

## The Cost of Broken Promises: Does a Firm's Environmental Footprint Affect Its Brand Equity?

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### ABSTRACT

Do customers punish a firm that harms the natural environment? We answer this question by examining the relationship between a firm's environmental footprint and customers' perceptions, as reflected in customer-based brand equity. Our empirical analysis shows that a firm's environmental footprint is negatively associated with its brand equity. Furthermore, the firm's advertising and CSR reputation aggravate this negative association. These results are consistent with the notion that customers view a large environmental footprint as a violation of the firm's brand promise. Follow-up analysis indicates that the association between a firm's environmental footprint and its brand equity is driven by resource use, rather than pollution, suggesting that customers interpret a firm's high resource use as a promissory violation. Additionally, the firm's environmental footprint is negatively associated with its brand stature but not its strength. The findings contribute to the environmental ethics literature and the brand-as-promise framework.

*Keywords:* Environmental footprint, brand equity, advertising, CSR reputation, brand-as-promise

### INTRODUCTION

Business ethicists have studied customer responses to a firm's unethical actions.

Unethical firm actions may be legal (e.g., increasing prices of essential goods during a disaster to exploit vulnerable populations) or illegal (e.g., employing child labor, bribing government officials) (Brunk 2010, 2012; Dalman, Buche, and Min 2019). A firm's unethical behavior violates any implicit *promise*<sup>1</sup> of ethical conduct, potentially drawing a punitive reaction from customers. While the theory and prior evidence are insightful, they fall short of explaining how customers might react to a firm's activity that is (1) central to its business (and thus legal), (2) potentially a part of the firm's implicit promise to its customers, but (3) *arguably* unethical. Our research addresses this omission in the ethically contentious context of a firm's *environmental*<sup>2</sup> *footprint*, which we define as the costs to the natural environment resulting from the firm's operations (Bolton and Kacperczyk 2021; Ghoul, Guedhami, Kim, and Park 2018; Krüger,

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<sup>1</sup> A *promise* "is a relational action entailing the communication of intentions to bring about a future state of affairs beneficial to the one to whom the promise is made" (Anker, Kappel, Eadie, and Sandøe 2012, p. 267).

<sup>2</sup> We use the word "environment" to refer to the natural environment (and not, for example, a firm's business environment).

Sautner, and Starks 2020; Ungemach et al. 2025).<sup>3</sup> A firm's environmental footprint is ethically ambivalent because customers can perceive it as a cost of conducting business, and thus, not necessarily a violation of the firm's promise to its customers. Therefore, we ask: *How is a firm's environmental footprint associated with its brand equity?*

We employ the brand-as-promise framework (Anker, Kappel, Eadie, and Sandøe 2012; Bhargava and Bedi 2022; Calonius 2006; Davcik, da Silva, and Hair 2015) as our conceptual foundation. Built on Scanlon's (1990, 2000) expectation view of promises, this framework positions a brand as the firm's promise to its customers. Prior research has suggested that a brand makes *implicit* promises (Anker, Kappel, Eadie, and Sandøe 2012; Calonius 2006; Grönroos 2009). Drawing on this framework, we reason that a brand implicitly promises not to harm nature (Levitt 1981; Misani 2020; Sagoff 1974). Violating this promise might elicit a morally charged response from the firm's customers. This response would manifest as a negative association between a firm's environmental footprint and its brand equity (Nickerson et al. 2022). Our analysis of observational data confirms this association. Next, we adopt a process-by-moderation research design (Vancouver and Carlson 2015) to provide indirect evidence supporting our promissory violation mechanism. Specifically, we propose that (1) customers' awareness of the firm (Öberseder, Schlegelmilch, and Gruber 2011; Servaes and Tamayo 2013) and (2) the firm's prior reputation (Klein and Dawar 2004) increase customer interpretation that its environmental footprint has violated the implicit promise. Accordingly, we choose the firm's *advertising spending* and *corporate social responsibility (CSR) reputation* as the two moderators of the association between the firm's environmental footprint and its brand equity. Empirical results indicate that the moderators exacerbate the negative association between environmental

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<sup>3</sup> Tables A1 and A2 in Web Appendix A summarize the literature on environmental footprint's outcomes and brand equity's determinants.

footprint and brand equity. These findings advise managers to limit their advertising spending to mitigate the environmental footprint's negative association with brand equity (Liu, Shankar, and Yun 2017) and that CSR reputation acts as a liability, not an asset, in shaping customer response to a firm's environmental footprint (Liu, Liu, Wang, and Xu 2020). Our supplementary analyses suggest that a firm's resource use, rather than its pollution, is associated with its brand equity. Lastly, the brand-equity loss spillovers to increase the firm's credit risk, indicating a pathway from environmental footprint to financial outcomes.

Our research contributes to environmental ethics<sup>4</sup> literature (e.g., Chang 2011; Kulkarni 2000). This literature has theorized that a firm's stakeholders have asymmetric information regarding its environmental footprint (Kulkarni 2000). Managers may exploit this asymmetry by failing to abate pollutant releases and/or drawing disproportionately from natural resources. However, the "invisible hand" will penalize firms that continue this unethical behavior (Kulkarni 2000). Consistent with this theory, we show that a firm's environmental footprint elicits undesired responses from customers and creditors. More broadly, our research falls within the tradition that considers nature a stakeholder (Phillips and Reichart 2000). Failing to preserve nature will elicit punitive responses from other stakeholders, suggesting the interdependencies among stakeholders.

Additionally, we apply the brand-as-promise framework (Bhargava and Bedi 2022; Davcik, da Silva, and Hair 2015) to a firm's environmental footprint, which we propose violates the firm's *implicit* promise to its customers. Also, we identify managerially relevant moderators that can exacerbate customers' perceived promise violation. Interestingly, customers are punitive toward the firm's resource use rather than its pollution, suggesting an asymmetry in how

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<sup>4</sup> Environmental ethics refers to "the total ethical belief, value, and norm of environmental concerns within a company" (Chang 2011, p. 364).

customers interpret the firm's promissory violations (Greenwood and Freeman 2017).

Furthermore, our findings suggest that the firm's customer response is associated with its financial outcomes.

## LITERATURE

We examine the association of a firm's environmental footprint with its brand equity. Accordingly, we begin our literature summary by discussing the empirical evidence on environmental footprint, followed by the evidence on the determinants of a firm's brand equity (for tabular summaries, see Web Appendix A, Tables A1 and A2, respectively).

### **Environmental Footprint**

A firm's environmental footprint refers to the cost the natural environment bears as a direct and indirect result of the firm's activities (Bolton and Kacperczyk 2021; Krüger, Sautner, and Starks 2020; Kulkarni 2000). Direct costs are incurred because of the firm's manufacturing and consumption of energy commodities. In contrast, indirect costs are caused by—among others—employees' work-related travel, suppliers' production of materials purchased by the firm, and customers' use of products and services sold by the firm (Garvey, Iyer, and Nash 2018). These direct and indirect costs can manifest as greenhouse gas (GHG) emissions, waste production, water abstraction, natural resource use, and raw material extraction (Delmas, Nairn-Birch, and Lim 2015). We structure our summary of the literature along three themes: environmental footprint's (1) measures (because environmental footprint is a relatively new variable), (2) determinants, and (3) consequences (i.e., effects on firm performance outcomes).

*Environmental footprint's measures:* Prior research has measured a firm's environmental footprint by its performance ratings from databases, such as the Morgan Stanley Capital International Kinder, Lydenberg, and Domini STATS databases (Fernando, Sharfman, and Uysal

2017), or by analyzing the firm's responses to the Carbon Disclosure Project questionnaire (Haney 2017). Yet other research has relied on a firm's reported emissions of toxic chemicals in the U.S. Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI) database (<https://www.epa.gov/enviro/tri-overview>) (Hart and Ahuja 1996; Hsu, Li, and Tsou 2021). Lastly, a firm's environmental footprint has been measured by its GHG<sup>5</sup> emissions (Bolton and Kacperczyk 2021; Delmas, Etzion, and Nairn-Birch 2013; Delmas and Nairn-Birch 2011; Ghoul, Guedhami, Kim, and Park 2018; Hsu, Li, and Tsou 2021). Firms follow the Greenhouse Gas Protocol,<sup>6</sup> which classifies a firm's GHG emissions by the *source* that emits the GHGs. A firm's Scope 1 (or direct) emissions are GHG emissions at sources/establishments the firm owns or manages. Scope 2 (or indirect) emissions are GHG emissions from the firm's energy suppliers—that is, suppliers that produce the energy (e.g., electricity, heat, steam) the firm purchases. Scope 3 (also indirect) emissions occur at the establishments of the firm's nonenergy suppliers and customers' use of its offerings and their post-usage disposal.

*Environmental footprint's determinants:* According to prior research, a firm's supply chain and ownership are two determinants of its environmental footprint. Specifically, the more a firm offshores its production to low-wage countries, the less toxic chemicals its domestic plant releases (Li and Zhou 2017). The complexity of a firm's supplier network is reported to produce an inverse-U-shaped effect on the firm's Scope 1 and Scope 2 emissions, suggesting an optimal level of complexity that minimizes emissions (Adhikary, Sharma, Diatha, and Jayaram 2020). Lastly, public firms (as opposed to private firms) release fewer pollutants (Shive and Forster 2021), suggesting that public firms' corporate governance reduces their environmental footprint.

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<sup>5</sup> In descending order of global warming potential, GHGs include sulfur hexafluoride (SF<sub>6</sub>), nitrogen trifluoride (NF<sub>3</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and carbon dioxide (CO<sub>2</sub>).

<sup>6</sup> The GHG Protocol (<https://ghgprotocol.org/>) is a standards framework for measuring and managing GHG emissions. It was created in 1998 by the World Resources Institute and the World Business Council for Sustainable Development.

*Environmental footprint's firm performance outcomes:* Prior research has examined the effect of a firm's environmental footprint on its product-market outcomes (e.g., price, sales), accounting returns (e.g., return on assets/sales, profit margin), and financial outcomes (e.g., stock returns). Web Appendix A's Table A1 summarizes the literature. Only one study has examined the effect of a firm's environmental mishap (e.g., an oil spill) on its product-market outcomes (Barrage, Chyn, and Hastings 2020), finding a negative effect. Academics have measured the accounting returns associated with a firm's environmental footprint. Some studies have reported a negative impact of environmental footprint (Jo, Kim, and Park 2015; King and Lenox 2002); others, a positive one (Aswani, Raghunandan, and Rajgopal 2023). The evidence is similarly mixed with respect to a firm's financial outcomes, with studies reporting both negative (Bolton and Kacperczyk 2021; Hart and Ahuja 1996; Kroes, Subramaniam, and Subramanyam 2012) and positive (Bolton and Kacperczyk 2021; Delmas and Nairn-Birch 2011; Hsu, Li, and Tsou 2021; King and Lenox 2002) effects.

The key takeaway from the preceding literature summary is the absence of research on customers' *perceptual* responses to a firm's environmental footprint. We address this absence by examining the impact of a firm's environmental footprint on its brand equity. Furthermore, we augment prior evidence on firm financial outcomes by examining the footprint's effect on a firm's credit risk and documenting a novel mechanism (i.e., brand equity) underlying this effect.

### **Brand Equity**

Brand equity is the *difference* between the value of a *branded* offering by a firm and the value of an unnamed (or fictitiously named) version of the firm's offering (Keller 1993).

Marketing academics and practitioners have conceptualized a brand's equity/value using one of the following three bases: (1) customer mindset/perceptions (customer-based brand equity; e.g.,

Keller 1993), (2) sales (i.e., sales-based brand equity; Ailawadi, Lehmann, and Neslin 2003),<sup>7</sup> and (3) cash flow (Simon and Sullivan 1990).<sup>8</sup> While customer-based brand equity operates at the customer mindset level, sales-based equity exists at the firm's product-market level, and the cash flow-based measure is at the accounting (and thus firm) level (Christodoulides and Chernatony 2009; Davcik, da Silva, and Hair 2015; de Oliveira, Silveira, and Luce 2015).

Among these three measures, customer-based brand equity is the most widely used for two reasons. First, it measures a brand's value at the most fundamental level of customer perceptions, which may benefit the firm through outcomes beyond sales and cash flow (Ailawadi, Lehmann, and Neslin 2003; Davcik, da Silva, and Hair 2015). Second, not all marketing actions are aimed at generating sales and cash flow (Swaminathan et al. 2020). For example, research on CSR has documented that a firm's social responsibility creates a context that *facilitates* purchases, rather than directly impacting them (Brown and Dacin 1997; Sen and Bhattacharya 2001). Therefore, customer-based brand equity is the most inclusive and long-term-oriented measure. The customer base, rather than the sales or cash-flow base, is more suitable for our research examining customers' *perceptions* of a firm's brand promise. Therefore, we adopt customer-based brand equity as our measure.

A firm invests considerable resources over many years to build its brands' equity (Datta, Ailawadi, and Van Heerde 2017), reaping the benefits of that investment in product and financial markets. Academics have studied each of these phenomena: (1) the product-market outcomes of brand equity, such as market share, price premium, revenue premium, and profit premium (Ailawadi, Lehmann, and Neslin 2003; Goldfarb, Lu, and Moorthy 2009; Srinivasan, Park, and

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<sup>7</sup> Brand equity can be measured by the "difference in revenue (i.e., net price  $\times$  volume) between a branded good and a corresponding private label" (Ailawadi, Lehmann, and Neslin 2003, p. 3)

<sup>8</sup> Brand equity is "the additional value (i.e., discounted cash flow) that accrues to a firm because of the presence of the brand [name] that would not accrue to an equivalent unbranded product" (Keller and Lehmann 2006, p. 7454).

Chang 2005), and (2) the financial-market outcomes of brand equity, such as stock market returns, risk, and market values (Aaker and Jacobson 1994; Mizik and Jacobson 2008; Rahman, Rodriguez-Serrano, and Lambkin 2019; Rego, Morgan, and Billett 2009). Thus, the literature contains substantial evidence on brand equity's *consequences*.

In contrast, the literature on brand equity's *determinants* is relatively sparse, focusing, for the most part, on a firm's marketing mix (Clark, Doraszelski, and Draganska 2009; Datta, Ailawadi, and van Heerde 2017; Hur, Kim, and Woo 2014; Yoo, Donthu, and Lee 2000) and CSR (de Fonseca, Rocha, and Alves 2024; Lin and Chung 2019; Muniz, Guzmán, and Paswan 2019). Web Appendix A's Table A2 summarizes this literature. We reason that customers also pay attention to a firm's nonmarket actions, including demonstration of social responsibility (Luo and Bhattacharya 2006), activism (Bhagwat et al. 2020; Mallapragada and Ganesan 2024), lobbying (Vadakkepatt et al. 2022), and political contributions (Martin et al. 2017). Yet, academics have ignored brand equity's nonmarket determinants. Vadakkepatt et al.'s (2022) article is an exception. The authors demonstrated that a firm's lobbying can erode customer satisfaction (a customer-mindset metric akin to brand equity). We extend this literature by conceptualizing a firm's environmental footprint as a determinant of its brand equity.

## HYPOTHESES

### **Firm Environmental Footprint → Firm Brand Equity**

Marketing academics have defined a brand as the aggregate of customer associations with what the firm and its offerings mean to customers (Swaminathan et al. 2020). Consistent with this definition, the promise view of marketing (e.g., Anker, Kappel, Eadie, and Sandøe 2012; Bitner 1995; Calonius 2006; Grönroos 2009; Levitt 1981) posits that a brand is a firm's *promise* to its customers. The firm makes this promise not only explicitly through advertising, product

packaging, retail environment, and customer service, but also implicitly (Anker, Kappel, Eadie, and Sandøe 2012; Calonius 2006; Grönroos 2009; Levitt 1981; Misani 2020; Sagoff 1974). The Web Appendix's Table A3 includes statements from 25 firms (collected from sustainability reports, citizenship reports, etc.) that highlight their commitment to minimizing their environmental footprint. Furthermore, when one firm makes such a commitment to the natural environment, customers may expect its rivals and peers to follow suit. Thus, even when a firm does not explicitly claim to minimize its environmental footprint, customers may assume the firm implicitly promises not to harm nature (Kulkarni 2000).

This promise is consequential for two reasons. First, natural resources are limited. Humanity reportedly consumes natural resources 1.7 times faster than the Earth can replenish them (Global Footprint Network 2024), an imbalance that compromises future generations' access to them. Thus, a firm's large environmental footprint is likely to elicit negative customer responses. Second, large public companies are reportedly the major culprits behind this ecological imbalance (Borenstein 2025), thereby damaging their reputations in the eyes of customers.

An increase in a firm's environmental footprint indicates disregard for its implicit promise to its customers. This disregard violates customers' expectations of how the firm should behave, evoking (1) emotions of anger and contempt (Romani et al. 2015), (2) perceptions of psychological and social risks of being associated with the firm (Dutta and Pullig 2011), and (3) overall perceived brand unethicity (Brunk 2012). Eventually, the violations hamper positive customer responses toward the brand (Roehm and Tybout 2006).

In addition, the locus of the environmental footprint is internal to the firm (rather than external), and the footprint is within (rather than outside) the firm's control (Sinha and Lu 2016).

Therefore, customers are more likely to blame the firm rather than external situations (Folkes 1984). Internal attribution is also more likely because customers view a brand as an “intentional agent” (Kervyn, Fiske, and Malone 2012). Intentionality enables a brand to reduce its environmental footprint. Collectively, attributing the footprint to the brand (rather than to external factors) leads customers to perceive that the firm has violated its promise. As a result, the increased footprint might evoke customers’ desire to punish the brand, leading to a negative association with the firm’s brand equity (Puzakova, Kwak, and Rocereto 2013). Furthermore, a larger environmental footprint might signal higher business risks (regulatory, litigation, and operational), which, in turn, might discount the brand’s value.<sup>9</sup> Accordingly, we hypothesize:

*H<sub>1a</sub>: A firm’s environmental footprint is negatively associated with its brand equity.*

A firm can leave a footprint on the natural environment by (1) using natural resources, (2) emitting pollutants into the environment, or (3) both (Hora and Subramanian 2018). Could customer response differ by these activities? We answer this question by decomposing a firm’s environmental footprint into two components: *resource use* (i.e., water and other natural resource use) and *pollution* (i.e., air pollution, GHG emissions, land and water pollution, and waste) (Kroes, Subramaniam, and Subramanyam 2012). Prior research has suggested three reasons customers may respond less punitively to a firm’s resource use than to pollution—business justification, perceived harm, and visibility (Ansolabehere and Konisky 2014; Dunlap and Scarce 1991; Konisky, Milyo, and Richardson 2008).

First, customers may believe that consuming natural resources is an inevitable cost of conducting business (Hora and Subramanian 2018). Without this consumption, a firm may be unable to manufacture and sell its products. In contrast, they may perceive that a firm can control

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<sup>9</sup> We thank our anonymous reviewer for this suggestion.

its pollution without harming its core business (King and Lenox 2002; Konar and Cohen 2001). Therefore, the firm's pollution may draw a stronger customer penalty than its resource use. Second, customers may believe that pollution's negative consequences, such as adverse health outcomes, soil contamination, and wildlife damage, are more severe, direct, and imminent than those of excessive resource use. Indeed, prior research has shown that pollution elicits stronger emotional and ethical responses from customers than resource use (Ansolabehere and Konisky 2014; Konisky, Milyo, and Richardson 2008). Third, a firm's environmental footprint through pollution is often more vivid and observable than its footprint through natural resource use (Dunlap and Scarce 1991; Konisky, Milyo, and Richardson 2008). For example, people can see smog in the air, polluted rivers, or harmed animals and attribute these negative observables to corporate actions. Furthermore, social and news media often frame pollution incidents (e.g., BP's oil spill, Volkswagen's emissions scandal) as "poisoning," a morally and ethically charged term that makes headlines and elicits customers' negative evaluations of corporations.

