, i.e., larger firms (*Ln(Assets)*), more valuable firms (*Tobin's Q*), consumer-facing firms (*Consumer Goods*; *Consumer Services*), firms in the oil and gas sector (*Oil and Gas*), and firms with higher news coverage (*Ln(News Article)*). In comparison with other industries, *Consumer Goods* firms are associated with a ten percentage points increase in the greenwashing allegations rate. Specifically, they experience a four percentage points increase in environmental-related allegations, an approximately eight percentage points increase in social-related allegations, and only a one percentage point increase in climate-related allegations. *Consumer Services* firms, likewise, are associated with an around five percentage points increase in greenwashing allegations. They exhibit an almost two percentage points increase for environmental allegations and a roughly four percentage points increase for social allegations. Meanwhile, *Oil and Gas* firms relate to a circa six percentage points increase in greenwashing allegations, with a particular concentration on environmental and climate-related ones. While these associations may be driven

by NGOs' private incentives, they signal the effectiveness of NGOs scrutinizing corporate sustainability claims if NGO criticism of visible firms spills over to and is internalized by less visible untargeted firms, if the most visible companies have the largest E&S impacts such that pressuring them to improve their E&S practices should be a priority, or if these companies are also those that have the strongest incentives to greenwash.

In line with intuition, consumer-facing firms are more likely to receive social-related greenwashing allegations, presumably because they have a greater impact in social concerns. *Oil and Gas* sector is more likely to be subject to environment-related (and climate-related) allegations but not to social ones, as it has the largest carbon footprint (e.g., Climate Trade 2023). Also, *Consumer Goods* companies are more likely than firms from other industries to experience *climate*-related greenwashing allegations while *Consumer Services* are not, presumably because the latter usually have a smaller carbon footprint than the former.

We also examine several other factors that may be related to companies' propensity to greenwash or to the risk of greenwashing allegations. We find no evidence that preparing sustainability reports following the GRI standards or purchasing assurance for these reports is associated with the probability of greenwashing allegations. This may not be surprising as Table 4 indicates that NGOs do not heavily focus on corporate sustainability reports. The insignificant associations suggest that the potential benefits from adhering to GRI standards and purchasing assurance may not spill over from sustainability reports tore firms' other E&S communications (see, Chen 2023). In addition, these findings contradict the notion that NGOs perceive sustainability report assurance as a credible signal of companies' commitment to transparent E&S reporting (see, Simnett et al. 2009).

In column 2, we find a positive and significant coefficient on *E&S Comp* that corresponds to a circa three percentage points increase in the greenwashing allegation rate, which seems

inconsistent E&S-based executive pay acting as a credible signal of companies' commitment to their E&S promises (see, Cohen et al. 2023).[9] Alternatively, the finding may reflect that executives who are paid for E&S performance, along with executives of more visible companies and of companies with greater E&S impacts on society, have stronger greenwashing incentives.

In column 3, we find that greenwashing allegations are less likely among companies for which independent sources such as media articles signal lower ESG reputation risk (i.e., higher *RepRisk Rating*). In contrast, column 7 shows that social-related greenwashing allegations are *more* common among firms with *better* social performance ratings from Refinitiv, which are mostly based on companies' disclosures (*Ln(S Score Refinitiv)*). While our manual data collection revealed no indication that NGOs rely on third-party ESG ratings, the evidence suggests that ratings based on independent information sources may be more reliable than ratings based on disclosures that were furnished by the rated companies. Finally, column 9 reveals that climate-related greenwashing allegations are more likely among firms with higher carbon emissions. Similar to the results for *Oil and Gas* companies, this may be due to high-pollution companies being more visible to shareholders and stakeholders and because these companies may have stronger incentives to greenwash.

4.3 Shareholder reaction to greenwashing allegations

Table 6 presents analyses of the predictions that the stock market reacts negatively to NGO greenwashing allegations (Hypothesis 2a; Panel A) and that this reaction is stronger for material allegations (Hypothesis 3a; Panel B). Panel A documents negative market-adjusted returns of 34 basis points in the three-day window centered on the day that the greenwashing allegation is

[9] We relate *E&S Comp* to the aggregate *Greenwashing* variable but not to *Environmental*, *Social*, or *Climate* because we are unable to tell which firms use E metrics and which firms use S metrics (or both) in executive compensation design. Similarly, in column 3, we relate *RepRisk Rating to* the aggregate *Greenwashing* indicator because the rating considers environmental, social, and governance dimensions. In contrast, in columns 5, 7, and 9, we can establish tighter links using E or S greenwashing dimensions and E or S performance ratings and emissions.

published. While this result is statistically significant and supports Hypothesis 2a, the magnitude of the response is modest, potentially reflecting variation in the financial materiality of NGOs' greenwashing allegations. Thus, in Panel B, we report analyses exploiting cross-sectional variation in the stock market reaction. Specifically, we estimate equation (2) using OLS with standard errors adjusted for clustering at the firm level. Similar to Panel A, the unit of analysis is the individual greenwashing allegations.

$$Stock\ Market\ Reaction_s = \beta \times Material\ Allegation_s + \Omega \times Controls + \varepsilon_s \quad (2)$$

where *Controls* represents a mix of firm-year-specific and allegation-specific control variables. Supporting Hypothesis 3a, columns 1 and 4 of Table 6 Panel B show that the stock market reaction is significantly more negative (about 50 basis points) for financially material NGO greenwashing allegations. Together with the observation that about 59 percent of all greenwashing allegations are material (see Table 1 Panel B), the findings in Table 6 thus provide some evidence that NGO scrutiny of corporate sustainability claims is important to shareholders. Further supporting this claim, columns 3 and 4 reveal that the market reaction to greenwashing allegations is more negative when ownership by institutional investors, who are supposedly more sensitive to E&S issues (e.g., Dyck et al. 2019) is higher. Finally, columns 2 and 4 show that *GRI Standards* also loads negatively and significantly, perhaps because the market expects less greenwashing by firms that follow these reporting standards.

