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CORPORATE SOCIAL RESPONSIBILITY AND SHAREHOLDER REACTION: THE ENVIRONMENTAL AWARENESS OF INVESTORS

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This study examines whether shareholders are sensitive to corporations' environmental footprint. Specifically, I conduct an event study around the announcement of corporate news related to environment for all US publicly traded companies from 1980 to 2009. In keeping with the view that environmental corporate social responsibility (CSR) generates new and competitive resources for firms, I find that companies reported to behave responsibly toward the environment experience a significant stock price increase, whereas firms that behave irresponsibly face a significant decrease. Extending this view of "environment-as-a-resource," I posit that the value of environmental CSR depends on external and internal moderators. First, I argue that external pressure to behave responsibly towards the environment—which has increased dramatically over recent decades—exacerbates the punishment for eco-harmful behavior and reduces the reward for eco-friendly initiatives. This argument is supported by the data: over time, the negative stock market reaction to eco-harmful behavior has increased, while the positive reaction to eco-friendly initiatives has decreased. Second, I argue that environmental CSR is a resource with decreasing marginal returns and insurance-like features. In keeping with this view, I find that the positive (negative) stock market reaction to eco-friendly (-harmful) events is smaller for companies with higher levels of environmental CSR.

Corporate social responsibility (CSR) has received increasing attention in the past decades, both among practitioners and in the academic literature. While the original focus of CSR was on "social" responsibility (e.g., paying fair wages to employees, community-based programs), a recent development is the inclusion of environmental responsibility (e.g., the reduction of CO_2 emissions). This "environmental CSR" is becoming an integral part of CSR and plays an increasingly important role in the corporate landscape. For example, in a recent survey of 766 CEOs conducted by Accenture and United Nations Global Compact (UNGC), 93 percent of the CEOs surveyed believe that sustainability will be critical to the future success of their businesses, and 91 percent report that their company will employ new technologies (e.g., renewable energy) to address sustainability issues over the next five years (Accenture & UNGC, 2010).

The increasing importance of environmental CSR among practitioners is receiving considerable attention in academic research. A growing literature studies the reasons why companies engage in environmental CSR and how it relates to corporate performance (e.g., for recent reviews, see Ambec and Lanoie [2008], Berchicci and King [2007], and Etzion [2007]). In particular, Hamilton (1995), Klassen and McLaughlin (1996), and Shane and Spicer (1983) examined the relationship between environmental and stock-market performance. While these articles point toward a positive relationship between environmental CSR and stock prices, little is known about whether and how this relationship has evolved over time.

Regarding the stock market's reaction to environmental CSR, perhaps one of the most prominent

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examples is British Petroleum's (BP) oil spill incident in April 2010. This oil spill contaminated a large area of marine environment along the Gulf of Mexico, and is currently the biggest off-shore oil spill in US history. On the day of the incident, BP's stock price was $59.5. By the end of June 2010, the stock price had dropped to $28.9—about half of its pre-incident value. As this example illustrates, environmental issues can have dramatic implications for stock prices. Yet, another set of anecdotes suggests that this may not always have been the case, or at least not in such magnitude. For instance, Exxon's oil spill in March 1989 was considered one of the most damaging incidents to the environment. However, Exxon's stock price decreased only marginally, from $44.5 on the day of the incident to $41.75 in April, and quickly recovering to its pre-incident level by June.

Arguably, BP and Exxon are very different companies, and such differences may partly explain the differing stock-market reactions (e.g., they may differ in their ability to manage public relations crises, or in the strength of their environmental management). Also, BP's oil spill was of a more severe magnitude, which may have triggered a relatively stronger stock-market reaction. Nevertheless, these arguments are unlikely to account for such large differences. Rather, these two examples suggest that shareholders' perception of environment-related corporate behavior may have shifted considerably over the years.

In this study, I extend existing theories to derive hypotheses on how the relationship between environmental CSR and stock prices may have evolved over time. I then systematically investigate whether shareholders reward or penalize corporations for their behavior toward the environment and how such rewards and punishments have changed over the past decades.

To identify events that reveal information about the firms' environmental CSR, I searched the *Wall Street Journal* (*WSJ*) for relevant press coverage on responsible and irresponsible behavior toward the environment for the whole universe of US publicly traded companies from 1980 to 2009. I then analyzed how the stock market reacted to these events by conducting an event study around the dates of the *WSJ* articles. I performed the analysis separately for the announcement of eco-friendly corporate initiatives (e.g., the introduction of a recycling program), and the announcement of eco-harmful corporate behavior (e.g., the release of hazardous waste into the environment).

My conceptual framework builds on the argument that environmental CSR generates new and competitive resources for firms. This argument is exemplified in Porter (1991), in instrumental stakeholder theory (e.g., Jones, 1995), in the natural resource-based view of the firm (e.g., Hart, 1995; Russo & Fouts, 1997), and in the recent literature on sustainability in business (e.g., Clelland, Dean, & Douglas, 2000; Rusinko, 2007; Russo & Harrison, 2005). In keeping with this argument, I found that the stock market reacted positively to the announcement of eco-friendly initiatives, and negatively to the announcement of eco-harmful behavior.

I then extended this framework by assuming that the value of "environment-as-a-resource" depends on both *external* norms of environmental CSR and *internal* levels of environmental CSR.

First, from an external perspective, I assumed that external pressure to becoming green (e.g., environmental regulations, media attention to the environment, customers' sensitivity to environment-related issues) sets the institutional norm of environmental CSR. The more that becoming green is institutionalized as the norm, the greater the negative effect of negative news on perceptions of a firm, because firms are punished for not following the norm. Similarly, the more that companies enact the institutional norm of going green, the less reactive shareholders are to the announcement of eco-friendly initiatives. I provide several "stylized" facts suggesting that external pressure—and hence the norm of becoming green—has increased tremendously over recent decades. In keeping with the above arguments, I have found that the positive stock-market reaction to eco-friendly initiatives has decreased over time, while the negative reaction to eco-harmful behavior has become more negative.