These three reasons suggest that customers may interpret a firm's pollution as a more serious violation of promise than its resource use. Consequently, customers will punish the firm less for consuming natural resources than for polluting nature.

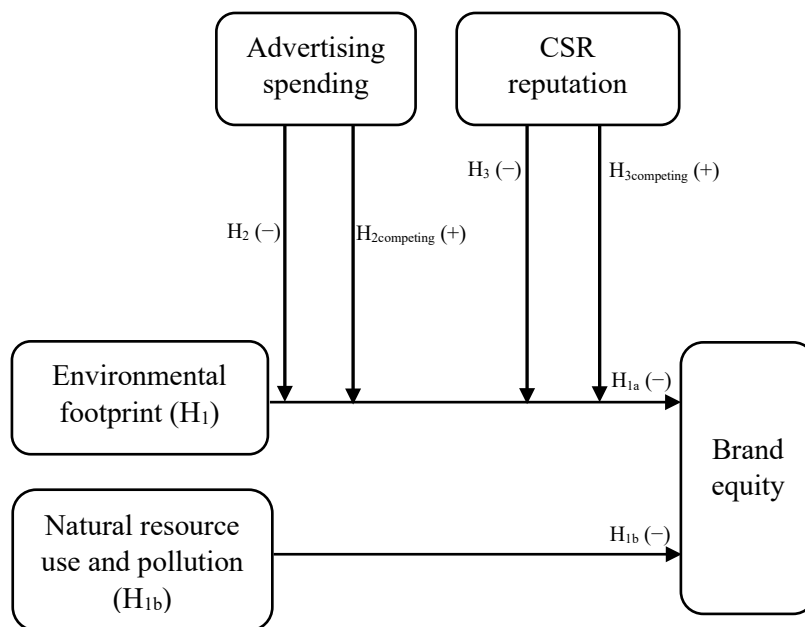
*H<sub>1b</sub>: The association between a firm's natural resource use and its brand equity is less negative than the association between its pollution and its brand equity.*

### **Contingencies of Environmental Footprint → Brand Equity**

The brand equity consequences of a firm's promissory violations are likely to be exacerbated if (1) customers exhibit high (vs. low) awareness of the firm and its promise (Luo and Bhattacharya 2009) and (2) the firm is endowed with high (vs. low) reputation for meeting its promissory obligations (Klein and Dawar 2004). Therefore, prior literature on corporate irresponsibility has suggested two moderators of customer response to a firm's violation of

promissory expectations—customer awareness (Servaes and Tamayo 2013) and firm reputation (Klein and Dawar 2004). Prior research has demonstrated that advertising moderates the product-market outcomes of a firm’s environmental violation (e.g., in the event of the Deepwater Horizon oil spill; Barrage, Chyn, and Hastings 2020) and that a firm’s CSR reputation is associated with its brand equity (e.g., Bardos, Ertugrul, and Gao 2020; Cowan and Guzman 2020; Liu, Wong, Shi, Chu, and Brock 2014; Hur, Kim, and Woo 2014). Accordingly, we select the firm’s *advertising spending* and *CSR reputation* as the two moderators of its environmental footprint’s effect on brand equity. Figure 1 depicts our conceptual framework.

**Figure 1: Conceptual Framework**



A firm’s advertising spending and CSR reputation play two roles (Bagwell 2007). First, they *inform* customers. Specifically, this “information view” assumes that customers lack information about a firm and its promise. The firm’s advertising spending and CSR reputation solve this problem by providing customers with the required information (e.g., Stigler 1961). Therefore, advertising and CSR reputation enhance customers’ awareness of the firm and draw

attention to its actions, both good (Srinivasan et al. 2009) and bad (Xiong and Bharadwaj 2013). In other words, advertising and CSR reputation are likely to make the firm's brand promise widely known. Second, advertising and CSR reputation *persuade* customers. The "persuasion view" suggests that the firm's advertising (McAlister, Srinivasan, and Kim 2007) and CSR reputation (Klein and Dawar 2004) build customers' mental associations about what the firm means to them. Therefore, advertising and CSR reputation create customer loyalty (Comanor and Wilson 1967).

These two views offer opposite predictions about how a firm's advertising and CSR reputation affect the promissory-violation mechanism we contend underlies the environmental footprint's impact on brand equity. The information view suggests that customers' greater awareness of the firm will make them more likely to notice a violation of the promise, thereby reinforcing their morally charged punitive reaction (Bhargava and Bedi 2022). In contrast, the persuasion view suggests that increased advertising or a stronger CSR reputation may lead customers to disregard the firm's promissory violation, thereby preserving their prior normative expectations.

### ***Firm Environmental Footprint, Advertising, and Brand Equity***

The advertising-as-information view posits that increasing advertising will make more customers aware of the firm (Servaes and Tamayo 2013) and draw their attention to its activities (Lou 2014). Although increased awareness boosts the firm's brand equity following its "good" activities, it likely harms brand equity when a perceived promise violation occurs, such as an increase in its environmental footprint (Xiong and Bharadwaj 2013). Specifically, a firm's higher (vs. lower) advertising spending increases customer attention to its socially responsible/irresponsible actions and inactions (Servaes and Tamayo 2013). Consistent with

Servaes and Tamayo's (2013) and Gielens et al.'s (2018) argument, our prediction neither assumes nor requires the firm to advertise its promissory violation. We only require advertising to improve customers' awareness of the firm and attention to its activities. Greater attention increases customer interpretation of a firm's environmental footprint as a violation of its implicit promise not to harm nature (Heath and Chatterjee 1995). Such stronger perceived violations will likely aggravate customers' negative responses to the firm's environmental footprint (Osinga et al. 2011). Indeed, research suggests that a firm with high public awareness faces a stronger penalty when stakeholders perceive it as socially irresponsible (Servaes and Tamayo 2013).

Accordingly, the advertising-as-information view leads us to the following hypothesis:

*H<sub>2</sub>: A firm's advertising spending **strengthens** the negative association between its environmental footprint and its brand equity.*

In contrast, the advertising-as-persuasion view suggests that increased advertising spending reinforces the firm's implicit and explicit promises, providing insurance-like protection against negative information about the firm (Ahluwalia, Burnkrant, and Unnava 2000), such as increased environmental footprint. Customers may view advertising as a promise (Erden, Swait, and Valenzuela, 2006), which raises their preference and loyalty toward the advertised firm (Joshi and Hanssens, 2010). Loyal customers are more likely to engage in biased processing of negative information about the brand, counterarguing negative information more than positive information (Chaiken, Liberman, and Eagly 1989). Thus, customers of firms with high advertising may be more likely to disregard new information suggesting the firm has violated a promise. Empirical research lends credence to this view. Studying customer response to BP's Deepwater Horizon Oil Spill, Barrage, Chyn, and Hastings (2020) found that the negative impact on BP's sales was significantly weaker in locations where BP had advertised heavily.

Accordingly, the advertising-as-persuasion view leads us to the following competing hypothesis:

*H<sub>2</sub>competing*: A firm's advertising spending **weakens** the negative association between its environmental footprint and its brand equity.

***Firm Environmental Footprint, CSR Reputation, and Brand Equity***

When evaluating a firm's current activities, customers consider the firm's reputation in the same or a related domain (Brunk and DeBoer 2022). Research suggests that the negative effect is stronger when a reputable firm "stumbles" by engaging in an activity that violates its promise to society (Schuler and Cording 2006). For example, consider a firm with a stronger (vs. weaker) reputation for social responsibility (i.e., CSR reputation). When the firm's environmental footprint increases, customers are likely to experience and express stronger indignation and resentment (Yoon, Gürhan-Canli, and Schwarz 2006). In response, they will lower their evaluations of the firm, thus punishing it (Sen and Bhattacharya 2001). In contrast, consider a firm with a lower CSR reputation. A lower reputation means that customers have adjusted their normative expectations and are less likely to feel morally violated when the firm's environmental footprint increases. Consequently, their punishment will be weaker. Supporting this line of reasoning, Einwiller et al. (2016) found that when customers receive negative information about a firm with a strong CSR reputation, they report more negative thoughts about the firm and a more unfavorable evaluation. Accordingly, we hypothesize:

*H<sub>3</sub>*: A firm's CSR reputation **strengthens** the negative association between its environmental footprint and its brand equity.

The CSR-as-persuasion view suggests that, like advertising, a firm's CSR reputation may provide insurance-like protection against negative information about the firm, such as an increased environmental footprint (Minor and Morgan 2011). A firm's CSR reputation assures customers of its prosocial intentions (Bhattacharya and Sen 2003). Therefore, it may help insulate the firm from perceived promissory violations when negative information comes to light

(Yoon, Gürhan-Canli, and Schwarz 2006). In other words, a firm's CSR reputation may produce a halo (or positive spillover), strengthening customers' beliefs about how much it cares about honoring its promise and nudging them to resist negative information about the firm's environmental footprint (Eisingerich et al. 2011). Similarly, customers may cut a highly reputable firm slack and interpret its increased footprint as an inevitable cost of developing safe, high-quality products, or of growth and expansion. Accordingly, the CSR-as-persuasion view leads us to the following competing hypothesis:

*H<sub>3</sub>competing: A firm's CSR reputation weakens the negative association between its environmental footprint and its brand equity.*

## DATA AND METHOD

### Data Sources

Testing our hypotheses requires firm-level data on brand equity, environmental footprint, advertising, and CSR reputation. Therefore, we collect data on U.S. public firms from four sources.

First, we collect data on brand equity from Y&R's BAV database (Mizik and Jacobson 2008; Lovett, Peres, and Shachar 2014). The BAV survey includes more than 870,000 respondents, representing the U.S. population across gender, ethnicity, age, income group, and geographic location. Y&R asks respondents to complete a 45-minute survey that yields measures of brand equity.

Second, we collect firm-specific environmental footprint data from S&P's Trucost database (Bolton and Kacperczyk 2021; Marquis, Toffel, and Zhou 2016). Trucost considers a broad range of firm activities that impact the environment. These activities include the use of natural resources, the extraction of raw materials, emissions, and waste production. Trucost collects, standardizes, and validates firm-reported environmental data from annual reports,

websites, and other publicly disclosed documents to quantify a firm's environmental footprint. Where such data are not publicly available, Trucost calculates them from global fuel use or imputes them from industry-level values. Trucost next converts each firm's environmental footprint into monetary value using validated methodologies from environmental economics (Delmas, Etzion, and Nairn-Birch 2015). We use this monetary value to measure a firm's annual environmental footprint.

Third, we collect data on a firm's CSR reputation from Refinitiv's Eikon (formerly ASSET4) database (Liang and Renneboog 2017; <https://eikon.refinitiv.com/>). Eikon is a comprehensive database of firm environmental, social, and governance performance, covering over 70% of all publicly traded firms worldwide. Refinitiv collects data from firm websites, annual reports, CSR reports, stock exchange filings, nonprofit organizations' websites, and news media. Using a combination of algorithmic and human processes, Refinitiv processes these data to assign each firm scores on various environmental, social, and governance metrics (Liang and Renneboog 2017).

Fourth, we collect data on a firm's advertising and control variables from S&P's Compustat – Capital IQ North America Fundamentals Annual.

Unlike firm-level data on environmental footprint, advertising, and CSR reputation, Y&R's BAV brand equity data are at the brand-year level. For example, if a firm has four brands, Y&R measures brand metrics for each. Following prior research examining brand equity's effects on financial outcomes (e.g., Fischer and Himme 2017; Fischer and Wies 2025; Rego, Billett, and Morgan 2009), we measure firm-year-specific brand equity by the average

brand equity across all the focal firm's brands in the focal year.<sup>10</sup> Using the average (rather than, say, the maximum) helps us focus on the average effect and avoid biased estimates caused by outliers.

### **Sample Construction and Estimation Sample**

Merging the four data sets generates a sample of 515 firm-year observations from 2005 to 2019 across 34 industries (Table B1 in the Web Appendix B reports the number of observations by industry). Practitioner reports and academic research have documented that customer opinions of firms and brands changed during and after the pandemic years (e.g., Blank, Loveland, Cheng, Beck, and Rundus 2023; Kantar 2020; Kohli, Timelin, Fabius, and Veranen 2020; McKinsey 2025; Nielsen 2023; Tudoran, Thomsen, and Thomasen 2024). Therefore, our sample ends in 2019 to preclude any confounding effects of the COVID-19 pandemic. We measure all variables in our regression at the firm-year level.

### **Variables**

*Dependent variable (DV).* We use Y&R's BAV (Brand Asset Value) variable to measure a firm's annual brand equity.

*Explanatory variable (EV).* *Environmental footprint* is the monetary value (in US\$) of a firm's environmental impact in a year divided by the firm's revenue in the same year. We consider the firm's environmental footprint across all domains in the Trucost database. These domains include water usage, GHG emissions, land and water pollution, and air pollution (Jira and Toffel 2013).

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<sup>10</sup> The correlation coefficient between the average brand equity of all a firm's brands in a year and the maximum brand equity of all a firm's brands in a year in our sample is high ( $b = 0.854, p < .01$ ), suggesting qualitatively similar results.

*Moderators: Advertising* is the amount (in US\$) a firm spent on advertising in a year, divided by the dollar value of its total assets<sup>11</sup> in the same year (McAlister et al. 2016). We source *CSR reputation* data from Eikon. This score measures a firm's ability to maintain its license to operate by producing quality goods and services that preserve the customer's health, safety, integrity, and privacy through accurate product information and labeling (Liang and Renneboog 2017), thus capturing a firm's social reputation.

*Covariates:* Prior research (e.g., Swaminathan et al., 2020) has suggested that a firm's marketing mix can affect its brand performance. Accordingly, we control for a firm's emphasis on (1) research and development (R&D; the ratio of research and development spending to total assets), (2) pricing power (the ratio of operating income before depreciation and amortization to total assets), and (3) distribution (the ratio of receivables to total assets).

Further, we control for the following variables, which may affect a firm's brand equity (Olsen, Slotegraaf, and Chandukala 2014): (1) firm size (using the natural logarithm of total assets), (2) cost efficiency (using the ratio of revenues to cost of goods sold), and (3) employee intensity (using the ratio of the number of employees to assets). Table 1 lists the variables, their measures, data sources, and reference research.

**Table 1: Variables**

<b>Name</b>	<b>Measure</b>	<b>Data Source</b>	<b>Reference Research</b>
<b>Brand Equity (DV)</b>	The composite value of a firm's customer-based brand equity, based on Y&R's customer survey, ranges from 0 to 100	Young & Rubicam Brand Asset Valuator (BAV)	Mizik and Jacobson (2008)
<b>Environmental footprint (EV)</b>	The firm's environmental footprint (in USD) divided by total revenues	Trucost	Bolton and Kacperczyk (2021)

<sup>11</sup> Following prior literature (Bharadwaj, Bharadwaj, and Konsynski 1999), we set missing values of advertising expenditure and R&D expenditure to 0.

<b>Advertising</b> (Moderator)	Advertising spending divided by total assets	Compustat	McAlister et al. (2016)
<b>CSR reputation</b> (Moderator)	The firm's ability to maintain its license to operate by producing quality goods and services; preserving the customer's health, safety, integrity, and privacy; and providing accurate product information and labeling	Refinitiv	Liang and Renneboog (2017)
<b>R&amp;D</b> (Covariate)	R&D spending divided by total assets	Compustat	Tuli and Bharadwaj (2009)
<b>Pricing power</b> (Covariate)	Operating income before depreciation and amortization divided by total assets	Compustat	Peress (2010)
<b>Distribution</b> (Covariate)	Receivables divided by total assets	Compustat	Chakravarty, Saboo, and Xiong (2022)
<b>Size</b> (Covariate)	Logarithm of assets	Compustat	Anderson and Mansi (2009); Rego, Billett, and Morgan (2009)
<b>Cost efficiency</b> (Covariate)	Revenues divided by cost of goods sold	Compustat	Gielens et al. (2018)
<b>Employee intensity</b> (Covariate)	Number of employees divided by total assets	Compustat	Autor et al. (2020)

Table 2 presents the descriptive statistics and correlation coefficients. We compute the variance inflation factor (VIF) for the main effects of the independent variables in our model. The minimum VIF is 1.30, the maximum VIF is 2.41, and the mean VIF is 1.79. Thus, the VIFs are well below the prescribed threshold of 10 (Marquardt 1970; Mason and Perreault 1991), suggesting that multicollinearity is unlikely to be a concern in our sample.

**Table 2: Descriptive Statistics and Correlation Coefficients**

	Mean	SD	1	2	3	4	5	6	7	8	9
1. Environmental footprint	.073	.078									
2. Advertising	.034	.043	.014								
3. CSR reputation	72.680	23.973	.134	-.164							
4. R&D	.025	.044	-.265	-.181	.151						
5. Pricing power	.173	.083	-.116	.569	-.079	-.186					
6. Distribution	.083	.043	-.088	-.035	.075	-.158	.409				
7. Size	38725.4	44915.61	-.300	-.207	.195	.149	-.060	.093			

8. Cost efficiency	2.271	1.413	-.317	-.068	.099	.469	.549	.138	-.004		
9. Employee intensity	.005	.008	-.126	.351	-.086	-.205	-.193	.398	-.213	-.211	
10. Brand equity	59.619	26.193	.106	.281	.020	-.071	-.176	.036	.044	-.218	.114

N = 515 observations, Correlations greater than 0.087 in magnitude are significant at the  $p < .05$  level.

### Regression Specification and Identification

*Specification.* We estimate the following equation for firm  $i$  in year  $t$ .

$$\begin{aligned} \text{Brand equity}_{i,t} = & \beta_{0i} + \beta_1 \text{Environmental footprint}_{i,t} + \\ & \beta_2 (\text{Environmental footprint}_{i,t} \times \text{Advertising}_{i,t}) + \beta_3 (\text{Environmental footprint}_{i,t} \times \\ & \text{CSR reputation}_{i,t}) + \beta_4 \text{Advertising}_{i,t} + \beta_5 \text{CSR reputation}_{i,t} + \beta_6 \text{R\&D}_{i,t} + \\ & \beta_7 \text{Pricing power}_{i,t} + \beta_8 \text{Distribution}_{i,t} + \beta_9 \text{Size}_{i,t} + \beta_{10} \text{Cost efficiency}_{i,t} + \\ & \beta_{11} \text{Employee intensity}_{i,t} + \gamma_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

We include firm fixed effects to control for unobserved, time-invariant firm-specific heterogeneity and year fixed effects to control for changes in the macroeconomic environment.

$\beta_{0i}$  refers to the firm-fixed effects,  $\gamma_t$  refers to the year-fixed effects,  $\beta_{1-3}$  are the coefficients of interest, and  $\beta_{4-11}$  are the covariates' coefficients.

*Identification.* Despite including firm-level controls and firm- and year-fixed effects, our regression may still omit variables that correlate with brand equity and be directly associated with environmental footprint. For example, a firm may possess specialized management skills that reduce its environmental footprint while simultaneously increasing its brand equity. Omitting firm management skills from the regression might cause the *Environmental footprint* to be correlated with the error term. Consequently, we cannot claim  $\beta_1$  as the environmental footprint's causal impact on brand equity. Similarly, *Advertising* and *CSR reputation* may be endogenous to our brand equity model.

We control for this potential endogeneity using the control function method (Petrin and Train 2010). Specifically, we estimate the control function to account for the dependence between the endogenous regressors (our explanatory and moderator variables) and the error term.

Including the estimated control function in Equation 1 mitigates the concern that endogenous regressors may be correlated with the error term.

We proceed in two steps. First, we estimate a first-stage regression for each of the three endogenous regressors—*Environmental footprint*, *Advertising*, and *CSR reputation*—regressing each on its instrument. The instrument must be associated with the endogenous variable (i.e., satisfy the relevance criterion/condition) and not correlate with the (unobserved) determinants of a firm's brand equity (i.e., fulfill the exclusion restriction). Second, we include the fitted residuals from the first-stage regressions as covariates in the second-stage regression that tests our hypotheses.