4.4 Media reaction to greenwashing allegations

We next examine whether the media reacts to NGO greenwashing allegations because the media plays an important role in disseminating news about companies to investors, stakeholders, and the general public. Thus, the absence of a media reaction would indicate that NGO greenwashing allegations may go unnoticed and will thus not be very effective. Panel A of Table

7 documents a three percent increase in E&S-related news articles from the three days before to the three days after NGO greenwashing allegations. While statistically significant and in support of Hypothesis 2b, this magnitude is modest, potentially because the analysis may relate environment-related greenwashing allegations to social news, and vice versa, and because it does not account for the materiality of allegations. Thus, we examine variation in the news reaction by re-estimating equation (2) with three new dependent variables, namely the percentage change in the number of E&S-related news (*E&S News Coverage Change*), environment-related news (*E News Coverage Change*), or social-related news (*S News Coverage Change*) captured in RepRisk. Supporting Hypothesis 3b, in columns 1, 3, and 5 of Table 7 Panel B, we find strong evidence that material allegations are followed by an additional significant 13.7 percentage points E&S news coverage increase, even after controlling for past E&S news and the RepRisk rating.

In columns 2 and 3 (4 and 5), We examine whether environment-related news indeed responds to environment-related allegations (columns 2 and 3) while social-related news responds to social-related allegations (columns 4 and 5).[10] We find this to be true for environment-related greenwashing allegations but not social-related ones, irrespective of whether we control for materiality. In terms of magnitude, as shown in column (2), environment-related allegations are followed by an almost ten percentage points increase in environment-related news. This suggests that media may be more attentive to environmental than social greenwashing allegations, potentially because the former are more salient to the public in most sample countries than the latter.

4.5 Firms direct responses to greenwashing allegations

[10] Since *Environmental Allegation* and *Social Allegation* are mutually exclusive, we only include one of these two indicator variables in the analyses.

Target companies can neglect NGOs' greenwashing allegations to avoid signaling that such allegations may be important, or comment on these allegations in a conceding or resisting way. We observe direct responses for about 10 percent of NGO greenwashing allegations, often when a journalist asks the target company for comments for an article. To explore cross-sectional variation in responses, we re-estimate equation (2) with indicators for any direct response (*Corporate Response*), resistance (*Press Response Resistance*), or concession (*Press Response Concession*) as dependent variables using linear probability models (LPM).

Columns 1 and 2 of Table 8 show that the probability of any direct response (*Corporate Response*) is lower for material greenwashing allegations but only when not controlling for stock market and media reactions. While we do not find any significant associations between *Material Allegation* and *Press Response Resistance*, columns 5 and 6 both indicate that concessions (*Press Response Concession*) are less likely for material allegations. This suggests that firms are more reluctant to admit to greenwashing when it concerns material E&S issues, potentially because such an admission would have worse reputational or financial consequences. Related to this, we find that companies are more (less) likely to concede (resist) when the sentiment of the NGO allegation is more favorable. Overall, target firms seem less likely to concede to more serious allegations.

We find no evidence that the stock market reaction affects corporate direct responses while greater increases in media coverage make responses, and particularly resistance less likely. However, since the dependent variables also relate to the media since many direct responses are solicited by journalists, these findings must be interpreted with caution, and the same holds for the positive coefficients on firms' past news coverage (*Ln(News Articles)*).

4.6 Carbon emissions following climate washing allegations

To the extent that NGO scrutiny of corporate sustainability claims is effective, greenwashing allegations should be followed by substantive (rather than symbolic) reactions by target firms. We

test for such substantive reactions first by investigating firms' real activities. Specifically, we examine whether target companies reduce their greenhouse gas emissions after being subject to allegations that they greenwash their impacts on climate change (i.e., "climate washing"). We estimate equation (3) using OLS with standard errors adjusted for clustering at the firm-level. Since carbon emissions are reported annually, the unit of analysis is the *firm-year*.

$$Emissions_{i,t} = \gamma \times Climate\ Washing_{i,t-1} + \Omega \times Controls + \alpha_{ICB} + \alpha_{Country} + \alpha_{t} + \varepsilon_{i,t.} \quad (3)$$

Emissions is a vector representing either the natural logarithm of scope 1 carbon emissions (*Ln(GHG Emissions)*) or the year-over-year percentage change in scope 1 carbon emissions (*GHG Emissions Change*). *Climate Washing* is an indicator variable equal to one for firms were subject to climate-related greenwashing allegations in the prior year and equal to zero for firm-years with other greenwashing allegations or without any greenwashing allegations. *Controls* includes an indicator for whether emissions were self-reported by the company or estimated by the data provider TruCost (*GHG Emissions Estimated*), the natural logarithm of prior year emissions (*Ln(GHG Emissions) Lagged*), and an indicator variable for whether the firm received material greenwashing allegations (*Material*).

Table 9 shows significant negative associations between NGO climate-washing allegations and future carbon emissions in four out of five specifications. The coefficients in columns (2) and (3) indicate a reduction in emission levels by approximately seven to eight percent, while the coefficients in columns (4) to (6) suggest about a five to nine percentage points reduction in emission changes for firms facing climate-washing allegations compared to the rest. These results hold irrespective of whether we control for the presence of material greenwashing allegations and untabulated analyses show that they are unaffected when controlling for *E&S Comp.* The findings thus indicate that companies are making tangible changes following climate-washing allegations. While the analyses cannot speak to corporate real activities beyond those related to climate

impacts, they do provide further evidence that NGO scrutiny of corporate sustainability claims is beneficial.