*Instruments.* Organizational herding theory holds that a firm's decisions are based on its peers' decisions rather than solely on its own information or analysis (Banerjee 1992; Bikhchandani, Hirshleifer, and Welch 1992; Shi, Grewal, and Sridhar 2021). Therefore, we follow this theory and prior empirical research (e.g., Jindal 2020; Jindal and Slotegraaf 2024; McAlister et al. 2016; Sridhar et al. 2016) to instrument a firm's environmental footprint in a year by the average environmental footprint of all firms (except the focal firm) in the focal firm's four-digit Standard Industrial Classification (SIC) code in the focal year. Similarly, we instrument a firm's advertising and CSR reputation in a year with the average advertising and CSR reputation of all firms (except the focal firm) in the focal firm's four-digit SIC code in that year.

The identifying assumption is that industry averages of these variables are unaffected by firm-level idiosyncratic shocks and do not correlate strongly with the residuals from Equation 1 (Lev and Sougiannis 1996). Indeed, neo-institutional theory posits that the product-market environment pressures a firm to imitate its peers to gain legitimacy (Meyer and Rowan 1977),

suggesting that a firm's environmental footprint, advertising, and CSR reputation are likely positively associated with their corresponding industry averages. Furthermore, the industry average satisfies the exclusion restriction because peers' decisions regarding environmental footprint (or advertising or CSR reputation) are unlikely to be related to the focal firm's omitted determinants of brand equity. Our first-stage regression of the control function method follows:

$$\begin{aligned} \text{Environmental footprint}_{i,t} = & \alpha_{0i} + \alpha_1 \text{Industry environmental footprint}_{-i,t} + \\ & \alpha_2 \text{Advertising}_{i,t} + \alpha_3 \text{CSR reputation}_{i,t} + \alpha_4 \text{R\&D}_{i,t} + \alpha_5 \text{Pricing power}_{i,t} + \\ & \alpha_6 \text{Distribution}_{i,t} + \alpha_7 \text{Size}_{i,t} + \alpha_8 \text{Cost efficiency}_{i,t} + \alpha_9 \text{Employee intensity}_{i,t} + \partial_t + \\ & \mu_{i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Advertising}_{i,t} = & \rho_{0i} + \rho_1 \text{Industry advertising}_{-i,t} + \rho_2 \text{Environmental footprint}_{i,t} + \\ & \rho_3 \text{CSR reputation}_{i,t} + \rho_4 \text{R\&D}_{i,t} + \rho_5 \text{Pricing power}_{i,t} + \rho_6 \text{Distribution}_{i,t} + \rho_7 \text{Size}_{i,t} + \\ & \rho_8 \text{Cost efficiency}_{i,t} + \rho_9 \text{Employee intensity}_{i,t} + \theta_t + \epsilon_{i,t} \end{aligned} \quad (3)$$

$$\begin{aligned} \text{CSR reputation}_{i,t} = & \omega_{0i} + \omega_1 \text{Industry CSR reputation}_{-i,t} + \\ & \omega_2 \text{Environmental footprint}_{i,t} + \omega_3 \text{Advertising}_{i,t} + \omega_4 \text{R\&D}_{i,t} + \omega_5 \text{Pricing power}_{i,t} + \\ & \omega_6 \text{Distribution}_{i,t} + \omega_7 \text{Size}_{i,t} + \omega_8 \text{Cost efficiency}_{i,t} + \omega_9 \text{Employee intensity}_{i,t} + \epsilon_{i,t} \end{aligned} \quad (4)$$

$\alpha_{0i}$ ,  $\rho_{0i}$  and  $\omega_{0i}$  refer to the firm fixed effects;  $\partial_t$ ,  $\theta_t$  and  $\pi_t$  refer to the year fixed effects; and  $\alpha_1$ ,  $\rho_1$  and  $\omega_1$  are the coefficients of interest.

We use the ordinary least squares estimator to estimate the following second-stage regression and test our hypotheses. The regression includes the fitted residuals (i.e., the control functions) from Equations 2, 3, and 4:

$$\begin{aligned} \text{Brand equity}_{i,t} = & \beta_{0i} + \beta_1 \text{Environmental footprint}_{i,t} + \\ & \beta_2 (\text{Environmental footprint}_{i,t} \times \text{Advertising}_{i,t}) + \beta_3 (\text{Environmental footprint}_{i,t} \times \\ & \text{CSR reputation}_{i,t}) + \beta_4 \text{Advertising}_{i,t} + \beta_5 \text{CSR reputation}_{i,t} + \beta_6 \text{R\&D}_{i,t} + \\ & \beta_7 \text{Pricing power}_{i,t} + \beta_8 \text{Distribution}_{i,t} + \beta_9 \text{Size}_{i,t} + \beta_{10} \text{Cost efficiency}_{i,t} + \\ & \beta_{11} \text{Employee intensity}_{i,t} + \beta_{12} \widehat{\delta}_{i,t} + \gamma_t + \epsilon_{i,t} \end{aligned} \quad (5)$$

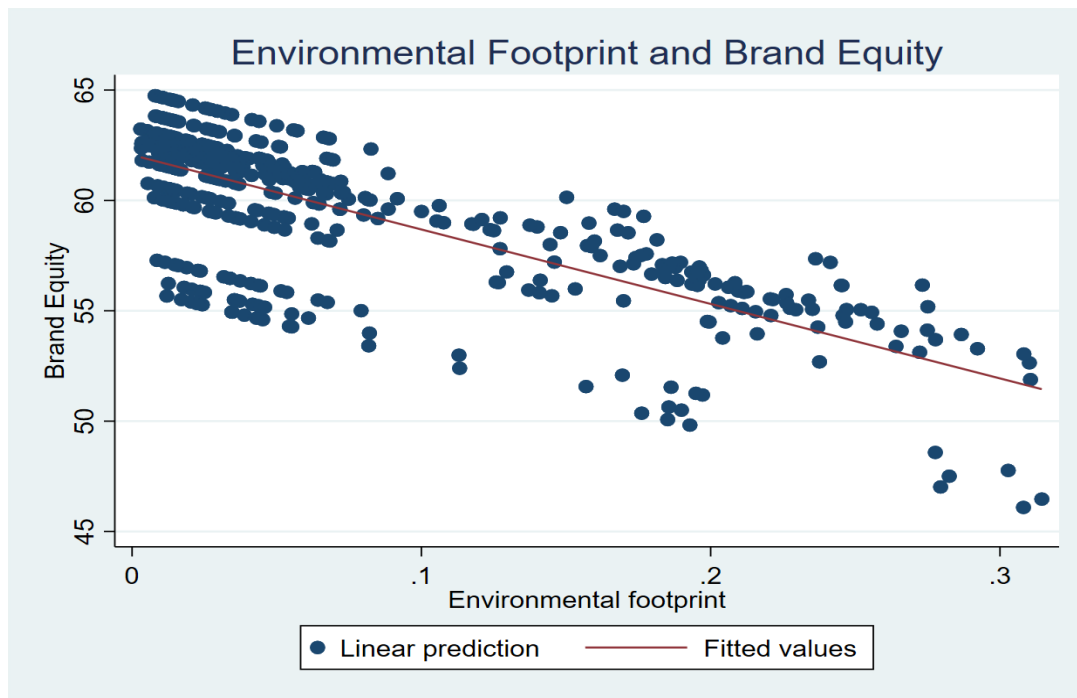
$\beta_{0i}$  refers to the firm fixed effects,  $\gamma_t$  refers to the year fixed effects,  $\beta_{1-3}$  are the coefficients of interest,  $\beta_{4-11}$  refer to the covariates' coefficients, and  $\beta_{12}$  is the vector of residuals' coefficients.

## RESULTS

### Model-Free Evidence

Figure 2 presents model-free graphical evidence of the association between a firm's environmental footprint and its brand equity. The graph suggests that as the environmental footprint increases, brand equity decreases.

**Figure 2: Firm Environmental Footprint and Brand Equity**



### First-Stage Regression Results

Columns 1–3 of Web Appendix B's Table B2 report the results for the first-stage regressions for environmental footprint, advertising, and CSR reputation. As we expect, the average environmental footprint of a firm's industry peers is positively associated with its own environmental footprint ( $b_{\text{Industry peers' average environmental footprint} \rightarrow \text{Environmental footprint}} = .0509, p < .01$ ). Similarly, the average advertising of a firm's industry peers is positively associated with its own advertising ( $b_{\text{Industry peers' average advertising} \rightarrow \text{Advertising}} = .0688, p < .01$ ), and the average industry CSR

reputation is positively associated with its own CSR reputation ( $b_{\text{Industry peers' average CSR reputation} \rightarrow \text{CSR reputation}} = .753, p < .01$ ), suggesting that each of the three instruments meets the relevance criterion.

### Second-Stage Regression Results

Table 3's Columns 1–4 present the results for Equation 5. We build the model in steps, checking the estimates' robustness at each step. Model 1 (Column 1) regresses brand equity on environmental footprint, all covariates, control functions, and firm- and year-fixed effects. The results indicate that a firm's environmental footprint is marginally negatively associated with its brand equity ( $b_{\text{Environmental footprint} \rightarrow \text{Brand equity}} = -296.3, p < .10$ ), marginally supporting H<sub>1a</sub>. The finding is consistent with our proposition that a firm implicitly promises customers that it will not damage nature. Thus, the higher the firm's environmental footprint, the greater customers' perceptions of its promissory violation, and the lower its brand equity (Bhargava and Bedi 2022).

Model 2 is Model 1 plus the first of our two-way interaction terms (i.e., *Environmental footprint* × *Advertising*). The results (in Table 3's Column 2) indicate that a firm's advertising exacerbates the negative association between its environmental footprint and its brand equity ( $b_{\text{Environmental footprint} \times \text{Advertising} \rightarrow \text{Brand equity}} = -902.2, p < .05$ ), supporting H<sub>2</sub>. Thus, the greater the firm's advertising, the greater customers' awareness of its promise—and consequently, the greater the perceived promissory violation. Model 3 is Model 1 plus *Environmental footprint* × *CSR reputation* as a regressor. Table 3's Column 3 results suggest that a firm's CSR reputation exacerbates the negative association between its environmental footprint and its brand equity ( $b_{\text{Environmental footprint} \times \text{CSR reputation} \rightarrow \text{Brand equity}} = -.875, p < .01$ ), supporting H<sub>3</sub>. Thus, customers may have stronger expectations that a firm with a strong CSR reputation will uphold its promises.

Customers respond with greater ethical outrage when this expectation is violated, thereby eroding the firm's brand equity more severely.

Model 4 is our full model. It includes both two-way interaction terms. Table 3's Column 4 reports that a firm's advertising ( $b_{\text{Environmental footprint} \times \text{Advertising}} \rightarrow \text{Brand equity} = -856.7, p < .05$ ) and CSR reputation ( $b_{\text{Environmental footprint} \times \text{CSR reputation}} \rightarrow \text{Brand equity} = -.844, p < .01$ ) continue to strengthen the negative association between its environmental footprint and its brand equity, supporting H<sub>2</sub> and H<sub>3</sub>. The collective evidence is consistent with the logic that high advertising or a high CSR reputation strengthens the firm's promise and customers' awareness of it. Consequently, the firm's large environmental footprint induces customers to perceive a stronger violation of the promise, resulting in a more pronounced negative effect on brand equity.

We compute the effect sizes based on the estimates presented in Table 3. The estimates in Column 1 suggest that for the average firm in our sample, a 1% increase in its environmental footprint in a year leads to a .36%<sup>12</sup> drop in brand equity. The estimates in Column 4 suggest that a one standard deviation (SD) increase in a firm's environmental footprint, combined with a 1 SD increase in advertising, causes a 4.82% decrease in the firm's brand equity. Further, a 1 SD increase in environmental footprint combined with a 1 SD increase in CSR reputation leads to a 2.65% decline in brand equity.

**Table 3: A Firm's Environmental Footprint → Brand Equity**

	(1)	(2)	(3)	(4)
	Brand Equity	Brand Equity	Brand Equity	Brand Equity
<b>Environmental footprint</b>	<b>-296.3*</b> <b>(176.6)</b>	<b>-289.4</b> <b>(175.8)</b>	<b>-242.5</b> <b>(176.4)</b>	<b>-237.8</b> <b>(175.7)</b>
<b>Environmental footprint × Advertising</b>		<b>-902.2**</b> <b>(400.6)</b>		<b>-856.7**</b> <b>(398.3)</b>

<sup>12</sup> We multiply the standard deviation of the focal variables by the coefficient estimates (from Table 3) and scale the resultant values as a percentage of the mean value of brand equity.

<b>Environmental footprint × CSR reputation</b>			<b>−.875***</b>	<b>−.844***</b>
			<b>(.323)</b>	<b>(.322)</b>
Advertising	−487.3 (461.7)	−498.5 (459.6)	−511.8 (458.4)	−521.5 (456.6)
CSR reputation	−.0237 (.0395)	−.0282 (.0394)	.0542 (.0487)	.0472 (.0486)
R&D	−24.11 (29.68)	−29.42 (29.64)	−24.87 (29.47)	−29.88 (29.44)
Pricing power	−26.04** (12.99)	−32.34** (13.23)	−28.42** (12.92)	−34.33*** (13.16)
Distribution	−11.78 (24.04)	−7.705 (24.00)	−6.763 (23.94)	−3.070 (23.90)
Size	−5.485** (2.316)	−6.490*** (2.348)	−5.489** (2.299)	−6.444*** (2.332)
Cost efficiency	2.167* (1.257)	2.490** (1.259)	2.229* (1.248)	2.534** (1.251)
Employee intensity	948.0*** (245.1)	1,000*** (245.1)	993.0*** (243.9)	1,041*** (243.9)
Control function: Environmental footprint	273.6 (181.0)	282.9 (180.2)	295.7 (179.9)	303.7* (179.2)
Control function: Advertising	481.1 (460.6)	575.9 (460.4)	513.4 (457.5)	602.3 (457.4)
Control function: CSR reputation	.0891** (.0441)	.104** (.0444)	.0818* (.0438)	.0962** (.0442)
Intercept	120.4*** (26.75)	129.6*** (26.93)	114.6*** (26.64)	123.5*** (26.85)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	515	515	515	515
R-squared	.152	.161	.166	.174
Number of firms	55	55	55	55

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

Next, we decompose a firm's environmental footprint into its two components: *resource use* and *pollution*. H<sub>1b</sub> reasoned that customers may perceive a firm's use of natural resources as an inevitable cost of conducting business and thus view it as less of a promissory violation. In contrast, they will interpret an increase in the firm's release of pollutants as a failure to control it, thus constituting a stronger violation of the promise.

Table 4's Columns 1 and 2 present the effects of a firm's resource use and pollution on its brand equity. The results indicate that a firm's resource use is marginally negatively associated with its brand equity ( $b_{\text{Resource use} \rightarrow \text{Brand equity}} = -192, p < .10$ ), whereas its pollution is not associated with brand equity ( $b_{\text{Pollution} \rightarrow \text{Brand equity}} = 146.7, \text{n.s.}$ ). Thus,  $H_{1b}$  is *unsupported*, as a firm's resource use has a marginally stronger effect on brand equity than pollution. Therefore, our finding contradicts  $H_{1b}$ , suggesting that customers view a firm's resource use as a greater ethical violation of its promise than its pollution.

The reason behind this counterintuitive finding may be as follows. Resource use may suggest a firm's active consumption of natural resources, thereby jeopardizing future generations' inheritance. Therefore, resource use may be viewed as a salient violation of the brand's promise, leading to a punitive and moral reaction. In several industries (e.g., oil, natural gas, soda), a firm's consumption of natural resources is highly visible and raises customer concerns, especially when those resources are non-renewable. In particular, the use or destruction of iconic natural resources (such as the Amazon Rainforest or the Great Barrier Reef) can trigger strong perceptions of ethical violations, as they threaten the habitats of nearly every species on the planet, including human beings. Specifically, for customers with a strong connection to nature, overconsumption of natural resources can trigger an intense backlash through perceived ethical violations. Relatedly, "pollution" is overused, whereas "resource use" is novel. Therefore, customers may pay more attention to the latter than the former and interpret the latter as a stronger violation.

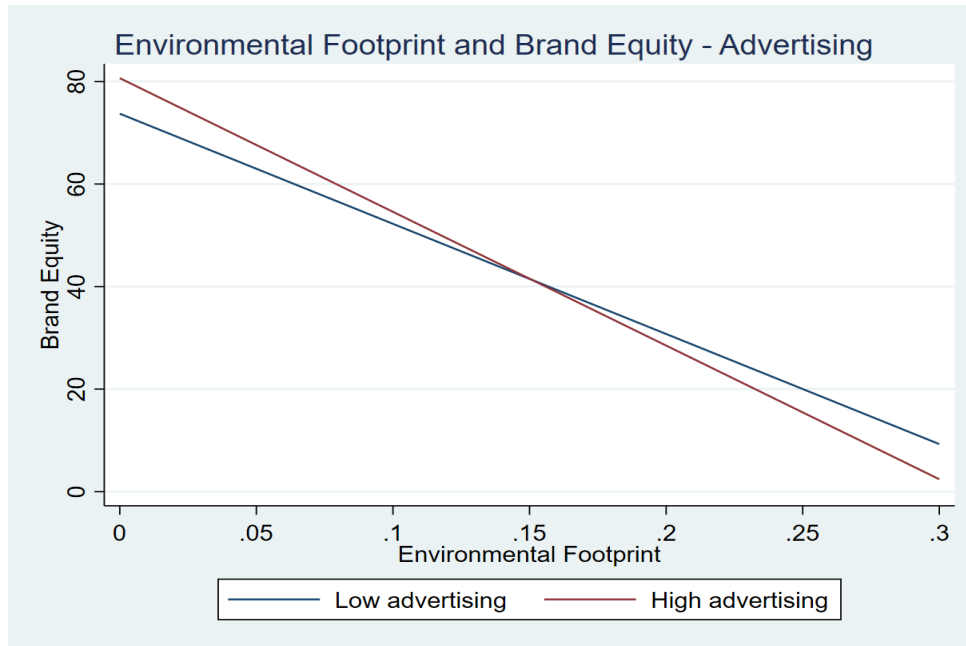
<b>Table 4: A Firm's Resource Use and Pollution → Brand Equity</b>		
	(1)	(2)
	Brand Equity	Brand Equity
<b>Resource use</b>	<b>-192.0*</b>	
	<b>(111.3)</b>	

<b>Pollution</b>		<b>146.7</b>
		<b>(208.7)</b>
Advertising	-529.9 (456.7)	-505.8 (457.1)
CSR reputation	-.0244 (.0395)	-.0204 (.0394)
R&D	-20.03 (29.55)	-19.44 (29.49)
Pricing power	-22.21* (12.73)	-21.15* (12.61)
Distribution	-10.12 (24.08)	-9.574 (24.14)
Size	-5.484** (2.327)	-5.505** (2.308)
Cost efficiency	2.171* (1.258)	2.150* (1.259)
Employee intensity	980.5*** (243.6)	980.8*** (244.1)
Control function: Resource Use	176.0 (112.1)	
Control function: Pollution		-219.1 (184.1)
Control function: Advertising	518.8 (456.1)	499.0 (456.4)
Control function: CSR reputation	.0903** (.0442)	.0876** (.0442)
Intercept	109.1*** (24.83)	101.9*** (25.18)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	515	515
R-squared	.155	.157
Number of firms	55	55

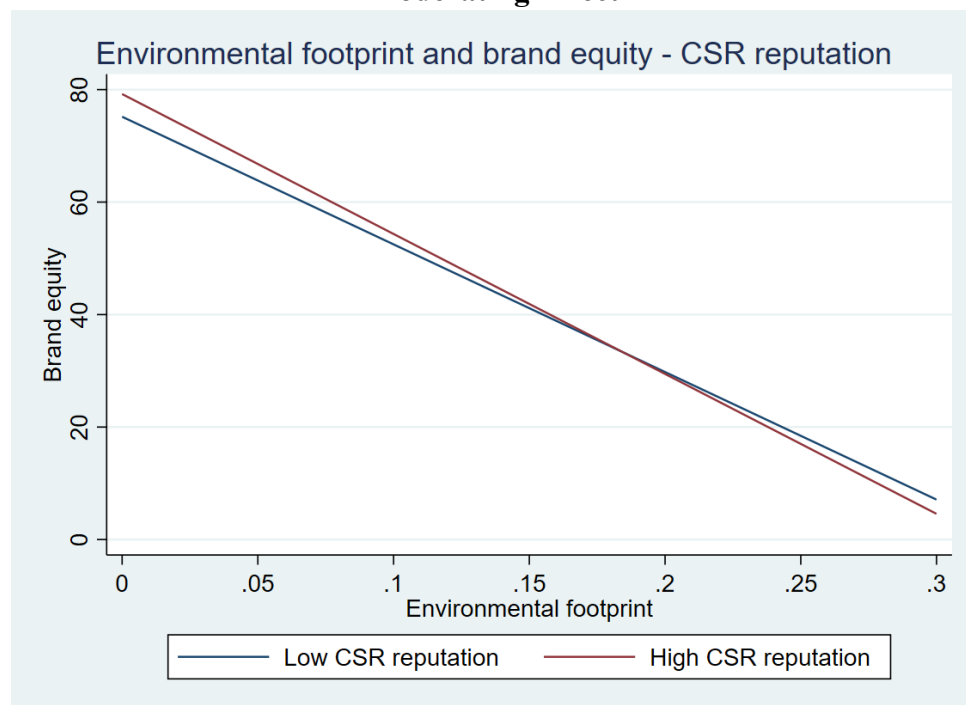
\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

Panels A and B of Figure 2 illustrate the moderation effects by plotting the association between a firm's environmental footprint and its brand equity at low (below the median) and high (above the median) levels of advertising and CSR reputation, respectively.