4.7 E&S disclosure practices following greenwashing allegations

Besides changing their E&S activities, target firms could also respond to greenwashing allegations by altering their E&S communication. Therefore, we explore a variety of disclosure responses by estimating equation (4) with OLS or LPM and standard errors adjusted for clustering at the firm level. The unit of analysis is the firm-year.

$$E\&S\ Disclosure_{i,t} = \gamma \times Allegation_{i,t-1} + \Omega \times Controls + \alpha_{ICB} + \alpha_{Country} + \alpha_{t} + \varepsilon_{i,t.} \quad (4)$$

where *E&S Disclosure* is a vector of variables including the use of *GRI Standards*, the purchase of sustainability report *Assurance*, and the natural logarithms of Bloomberg's environmental (*Ln(E Disclosure Score)*) and social (*Ln(S Disclosure Score)*) disclosure quantity scores. Higher values of these last two variables indicate that the company is disclosing more of the individual E&S items that Bloomberg checks for in annual and sustainability reports and corporate websites. *Allegation* refers to indicator variables capturing whether the firm was subject to any greenwashing allegation (*Greenwashing*) or to environment-related (*Environmental*) or social-related (*Social*) greenwashing allegations in the prior year. We control for the lagged *E&S Disclosure* variables and for the existence of material allegations and, in untabulated analyses, for *E&S Comp*.

In Table 10, columns 1 to 4 do not provide evidence that firms facing greenwashing allegations try to increase the credibility of their disclosures by relying on GRI standards or independent assurance in the preparation of their sustainability reports in the future. However, columns 5 and 6 reveal that environment-related greenwashing allegations are associated with a up to three percent lower future environmental disclosure score. While this result may indicate that companies are reducing their environmental claims to align their communications with actual environmental practices, it may also reflect "greenhushing," where companies withhold

environmental information to minimize future scrutiny (see Rogers and Van Buskirk 2009; WEF 2022). In columns 7 and 8, we also find negative relations between social-related greenwashing allegations and the quantity of future social performance disclosures, but the results are not statistically significant. Overall, we find only modest evidence that NGO greenwashing allegations affect target companies' sustainability disclosures in outlets such as annual reports and sustainability reports, potentially because these communication channels are rarely referenced in NGO allegations (see Table 4). These findings suggest that NGO scrutiny of corporate sustainability claims complements the focus of financial markets regulators, indicating their importance in assessing sustainability claims.

5. Conclusion

In this study, we use novel and detailed data on NGO activism campaigns to examine whether these campaigns can facilitate scrutiny of corporate sustainability claims. We focus on NGOs because they have significant experience and expertise in monitoring companies' sustainability practices and have been shown in prior research to raise corporate reputation concerns.

The findings reveal several interesting descriptive indications regarding how and where companies greenwash, and which sustainability performance dimensions are misrepresented most frequently. The results also suggest that NGO scrutiny of corporate sustainability claims is beneficial, reflected for example in stock market reactions, media attention, and associations with target firms' future real activities.

Overall, this research contributes to the discussion of how to identify and prevent corporate greenwashing and indicates that NGO scrutiny may inform, and be complementary to, other mechanisms that are more frequently discussed in the literature such as sustainability reporting standard setting, assurance of sustainability reporting by external audits, and monitoring by financial markets regulators.

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Appendix A

Greenwashing Allegations by Company

Company	#	%
Nestle	77	6.4%
Coca Cola	70	5.8%
Mondelez	47	3.9%
Danone	36	3.0%
Kellogg	34	2.8%
Pepsico	33	2.8%
Exxon Mobil	30	2.5%
Chevron	28	2.3%
Procter & Gamble	26	2.2%
BP	24	2.0%
Ahold Delhaize	21	1.8%
Walmart	21	1.8%
General Mills	19	1.6%
McDonalds	19	1.6%
BNP Paribas	16	1.3%
Engie	15	1.3%
Total Energies	14	1.2%
Volkswagen	14	1.2%
Samsung	13	1.1%
Amazon	10	0.8%
Bayer	11	0.9%
L'Oreal	11	0.9%
Equinor	10	0.8%
H&M	10	0.8%
Others	589	49.2%
Total	1,198	

This Appendix lists sample firms subject to at least ten greenwashing allegations.

Appendix B

Greenwashing Allegations by NGO

NGO	#
Friends of the Earth	120
Greenpeace	90
Foodwatch	80
Corporate Europe Observatory	53
Verbraucherzentrale	49
Which?	48
Center for Science in the Public Interest	44
Union of Concerned Scientists	38
Rainforest Action Network	36
Observatoire des Multinationales	35
Corporate Accountability International	34
Konsument.at	34
Resistance a l'Agression Publicite	28
BankTrack	27
Changing Markets Foundation	24
Sierra Club U.S.A.	23
Stand.earth (ForestEthics)	23
350.org	21
Deutsche Umwelthilfe	21
Plastic Soup Foundation	20
Transnational Institute	20
Amazon Watch	19
BEUC	19
Clean Clothes Campaign International	17
Recycling Netwerk	16
Divest Invest Protect	15
Women's Earth and Climate Action Network	15
Ecologistas en Accion	14
Environmental Working Group	14
Proteste Brasil / Associao Brasileira de Defesa do Consumidor	14
Consumentenbond	12
DECO Proteste	12
Organic Consumers Association	11
ChemSec	10
Cornucopia Institute	10
UFC Que Choisir	10
Urgewald	10
Wakker Dier	10

This table presents the names of the NGOs that make at least ten greenwashing allegations in our sample.

Appendix C
Variable Definitions

Variable Name	Definition	Source
	Allegation Level Variables	
Environmental Allegation	Indicator equal to 1 for campaigns with environmental greenwashing allegations, equal to 0 for campaigns with social washing allegations.	*SigWatch, hand collection*
Social Allegation	Indicator equal to 1 for campaigns with climate-washing allegations, and equal to 0 for campaigns with environmental greenwashing allegations.	*SigWatch, hand collection*
Material Allegation	Indicator equal to 1 if the E&S topic (see Table 2) that the greenwashing allegation relates to is a material one for the target company given its industry membership, equal to 0 otherwise. Industry-level material E&S topics are identified using the SASB materiality map. For the broad E&S topics (Other Environment; Other Social) in Table 2, we use disaggregated information on the particular E&S topic that the allegation relates to.	*Sustainability Accounting Standards Board (SASB), hand collection*
Allegation Sentiment	Categorical variable for how negative the NGO's comments about the target firm are. A value of -2 (-1) implies strong (mild) criticism.	*SigWatch*
NGO Influence	Categorical variable for the NGO's reach and influence. Higher values indicate broader geographic reach and influence through greater and more international operations and coalitions.	*SigWatch*
Misleading Claim	Indicator equal to 1 for campaigns alleging that the company made a claim or statement about its environmental or social practices or outcomes that is not necessarily incorrect but creates the wrong impression among the audience, equal to 0 for campaigns with other allegations.	*SigWatch, hand collection*
False Claim	Indicator equal to 1 for campaigns alleging that the company made an incorrect statement about its environmental or social practices or outcomes, equal to 0 for campaigns with other allegations.	*SigWatch, hand collection*
Talk vs Action	Indicator equal to 1 for campaigns alleging that companies' practices and outcomes are inconsistent with publicly announced pledges or promises, according to the NGO.	*SigWatch, hand collection*
False Solution	Indicator equal to 1 for campaigns alleging that the company offered a false solution to solve environmental or social problems it encounters, equal to 0 for campaigns with other allegations.	*SigWatch, hand collection*
Information Hidden	Indicator equal to 1 for campaigns alleging that the company was hiding information about its ESG activities, equal to 0 for campaigns with other allegations.	*SigWatch, hand collection*
Information Omitted	Indicator equal to 1 for campaigns alleging that the company was omitting information about its ESG activities, equal to 0 for campaigns with other allegations.	*SigWatch, hand collection*
Other	Indicator equal to 1 for all remaining campaigns alleging that could not be allocated to Misleading Claim, False Claim, Talk vs. Action, False Solution, Information Hidden, or Information Omitted, equal to 0 otherwise.	*SigWatch, hand collection*
Stock Market Reaction	The three-day buy-and-hold return of the target firm from the day before to the day after the NGO allegation adjusted for the buy-and-hold return on the market index for the country where the firm is headquartered.	*Worldscope*

E&S News Coverage Change	The percentage change in the number of E&S-related news articles in RepRisk from the three days leading up to the NGO's greenwashing allegation to the three days afterward.	*RepRisk*
E&S News Coverage Before Allegation	The number of E&S-related news articles in RepRisk over the three days leading up to the NGO's greenwashing allegation.	*RepRisk*
E News Coverage Change	The percentage change in the number of environment-related news articles in RepRisk from the three days leading up to the NGO's greenwashing allegation to the three days afterward.	*RepRisk*
E News Coverage Before Allegation	The number of environment-related news articles in RepRisk over the three days leading up to the NGO's greenwashing allegation.	*RepRisk*
S News Coverage Change	The percentage change in the number of social-related news articles in RepRisk from the three days leading up to the NGO's greenwashing allegation to the three days afterward.	*RepRisk*
S News Coverage Before Allegation	The number of social-related news articles in RepRisk over the three days leading up to the NGO's greenwashing allegation.	*RepRisk*
Corporate Press Response	Indicator equal to 1 for campaigns that the firm responds to in the press within two months, equal to 0 for other campaigns.	*SigWatch, Factiva*
Press Response Resistance	Indicator equal to 1 for campaigns that the firm responds in the press within two months by denying or resisting the NGO's allegations, equal to 0 for other campaigns.	*SigWatch, Factiva*
Press Response Concession	Indicator equal to 1 for campaigns that the firm responds in the press within two months by conceding or admitting to (some of) the NGO's allegations, equal to 0 for other campaigns.	*SigWatch, Factiva*
	Firm-Year Level Variables	
Greenwashing	Indicator equal to 1 for firm-years with greenwashing allegations, equal to 0 otherwise.	*SigWatch*
Environmental	Indicator equal to 1 for firm-years with environmental greenwashing allegations, equal to 0 otherwise.	*SigWatch*
Climate Washing	Indicator equal to 1 for firm-years with climate washing allegations, equal to 0 otherwise. *Climate Washing* is a subset of the *Environmental* indicator variable.	*SigWatch*
Social	Indicator equal to 1 for firm-years with social greenwashing allegations, equal to 0 otherwise.	*SigWatch*
Material	Indicator equal to 1 for firm-years with material allegations, equal to 0 otherwise (see definition for allegation-specific indicator variable *Material Allegation* above).	*SASB, SigWatch own coding*
Consumer Goods	Indicator equal to 1 for firms in the ICB consumer goods industry, equal to 0 otherwise.	*Corporate Register*
Consumer Services	Indicator equal to 1 for firms in the ICB consumer services industry, equal to 0 otherwise.	*Corporate Register*
Oil & Gas	Indicator equal to 1 for firms in the ICB oil and gas industry, equal to 0 otherwise.	*Corporate Register*
GHG Emissions	The amount of Scope 1 CO2 and CO2-equivalent emissions measured in tonnes.	*TruCost*
GHG Emissions Change	The annual percentage change in the amount of Scope 1 CO2 and CO2-equivalent emissions.	*TruCost*
GHG Emissions Estimated	Indicator equal to 1 if TruCost indicates that it estimated the Scope 1 greenhouse gas emissions, equal 0 if the emission number was obtained from firm disclosures	*TruCost*
E Disclosure Score	Bloomberg's environmental disclosure score ranges from 0.1 for firms that disclose a minimum amount of environmental data to 100 for firms that disclose every data point that Bloomberg collects. These data points relate to disclosures about the firm's	*Bloomberg*