**Figure 2: Panel A: Environmental Footprint and Brand Equity: Advertising's Moderating Effect**



**Figure 2: Panel B: Environmental Footprint and Brand Equity: CSR Reputation's Moderating Effect**



Next, we report supplementary analyses that provide nuanced insights into the environmental footprint's impact on brand equity.

## SUPPLEMENTARY ANALYSES

### *Heterogeneity by Polluting Versus Nonpolluting Industries*

Customers' expectations of a firm's environmental footprint may vary depending on whether the firm operates in a less or more polluting industry. The baseline expectations may shape the association between environmental footprint and brand equity. We explore this possibility by classifying our sampled industries into low-polluting and high-polluting categories. Berrone et al. (2013) used the Toxic Release Inventory (TRI) database. Based on total toxic emissions, they classified the following two-digit Standard Industrial Classification (SIC) codes as high-polluting industries: 10, 50, 33, 49, 28, 36, 12, 13, 20, 32, 30, 51, 26, 34, 29, 31, 35, 37, 24, and 27. We use their classification and re-estimate the environmental footprint's association with brand equity for (1) the subsample of firms in low-polluting industries, and (2) a sample of firms in high-polluting industries. Table B3 presents the estimates. The results indicate that the environmental footprint is negatively associated (not associated) with brand equity for firms in *less* (more) polluting industries. These findings are consistent with the intuition that customers expect firms in the high-polluting industry to pollute and do not penalize them for doing so.

### **Advertising and CSR Reputation as Moderators of the Effects of Resource Use and Pollution**

Do the moderation effects of advertising and CSR reputation differ depending on whether we consider a firm's resource use or pollution? We answer this question by decomposing the *Environmental footprint* into its two components and estimating the moderating effects of advertising and CSR reputation.

The results (Table 5's Columns 1 and 2) suggest that a firm's advertising exacerbates the associations between its resource use and brand equity ( $b_{\text{Resource use} \times \text{Advertising} \rightarrow \text{Brand equity}} = -1429$ ,

$p < .05$ ) and its pollution and brand equity ( $b_{\text{Pollution} \times \text{Advertising} \rightarrow \text{Brand equity}} = -1602, p < .10$ ). While the firm's CSR reputation exacerbates the negative association between resource use and brand equity ( $b_{\text{Resource use} \times \text{CSR reputation} \rightarrow \text{Brand equity}} = -1.639, p < .01$ ), it does not moderate the association between the firm's pollution and its brand equity ( $b_{\text{Pollution} \times \text{Advertising} \rightarrow \text{Brand equity}} = -1.164, \text{n.s.}$ ).

The findings suggest that when customers are more aware of a firm's resource use or pollution, they are more likely to perceive promissory violations and, in turn, respond negatively to the firm. In contrast, a firm's CSR reputation exacerbates the negative association with resource use but not pollution. Therefore, customers expect firms with a strong CSR reputation to manage their natural resource use effectively; if they fail to do so, customers penalize them for violating that promise. In contrast, customers do not perceive that firms with a strong CSR reputation should reduce their pollution or, at least, do not penalize them for a promissory violation by increasing pollution. We conjecture that a firm with a strong CSR reputation may be insulated from the consequences of pollution but not from the consequences of resource use, perhaps through the accumulation of moral credit from past CSR. One potential reason could be that customers interpret prior CSR as a penance (a substitute) for pollution rather than for resource use. Future research, perhaps using experiments, can uncover the psychological mechanisms underlying this effect.

**Table 5: A Firm's Resource Use and Pollution → Brand Equity: Moderation Effects**

	(1) Brand Equity	(2) Brand Equity
Resource use	-54.42 (116.3)	
Pollution		260.0 (216.7)
<b>Resource use × Advertising</b>	<b>-1,429** (672.3)</b>	
<b>Pollution × Advertising</b>		<b>-1,602*</b>

		<b>(931.4)</b>
<b>Resource use × CSR reputation</b>	<b>-1.639***</b>	
	<b>(.497)</b>	
<b>Pollution × CSR reputation</b>		<b>-1.164</b>
		<b>(.842)</b>
Advertising	-541.8	-544.4
	(449.6)	(455.9)
CSR reputation	.0565	.0194
	(.0465)	(.0508)
R&D	-24.59	-24.89
	(29.15)	(29.51)
Pricing power	-30.63**	-27.03**
	(12.80)	(12.90)
Distribution	-2.393	-2.218
	(23.78)	(24.27)
Size	-6.087***	-6.606***
	(2.313)	(2.373)
Cost efficiency	2.521**	2.435*
	(1.246)	(1.263)
Employee intensity	1,064***	1,056***
	(240.9)	(245.4)
Control function: Resource Use	212.4*	
	(110.7)	
Control function: Pollution		-203.4
		(183.5)
Control function: Advertising	612.7	607.7
	(450.5)	(457.3)
Control function: CSR reputation	.0894**	.0999**
	(.0440)	(.0448)
Intercept	107.1***	108.2***
	(24.74)	(25.68)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	515	515
R-squared	.185	.167
Number of firms	55	55

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

### Brand Stature and Strength

Prior research (e.g., Dou et al., 2021; Leone et al., 2006) has theorized that customers evaluate a brand based on its *stature* and *strength*. While brand stature captures the extent to which customers hold the brand in high esteem and consider it reliable, brand strength refers to

the degree to which customers perceive the brand as unique or different. Whereas brand stature is likely to be destroyed when a brand deviates from societal norms (as in the case of a firm's increased environmental footprint), brand strength may be unaffected or even enhanced when brands deviate from societal norms, as consumers may perceive such deviation as contributing to the brand's uniqueness or differentiation.

Therefore, we decompose the brand equity measure into its two components—*Brand stature* and *Brand strength*—and estimate the effects of a firm's environmental footprint on the components. Specifically, we create two versions of Equation 5, with firm brand stature and strength as DVs. We estimate both versions simultaneously, accounting for correlated errors between them. Table 6's Columns 1 and 2 report that a firm's environmental footprint is negatively associated with its brand stature ( $b_{\text{Environmental footprint} \rightarrow \text{Brand stature}} = -348.8, p < .05$ ) but unassociated with its brand strength ( $b_{\text{Environmental footprint} \rightarrow \text{Brand strength}} = -135, \text{n.s.}$ ). Juxtapose this finding with the one from Table 3's Column 1, which reported  $b_{\text{Environmental footprint} \rightarrow \text{Brand equity}} = -296.3, p < .10$ . The insight is that this association—significant at 10% threshold—is on brand stature, not strength.

Table 6's Columns 3 and 4 report advertising's and CSR reputation's moderation of (1) the association between environmental footprint and brand stature (Column 3) and (2) the association between environmental footprint and brand strength (Column 4). The results in Column 3 indicate that a firm's advertising ( $b_{\text{Environmental footprint} \times \text{Advertising} \rightarrow \text{Brand stature}} = -881.3, p < .05$ ) and CSR reputation ( $b_{\text{Environmental footprint} \times \text{CSR reputation} \rightarrow \text{Brand stature}} = -.957, p < .01$ ) exacerbate the association between its environmental footprint and brand stature. In contrast, a firm's advertising does not moderate its environmental footprint's association with brand strength ( $b_{\text{Environmental footprint} \times \text{Advertising} \rightarrow \text{Brand strength}} = 54.49, \text{n.s.}$ ). Lastly, a firm's CSR reputation

marginally exacerbates the negative association between its environmental footprint and its brand strength ( $b_{\text{Environmental footprint} \times \text{CSR reputation} \rightarrow \text{Brand strength}} = -.648, p < .10$ ). Again, juxtapose the coefficients from Table 6's Columns 3 and 4 with those in Table 3's Column 4. The insight is that the observed associations between environmental footprint and brand equity are drawn from those on brand stature, not strength.

These findings suggest that the association between the environmental footprint and brand equity is driven by brand stature rather than brand strength. The theoretical insight is that a firm's violations of its brand promise, such as increasing its environmental footprint, damage customers' respect and esteem for the firm, but not the extent of perceived differentiation.

**Table 6: Firm Environmental Footprint → Brand Stature and Brand Strength**

	(1) Brand Stature	(2) Brand Strength	(3) Brand Stature	(4) Brand Strength
<b>Environmental footprint</b>	<b>-348.8**</b> <b>(158.5)</b>	<b>-135.0</b> <b>(189.4)</b>	<b>-283.2*</b> <b>(156.8)</b>	<b>-95.56</b> <b>(190.0)</b>
<b>Environmental footprint × Advertising</b>			<b>-881.3**</b> <b>(355.3)</b>	<b>54.49</b> <b>(430.6)</b>
<b>Environmental footprint × CSR reputation</b>			<b>-.957***</b> <b>(.288)</b>	<b>-.648*</b> <b>(.349)</b>
Advertising	-308.1 (414.3)	-422.9 (495.2)	-345.8 (407.3)	-440.4 (493.7)
CSR reputation	-.0246 (.0355)	-.0122 (.0424)	.0562 (.0433)	.0458 (.0525)
R&D	-25.94 (26.64)	-2.215 (31.84)	-31.96 (26.27)	-2.458 (31.83)
Pricing power	-23.10** (11.65)	-12.59 (13.93)	-31.87*** (11.74)	-13.97 (14.23)
Distribution	8.399 (21.57)	-28.79 (25.79)	17.86 (21.33)	-25.32 (25.85)
Size	-5.574*** (2.078)	.437 (2.484)	-6.561*** (2.081)	.494 (2.522)

Cost efficiency	2.713** (1.128)	-.0585 (1.348)	3.096*** (1.116)	-.0322 (1.353)
Employee intensity	748.6*** (219.9)	1,251*** (262.9)	848.6*** (217.6)	1,281*** (263.8)
Control function: Environmental footprint	321.5** (162.5)	107.8 (194.2)	354.7** (159.9)	123.6 (193.8)
Control function: Advertising	312.2 (413.3)	372.2 (494.1)	440.2 (408.1)	390.4 (494.6)
Control function: CSR reputation	.0834** (.0396)	.0408 (.0473)	.0901** (.0394)	.0345 (.0478)
Intercept	109.4*** (24.95)	20.19 (29.83)	113.0*** (24.95)	15.22 (30.24)
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	515	515	515	515
R-squared	.137	.138	.166	.144

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

## Credit Risk

Next, we examine whether the negative association between a firm's environmental footprint and brand equity has downstream consequences for its financial performance. Prior research has established that a firm's brand equity enhances its financial performance by increasing stock returns (Mizik and Jacobson 2008) and mitigating overall firm risk (Rego, Billett, and Morgan 2009). Thus, we have reason to believe that the association between a firm's environmental footprint and its brand equity may spill over to affect its financial performance.

We measure a firm's financial performance by its credit risk for two reasons. First, firms raise five times more funds from bond investors (who consider a firm's credit rating) than they do from equity investors (who consider a firm's stock return risk) (Securities Industry and Financial Markets Association 2024). Therefore, the risk to bond investors is as important—if not more important—than the risk to stockholders. Yet, surprisingly, little research has examined

the antecedents of bond investors' risk (Anderson and Mansi's [2008] and Rego, Billett, and Morgan's [2009] articles are two exceptions). Second, while prior research has shown that a firm's environmental footprint affects its accounting returns and stock market outcomes (e.g., Delmas, Etzion, and Nairn-Birch 2015), no research (to our knowledge) has examined the association between environmental footprint and credit risk.

We use Standard & Poor's credit rating to measure a firm's credit risk (Anderson and Mansi 2008; Rego, Billett, and Morgan 2009). S&P assesses a firm's cash flow vulnerability (i.e., the likelihood that the firm will not be able to pay its debt) to measure its credit risk. The credit rating ranges from 1 (AAA) to 26 (D, or default). Thus, a higher credit rating indicates greater credit risk.

First, we estimate the association between a firm's environmental footprint and its credit risk. Credit rating is an ordinal variable. Therefore, we use an ordered probit estimator. As in our main analysis, we include firm- and year-fixed effects. Table 7 reports the estimates. The results confirm our intuition that a firm's environmental footprint is positively associated with its credit risk ( $b_{\text{Environmental footprint} \rightarrow \text{Credit risk}} = 61.12, p < .05$ ).

**Table 7: Effects of Firm Environmental Footprint on Credit Risk**

	Credit Risk
<b>Environmental footprint</b>	<b>61.12**</b> <b>(25.85)</b>
Advertising	11.39 (62.94)
CSR reputation	.0165*** (.00530)
R&D	-.241 (5.073)
Pricing power	-3.954* (2.231)
Distribution	-.0628 (3.334)
Size	-1.185*** (.327)

Cost efficiency	-.148 (.169)
Employee intensity	-43.89 (33.42)
Control function: Environmental footprint	-53.75** (26.14)
Control function: Advertising	-.0102* (.00601)
Control function: CSR reputation	-17.84 (62.64)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	515

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

Our previous supplementary analysis revealed a negative association between a firm's environmental footprint and its brand stature, but not its strength. We build on that evidence to test whether a firm's brand stature, strength, or both mediate the positive association between its environmental footprint and credit risk. Specifically, we estimate a series of regressions simultaneously (Vadakkappatt et al. 2022).

$$\begin{aligned} \text{Brand stature}_{i,t} = & \varphi_{0i} + \varphi_1 \text{Environmental footprint}_{i,t} + \varphi_2 \text{Advertising}_{i,t} + \varphi_3 \text{CSR reputation}_{i,t} + \\ & \varphi_4 \text{R\&D}_{i,t} + \varphi_5 \text{Pricing power}_{i,t} + \varphi_6 \text{Distribution}_{i,t} + \varphi_7 \text{Size}_{i,t} + \varphi_8 \text{Cost efficiency}_{i,t} + \\ & \varphi_9 \text{Employee intensity}_{i,t} + \varphi_{10} \widehat{\delta}_{it} + \gamma_t + \varepsilon_{i,t} \end{aligned} \quad (6)$$

$$\begin{aligned} \text{Brand strength}_{i,t} = & C_{0i} + C_1 \text{Environmental footprint}_{i,t} + C_2 \text{Advertising}_{i,t} + C_3 \text{CSR reputation}_{i,t} + \\ & C_4 \text{R\&D}_{i,t} + C_5 \text{Pricing power}_{i,t} + C_6 \text{Distribution}_{i,t} + C_7 \text{Size}_{i,t} + C_8 \text{Cost efficiency}_{i,t} + \\ & C_9 \text{Employee intensity}_{i,t} + C_{10} \widehat{\delta}_{it} + \gamma_t + \varepsilon_{i,t} \end{aligned} \quad (7)$$

$$\begin{aligned} \text{Credit risk}_{i,t} = & \emptyset_{0i} + \emptyset_1 \text{Environmental footprint}_{i,t} + \emptyset_2 \text{Brand stature}_{i,t} + \emptyset_3 \text{Brand strength}_{i,t} + \\ & \emptyset_4 \text{Advertising}_{i,t} + \emptyset_5 \text{CSR reputation}_{i,t} + \emptyset_6 \text{Size}_{i,t} + \emptyset_7 \text{R\&D}_{i,t} + \emptyset_8 \text{Pricing power}_{i,t} + \\ & \emptyset_9 \text{Distribution}_{i,t} + \emptyset_{10} \text{Size}_{i,t} + \emptyset_{11} \text{Cost efficiency}_{i,t} + \emptyset_{12} \widehat{\delta}_{it} + \gamma_t + \varepsilon_{i,t} \end{aligned} \quad (8)$$

$\varphi_{0i}$ ,  $C_{0i}$ , and  $\emptyset_{0i}$  refer to the firm fixed effects and  $\gamma_t$  refers to the year fixed effects.

Columns 1–3 of Table 8 present the estimates. Consistent with our previous finding, a firm's environmental footprint is negatively associated with its brand stature ( $b_{\text{Environmental footprint} \rightarrow \text{Brand stature}} = -348.8, p < .05$ ) but not its brand strength ( $b_{\text{Environmental footprint} \rightarrow \text{Brand strength}} = -135,$

n.s.). The results in Column 3 suggest that a firm's brand stature is marginally negatively associated with its credit risk ( $b_{\text{Brand stature} \rightarrow \text{Credit risk}} = -.022, p < .10$ ). Upon including brand stature in the regression where credit risk is the DV, the association of environmental footprint with credit risk is negative and insignificant ( $b_{\text{Environmental footprint} \rightarrow \text{Credit risk}} = 42.73, \text{n.s.}$ ). Thus, we infer that brand stature *fully* mediates the positive association between environmental footprint and credit risk. That is, a firm's environmental footprint is negatively associated with its brand stature, which in turn is positively associated with its credit risk.

**Table 8: Brand Stature and Strength as Mechanisms for Environmental Footprint → Credit Risk**

	(1) Brand Stature	(2) Brand Strength	(3) Credit Risk
<b>Environmental footprint</b>	<b>-348.8**</b> (158.5)	<b>-135.0</b> (189.4)	<b>42.73</b> (35.98)
<b>Brand stature</b>			<b>-.0216*</b> (.0113)
<b>Brand strength</b>			<b>.00787</b> (.00946)
Advertising	-308.1 (414.3)	-422.9 (495.2)	-31.09 (93.69)
CSR reputation	-.0246 (.0355)	-.0122 (.0424)	.00817 (.00802)
R&D	-25.94 (26.64)	-2.215 (31.84)	4.627 (6.025)
Pricing power	-23.10** (11.65)	-12.59 (13.93)	-2.514 (2.643)
Distribution	8.399 (21.57)	-28.79 (25.79)	6.162 (4.886)
Size	-5.574*** (2.078)	.437 (2.484)	-1.615*** (.474)
Cost efficiency	2.713** (1.128)	-.0585 (1.348)	-.925*** (.257)
Employee intensity	748.6*** (219.9)	1,251*** (262.9)	37.55 (50.86)
Control function: Environmental footprint	321.5** (162.5)	107.8 (194.2)	-45.30 (36.85)
Control function: Advertising	312.2 (413.3)	372.2 (494.1)	37.38 (93.46)

Control function: CSR reputation	.0834** (.0396)	.0408 (.0473)	-.0100 (.00898)
Intercept	109.4*** (24.95)	20.19 (29.83)	21.41*** (5.756)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	515	515	515
R-squared	.905	.886	.812

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\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

## ROBUSTNESS CHECKS

### Alternative Specification

We re-estimate Equation 5 using a random-effects rather than a fixed-effects specification (Germann, Ebbes, and Grewal 2015; Moon, Tuli, and Mukherjee 2023). We control for unobserved industry heterogeneity by including industry fixed effects (classified by two-digit SIC codes). Table B4 of Web Appendix B presents the estimates consistent with those in Table 3.