	risks, policies, and impacts regarding air quality, climate change, biodiversity, energy, waste, environmental supply chain management, and water consumption.	
S Disclosure Score	Bloomberg's social disclosure score ranges from 0.1 for firms that disclose a minimum amount of social data to 100 for firms that disclose every data point that Bloomberg collects. These data points relate to disclosures about the firm's risks, policies, and impacts regarding community, customers, diversity, ethics, employee safety, human capital development, and employee-related supply chain management.	*Bloomberg*
GRI Standards	Indicator equal to 1 if the firm followed any of the Global Reporting Initiative's sustainability reporting standards in its sustainability report, equal to 0 otherwise.	*Corporate Register*
Assurance	Indicator equal to 1 for firm-years in which the firm has its sustainability reports assured, equal to 0 otherwise.	*Corporate Register*
Institutional Ownership	The ratio of the firm's shares owned by institutional owners to total shares outstanding.	*FactSet*
E&S Comp	Indicator equal to 1 for firm-years in which executive compensation is partly dependent on environmental or social metrics, equal to 0 otherwise.	*Refinitiv ESG*
RepRisk Rating	Categorical variable capturing a company's reputational risk exposure to ESG issues based on publicly available third-party (e.g., news media) information about a company's ESG practices, outcomes, or risks.	*RepRisk*
E Score Refinitiv	The environmental pillar score underlying Refinitiv's ESG rating, captures information companies disclose about resource use, emissions, and environmental innovation.	*Refinitiv ESG*
S Score Refinitiv	The social pillar score underlying Refinitiv's ESG rating, capturing information companies disclose about employment quality, health and safety, training and development, diversity, human rights, community involvement, and product safety.	*Refinitiv ESG*
News Articles	The number of news articles related to the firm during the fiscal year.	*Ravenpack*
Assets	Book value of total assets (WC02999).	*Worldscope*
ROA	Earnings before interest and taxes (WC18191) scaled by lagged total assets (WC02999).	*Worldscope*
Sales Growth	Annual change in sales revenue scaled by prior year sales revenue (WC01001).	*Worldscope*
Tangibility	Property, plant, and equipment (WC02501) scaled by total assets (WC02999).	*Worldscope*
Tobin's Q	Ratio of total debt (WC03255) and the market value of equity (WC08001) to the book value of total assets (WC02999).	*Worldscope*
NGO Activity	Number of any NGO campaigns (i.e., not just related to greenwashing) in a given country and year.	*SigWatch*

This Appendix provides variable definitions and sources. Continuous variables are winsorized at 1st and 99th percentiles.

Table 1
Summary Statistics

Panel A. Firm-Year Level Analyses

	No Greenwashing Allegations						Greenwashing Allegations						*Diff. in means*
	Mean	SD	P25	Median	P75	N	Mean	SD	P25	Median	P75	N	*p value*
Environmental	0.00	0.00	0.00	0.00	0.00	11,264	0.61	0.49	0.00	1.00	1.00	655	-
Social	0.00	0.00	0.00	0.00	0.00	11,264	0.50	0.50	0.00	0.00	1.00	655	-
Climate	0.00	0.00	0.00	0.00	0.00	11,264	0.38	0.49	0.00	0.00	1.00	655	-
Material	0.00	0.00	0.00	0.00	0.00	11,264	0.59	0.49	0.00	1.00	1.00	655	-
GHG Emissions (in tCO2e)	3,216,754	10,343,088	18,781	110,482	709,422	9,796	8,266,312	18,144,412	79,064	719,263	3,974,970	556	*0.00*
GHG Emissions Change	0.04	0.46	-0.11	-0.01	0.09	9,547	0.01	0.33	-0.10	-0.02	0.06	545	*0.14*
GHG Emissions Estimated	0.14	0.35	0.00	0.00	0.00	9,796	0.04	0.19	0.00	0.00	0.00	556	*0.00*
Assurance	0.40	0.49	0.00	0.00	1.00	11,264	0.56	0.50	0.00	1.00	1.00	655	*0.00*
GRI Standards	0.56	0.50	0.00	1.00	1.00	11,264	0.70	0.46	0.00	1.00	1.00	655	*0.00*
E Disclosure Score	37.44	18.30	24.65	37.84	50.54	10,516	45.27	16.43	35.59	43.61	58.17	644	*0.00*
S Disclosure Score	29.75	12.81	20.01	28.75	38.41	10,516	35.65	12.78	26.45	35.50	44.27	644	*0.00*
E&S Comp	0.40	0.49	0.00	0.00	1.00	9,749	0.61	0.49	0.00	1.00	1.00	604	*0.00*
Consumer Goods	0.14	0.35	0.00	0.00	0.00	11,264	0.33	0.47	0.00	0.00	1.00	655	*0.00*
Consumer Services	0.11	0.31	0.00	0.00	0.00	11,264	0.18	0.38	0.00	0.00	0.00	655	*0.00*
Oil & Gas	0.04	0.20	0.00	0.00	0.00	11,264	0.09	0.28	0.00	0.00	0.00	655	*0.00*
Institutional Ownership	0.40	0.29	0.18	0.31	0.63	11,264	0.46	0.25	0.25	0.41	0.70	655	*0.00*
News Articles	2,532	5,841	322	843	2,211	11,264	9,927	13,109	1,924	4,278	11,514	655	*0.00*
Assets (in $millions)	1,873	9,039	5	21	173	11,264	3,009	13,503	21	70	233	655	*0.00*
ROA	0.08	0.08	0.03	0.07	0.12	11,264	0.08	0.08	0.03	0.07	0.13	655	*0.38*
Tangibility	0.30	0.25	0.09	0.23	0.47	11,264	0.30	0.21	0.14	0.25	0.45	654	*0.92*
Tobin's Q	1.37	1.18	0.68	1.01	1.65	11,264	1.49	1.29	0.67	1.06	1.92	655	*0.01*
Sales Growth	0.06	0.16	-0.02	0.04	0.11	11,264	0.02	0.13	-0.03	0.02	0.08	653	*0.00*
E Score Refinitiv	61.87	21.44	47.29	64.92	79.31	9,885	75.82	16.97	68.06	80.54	87.98	617	*0.00*
S Score Refinitiv	62.16	19.81	48.66	64.35	77.69	9,930	75.87	17.02	67.58	79.97	88.63	620	*0.00*
NGO Activity	1,333	1,614	206	539	2,067	11,264	1,926	1,714	495	1,298	3,176	655	*0.00*

Panel B. Allegation Level Analyses

	N	Mean	SD	P25	Median	P75
Environmental Allegation	1,198	0.49	0.50	0.00	0.00	1.00
Social Allegation	1,198	0.51	0.50	0.00	1.00	1.00
Material Allegation	1,198	0.53	0.50	0.00	1.00	1.00
Stock Market Reaction	1,117	0.00	0.03	-0.02	0.00	0.01
E&S News Coverage Change	1,169	0.03	0.48	0.00	0.00	0.00
E News Coverage Change	1,169	0.00	0.41	0.00	0.00	0.00
S News Coverage Change	1,169	0.03	0.44	0.00	0.00	0.00
Corporate Press Response	1,198	0.10	0.30	0.00	0.00	0.00
Press Response Resistance	1,198	0.06	0.24	0.00	0.00	0.00
Press Response Concession	1,198	0.04	0.18	0.00	0.00	0.00
Allegation Sentiment	1,198	-1.64	0.48	-2.00	-2.00	-1.00
GRI Standards	1,147	0.69	0.46	0.00	1.00	1.00
Assurance	1,147	0.58	0.49	0.00	1.00	1.00
Institutional Ownership	1,198	0.48	0.23	0.30	0.44	0.70
News Articles	1,198	10,845	13,770	2,521	5,567	12,385
E&S News Coverage Before Allegation	1,169	0.36	0.76	0.00	0.00	0.00
E News Coverage Before Allegation	1,169	0.25	0.59	0.00	0.00	0.00
S News Coverage Before Allegation	1,169	0.25	0.61	0.00	0.00	0.00
RepRisk Rating	1,129	5.36	1.48	4.00	5.00	6.00
NGO Influence	1,198	1.35	0.56	1.00	1.00	1.50
Assets (in $millions)	1,198	2,076	11,216	31	83	200
Tobin's Q	1,198	1.61	1.24	0.73	1.28	2.16
ROA	1,198	0.09	0.08	0.04	0.09	0.13

Panel A of this table provides summary statistics for the variables used in the firm-year level regression analyses separately for firm-years with and without greenwashing allegations. Panel B focuses on the variables used in the allegation-level analyses. The sample includes the years 2011 to 2022. Variable definitions are provided in Appendix C.

Table 2

Greenwashing Allegations by E&S Topic

E&S Topics	#	%
Environmental Allegation		
Climate Change	361	30.1
Waste	135	11.3
Biodiversity	39	3.3
Other Environment	53	4.4
Social Allegation		
Consumer Health	264	22.0
Transparent Pricing	102	8.5
Other Product Quality	70	5.8
Other Consumer	64	5.3
Animal Welfare	50	4.2
Employee Rights, Health and Safety	43	3.6
Other Social	17	1.4
Total	1,198	

This table presents NGO greenwashing allegations broken down by the environmental and social (E&S) topics that the greenwashing allegation refers to. The unit of observation is the NGO allegation.

Table 3

Greenwashing Allegations by Presentation or Obfuscation Style

Style	# Greenwashing Allegations	# Environmental	% Environmental	# Social	% Social
Misleading Claim	434	115	26.5	319	73.5
Talk vs Action	164	132	80.5	32	19.5
False Claim	163	76	46.6	87	53.4
False Solution	91	78	85.7	13	14.3
Information Hidden	85	0	0.0	85	100.0
Information Omitted	80	41	51.3	39	48.8
Other	181	146	80.7	35	19.3
Total	1,198	588	49.1	610	50.9

This table presents NGO greenwashing allegations broken down by the presentation or obfuscation style through which the firm is greenwashing according to the NGO and by the environmental and social (E&S) dimensions. The unit of observation is the NGO allegation.

Table 4
Greenwashing Allegations by Disclosure Outlet

Disclosure Outlet	# Greenwashing Allegations	# Environmental	% Environmental	# Social	% Social
Advertising	247	95	38.5	152	61.5
CSR Commitment	30	16	53.3	14	46.7
Certification	38	23	60.5	15	39.5
Corporate Website	10	4	40.0	6	60.0
Environmental Commitment	88	88	100.0	0	0.0
Financial Report or Presentation	6	6	100.0	0	0.0
Impact Assessment	4	3	75.0	1	25.0
Label or Packaging	271	33	12.2	238	87.8
PR Campaign	142	109	76.8	33	23.2
Product Information	140	16	11.4	124	88.6
Sponsorship	84	73	86.9	11	13.1
Sustainability Report	5	2	40.0	3	60.0
Total	1,065	468	43.9	597	56.1

This table presents NGO greenwashing allegations broken down by the disclosure outlet in which the firm is greenwashing and by the environmental and social (E&S) dimensions. The number of cases is less than the total number of greenwashing allegations in the sample (1,198) because information on the disclosure outlet is not always available. The unit of observation is the NGO allegation.

Table 5
Greenwashing Allegation Antecedents

	Greenwashing			Environmental		Social		Climate	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Consumer Goods	0.095***	0.103***	0.099***	0.037***	0.039***	0.079***	0.081***	0.009*	0.009*
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.00)	(0.00)
Consumer Services	0.052***	0.055***	0.059***	0.017***	0.017**	0.044***	0.043***	0.004	0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Oil & Gas	0.066***	0.065***	0.057**	0.068***	0.070***	0.006	0.006	0.065***	0.071***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)
Assurance	0.006	-0.001	0.001	0.008	0.007	0.000	-0.005	0.004	0.000
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
GRI Standards	0.006	0.008	0.002	0.002	0.003	0.003	0.003	0.000	0.000
	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
Institutional Ownership	-0.026	-0.036*	-0.035	-0.007	-0.004	-0.025*	-0.028*	-0.004	-0.003
	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Ln(News Articles)	0.010***	0.011***	0.007***	0.007***	0.008***	0.005***	0.005***	0.005***	0.010***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln(Assets)	0.030***	0.031***	0.024***	0.021***	0.024***	0.013***	0.013***	0.016***	0.012***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.044	0.049	0.037	0.006	0.009	0.032	0.037	-0.001	0.015
	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)	(0.03)	(0.04)	(0.02)	(0.02)
Tangibility	0.036***	0.036***	0.043***	0.025***	0.035***	0.019**	0.026***	0.012*	0.009
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tobin's Q	0.014***	0.015***	0.014***	0.006***	0.008***	0.012***	0.012***	0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sales Growth	-0.052***	-0.057***	-0.049***	-0.042***	-0.049***	-0.018**	-0.020**	-0.033***	-0.021**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(NGO Activity)	0.027***	0.030***	0.028***	0.012*	0.014*	0.014***	0.015***	0.006	0.007
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
E&S Comp		0.029***							
		(0.01)							
RepRisk Rating			-0.030***						
			(0.00)						
Ln(E Score Refinitiv)					0.002				
					(0.00)				
Ln(S Score Refinitiv)							0.016***		
							(0.01)		
Ln(GHG Emissions)									0.002*
									(0.00)
Year & Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,884	10,319	9,048	11,884	10,470	11,884	10,516	11,884	10,094
Adjusted R-Squared	0.105	0.112	0.135	0.079	0.085	0.072	0.074	0.070	0.072