### Alternate Measure of Firm Size

We re-estimate Equation 5 using revenues rather than assets as the measure of size. Specifically, we scale all relevant variables (advertising, R&D, pricing power, distribution, and employee intensity) using a firm's revenues rather than its assets. We also measure firm size as the logarithm of revenues, rather than total assets. Table B5 of Web Appendix B presents the estimates consistent with those in Table 3.

## DISCUSSION

“Over a 10-year horizon, the health of the planet dominates concerns: environmental risks are perceived to be the five most critical long-term threats to the world as well as the most potentially damaging to people and planet, with ‘climate action failure,’ ‘extreme weather,’ and ‘biodiversity loss’ ranking as the top three most severe risks.” World Economic Forum 2022, p. 7

As this quote suggests, the World Economic Forum's 2022 Global Risks Perception Survey ranked “the health of the planet” as the top global risk—on both likelihood and impact—

over the next 10-year horizon (World Economic Forum 2022). Increasingly, customers hold firms responsible for exacerbating these risks (Close 2021; Taylor and Watts 2019). However, academics have paid little attention to how a firm's environmental actions affect its customers' perceptions. Our research fills this gap. Next, we discuss our findings' theoretical contributions and practical implications.

### **Contributions to Theory**

*Contributions to environmental ethics literature.* We contribute to the corporate environmental ethics literature (e.g., Chang 2011; Kulkarni 2000). This literature stream contends that, “despite the denial of stakeholder status, the environment is nonetheless accounted for on a fairness-based approach through legitimate organizational stakeholders” (Phillips and Reichart 2000, p. 185). In line with this contention, prior research has examined shareholder (Cordeiro and Tewari 2015) and employee (Gabler, Itani, and Agnihotri 2023) responses to corporate environmental practices. We add to this literature by examining customer responses, manifest in corporate brand equity. Furthermore, while proposing the environmental ethics framework, Kulkarni (2000) noted, “corporate environmental performance may, in fact, be positively associated with economic performance. One of the important reasons for this is that an environmentally oriented firm establishes its reputation among customers that are sensitive to environmental issues” (p. 216). Our empirical results test these propositions. Specifically, we report that customers and creditors respond unfavorably to a firm's environmental footprint by reducing brand equity and increasing credit risk, respectively. Thus, we demonstrate that a firm's environmental footprint can yield undesired stakeholder responses.

*Contributions to the environmental footprint literature.* Our findings contribute to the literature on environmental footprint by highlighting brand equity as a heretofore overlooked

consumer-level consequence. Furthermore, our research highlights two dimensions of a firm's environmental footprint (i.e., pollution and resource use) and finds that customers may interpret these dimensions differently in relation to brand equity. Lastly, we document the diverging effects of environmental footprint on two aspects of brand equity: brand stature and brand strength.

*Contributions to the brand equity literature: Research on the determinants of brand equity has focused on a firm's marketing mix actions (Ataman, Van Heerde, and Mela 2010; Clark, Doraszelski, and Draganska 2009; Olsen, Slotegraaf, and Chandukala 2014). Thus, the state of this literature may lead one to assume that only firm actions in the product market impact brand equity. We show that the firm's actions in nonmarket domain (specifically, its impact on the natural environment) affect its brand equity. Thus, we add to the literature exploring the interdependence between a firm's actions in the nonmarket domain and customer mindset metrics (Vadakkappatt et al. 2022). Our findings highlight the need to examine a firm's nonmarket actions alongside its market counterparts as determinants of its brand equity. Furthermore, we contribute by considering consumer-based brand equity's dimensions (i.e., brand stature and brand strength) and highlighting their connections to downstream financial outcomes. Our findings suggest that customers and creditors penalize a firm for harming nature. We conjecture that a perceived promissory violation might be the underlying mechanism. Thus, we emphasize that customers and creditors are key stakeholders in a firm's environmental externalities.*

*Contributions to advertising and CSR literature: Prior research has demonstrated that a firm's advertising spending increases stakeholder awareness of the firm (Servaes and Tamayo, 2013) and attention toward it (Lou 2014), resulting in favorable outcomes for the firm. We offer the insight that this advertising spending-induced awareness and attention can harm the firm by*

strengthening the negative association between environmental footprint and brand equity.

Relatedly, prior research has shown that a firm's sustainability positioning and CSR reputation can *lower* customers' preferences (Luchs et al. 2010; Sen and Bhattacharya 2001) because customers assume that a firm's focus on environmental footprint may lead it to compromise on product quality. We contribute to this literature by demonstrating one more means through which a firm's CSR reputation can hurt consumer-based and financial outcomes: by exacerbating penalties in the event of perceived irresponsibility on the firm's part.

*Application of the promise view of marketing:* We conjecture that a brand *implicitly* promises customers that it will not harm nature. Therefore, customers may view a firm's environmental footprint as a violation of its promise. Our supplementary analysis suggests that customers may perceive a firm's resource use as a greater violation of its promise, while they may be more accommodating of its pollution (Harvey 2021). We conjecture that customers may interpret a firm's emissions as the inevitable cost of conducting business. In contrast, they may interpret the firm's use of resources as an avoidable activity. Additionally, they may have become desensitized to the overuse of the term "pollution." Overall, our application of the brand-as-promise framework extends the promise view of marketing (Anker, Kappel, Eadie, and Sandøe 2012; Bhargava and Bedi 2022; Bitner 1995; Calonius 2006; Davcik, da Silva, and Hair 2015; Grönroos 2009; Levitt 1981).

### **Practical Implications**

*Managers:* *Be wary of the negative association between the environmental footprint and brand equity.* We offer four actionable insights to managers. First, managers tasked with building and consolidating brand equity should pay attention to nonmarket factors, such as environmental footprint, to ensure their gains in brand equity are not reversed. This finding is particularly

relevant for firms in less polluting industries. In particular, our findings indicate that managers of brands that rely on brand stature must be particularly concerned about their firm's environmental footprint. Second, managers should reduce their firm's resource use to limit erosion of brand equity. At the same time, managers may find solace in the finding that customers seem to ignore the firm's pollution. However, we caution them against overgeneralizing this seemingly counterintuitive result. Third, managers must limit their firm's advertising spending to limit the negative association between environmental footprint and brand equity. Fourth, managers of firms with a strong CSR reputation should vigilantly monitor their environmental footprint to ensure it does not harm their brand equity.

*Managers should be aware of the positive association between environmental footprint and credit risk.* We enhance managers' knowledge by considering the credit providers' perspective. This perspective is managerially relevant for two reasons. First, environmental footprint manifests as a downside risk (Bai, Bali, and Wen 2019). Therefore, it is reflected more accurately in corporate credit risk than in stock return risk (Krüger, Sautner, and Starks 2020; Seltzer, Starks, and Zhu 2021). Second, companies raise five times the capital from bond investors (who consider a company's credit risk) than they do from stock investors (who consider a firm's stock return risks) (Securities Industry and Financial Markets Association 2024). By documenting that a firm's environmental footprint is negatively associated with its credit market performance, we strengthen the business case for firms to manage their environmental footprint, thereby reducing their credit risk.

*Implications for nonmanagerial stakeholders:* Our findings are consequential to institutional investors, consultants, journalists, and public policymakers. Institutional investors are forming coalitions (e.g., Climate Action 100+; <https://www.climateaction100.org/>) and

declaring goals to reward firms that reduce their environmental footprint and penalize those that do not (e.g., Church of England Pension Fund 2019). These investors would find value in our findings that a large environmental footprint decreases a firm's brand equity and increases its credit risk. Consultants (e.g., Janosik and Verbaken 2021) and journalists (e.g., Sommer 2021) have argued that businesses should proactively limit their environmental footprint. Our empirical evidence helps bolster these stakeholders' anecdotal arguments. Public policymakers have debated whether, when, and to what extent regulatory action should be taken to enforce the Paris Agreement while balancing the divergent interests of multiple corporate stakeholders (Ilhan, Sautner, and Vilkov 2021). These policymakers can use our evidence to inform firms that lowering their environmental footprint is in their best interests.

### **Limitations and Future Research**

First, consistent with the brand-as-promise framework, we assume that a brand *implicitly* promises its customers that it will not harm nature. This assumption leads us to frame promissory violation as the mechanism that links a firm's environmental footprint and brand equity. We also use moderation analysis to provide indirect evidence supporting the mechanism. Future experimental research can test whether customers view a brand as a promise only when an explicit brand statement is present (Levitt 1981), or even in its absence. Relatedly, experiments can (1) provide causal evidence for the main association, (2) test our mechanism directly using mediation, and (3) explore alternative mechanisms (e.g., self-brand connection and perceived risk). Specifically, an experiment can test whether consumers interpret information about a brand's environmental footprint as a promissory violation, and whether this interpretation reduces their purchase intention.

Second, we source CSR and brand equity data from providers that employ a specific methodology, thereby capturing specific dimensions of these variables. Other providers use alternative methods that may capture additional dimensions. In addition, our sample comprises only U.S. public firms, limiting the generalizability of our findings to other countries or to U.S. private firms. Future research can use alternative data (e.g., from outside the United States) and/or employ different methods (e.g., experiments) to test our findings' generalizability. It can also shed further light on the psychological mechanisms underlying our observed effects. In addition, our sample ends in 2019, and future research can extend it to later time periods to confirm whether these results continue to hold in the aftermath of the COVID pandemic.

Third, our research is the first attempt (to our knowledge) to examine the association between a firm's environmental footprint and performance outcomes. We show that a large environmental footprint reduces a firm's credit risk, and brand equity mediates this effect. The mediation results could pave the way for future research on financial outcome-based measures of brand equity (Davicik, da Silva, and Hair 2015). Additionally, Table A1 lists only one article on the environmental footprint's product-market outcomes. Future research can extend our findings by examining how and why environmental footprint impacts other product-market outcomes (e.g., product quality, innovation, and market share), and what managerial actions (e.g., stated policies and targets to mitigate environmental footprint) exacerbate or mitigate these effects.

Fourth, we focus on aggregated advertising spending and CSR reputation. However, different types of advertising (Sridhar et al. 2016) and CSR reputation (Mishra and Modi 2016) may differentially moderate the association between environmental footprint and brand equity.

Future research can use different data sources to determine whether our effects hold across disaggregated measures.

In conclusion, our research makes a novel and consequential contribution to the literature by demonstrating that a firm's environmental footprint can hurt its brand equity. We hope that our study spurs future research in this domain.

## REFERENCES

- Aaker, David A., and Robert Jacobson (1994), "The financial information content of perceived quality," *Journal of Marketing Research*, 31 (2), 191-201.
- Aaker, Jennifer, Susan Fournier, and S. Adam Brasel (2004), "When good brands do bad," *Journal of Consumer Research*, 31 (1), 1-16.
- Ahluwalia, Rohini, Robert E. Burnkrant, and H. Rao Unnava (2000), "Consumer response to negative publicity: The moderating role of commitment," *Journal of Marketing Research*, 37 (2), 203-214.
- Ailawadi, Kusum L., Donald R. Lehmann, and Scott A. Neslin (2003), "Revenue premium as an outcome measure of brand equity," *Journal of Marketing*, 67 (4), 1-17.
- Anker, T. B., Kappel, K., Eadie, D., & Sandøe, P. (2012). Fuzzy promises: explicative definitions of brand promise delivery. *Marketing Theory*, 12(3), 267-287.
- Ansolabehere, S., & Konisky, D. M. (2016). *Cheap and clean: how Americans think about energy in the age of global warming*. MIT Press.
- Anderson, Eugene W., and Sattar A. Mansi (2009), "Does customer satisfaction matter to investors? Findings from the bond market," *Journal of Marketing Research*, 46(5), 703-714.
- Antonetti, P., & Maklan, S. (2016). An extended model of moral outrage at corporate social irresponsibility. *Journal of Business Ethics*, 135(3), 429-444.
- Ataman, M. Berk, Harald J. Van Heerde, and Carl F. Mela (2010), "The long-term effect of marketing strategy on brand sales," *Journal of Marketing Research*, 47 (5), 866-882.
- Autor, David, David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen (2020), "The fall of the labor share and the rise of superstar firms," *Quarterly Journal of Economics*, 135(2), 645-709.
- Backhaus, Max, and Marc Fischer, "Brand damage from product harm and corporate social irresponsibility: how deep and how long," *Marketing Science Institute Working Paper Series*, 16 (133), 1-63.

- Bagwell, Kyle (2007), "The economic analysis of advertising," *Handbook of Industrial Organization*, 3, 1701-1844.
- Bai, Jennie, Turan G. Bali, and Quan Wen (2019), "Common risk factors in the cross-section of corporate bond returns," *Journal of Financial Economics*, 131(3), 619-642.
- Banerjee, Sumitro, and Luc Wathieu (2017), "Corporate social responsibility and product quality: Complements or substitutes?" *International Journal of Research in Marketing*, 34 (3), 734-745.
- Bardos, K. S., Ertugrul, M., & Gao, L. S. (2020). Corporate social responsibility, product market perception, and firm value. *Journal of Corporate Finance*, 62, 101588.
- Barrage, Lint, Eric Chyn, and Justine Hastings (2020), "Advertising and environmental stewardship: Evidence from the BP oil spill," *American Economic Journal: Economic Policy*, 12(1), 33-61.
- Barth, Mary E., Michael B. Clement, George Foster, and Ron Kasznik (1998), "Brand values and capital market valuation. *Review of Accounting Studies*. 3 (1): 41-68.
- Batson, C. D., Chao, M. C., & Givens, J. M. (2009). Pursuing moral outrage: Anger at torture. *Journal of Experimental Social Psychology*, 45(1), 155-160.
- Berrone, P., Fosfuri, A., Gelabert, L., & Gomez-Mejia, L. R. (2013). Necessity as the mother of 'green' inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*. 34 (8), 891-909.
- Bhagwat, Yashoda, Nooshin L. Warren, Joshua T. Beck, and George F. Watson IV (2020), "Corporate sociopolitical activism and firm value," *Journal of Marketing*, 84 (5), 1-21.
- Bharadwaj, Anandhi S., Sundar G. Bharadwaj, and Benn R. Konsynski (1999), "Information technology effects on firm performance as measured by Tobin's q," *Management Science*, 45(7), 1008-1024.
- Bhargava, V. R., & Bedi, S. (2022). Brand as promise. *Journal of Business Ethics*, 179(3), 919-936.
- Bhattacharya, Chitrabhan B., and Sankar Sen (2003), "Consumer-company identification: A framework for understanding consumers' relationships with companies." *Journal of Marketing*, 67 (2), 76-88.
- Bitner, M. J. (1995). Building service relationships: It's all about promises. *Journal of the Academy of Marketing Science*, 23(4), 246-251.
- Blank, A. S., Loveland, K. E., Cheng, A., Beck, S., & Rundus, A. (2024). Responding to COVID-19: The impact of corporate social responsibility on consumer behavior. *International Journal of Consumer Studies*, 48(1), e12982.

- Bolton, Patrick, and Marcin Kacperczyk (2021), "Do investors care about carbon risk?" *Journal of Financial Economics*, 142 (2), 517-549.
- Brunk, K. H. (2010). Exploring origins of ethical company/brand perceptions—A consumer perspective of corporate ethics. *Journal of Business Research*, 63(3), 255-262.
- Brunk, K. H. (2012). Un/ethical company and brand perceptions: Conceptualising and operationalising consumer meanings. *Journal of business ethics*, 111, 551-565.
- Brunk, K. H., & Blümelhuber, C. (2011). One strike and you're out: Qualitative insights into the formation of consumers' ethical company or brand perceptions. *Journal of Business Research*, 64(2), 134-141.
- Brunk, K. H., & DeBoer, C. (2015). Ethical brand perception formation when information is inconsistent-An impression formation perspective. *NA - Advances in Consumer Research Volume 43*, eds. Kristin Diehl and Carolyn Yoon, Duluth, MN : Association for Consumer Research, 319-323.
- Brunk, K. H., & De Boer, C. (2020). How do consumers reconcile positive and negative CSR-related information to form an ethical brand perception? A mixed method inquiry. *Journal of Business Ethics*, 161, 443-458.
- Calonius, H. (2006). Contemporary research in marketing: A market behaviour framework. *Marketing Theory*, 6(4), 419-428.
- Chaiken, S.; A. Liberman; and A. H. Eagly (1989), "Heuristic and systematic processing within and beyond the persuasion context," in *Unintended Thought*, edited by J. S. Uleman and J.A. Bargh. New York: Guilford, 1989.
- Chakravarty, Anindita, Alok R. Saboo, and Guiyang Xiong (2022), "Marketing's and Operations' Roles in Product Recall Prevention: Antecedents and Consequences," *Production and Operations Management*, 31(3), 1174-1190.
- Chang, C. H. (2011). The influence of corporate environmental ethics on competitive advantage: The mediation role of green innovation. *Journal of business ethics*, 104(3), 361-370.
- Cheung, M. F., & To, W. M. (2021). The effect of consumer perceptions of the ethics of retailers on purchase behavior and word-of-mouth: The moderating role of ethical beliefs. *Journal of Business Ethics*, 171(4), 771-788.
- Christodoulides, G., & De Chernatony, L. (2010). Consumer-based brand equity conceptualisation and measurement: a literature review. *International Journal of Market Research*, 52(1), 43-66.
- Church of England Pension Fund (2019), "RI Transparency Report," [https://www.churchofengland.org/sites/default/files/2019-07/pri\\_2019\\_public\\_transparency\\_report\\_church\\_commissioners.pdf](https://www.churchofengland.org/sites/default/files/2019-07/pri_2019_public_transparency_report_church_commissioners.pdf).

- Clark, C. Robert, Ulrich Doraszelski, and Michaela Draganska (2009), “The effect of advertising on brand awareness and perceived quality: An empirical investigation using panel data,” *Quantitative Marketing and Economics*, 7 (2), 207-236.
- Close, Cristianne (2021), “The global eco-wakening: how consumers are driving sustainability,” World Economic Forum, available at <https://www.weforum.org/agenda/2021/05/eco-wakening-consumers-driving-sustainability/>
- Comanor, Willaim S., and Wilson, Thomas A. (1967) “Advertising, market structure and performance. *Review of Economics and Statistics*,” 49(4), 423–440.
- Cordeiro, J. J., & Tewari, M. (2015). Firm characteristics, industry context, and investor reactions to environmental CSR: A stakeholder theory approach. *Journal of business ethics*, 130(4), 833-849.
- Cowan, K., & Guzman, F. (2020). How CSR reputation, sustainability signals, and country-of-origin sustainability reputation contribute to corporate brand performance: An exploratory study. *Journal of business research*, 117, 683-693.
- da Fonseca, M. R., Rocha, T. V., & Alves, A. P. C. C. (2024). Delivering satisfaction and brand equity from consumer’s CSR perception: the mediating role of hedonic and utilitarian motivations in the online food delivery services. *International Journal on Food System Dynamics*, 15(4), 358-375.
- Dalman, M. D., Buche, M. W., & Min, J. (2019). The differential influence of identification on ethical judgment: The role of brand love. *Journal of Business Ethics*, 158, 875-891.
- de Oliveira, M. O. R., Silveira, C. S., & Luce, F. B. (2015). Brand equity estimation model. *Journal of Business Research*, 68(12), 2560-2568.
- Davcik, N. S., Vinhas da Silva, R., & Hair, J. F. (2015). Towards a unified theory of brand equity: Conceptualizations, taxonomy and avenues for future research. *Journal of Product & Brand Management*, 24(1), 3-17.
- De Kerviler, G., Heuvinck, N., & Gentina, E. (2022). “Make an effort and show me the love!” Effects of indexical and iconic authenticity on perceived brand ethicality. *Journal of Business Ethics*, 1-22.
- Delmas, Magali A., and Nicholas S. Nairn-Birch (2011), “Is the tail wagging the dog? An empirical analysis of corporate carbon footprints and financial performance,” <https://escholarship.org/uc/item/3k89n5b7>.
- Delmas, Magali A., Nicholas Nairn-Birch, and Jinghui Lim (2015), “Dynamics of environmental and financial performance: The case of greenhouse gas emissions,” *Organization & Environment*, 28 (4), 374-393.

Diallo, M. F., & Lambey-Checchin, C. (2017). Consumers' perceptions of retail business ethics and loyalty to the retailer: The moderating role of social discount practices. *Journal of Business Ethics, 141*, 435-449.

Diallo, M. F., Ben Dahmane Mouelhi, N., Gadekar, M., & Schill, M. (2021). CSR actions, brand value, and willingness to pay a premium price for luxury brands: does long-term orientation matter? *Journal of Business Ethics, 169*, 241-260.

Diallo, M. F., & Lambey-Checchin, C. (2017). Consumers' perceptions of retail business ethics and loyalty to the retailer: The moderating role of social discount practices. *Journal of Business Ethics, 141*, 435-449.

Dou, Winston Wei, Yan Ji, David Reibstein, and Wei Wu (2021), "Inalienable customer capital, corporate liquidity, and stock returns," *Journal of Finance, 76* (1), 211-265.

Driscoll, C., & Starik, M. (2004). The primordial stakeholder: Advancing the conceptual consideration of stakeholder status for the natural environment. *Journal of Business Ethics, 49*, 55-73.

Du, Shuili, Chitra B. Bhattacharya, and Sankar Sen (2011), "Corporate social responsibility and competitive advantage: Overcoming the trust barrier," *Management Science, 57* (9), 1528-1545.

Dunlap, R. E., & Scarce, R. (1991). Poll trends: Environmental problems and protection. *Public Opinion Quarterly, 55*(4), 651-672.

Dutta, Sujay, and Chris Pullig (2011), "Effectiveness of corporate responses to brand crises: The role of crisis type and response strategies," *Journal of Business Research, 64* (12), 1281-1287.

Einwiller, Sabine, Christopher Ruppel, and Alexandra Schnauber (2016), "Harmonization and differences in CSR reporting of US and German companies: Analyzing the role of global reporting standards and country-of-origin," *Corporate Communications: An International Journal, 21* (2), 230-245.

Eisingerich, Andreas B., Gaia Rubera, Matthias Seifert, and Gunjan Bhardwaj. "Doing good and doing better despite negative information? The role of corporate social responsibility in consumer resistance to negative information," *Journal of Service Research, 14* (1), 60-75.

Erdem, Tülin, Joffre Swait, and Ana Valenzuela (2006), "Brands as signals: A cross-country validation study." *Journal of Marketing, 70* (1), 34-49.

Fernando, Chitru S., Mark P. Sharfman, and Vahap B. Uysal (2017), "Corporate environmental policy and shareholder value: Following the smart money," *Journal of Financial and Quantitative Analysis, 52* (5), 2023-2051.

Flammer, Caroline (2013), "Corporate social responsibility and shareholder reaction: The environmental awareness of investors," *Academy of Management Journal, 56*(3), 758-781.

- Folkes, Valerie S. (1984), "Consumer reactions to product failure: An attributional approach," *Journal of Consumer Research*, 10 (4), 398-409.
- Friedman, Milton (1970), "A theoretical framework for monetary analysis," *Journal of Political Economy*, 78 (2), 193-238.
- Gabler, C. B., Itani, O. S., & Agnihotri, R. (2023). Activating corporate environmental ethics on the frontline: a natural resource-based view. *Journal of Business Ethics*, 186(1), 63-86.
- Galavielle, J. P. (2004). Business ethics is a matter of good conduct and of good conscience? *Journal of Business Ethics*, 53(1), 9-16.
- Garvey, Gerald T., Mohanaraman Iyer, and Joanna Nas (2018), "Carbon footprint and productivity: does the "E" in ESG capture efficiency as well as environment," *Journal of Investment Management*, 16 (1), 59-69.
- Germann, F., Ebbes, P., & Grewal, R. (2015). The chief marketing officer matters!. *Journal of Marketing*, 79(3), 1-22.
- Gielens, Katrijn, Inge Geyskens, Barbara Deleersnyder, and Max Nohe (2018), "The new regulator in town: The effect of Walmart's sustainability mandate on supplier shareholder value," *Journal of Marketing*, 82 (2), 124-141.
- Greenwood, M., & Freeman, R. E. (2017). Focusing on ethics and broadening our intellectual base. *Journal of Business Ethics*, 140, 1-3.
- Grönroos, C. (2009). Marketing as promise management: regaining customer management for marketing. *Journal of Business & Industrial Marketing*, 24(5/6), 351-359.
- Habel, Johannes, Laura Marie Schons, Sascha Alavi, and Jan Wieseke (2016), "Warm glow or extra charge? The ambivalent effect of corporate social responsibility activities on customers' perceived price fairness," *Journal of Marketing*, 80 (1), 84-105.
- Harvey, Fiona (2021), "Global water crisis will intensify climate breakdown, says report," *The Guardian*, available at <https://www.theguardian.com/environment/2021/aug/17/global-water-crisis-will-intensify-with-climate-breakdown-says-report>
- Heath, Timothy B., and Subimal Chatterjee (1995), "Asymmetric decoy effects on lower-quality versus higher-quality brands: Meta-analytic and experimental evidence," *Journal of Consumer Research*, 22 (3), 268-284.
- Hsu, Po-Hsuan, Kai Li, and Chi-Yang Tsou (2022), "The pollution premium," *Journal of Finance*, Forthcoming.
- Hur, W. M., Kim, H., & Woo, J. (2014). How CSR leads to corporate brand equity: Mediating mechanisms of corporate brand credibility and reputation. *Journal of Business Ethics*, 125, 75-86.

- Iglesias, O., Markovic, S., Singh, J. J., & Sierra, V. (2019). Do customer perceptions of corporate services brand ethicality improve brand equity? Considering the roles of brand heritage, brand image, and recognition benefits. *Journal of Business Ethics*, 154, 441-459.
- Ilhan, Emirhan, Zacharias Sautner, and Grigory Vilkov (2021), "Carbon tail risk," *Review of Financial Studies*, 34 (3), 1540-1571.
- Janosik, Reka, and Verbraken, Thomas (2021), "How Climate Change Could Impact Credit Risk," <https://www.msci.com/www/blog-posts/how-climate-change-could-impact/02803746523>.
- Jindal, N., & McAlister, L. (2015). The impacts of advertising assets and R&D assets on reducing bankruptcy risk. *Marketing Science*, 34(4), 555-572.
- Jindal, N., & Slotegraaf, R. J. (2024). Effects of advertising and R&D on spillovers from a rival's bankruptcy. *Journal of the Academy of Marketing Science*, 52(2), 349-369.
- Jira, Chonnikarn, and Michael W. Toffel (2013), "Engaging supply chains in climate change," *Manufacturing & Service Operations Management*, 15 (4), 559-577.
- Joshi, Amit, and Dominique M. Hanssens (2010), "The direct and indirect effects of advertising spending on firm value," *Journal of Marketing*, 74(1), 20-33.
- Kachaner, Nicolas, J. Nielsen, A. Portafaix, and F. Rodzko (2020), "The pandemic is heightening environmental awareness," <https://www.bcg.com/publications/2020/pandemic-isheightening-environmental-awareness>.
- Kantar. (2020), "COVID-19 Barometer: Consumer attitudes, media habits and expectations." <https://www.kantar.com/inspiration/coronavirus/covid-19-barometer-consumer-attitudes-media-habits-and-expectations>
- Kashmiri, Saim, and Vijay Mahajan (2014), "Beating the recession blues: Exploring the link between family ownership, strategic marketing behavior and firm performance during recessions," *International Journal of Research in Marketing*, 31 (1), 78-93.
- Keller, Kevin Lane (1993), "Conceptualizing, measuring, and managing customer-based brand equity," *Journal of Marketing*, 57 (1): 1-22.
- Keller, Kevin Lane (2017), "Managing the growth tradeoff: Challenges and opportunities in luxury branding," *Advances in Luxury Brand Management*, 179-198.
- Kermani, M. S., Noseworthy, T. J., & Darke, P. R. (2024). Getting political: The value-protective effects of expressed outgroup outrage on self-brand connection. *Journal of Consumer Psychology*, 34(3), 385-405.
- Kervyn, Nicolas, Susan T. Fiske, and Chris Malone (2012), "Brands as intentional agents framework: How perceived intentions and ability can map brand perception," *Journal of Consumer Psychology*, 22 (2), 166-176.

- Klein, Jill, and Niraj Dawar (2004), "Corporate social responsibility and consumers' attributions and brand evaluations in a product-harm crisis," *International Journal of Research in Marketing*, 21 (3), 203-217.
- Kohli, S., Timelin, B., Fabius, V., Veranen, S. M. (2020), "How COVID-19 is changing consumer behavior-now and forever," <https://www.mckinsey.com/~/media/McKinsey/Industries/Retail/Our%20Insights/How%20COVID%20is%20changing%20consumer%20behavior%20now%20and%20forever/How-COVID-19-is-changing-consumer-behaviornow-and-forever.pdf>
- Konisky, D. M., Milyo, J., & Richardson, L. E. (2008). Environmental policy attitudes: Issues, geographical scale, and political trust. *Social Science Quarterly*, 89(5), 1066-1085.
- Krüger, Philipp (2015), "Corporate goodness and shareholder wealth." *Journal of Financial Economics*, 115 (2), 304-329.
- Krüger, Philipp, Zacharias Sautner, and Laura T. Starks (2020), "The importance of climate risks for institutional investors," *Review of Financial Studies*, 33 (3), 1067-1111.
- Kulkarni, Subodh P. (2000), "Environmental ethics and information asymmetry among organizational stakeholders," *Journal of Business Ethics*, 27(3), 215-228.
- Leone, Robert P., Vithala R. Rao, Kevin Lane Keller, Anita Man Luo, Leigh McAlister, and Rajendra Srivastava (2006), "Linking brand equity to customer equity," *Journal of Service Research*, 9 (2), 125-138.
- Leonidou, L. C., Kvasova, O., Leonidou, C. N., & Chari, S. (2013). Business unethicity as an impediment to consumer trust: The moderating role of demographic and cultural characteristics. *Journal of Business Ethics*, 112, 397-415.
- Lev, Baruch, and Theodore Sougiannis (1996), "The capitalization, amortization, and value-relevance of R&D," *Journal of Accounting and Economics*, 21(1), 107-138.
- Levitt, T. (1981). Marketing intangible products and product intangibles. *Harvard Business Review*, 59(May-June), 94-102
- Liang, Hao, and Luc Renneboog (2017), "On the foundations of corporate social responsibility," *Journal of Finance*, 72 (2), 853-910.
- Lin, M. S., & Chung, Y. K. (2019). Understanding the impacts of corporate social responsibility and brand attributes on brand equity in the restaurant industry. *Tourism Economics*, 25(4), 639-658.
- Lindenmeier, J., Schleer, C., & Pricl, D. (2012). Consumer outrage: Emotional reactions to unethical corporate behavior. *Journal of Business Research*, 65(9), 1364-1373.
- Lou, D. (2014). Attracting investor attention through advertising. *Review of Financial Studies*, 27(6), 1797-1829.

- Luo, Xueming, and Chitra Bhanu Bhattacharya (2009), "The debate over doing good: Corporate social performance, strategic marketing levers, and firm-idiosyncratic risk," *Journal of Marketing*, 73(6), 198-213.
- Lovett, Mitchell, Renana Peres, and Ron Shachar (2014), "A data set of brands and their characteristics," *Marketing Science*, 33 (4): 609-617.
- Malmqvist, Tove (2022), "More consumers are serious about climate change. Are business and government listening?" <https://www.greenbiz.com/article/more-consumers-are-serious-about-climate-change-are-business-and-government-listening>.
- Marquis, Christopher, Michael W. Toffel, and Yanhua Zhou (2016), "Scrutiny, norms, and selective disclosure: A global study of greenwashing," *Organization Science*, 27 (2), 483-504.
- McAlister, L., Srinivasan, R., Jindal, N., & Cannella, A. A. (2016). Advertising effectiveness: The moderating effect of firm strategy. *Journal of Marketing Research*, 53(2), 207-224.
- McAlister, Leigh, Raji Srinivasan, and MinChung Kim (2007), "Advertising, research and development, and systematic risk of the firm," *Journal of Marketing*, 71 (1), 35-48.
- McAlister, Leigh, Raji Srinivasan, Niket Jindal, and Albert A. Cannella (2016), "Advertising effectiveness: the moderating effect of firm strategy," *Journal of Marketing Research*, 53(2), 207-224.
- McKinsey. (2025), "Emerging consumer trends in a post COVID 19 world," <https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/emerging-consumer-trends-in-a-post-covid-19-world>
- Meyer, John W., and Brian Rowan (1977), "Institutionalized organizations: Formal structure as myth and ceremony," *American Journal of Sociology*, 83(2), 340-363.
- Minor, Dylan, and John Morgan (2011), "CSR as reputation insurance: Primum non nocere," *California Management Review*, 53 (3), 40-59.
- Misani, Nicola (2020), "Sustainability and Implicit Contracts," *Sustainability*, (pp. 81-97). Emerald Publishing Limited.
- Mishra, Saurabh, and Sachin B. Modi (2016), "Corporate social responsibility and shareholder wealth: The role of marketing capability," *Journal of Marketing*, 80 (1), 26-46.
- Mizik, Natalie, and Robert Jacobson (2008), "The financial value impact of perceptual brand attributes," *Journal of Marketing Research*, 45 (1), 15-32.
- Mizik, Natalie, and Robert Jacobson (2009), "Valuing branded businesses," *Journal of Marketing*, 73 (6), 137-153.
- Moon, S., Tuli, K. R., & Mukherjee, A. (2023). Does disclosure of advertising spending help investors and analysts? *Journal of Marketing*, 87(3), 359-382.

Morgan, Neil A. (2012), "Marketing and business performance," *Journal of the Academy of Marketing Science*, 40 (1), 102-119.

Muniz, F., Guzmán, F., Paswan, A. K., & Crawford, H. J. (2019). The immediate effect of corporate social responsibility on consumer-based brand equity. *Journal of Product & Brand Management*, 28(7), 864-879.

Nickerson, Dionne, Michael Lowe, Adithya Pattabhiramaiah, and Alina Sorescu (2022), "The impact of corporate social responsibility on brand sales: an accountability perspective," *Journal of Marketing*, 86 (2), 5-28.

Nielsen. (2025), "2023 Consumer Survey Report," <https://www.nielsen.com/wp-content/uploads/sites/2/2023/11/2023-Consumer-Survey-Report.pdf>

Oliver, Richard L., and Russell S. Winer (1987), "A framework for the formation and structure of consumer expectations: Review and propositions," *Journal of Economic Psychology*, 8 (4), 469-499.

Olsen, Mitchell C., Rebecca J. Slotegraaf, and Sandeep R. Chandukala (2014), "Green claims and message frames: how green new products change brand attitude," *Journal of Marketing*, 78 (5), 119-137.

Osinga, Ernst C., Peter SH Leeflang, Shuba Srinivasan, and Jaap E. Wieringa (2011), "Why do firms invest in consumer advertising with limited sales response? A shareholder perspective," *Journal of Marketing*, 75 (1), 109-124.

Peress, Joel (2010), "Product market competition, insider trading, and stock market efficiency," *Journal of Finance*, 65(1), 1-43.

Petrin, Amil, and Kenneth Train (2010), "A control function approach to endogeneity in consumer choice models," *Journal of Marketing Research*, 47(1), 3-13.

Phillips, R. A., & Reichart, J. (2000). The environment as a stakeholder? A fairness-based approach. *Journal of Business Ethics*, 23, 185-197.

Puzakova, Marina, Hyokjin Kwak, and Joseph F. Rocereto (2013), "When humanizing brands goes wrong: The detrimental effect of brand anthropomorphization amid product wrongdoings," *Journal of Marketing*, 77 (3), 81-100.

Rego, Lopo L., Matthew T. Billett, and Neil A. Morgan (2009), "Consumer-based brand equity and firm risk." *Journal of Marketing*, 73 (6), 47-60.

Roehm, Michelle L., and Alice M. Tybout (2006), "When will a brand scandal spill over, and how should competitors respond?" *Journal of Marketing Research*, 43 (3), 366-373.

Romani, Simona, Silvia Grappi, Lia Zarantonello, and Richard P. Bagozzi (2015), "The revenge of the consumer! How brand moral violations lead to consumer anti-brand activism," *Journal of Brand Management*, 22 (8), 658-672.

- Sagoff, Mark (1974), "On Preserving the Natural Environment," *Yale Law Journal*, 84(2), 205-267.
- Scanlon, Thomas M. (1990), "Promises and Practices," *Philosophy and Public Affairs*, 19(3), 199–226.
- Scanlon, Thomas M. (2000), "What We Owe to Each Other," Cambridge, MA: Harvard University Press.
- Schuler, Douglas A., and Margaret Cording (2006), "A corporate social performance–corporate financial performance behavioral model for consumers," *Academy of Management Review*, 31 (3), 540-558.
- Securities Industry and Financial Markets Association (2024), "2024 Capital Markets Fact Book," <https://www.sifma.org/wp-content/uploads/2023/07/2024-SIFMA-Capital-Markets-Factbook.pdf>.
- Seltzer, Lee H., Laura Starks, and Qifei Zhu (2022), "Climate regulatory risk and corporate bonds," <https://www.nber.org/papers/w29994>.
- Sen, Sankar, and Chitra Bhanu Bhattacharya (2001), "Does doing good always lead to doing better? Consumer reactions to corporate social responsibility," *Journal of Marketing Research*, 38 (2), 225-243.
- Servaes, Henri, and Ane Tamayo (2013), "The impact of corporate social responsibility on firm value: The role of customer awareness," *Management Science*, 59 (5), 1045-1061.
- Sharfman, Mark P., and Chitru S. Fernando (2008), "Environmental risk management and the cost of capital," *Strategic Management Journal*, 29 (6), 569-592.
- Simon, Carol J., and Mary W. Sullivan (1993), "The measurement and determinants of brand equity: A financial approach," *Marketing Science*, 12 (1), 28-52.
- Singh, J. J., Iglesias, O., & Batista-Foguet, J. M. (2012). Does having an ethical brand matter? The influence of consumer perceived ethicality on trust, affect and loyalty. *Journal of business ethics*, 111, 541-549.
- Sinha, Jayati, and Fang-Chi Lu (2016), "'I' value justice, but 'we' value relationships: Self-construal effects on post-transgression consumer forgiveness," *Journal of Consumer Psychology*, 26 (2), 265-274.
- Sommer, Jeff. (2021), "When Bad News About the Climate Is Good for Green Stocks," <https://www.nytimes.com/2021/11/05/business/climate-green-stock-market.html>.
- Sridhar, Shrihari, Frank Germann, Charles Kang, and Rajdeep Grewal (2016), "Relating online, regional, and national advertising to firm value," *Journal of Marketing*, 80 (4), 39-55.
- Srinivasan, Shuba, Koen Pauwels, Jorge Silva-Risso, and Dominique M. Hanssens (2009), "Product innovations, advertising, and stock returns," *Journal of Marketing*, 73 (1), 24-43.