This table presents results for OLS analyses examining the antecedents of firms being subject to a greenwashing allegation. The unit of analysis is the firm-year. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. All independent variables are measured prior to the dependent ones except Ln(NGO Activity), which is measured contemporaneously with the dependent variables. All variables are defined in Appendix C.

Table 6

Stock Market Reaction to Greenwashing Allegations

Panel A. Univariate Analysis of Stock Market Reaction

Mean	Std. Error	N	t value	p value
-0.0034	0.0009	1,117	-3.821	0.000

Panel B. Regression Analyses

	Stock Market Reaction			
	(1)	(2)	(3)	(4)
Material Allegation	-0.005**			-0.005**
	(0.00)			(0.00)
GRI Standards		-0.004*		-0.005**
		(0.00)		(0.00)
Assurance		-0.000		-0.001
		(0.00)		(0.00)
Institutional Ownership			-0.013***	-0.015***
			(0.00)	(0.01)
Ln(News Articles)	-0.000	-0.001	-0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Allegation Sentiment	0.002	0.002	0.002	0.001
	(0.00)	(0.00)	(0.00)	(0.00)
NGO Influence	-0.001	-0.002*	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Ln(Assets)	-0.001	-0.001	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Tobin's Q	0.001	-0.000	0.001	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
ROA	-0.021	-0.005	-0.014	-0.011
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	1,117	1,066	1,117	1,066
Adjusted R-Squared	0.006	0.004	0.010	0.020

This table presents results for analyses examining the stock market reaction in the three days around greenwashing allegations. Panel A shows a test of whether the average stock market reaction is different from 0. Panel B provides insights into the antecedents of the stock market reaction. The unit of analysis is the individual greenwashing allegation. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. All independent variables are measured prior to the dependent ones. All variables are defined in Appendix C.

Table 7
News Reaction to Greenwashing Allegations

Panel A. Univariate Analysis of Change In E&S News Coverage Around Greenwashing Allegations

Mean	Std. Error	N	t value	p value
0.0303	0.0140	1,169	2.167	0.031

Panel B. Regression Analyses

	E&S News Coverage Change (1)	E News Coverage Change (2)	E News Coverage Change (3)	S News Coverage Change (4)	S News Coverage Change (5)
Material Allegation	0.137***		0.111***		0.067**
	(0.03)		(0.02)		(0.03)
Environmental Allegation		0.098***	0.053***		
		(0.02)	(0.02)		
Social Allegation				-0.035	-0.008
				(0.02)	(0.02)
GRI Standards	-0.038	-0.016	-0.022	-0.034	-0.037
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
Assurance	0.025	0.018	0.021	0.015	0.017
	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)
E&S News Coverage Before Allegation	-0.384***				
	(0.03)				
E News Coverage Before Allegation		-0.418***	-0.422***		
		(0.03)	(0.03)		
S News Coverage Before Allegation				-0.455***	-0.455***
				(0.03)	(0.03)
RepRisk Rating	-0.048***	-0.048***	-0.047***	-0.040***	-0.038***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(News Articles)	0.023*	0.007	0.003	0.026**	0.024**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Institutional Ownership	-0.156**	-0.062	-0.078	-0.158**	-0.167**
	(0.08)	(0.06)	(0.06)	(0.07)	(0.07)
Allegation Sentiment	-0.032	-0.049***	-0.047***	-0.030	-0.028
	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)
NGO Influence	0.021	-0.007	-0.013	0.011	0.007
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln(Assets)	0.002	-0.014*	-0.014*	0.007	0.007
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Tobin's Q	0.039*	-0.009	-0.004	0.038*	0.041**
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)
ROA	-0.080	-0.082	-0.038	-0.146	-0.119
	(0.26)	(0.16)	(0.16)	(0.24)	(0.25)
Observations	1,070	1,070	1,070	1,070	1,070
Adjusted R-Squared	0.337	0.331	0.344	0.368	0.371

This table presents results for analyses of the change in the number of E&S news articles about the focal firm in the three days following greenwashing allegations to the three days prior. Panel A shows a test of whether the average change in the number of E&S news articles around greenwashing allegations is positive and statistically different from 0. Panel B presents results for OLS regression analyses examining the determinants of the change in the number of E&S news articles. The unit of analysis is the individual greenwashing allegation. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. All independent variables are measured prior to the dependent ones. All variables are defined in Appendix C.