Stigler, George J. (1961), "The economics of information," *Journal of Political Economy*, 69 (3), 213-225.

Swaminathan, Vanitha, Alina Sorescu, Jan-Benedict EM Steenkamp, Thomas Clayton Gibson O'Guinn, and Bernd Schmitt (2020), "Branding in a hyperconnected world: Refocusing theories and rethinking boundaries," *Journal of Marketing*, 84 (2), 24-46.

Tavassoli, Nader T., Alina Sorescu, and Rajesh Chandy (2014), "Employee-based brand equity: Why firms with strong brands pay their executives less," *Journal of Marketing Research*, 51 (6), 676-690.

Taylor, Matthew and Jonathan Watts (2019), "Revealed: the 20 firms behind a third of all carbon emissions," *The Guardian*, available at <https://www.theguardian.com/environment/2019/oct/09/revealed-20-firms-third-carbon-emissions>

Tingchi Liu, M., Anthony Wong, I., Shi, G., Chu, R., & L. Brock, J. (2014). The impact of corporate social responsibility (CSR) performance and perceived brand quality on customer-based brand preference. *Journal of Services Marketing*, 28(3), 181-194.

Tudoran, A. A., Thomsen, C. H., & Thomasen, S. (2024). Understanding consumer behavior during and after a Pandemic: Implications for customer lifetime value prediction models. *Journal of Business Research*, 174, 114527.

Tuli, Kapil R., and Sundar G. Bharadwaj (2009), "Customer satisfaction and stock returns risk" *Journal of Marketing*, 73(6), 184-197.

Tyron, William W. (1994), "Expectations," *Encyclopedia of human behaviour*. San Diego: CA Acaemia.

Ungemach, Christoph, Vivek Astvansh, Suneal Bedi, Dinesh Puranam, Anna Sáez de Tejada Cuenca, Tamara Sheldon, Christian Blanco, Sara Constantino, Tamar Makov, Shelia Miller, Cem Öztürk, David Reibstein, and David J. Hardisty (2026), "The Role of Marketing Research in Achieving Environmentally Sustainable Consumption and Production: Current and Future Directions," *Journal of Retailing*. Forthcoming.

Vadakkepatt, Gautham G., Sandeep Arora, Kelly D. Martin, and Neeru Paharia (2022), "Shedding light on the dark side of firm lobbying: A customer perspective," *Journal of Marketing*, 86 (3), 79-97.

Vancouver, J. B., & Carlson, B. W. (2015). All things in moderation, including tests of mediation (at least some of the time). *Organizational Research Methods*, 18(1), 70-91.

Xiong, Guiyang, and Sundar Bharadwaj (2013), "Asymmetric roles of advertising and marketing capability in financial returns to news: Turning bad into good and good into great," *Journal of Marketing Research*, 50 (6), 706-724.

Yoon, Yeosun, Zeynep Gürhan-Canli, and Norbert Schwarz (2006), “The effect of corporate social responsibility (CSR) activities on companies with bad reputations,” *Journal of Consumer Psychology*, 16 (4), 377-390.

World Economic Forum (2022), “Global Risks Report 2022,”  
<https://www.weforum.org/reports/global-risks-report-2022/>.

## Web Appendix A

**Table A1: Multidisciplinary Evidence on the Association Between a Firm’s Environmental Footprint and Its Performance Outcomes**

Note: EV = explanatory variable; DV = dependent variable; ROA = return on assets, ROE = return on equity; ROS = return on sales; EBIT = earnings before interest and taxes; EBITDA = earnings before interest, taxes, depreciation, and amortization; KLD = Kinder, Lydenberg, Domini and Company; MVE = market value of equity; CAR = cumulative abnormal returns; AT = total assets; LIWC = Linguistic Inquiry and Word Count

Citation	EV(s) and DV(s)	Key Finding(s)
Aghion et al. (2023)	<p>EV1: Product-market competition (Lerner index)</p> <p>EV2: Citizens’ willingness to pay for the environment, where citizens are from the focal firm’s country of headquarters</p> <p>DV: Number of “clean” (non-fossil-fuel-based propulsion) patents a car manufacturer filed in a year minus the number of “dirty” (internal combustion engine) patents it filed</p>	<p>The more willing citizens are to pay for the environment, the greater a firm’s focus on clean innovations.</p>
Aswani, Raghunandan, and Rajgopal (2023)	<p>EV: Carbon emissions and their intensity</p> <p>DV: ROA, ROS, EBIT margin, EBITDA margin, stock returns</p>	<p>The higher a firm’s Scope 1 carbon emissions, the higher its ROA, ROS, EBIT margin, and EBITDA margin.</p> <p>However, the firm’s carbon <i>intensity</i> is unrelated to these four performance measures.</p>
Barrage, Chyn, and Hastings (2020)	<p>EV: 2010 BP oil spill</p> <p>DV: Price, profit margin, and volume of BP’s gasoline sales in the month after the spill</p>	<p>In the aftermath of the 2010 BP oil spill, BP gas stations’ gasoline prices, profit margins, and sales volumes dropped.</p> <p>BP’s pre-spill advertising dampened the customer response.</p>
Berkman, Jona, and Sodestrom (2021)	<p>EV: A firm’s disclosure of environmental risk in its 10-K</p> <p>DV: Firm’s market value</p>	<p>The more a firm discloses its environmental risk, the lower its market value.</p>
Bolton and Kacperczyk (2021)	<p>EV: Carbon emissions and their intensity</p> <p>DV: Tobin’s q, MVE</p>	<p>The higher a firm’s Scope 1 emissions, the higher its stock returns. Same association for Scope 2 and Scope 3 emissions and change (from the previous year) in Scope 1, 2, and 3 emissions. However, emissions intensity is unrelated to stock returns.</p>
Delmas and Nairn-Birch (2011)	<p>EV: Scope 1, Scope 2, and Scope 3 emissions</p>	<p>A firm’s GHG emissions are positively associated with its return on assets but negatively associated with its Tobin’s q.</p>

DV1: Short-term performance, ROA  
(earnings before interest divided by SALE)

DV2: Long-term performance, Tobin's q  
EVs: The authors convert five variables into two principal components. The five variables are (1) Trucost's total environmental damage, KLD's (2) total environmental strengths and (3) total environmental concerns, and Sustainable Asset Management's (SAM's) (4) eco-efficiency and (5) environmental reporting. The authors label the components as environmental processes and environmental outcomes.

The higher a firm's environmental processes, the higher its Tobin's q, whereas the firm's environmental outcomes are unrelated to its Tobin's q.

Among the five variables, only SAM's eco-efficiency is positively associated with the firm's Tobin's q.

Delmas,  
Etzion, and  
Nairn-Birch  
(2013)

DV: Tobin's q

Fernando,  
Sharfman,  
and Uysal  
(2017)

EV: Number of KLD environmental strengths minus number of environmental concerns

The higher the net strength of a firm's environmental score, the higher its Tobin's q.

DV: Tobin's q

Fisher-  
Vanden and  
Thorburn  
(2011)

EV: A firm's announcement of membership in the EPA's Climate Leaders program

A firm's voluntary environmental initiative elicits a penalty from its investors.

DV: CAR

Ghoul,  
Guedhami,  
Kim, and Park  
(2018)

EV: Environmental costs divided by AT

The higher a firm's environmental responsibility, the lower its cost of equity capital.

DV: Four measures of cost of equity capital

Gilley et al.  
(2000)

EV: Whether a firm's announced environmental initiative is product-driven or process-driven

A firm's announcement of a process-driven environmental initiative elicits a penalty from investors. Announcement of a product-driven environmental initiative elicits no reaction.

DV: Cumulative abnormal stock returns in the (-1,0) event window

Haney (2017)

EVs: LIWC variables—positive, negative, positive minus negative—measured the firm's perceptions as threats versus opportunities. The input text was the firm's answer to an open-ended question of the Carbon Disclosure Project (CDP) questionnaire.

A firm's interpretation of environmental challenges as threats (vs. opportunities) encourages firm innovation.

DVs 1 and 2: The extent to which a firm develops new-to-the-firm *products* (DV1)

The underlying mechanisms are the firm's perceived responsibility toward society and moral legitimacy.

and *services* (DV2), reported in the CDP questionnaire.

DVs 3 and 4: The extent to which a firm is improving its products (DV3) and services (DV4), reported in the CDP questionnaire  
EV: Emissions reduction

A firm's emissions reduction is positively associated with its operating and financial performance.

The higher a firm's announcement of voluntary environmental efforts, the greater its relative reduction in toxic releases.

Whether the announcement is of intent or achievement does not matter.

The firm's announcements of "wide" (vs. narrow) initiatives are positively associated with its emissions reduction.

The higher a firm's intensity of toxic emissions, the higher its stock returns.

Firms with the following characteristics are more carbon efficient:

Lower book-to-market ratios, higher ROA, higher Tobin's q, higher cash flows and cash holdings, higher coverage ratios, lower leverage ratios, and higher dividend payout ratios

On average, investors react neither to a firm's announcement of environmental initiatives nor to its granting of awards/certifications. However, they react to subcategories of such announcements.

A firm's philanthropic gifts to environmental causes elicit a reward from investors. Same reaction for ISO 14001 certification. However, the firm's voluntary effort to reduce emissions elicits a penalty.

Environmental costs are negatively associated with ROA.

Hart and Ahuja (1996)

DV: Operating performance (ROS, ROA) and financial performance (ROE)

Hora and Subramanian (2018)

EV: Whether the firm announced undertaking environmental efforts beyond regulatory compliance

DV: Relative reduction in the firm's annual toxic releases into nature (i.e., air, water, and land)

Hsu, Li, and Tsou (2021)

EV: Intensity of toxic emissions

DV: Stock returns

EVs: Several accounting variables

In, Park, and Monk (2017)

DV: Carbon efficiency: Firm's GHG emissions from Scopes 1 (own operations), 2 (purchased electricity), and 3 (suppliers' operations)

Jacobs, Singhal, and Subramaniam (2010)

EV: Firm announcement of (1) its environmental efforts/initiatives and (2) environmental awards and certifications granted to the firm by third parties

DV: CAR

Jo, Kim, and Park (2015)

EV: Total environmental costs

DV: ROA

Khanna and Damon (1999)	EV: Whether a firm participates in the EPA's 33/50 Releases Program DVs: (1) Return on investment and (2) excess value ÷ sales	Whether a firm participated in the 33/50 Program had no impact on either of the two economic performance outcomes.  The association between a firm's emissions and Tobin's q is unclear.
King and Lenox (2001)	EV: A firm's emissions of toxic chemicals DV: Tobin's q	Also unclear are the associations between (1) the firm's emissions relative to its industry peers and its Tobin's q, and (2) the industry-level emissions and the firm's Tobin's q. A firm's waste/emissions are negatively associated with its Tobin's q and ROA.
King and Lenox (2002)	EV: Total emissions/waste, and waste prevention DV: Tobin's q and ROA	However, the firm's waste prevention (deviation of actual waste generated from its predicted value) is positively associated with its Tobin's q and ROA.
Klassen and McLaughlin (1996)	EV: News about a firm (1) receiving an environmental award and (2) facing environmental crisis (e.g., oil spill) DV: CAR	News about a firm receiving an environmental award elicits a reward from its investors, whereas news about the firm being involved in an environmental crisis elicits a marginally significant penalty.
Konar and Cohen (2001)	EV: A firm's release of toxic chemicals, the number of environmental lawsuits DV: Tobin's q	The higher the firm's toxic releases, the lower Tobin's q.  The higher the firm's environmental lawsuits, the lower Tobin's q.
Kroes, Subramaniam, and Subramanyam (2012)	EV: A firm's at-source pollution prevention, end-of-pipe pollution control, and the use of allowances DV: Tobin's q	The higher a firm's (1) at-source pollution prevention (i.e., use of subbituminous coal for heat) and (2) end-of-pipe pollution control (i.e., removing SO <sub>2</sub> from exhaust gases), the lower its Tobin's q.  The firm's use of grandfathered allowances for SO <sub>2</sub> , the higher its Tobin's q.
Li and Wu (2017)	EV: Announcement of environmental sustainability efforts/initiatives DV: CAR	A firm's announcement of an environmental sustainability effort/initiative receives a penalty from its investors.
Lyon and Shimshack (2015)	EV: <i>Newsweek</i> rank DV: Short-term CAR	Being ranked in the top 100 of <i>Newsweek</i> magazine's Greenest Big Companies in America ranking increases short-term CAR in (1,3).

Marquis, Toffel, and Zhou (2016)	EV: Environmental damage DV: Magnitude of selective disclosure (or greenwashing)	The more environmental damage a firm causes, the less selective its environmental disclosure.
Matsumura, Prakash, and Vera-Munoz (2014)	EV: Carbon emissions DV: Market value of equity	The higher a firm's carbon emissions, the lower the market value of the firm's equity.
Russo and Fouts (1997)	EV: A firm's environmental rating DV: ROA	The higher a firm's environmental rating, the higher its ROA.
Sharfman and Fernando (2006)	EV: A firm's emissions treated on-site, and emissions reused/recycled on-site DV: Cost of (debt and equity) capital	The higher a firm's environmental risk management, the lower its cost of capital.
Walker and Wan (2012)	EV: A firm's substantive and symbolic environmental actions DV: ROA	A firm's symbolic environmental actions ("green talk") are negatively unrelated to its ROA, but its substantive actions ("green walk") are unrelated to its ROA.  While greenwashing (a discrepancy between talk and walk) is negatively associated with ROA, green highlighting is unrelated to ROA.

### References Not Included in the Main Manuscript

- Berkman, Henk, Jonathan Jona, and Naomi S. Soderstrom (2021), “Firm-Specific Climate Risk and Market Valuation,” [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2775552](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2775552)
- El Ghoul, Sadok, Omrane Guedhami, Hakkon Kim, and Kwangwoo Park (2018), “Corporate Environmental Responsibility and the Cost of Capital: International Evidence,” *Journal of Business Ethics*, 149, 335-361.
- Fernando, Chitru S., Mark P. Sharfman, and Vahap B. Uysal (2017), “Corporate Environmental Policy and Shareholder Value: Following the Smart Money,” *Journal of Financial and Quantitative Analysis*, 52 (5), 2023-2051.
- Gilley, K. Matthew, Dan L. Worrell, Wallace N. Davidson III, and Abuzar El-Jelly (2006), “Corporate Environmental Initiatives and Anticipated Firm Performance: The Differential Effects of Process-Driven Versus Product-Driven Greening Initiatives,” *Journal of Management*, 26 (6), 1199-1216.
- Haney, Aoife Brophy (2017), “Threat Interpretation and Innovation in the Context of Climate Change: An Ethical Perspective,” *Journal of Business Ethics*, 143, 261-276.
- Hart, Stuart L., and Gautam Ahuja (1996), “Does It Pay to be Green? An Empirical Examination of the Relationship Between Emission Reduction and Firm Performance,” *Business Strategy and the Environment*, 5 (1), 30-37.
- Hora, Manpreet, and Ravi Subramanian (2019), “Relationship Between Positive Environmental Disclosures and Environmental Performance: An Empirical Investigation of the Greenwashing Sin of the Hidden Trade-off,” *Journal of Industrial Ecology*, 23 (4), 855-868.
- In, Soh Young, Ki Young Park, and Ashby Monk (2017), “Is ‘Being Green’ Rewarded in the Market? An Empirical Investigation of Decarbonization Risk and Stock Returns,” *International Association for Energy Economics*, Singapore Issue, 46-48."
- Jacobs, Brian W., Vinod R. Singhal, and Ravi Subramanian (2010), “An Empirical Investigation of Environmental Performance and the Market Value of the Firm,” *Journal of Operations Management*, 28 (5), 430-441.
- Jo, Hoje, Hakkon Kim, and Kwangwoo Park (2015), “Corporate Environmental Responsibility and Firm Performance in the Financial Services Sector,” *Journal of Business Ethics*, 131, 257-284.
- Khanna, Madhu, and Lisa A. Damon (1999), “EPA’s Voluntary 33/50 Program: Impact on Toxic Releases and Economic Performance of Firms,” *Journal of Environmental Economics and Management*, 37 (1), 1-25.
- King, Andrew, and Michael Lenox (2002), “Exploring the Locus of Profitable Pollution Reduction,” *Management Science*, 48.2 (2002): 289-299.

Fernando, Chitru S., Mark P. Sharfman, and Vahap B. Uysal (2017), "Corporate Environmental Policy and Shareholder Value: Following the Smart Money," *Journal of Financial and Quantitative Analysis*, 52 (5), 2023-2051.

Klassen, Robert D., and Curtis P. McLaughlin (1996), "The Impact of Environmental Management on Firm Performance." *Management Science*, 42 (8), 1199-1214.

Konar, Shameek, and Mark A. Cohen (2001), "Does the Market Value Environmental Performance?" *Review of Economics and Statistics*, 83 (2), 281-289.

Kroes, James, Ravi Subramanian, and Ramanath Subramanyam (2012), "Operational Compliance Levers, Environmental Performance, and Firm Performance Under Cap and Trade Regulation," *Manufacturing & Service Operations Management*, 14 (2), 186-201.

Li, Biao, and Kekun Wu (2017), "The Price of Environmental Sustainability: Empirical Evidence from Stock Market Performance in China," *Sustainability*, 9 (8), 1452.

Lyon, Thomas P., and Jay P. Shimshack (2015), "Environmental Disclosure: Evidence from Newsweek's Green Companies Rankings," *Business & Society*, 54 (5), 632-675.

Matsumura, Ella Mae, Rachna Prakash, and Sandra C. Vera-Munoz (2014), "Firm-Value Effects of Carbon Emissions and Carbon Disclosures," *Accounting Review*, 89 (2), 695-724.

Phillips, Robert A. and Joel Reichart (2000), "The environment as a stakeholder? A fairness-based approach," *Journal of Business Ethics*, 23(2), 185-197.

Russo, Michael V., and Paul A. Fouts (1997), "A Resource-Based Perspective on Corporate Environmental Performance and Profitability." *Academy of Management Journal* 40.3 (1997): 534-559.

Sharfman, Mark P., and Chitru S. Fernando (2008), "Environmental Risk Management and the Cost of Capital," *Strategic Management Journal*, 29 (6), 569-592.

Walker, Kent, and Fang Wan (2012), "The Harm of Symbolic Actions and Green-Washing: Corporate Actions and Communications on Environmental Performance and their Financial Implications," *Journal of Business Ethics*, 109, 227-242.

**Table A2: Evidence on the Determinants of a Firm's Brand Equity**

Note: EV = explanatory variable; DV = dependent variable

Citation	EV(s) and DV(s)	Key Finding(s)
Ataman, Van Heerde, and Mela (2010)	EV: Product, distribution, advertising, and price discounting DV: Brand sales	The authors report the short- and long-term elasticities of product, price discounting, distribution, and advertising with respect to brand sales.  The total elasticity for product is 1.37, followed by 0.74 for distribution, 0.13 for advertising, and 0.04 for price discounting.
Cark, Doraszelski, and Draganska (2009)	EV: Annual brand-level advertising expenditure (TNS Media Intelligence and Competitive Media Reporting) DVs: Brand awareness, perceived quality	Annual brand-level ad expenditures increase brand awareness and not perceived quality.
de Fonseca, Rocha, and Alves (2024)	EV: CSR perception DVs: Satisfaction and brand equity EV: CSR action	A customer's perception of a firm's CSR initiatives boosts the firm's brand equity.
Hur, Kim, and Woo (2014)	DVs: Corporate brand credibility, reputation, and equity	A firm's CSR actions boost its corporate brand credibility and reputation, each of which improves its brand equity.
Lin and Chung (2019)	IV: CSR and brand attributes DV: Brand equity	CSR boosts brand equity.
Liu, Wong, Shi, Chu, and Brock (2014)	EVs: CSP and brand quality DV: Brand preference	A firm's CSP boosts customers' preference for the brand.
Muniz, Guzmán, and Paswan (2019)	EV: CSR communication DVs: Brand awareness, quality, loyalty, and equity	A firm's CSR communication increases its brand awareness, quality, and loyalty, each of which raises its equity.
Olsen, Slotegraaf, and Chandukala (2014)	EV: Number of new products with "green" claims a brand introduced in a year DV: Brand attitude in year $t$ minus brand attitude in year $t - 1$	The more new green products a brand introduces in a year, the more positive customers' attitudes toward the brand.

Torres and Tribo (2011)	EV: Customer satisfaction DV: Brand equity	A firm's customer satisfaction has an inverted U-shaped relation with its brand equity.
Yoo, Donthu, and Lee (2000)	EV: Price, store image, distribution intensity, ad spending, price deals DVs: Perceived quality, brand loyalty, brand awareness/associations, and brand equity	A brand's marketing-mix elements impact perceived quality, brand loyalty, and brand awareness/associations. Each of these customer evaluation variables, in turn, determines the brand's equity.

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**Table A3: Firms' Promises Not to Harm the Natural Environment**

S.no	Company	Year	Source Document	Relevant Excerpt	Page
1	Unilever	2010	Unilever Sustainable Living Plan	"By 2020 our goal is to halve the environmental footprint of the making and use of our products as we grow our business."	p. 7
2	Ford	2012	Ford Sustainability Report	"We are committed to reducing other elements of the environmental footprint of our vehicles and operations as well. For example, we continue to increase the use of sustainable materials in our vehicles."	p. 147
3	Patagonia	2013	Patagonia CSR Report	"As prescribed in Patagonia's mission statement, Patagonia will conduct its operations causing no unnecessary harm by continually seeking to reduce the environmental footprint and impact of its operations in water use, water quality, energy use, greenhouse gas emissions, chemical use, toxicity and waste."	p. 10
4	Starbucks	2015	Starbucks Global Responsibility Report	"Starbucks did not back away from our commitment to responsibility. Instead we announced a set of ambitious goals – committing that by 2015 we would improve ethical sourcing in coffee and throughout our supply chain, serve our communities and engage young people, and decrease the environmental footprint from our store operations."	p. 1
5	Microsoft	2012	Microsoft Citizenship Report	"Achieving carbon neutrality and net-zero emissions for our data centers, software development labs, offices, and employee air travel by increasing energy efficiency and purchasing renewable energy."	p. 57
6	Google	2017	Google Environmental Report	"As we continue to improve our energy efficiency and reach our target of operating with 100% renewable electricity, our need for carbon offsets will decrease."	p. 8
7	Apple	2014	Apple Environmental Responsibility Report	"We're committed to continuing to reduce our greenhouse gas emissions and using our life cycle analysis to drive that change."	p. 5
8	Nike	2016	Nike Sustainable Business Report	"We set out to fundamentally reinvent every part of our business with a zero-compromise, all-encompassing approach, maximizing the performance and minimizing the environmental impact of every product we create."  "In 2016, we set an ambition to double our business while cutting our environmental impact in half on a per unit basis."	p. 11 p. 19
9	Procter & Gamble	2013	P&G 2013 Sustainability Report	"Reduce energy use at P&G facilities and total CO2 (Scope 1 and Scope 2) 20% per unit of production by 2020."	p. 8
10	Walmart	2014	Walmart Global Responsibility Report	"We hope our commitment to renewables will encourage innovation and new market entries into the sector, which will help us accelerate our sourcing of renewables while maintaining everyday low cost."	p. 5
11	Coca-Cola	2011	Coca-Cola Sustainability Report	"By 2012, improve water efficiency by 20 percent compared with a 2004 baseline."	p. 78
12	PepsiCo	2014	PepsiCo Sustainability Report	"We are striving to reduce our impact on the environment and conserve natural resources, reducing our operating costs in the process."	p. 3
13	IKEA	2014	IKEA Sustainability Strategy	"Produce as much renewable energy as the energy we consume and drive energy efficiency throughout our value chain."	p. 9

14	General Motors	2015	GM Sustainability Report	"In addition, we are helping our suppliers reduce their carbon footprint through the GM China Green Supply Chain project."	p. 3
15	Nestlé	2016	Nestlé Creating Shared Value Report	"We are committed to responsible water stewardship across our supply chains, factories and public policy."	p. 130
16	Danone	2014	Danone Sustainability Report	"Between now and 2020, we will continue to protect water, especially where it is scarce, and use this vital resource in harmony with our business ecosystems and local communities."	p. 63
17	Shell	2015	Shell Sustainability Report	"We continue to work to reduce our own greenhouse gas (GHG) emissions over the long term."	p. 1
18	BP	2013	BP Sustainability Review	"BP aims to manage its operational GHG emissions through operational energy efficiency, reductions in flaring and venting, and by factoring a carbon cost into our investment appraisals and the engineering design of new projects."	p. 36
19	HSBC	2017	HSBC CSR Report	"Source 100% of our electricity from renewable sources by 2030, with an interim target of 90% by 2025"	p. 10
20	Siemens	2014	Siemens Business Responsibility Report	"To create awareness and build their competence, we undertake various sustainability initiatives focused on minimising the environmental impact and promoting cleaner and safer value chain operations."	p. 4
21	Intel	2016	Intel CSR Report	"We seek to reduce the environmental impact of our products through product ecology and e-waste initiatives and by designing products with improved energy-efficient performance, which helps us meet customer needs and identify market expansion opportunities."	p. 11
22	IBM	2011	IBM Corporate Responsibility Report	"We have reduced IBM's CO2 emissions by 16 percent through 2011 against the company's stated goal of a 12-percent reduction by 2012, using 2005 as the base year."	p. 8
23	Johnson & Johnson	2015	J&J Sustainability Report	"Reduce absolute carbon emissions 20 percent by 2020, 80 percent by 2050."	p. 9
24	3M	2014	3M Sustainability Executive Summary Report	"At 3M, we are focused on understanding those connections and seeking solutions that promote energy conservation, clean energy infrastructure, and reductions in atmospheric greenhouse gases."	p. 6
25	Toyota	2015	Toyota North American Environmental Report	"Pursue innovation and continuous improvement opportunities to maximize energy and fuel efficiency and optimize our environmental performance."	p. 10

## References

Unilever. (2020). Unilever Sustainable Living Plan. <https://www.unilever.com/files/92e850cf-299e-40ec-82ef-ca19e6f30a59/unilever-sustainable-living-plan-2010.pdf>

Microsoft. (2012). Microsoft Citizenship Report. <https://download.microsoft.com/download/0/B/4/0B45C094-CAF2-4909-99FB-897BB65B4815/MS%202012%20Citizenship%20Report.pdf>

Google. (2017). Google Environmental Report. <https://sustainability.google/reports/google-2017-environmental-report/>

Apple. (2014). Apple Environmental Responsibility Report. [https://www.apple.com/newsroom/pdfs/Apple\\_Environmental\\_Responsibility\\_Report\\_2014.pdf](https://www.apple.com/newsroom/pdfs/Apple_Environmental_Responsibility_Report_2014.pdf)

Patagonia. (2013) Patagonia CSR Report. [https://www.patagonia.com/on/demandware.static/sites-patagonia-us-Site/Library-Sites-PatagoniaShared/en\\_US/v1484248663834/PDF-Resources/2012\\_Enviro\\_Social\\_Initiatives.pdf](https://www.patagonia.com/on/demandware.static/sites-patagonia-us-Site/Library-Sites-PatagoniaShared/en_US/v1484248663834/PDF-Resources/2012_Enviro_Social_Initiatives.pdf)

Nike. (2016). Nike Sustainable Business Report. [https://media.about.nike.com/files/6cbd26ae-7222-45f8-ae29-885429852268/FY16-17-Nike-Sustainable-Business-Report\\_FINAL.pdf](https://media.about.nike.com/files/6cbd26ae-7222-45f8-ae29-885429852268/FY16-17-Nike-Sustainable-Business-Report_FINAL.pdf)

Starbucks. (2015). Starbucks Global Responsibility Report. <https://stories.starbucks.com/uploads/2019/01/2015-global-responsibility-report.pdf>

Procter & Gamble. (2013). P&G 2013 Sustainability Report. [https://assets.ctfassets.net/oggad6svuzkv/2YLbgvN5rOSwswwGAgkEEs/1e257a435ac70bfb9316aa24eb5d9b59/2013\\_Full\\_Sustainability\\_Report.pdf](https://assets.ctfassets.net/oggad6svuzkv/2YLbgvN5rOSwswwGAgkEEs/1e257a435ac70bfb9316aa24eb5d9b59/2013_Full_Sustainability_Report.pdf)

Walmart. (2014). Walmart Global Responsibility Report. <https://corporate.walmart.com/content/dam/walmart/documents/global-responsibility-report-archive/2014-global-responsibility-report.pdf>

Coca-Cola. (2011). Coca-Cola Sustainability Report. <https://www.coca-colacompany.com/content/dam/company/us/en/reports/archive/sustainability-reports/2010-2011-sustainability-report.pdf>

PepsiCo. (2014). PepsiCo Sustainability Report. [https://www.pepsico.com/docs/default-source/sustainability-reporting/pepsico\\_2013\\_sustainability\\_report.pdf](https://www.pepsico.com/docs/default-source/sustainability-reporting/pepsico_2013_sustainability_report.pdf)

IKEA. (2014). IKEA Sustainability Strategy. [https://www.ikea.com/cz/cs/files/pdf/7e/16/7e164668/sustainability\\_report\\_2014.pdf](https://www.ikea.com/cz/cs/files/pdf/7e/16/7e164668/sustainability_report_2014.pdf)

General Motors. (2015). GM Sustainability Report [https://www.gm.com.cn/content/dam/company/cn/pdf/csr/2015\\_CSR\\_Report\\_EN.pdf](https://www.gm.com.cn/content/dam/company/cn/pdf/csr/2015_CSR_Report_EN.pdf)

Ford. (2012). Ford Sustainability Report. <https://ophelia.sdsu.edu:8443/ford/09-14-2014/doc/sr12.pdf>

Nestlé (2016). Nestlé Creating Shared Value Report. [https://www.nestle.com/sites/default/files/asset-library/documents/library/documents/corporate\\_social\\_responsibility/nestle-csv-full-report-2016-en.pdf](https://www.nestle.com/sites/default/files/asset-library/documents/library/documents/corporate_social_responsibility/nestle-csv-full-report-2016-en.pdf)

Danone (2014). Danone Sustainability Report.

[https://www.danone.com/content/dam/corp/global/danonecom/investors/en-all-publications/2014/integratedreports/Danone\\_RES2014\\_EN\\_01.pdf](https://www.danone.com/content/dam/corp/global/danonecom/investors/en-all-publications/2014/integratedreports/Danone_RES2014_EN_01.pdf)

Shell. (2015). Shell Sustainability Report. [https://www.shell.com/sustainability/sustainability-reporting-and-performance-data/sustainability-reports-archive/\\_jcr\\_content/root/main/section/simple/text.downloadapp.pdf/1619002237033/shell-sustainability-report-2015.pdf](https://www.shell.com/sustainability/sustainability-reporting-and-performance-data/sustainability-reports-archive/_jcr_content/root/main/section/simple/text.downloadapp.pdf/1619002237033/shell-sustainability-report-2015.pdf)

BP. (2013). BP Sustainability Review. <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/sustainability/archive/archived-reports-and-translations/2013/bp-sustainability-review-2013.pdf>

HSBC. (2017), HSBC CSR Report. <https://www.hsbc.com/-/files/hsbc/news-and-insight/2018/pdfs/171103-esg-supplement.pdf>

Siemens. (2014). Siemens Business Responsibility Report.

<https://assets.new.siemens.com/siemens/assets/api/uuid:66f06a16-6515-419b-89ba-08889498260c/siemens-sustainability-report-2014.pdf>

Intel. (2016). Intel CSR Report.

<https://www.intel.com/content/dam/www/public/us/en/documents/corporate-responsibility/2016-corporate-responsibility-report.pdf>

IBM. (2011). IBM Corporate Responsibility Report.

[https://www.ibm.com/ibm/responsibility/2011/pdf/IBM\\_2011\\_Corporate\\_Responsibility\\_Report.pdf](https://www.ibm.com/ibm/responsibility/2011/pdf/IBM_2011_Corporate_Responsibility_Report.pdf)

Johnson & Johnson. (2015). J&J Sustainability Report. <https://www.jnj.com/media-center/press-releases/johnson-johnson-launches-healthy-future-2015-its-citizenship-and-sustainability-goals>

3M. (2014). 3M Sustainability Executive Summary Report.

<https://multimedia.3m.com/mws/media/801452O/2012-sustainability-report.pdf>

Toyota. (2015). Toyota North American Environmental Report. [https://www.toyota-global.com/sustainability/report/archive/sr15/pdf/sustainability\\_report15\\_full\\_en.pdf](https://www.toyota-global.com/sustainability/report/archive/sr15/pdf/sustainability_report15_full_en.pdf)

## Web Appendix B

### Table B1: Industry Breakup of Sample

SIC 4-Digit Codes	Industry Name	Number of Observations
2000	Food and Kindred products	22
2011	Meat packaging plants	30
2030	Canned, Frozen & Preserved Fruit, Veg & Food Specialties	19
2033	Canned, Fruits, Veg, Preserves, Jams & Jellies	16
2040	Grain Mill Products	30
2050	Bakery Products	2
2082	Malt Beverages	12
2086	Bottled & Canned Soft Drinks & Carbonated Waters	15
2090	Miscellaneous Food Preparations & Kindred Products	3
2111	Cigarettes	27
2621	Paper Mills	15
	Converted Paper & Paperboard Prods (No	
2670	Containers/Boxes)	11
2834	Pharmaceutical Preparations	76
2836	Biological products	3
	Soap, Detergents, Cleaning Preparations, Perfumes,	
2840	Cosmetics	30
2842	Specialty Cleaning, Polishing and Sanitation Preparations	15
2844	Perfumes, Cosmetics & Other Toilet Preparations	13
2911	Petroleum Refining	8
3290	Abrasive, Asbestos & Misc Nonmetallic Mineral Prods	5
3580	Refrigeration & Service Industry Machinery	5
3630	Household Appliances	15
3690	Miscellaneous Electrical Machinery, Equipment & Supplies	5
3724	Aircraft Engines & Engine Parts	14
3845	Electromedical & Electrotherapeutic Apparatus	15
4888	Communication	13
5331	Retail-Variety Stores	18
5411	Retail-Grocery Stores	12
5812	Retail-Eating Places	34
5912	Retail-Drug Stores and Proprietary Stores	3
5961	Retail-Catalog & Mail-Order Houses	1
6282	Investment Advice	5
6531	Real Estate Agents & Managers (For Others)	9
7200	Services-Personal Services	13
7510	Services-Auto Rental & Leasing	1

**Table B2: First-Stage Regression Control Function Method**

	(1) Environmental Footprint	(2) Advertising	(3) CSR Reputation
<b>Industry average excluding focal firm</b>	<b>.0509***</b> <b>(.0117)</b>	<b>.0688***</b> <b>(.0173)</b>	<b>.753***</b> <b>(.0115)</b>
Environmental footprint		-.00113 (.00283)	.262 (3.574)
Advertising	-.0112 (.0275)		-8.876 (11.10)
CSR reputation	-1.23e-06 (1.87e-05)	3.06e-06 (6.01e-06)	
R&D	-.0149** (.00746)	.00400* (.00241)	-3.515 (3.046)
Pricing power	-.0141*** (.00365)	.00102 (.00118)	-2.925** (1.490)
Distribution	-.000225 (.00792)	-.000965 (.00255)	-6.083* (3.229)
Size	-.000873 (.000865)	-.00283*** (.000277)	.517 (.352)
Cost efficiency	2.06e-07 (6.64e-06)	-2.70e-07 (2.14e-06)	-.00243 (.00271)
Employee intensity	-.0328 (.145)	.431*** (.0466)	-6.399 (59.09)
Intercept	.0549*** (.00730)	.0308*** (.00234)	4.024 (2.999)
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	15,291	15,463	15,463
R-squared	.009	.025	.264
Number of firms	2,432	2,460	2,460

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

**Table B3: Environmental Footprint → Brand Equity: Non-Polluting Industries Versus Polluting Industries**

	<b>DV = Brand Equity</b>	
	Subsample of firms in low-polluting industries	Subsample of firms in high- polluting industries
Environmental footprint	-6,932*** (2,193)	-259.3 (182.0)
Advertising	1,468 (3,216)	-571.2 (481.0)
CSR reputation	-0.103 (0.0999)	-0.0640 (0.0448)
R&D	-389.7*** (125.2)	12.58 (32.81)
Pricing power	-167.5*** (37.35)	-4.679 (16.37)
Distribution	-38.28 (33.24)	39.25 (41.02)
Size	-10.37 (10.55)	-0.0622 (3.270)
Cost efficiency	11.50*** (3.128)	1.036 (1.393)
Employee intensity	-103.0 (1,445)	752.1 (985.1)
Control function: Environmental footprint	7,003*** (2,217)	248.9 (186.0)
Control function: Advertising	-1,460 (3,230)	561.0 (480.1)
Control function: CSR reputation	0.363*** (0.106)	0.0731 (0.0523)
Intercept	451.2*** (168.0)	70.45* (36.30)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
<b>Observations</b>	151	364
<b>Number of firms</b>	18	37
<b>R-squared</b>	0.512	0.118

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$ . Standard errors are reported in parentheses.

**Table B4: Firm's Environmental Footprint and Brand Equity: Random Effects Estimation with Industry Fixed Effects**

	Brand Equity	Brand Equity
<b>Environmental footprint</b>	<b>-291.9*</b> <b>(176.2)</b>	<b>-231.3</b> <b>(175.6)</b>
<b>Environmental footprint × Advertising</b>		<b>-755.9*</b> <b>(393.1)</b>
<b>Environmental footprint × CSR reputation</b>		<b>-.859***</b> <b>(.326)</b>
Advertising	-359.3 (453.6)	-405.8 (449.4)
CSR reputation	-.0228 (.0398)	.0507 (.0491)
R&D	-46.01 (28.44)	-50.55* (28.24)
Pricing power	-20.42 (12.94)	-27.79** (13.10)
Distribution	-19.44 (23.99)	-10.78 (23.89)
Size	-2.851 (2.058)	-3.578* (2.073)
Cost efficiency	1.697 (1.206)	2.022* (1.203)
Employee intensity	871.9*** (241.6)	961.7*** (240.8)
Control function: Environmental footprint	287.6 (180.7)	314.4* (179.1)
Control function: Advertising	374.4 (453.6)	496.6 (451.6)
Control function: CSR reputation	.0887** (.0443)	.0935** (.0444)
Intercept	97.24*** (24.49)	97.62*** (24.67)
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	515	515
Number of firms	55	55

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

**Table B5: Firm's Environmental Footprint and Brand Equity: Revenues as a Measure of Size**

	Brand Equity
<b>Environmental footprint</b>	<b>-157.9</b> <b>(177.6)</b>
<b>Environmental footprint × Advertising</b>	<b>-1,086**</b> <b>(515.7)</b>
<b>Environmental footprint × CSR reputation</b>	<b>-.713**</b> <b>(.331)</b>
Advertising	746.7*** (278.9)
CSR reputation	.0442 (.0503)
R&D	-10.52 (15.29)
Pricing power	-7.181 (12.59)
Distribution	10.08 (16.79)
Size	6.297 (4.392)
Cost efficiency	2.060 (1.349)
Employee intensity	686.6*** (200.2)
Control function: Environmental footprint	223.4 (179.3)
Control function: Advertising	-655.3** (272.4)
Control function: CSR reputation	.0799* (.0442)
Intercept	9.179 (40.61)
Firm fixed effects	Yes
Year fixed effects	Yes
Observations	520
Number of firms	55
R-squared	.135

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$