Table 8
Direct Corporates Responses to Greenwashing Allegations

	Corporate Press Response		Press Response Resistance		Press Response Concession	
	(1)	(2)	(3)	(4)	(5)	(6)
Material Allegation	-0.033*	-0.020	-0.008	0.003	-0.025**	-0.023*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Stock Market Reaction		0.320		0.494		-0.174
		(0.35)		(0.33)		(0.14)
E&S News Coverage Change		-0.043*		-0.039**		-0.004
		(0.02)		(0.02)		(0.01)
GRI Standards	-0.011	-0.010	-0.006	-0.006	-0.004	-0.004
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Assurance	0.009	0.003	-0.009	-0.016	0.018*	0.019*
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Ln(News Articles)	0.013***	0.017***	0.008*	0.012**	0.005***	0.005**
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
Institutional Ownership	-0.013	-0.026	0.007	-0.002	-0.020	-0.024
	(0.04)	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)
Allegation Sentiment	-0.000	0.008	-0.044***	-0.039***	0.044***	0.046***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
NGO Influence	0.048***	0.045**	0.019	0.014	0.029**	0.031**
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(Assets)	-0.007	-0.007	-0.004	-0.005	-0.003	-0.002
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Tobin's Q	0.015	0.016	0.006	0.007	0.009	0.009
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ROA	-0.120	-0.085	-0.152	-0.151	0.032	0.066
	(0.18)	(0.19)	(0.16)	(0.16)	(0.08)	(0.08)
Observations	1,147	1,043	1,147	1,043	1,147	1,043
Adjusted R-Squared	0.011	0.013	0.006	0.014	0.025	0.024

This table presents results for OLS analyses examining the target company's response in the press in the two months following greenwashing allegations. The unit of analysis is the individual greenwashing allegation. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. All independent variables are measured prior to the dependent ones except Stock Market Reaction and E&S News Coverage Change, which may be contemporaneous. All variables are defined in Appendix C.

Table 9
Climate Washing Allegations and Future GHG Emissions

	Ln(GHG Emissions)			GHG Emissions Change		
	(1)	(2)	(3)	(4)	(5)	(6)
Climate Washing	0.152	-0.067***	-0.080**	-0.061***	-0.052**	-0.092**
	(0.14)	(0.03)	(0.04)	(0.02)	(0.02)	(0.04)
Material			0.016			0.047
			(0.03)			(0.04)
Assurance	0.103	-0.005	-0.005	-0.028***	-0.022**	-0.022**
	(0.08)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
GRI Standards	-0.011	0.001	0.001	-0.003	-0.003	-0.004
	(0.07)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Institutional Ownership	-0.042	-0.045	-0.045	-0.045	-0.047	-0.046
	(0.25)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Ln(News Articles)	0.063**	0.002	0.002	-0.002	0.001	0.001
	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln(Assets)	0.815***	0.049***	0.049***	-0.008	0.025***	0.025***
	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ROA	0.760*	-0.081	-0.081	-0.098	-0.057	-0.058
	(0.46)	(0.17)	(0.17)	(0.10)	(0.10)	(0.10)
Tangibility	3.679***	0.267***	0.266***	0.021	0.170***	0.170***
	(0.25)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)
Tobin's Q	-0.219***	-0.004	-0.004	0.011	0.001	0.001
	(0.04)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Sales Growth	-0.259*	0.087	0.087	0.137***	0.123***	0.124***
	(0.13)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)
Ln(NGO Activity)	-0.067	0.047	0.047	0.050**	0.045*	0.044*
	(0.07)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)
GHG Emissions Estimated	0.499***	0.116***	0.116***	0.037**	0.054***	0.054***
	(0.10)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Ln(GHG Emissions) *(Lagged)*		0.954***	0.953***		-0.041***	-0.041***
		(0.01)	(0.01)		(0.00)	(0.00)
Year, Industry, Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,687	9,472	9,472	9,449	9,449	9,449
Adjusted R-Squared	0.687	0.968	0.968	0.015	0.034	0.034

This table presents results for OLS analyses examining the relation between climate-washing allegations and Scope 1 GHG emissions. The unit of analysis is the firm-year. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. All independent variables are measured prior to the dependent ones. All variables are defined in Appendix C.

Table 10
Greenwashing Allegations and Future E&S Disclosure

	Assurance		GRI Standards		Ln(E Disclosure Score)		Ln(S Disclosure Score)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greenwashing	0.014		0.001					
	(0.02)		(0.02)					
Environmental					-0.022***	-0.029*		
					(0.01)	(0.02)		
Social							-0.010	-0.009
							(0.01)	(0.01)
Material		0.011		-0.011		0.010		-0.002
		(0.02)		(0.02)		(0.02)		(0.01)
Assurance *(Lagged)*	0.718***	0.718***	0.039***	0.039***	0.008	0.008	0.016***	0.016***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
GRI Standards *(Lagged)*	0.064***	0.064***	0.690***	0.690***	0.030***	0.030***	0.029***	0.029***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Ln(E Disclosure Score) *(Lagged)*					0.767***	0.767***		
					(0.01)	(0.01)		
Ln(S Disclosure Score) *(Lagged)*							0.740***	0.740***
							(0.02)	(0.02)
Institutional Ownership	-0.047**	-0.048**	-0.008	-0.008	0.014	0.014	0.015	0.015
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Ln(News Articles)	0.004**	0.004**	0.002	0.003	0.001	0.001	0.002	0.002
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Ln(Assets)	0.018***	0.018***	0.015***	0.015***	0.017***	0.017***	0.009***	0.009***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ROA	0.103**	0.103**	0.072	0.072	0.095	0.095	0.084**	0.084**
	(0.05)	(0.05)	(0.06)	(0.06)	(0.07)	(0.07)	(0.04)	(0.04)
Tangibility	0.020	0.020	0.010	0.010	0.073***	0.073***	0.012	0.012
	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Tobin's Q	0.005	0.005	-0.002	-0.002	-0.001	-0.001	-0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
Sales Growth	-0.023	-0.023	0.008	0.008	0.050*	0.050*	0.018	0.018
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)
Ln(NGO Activity)	-0.026**	-0.026**	-0.015	-0.014	0.016	0.016	0.015	0.015
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
Year, Industry, Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,140	11,140	11,140	11,140	10,371	10,371	10,371	10,371
Adjusted R-Squared	0.646	0.646	0.613	0.613	0.825	0.825	0.842	0.842

This table presents results for OLS analyses examining the relation between greenwashing allegations and future environmental and social (E&S) disclosure practices. The sample includes the years 2011 to 2022. The unit of analysis is the firm-year. Standard errors appear below the coefficients and are clustered by firm. *, **, *** indicate statistical significance at the 10, 5, 1% level, respectively. Independent variables with the subscript t-1 are measured for the year before the fiscal year for which the dependent variable is measured. All independent variables are measured prior to the dependent ones. All variables are defined in Appendix C.