Second, from an internal perspective, I argue that environmental CSR is a resource with decreasing marginal returns. The higher the "stock" of this resource, the lower the additional value generated by additional investments in environmental CSR, and hence the lower the shareholders' reward for eco-friendly initiatives. Similarly, the higher the stock of environmental CSR, the lower the punishment for eco-harmful behavior: a larger stock of environmental resources may act as "insurance," mitigating shareholders' negative reaction to the announcement of eco-harmful events. In support of these arguments, I find that firms with stronger environmental performance—measured by firm-level indexes of environmental strengths and con-

cerns from Kinder, Lydenberg, Domini Research & Analytics (KLD)—experience a smaller stock-price increase following the announcement of eco-friendly initiatives as well as a smaller decrease following the announcement of eco-harmful behavior.

Overall, the findings of this study support the view of environment-as-a-resource and shed light on how the value of this resource depends on external and internal moderators. In the following sections, I develop my theoretical arguments in detail, describe the methodology, present the empirical results, and conclude by discussing the implications and limitations of my findings.

THEORY AND HYPOTHESES

Environmental CSR and Shareholder Reaction

The link between environment and management has been an active area of research. The early literature, in the spirit of Friedman's (1962, 1970: 122) view that the "social responsibility of business is to increase its profits," saw CSR as a cost of doing business. CSR would decrease profits and thereby violate the contractual relationship with shareholders. For instance, the introduction of a new recycling program would require the installation of new physical capital, the training of employees, and so on, all of which would be costly to the firm.

This view has been challenged in subsequent research. Freeman's (1984) stakeholder theory suggested that companies should consider the interests of a broader group of stakeholders—everyone who can substantially affect, or be affected by, the welfare of a company. Several extensions of stakeholder theory have been proposed (for a review, see Agle, Donaldson, Freeman, Jensen, Mitchell, and Wood [2008]). In particular, in Jones's (1995) instrumental stakeholder theory, CSR efforts were seen as potentially instrumental in obtaining necessary resources or stakeholder support. For example, the introduction of a new recycling program might improve the company's reputation and appeal to new customers and other stakeholders who are concerned about the environment. Along similar lines, in the aforementioned survey by Accenture and UNGC, 72 percent of the CEOs cited "brand, trust, and reputation" (2010: 14) as one of the main factors driving them to take action on sustainability issues. In their meta-analysis of the literature, Orlitzky, Schmidt, and Rynes (2003) further emphasized that reputation may be an important mediating variable of the relationship between corporate social responsibility and financial performance.

Related literature in management further challenged Friedman's view. In particular, Porter (1991) argued that profitability and pollution reduction might not be mutually exclusive goals. In his view, pollution is a waste of resources (e.g., energy, material). Accordingly, efforts to reduce pollution (e.g., through improved products or processes) might not only reduce a company's environmental footprint but also strengthen its competitiveness. In a related argument, Porter (1991) and Porter and van der Linde (1995a, 1995b) proposed that properly designed environmental regulations can stimulate innovation and enhance competitiveness. This proposition, known as the "Porter hypothesis," has spurred a large debate in the literature on environmental regulations (for a recent review, see Ambec, Cohen, Elgie, and Lanoie [2011]).

A growing literature has extended Porter's view (for examples of detailed reviews of this literature, see Ambec and Lanoie [2008], Berchicci and King [2007], and Etzion [2007]). For instance, the literature on sustainability in business has examined ways in which companies can become more sustainable (i.e., "green"), and how these greening initiatives influence financial performance. In particular, it reports that companies can become more sustainable by leveraging, for example, the low hanging fruits of efficiency and waste management to achieve significant financial benefits (e.g., Clelland et al., 2000; Rusinko, 2007; Russo & Harrison, 2005). More complex initiatives studied include efforts to integrate sustainability into product design (e.g., Lenox, King, & Ehrenfeld, 2000; Waage, 2007), to pursue environmental management systems (e.g., Melnyk, Sroufe, & Calantone, 2003; Sroufe, 2003), and to "green" the supply chain (e.g., Linton, Klassen, & Jayaraman, 2007).

Perhaps one of the most visible examples of such complex initiatives is Walmart. In October 2005, Walmart launched an ambitious sustainability program with three broad objectives: (1) be powered by 100 percent renewable energy, (2) create zero waste, and (3) sell products that sustain people and the environment (Walmart, 2009). The potential benefits of this initiative were emphasized by, for example, the *New York Times*: "While the initiative may be good for the environment, it may also be good for Wal-Mart. Driving costs out of the supply chain could result in savings for Wal-Mart that can

be passed along to consumers—enabling the company to uphold its reputation as a destination for rock-bottom prices" (2010: B3). An explanation of how and why corporations would pursue environmental CSR derives from the natural resource–based view of the firm (e.g., Hart, 1995; Hart & Dowell, 2011; Russo & Fouts, 1997). This theory recognizes that heterogeneity of resources in a firm is a driver of competitive differences within an industry; those companies that foster resources in support of environmental awareness are likely to gain competitive advantages and hence achieve higher profits.

In the spirit of this literature, I argue that *a company's positive engagement with the environment generates new and competitive resources for the firm*. Accordingly, I hypothesize a positive relationship between environmental CSR and stock prices:

Hypothesis 1. Shareholders react positively to the announcement of eco-friendly corporate initiatives.

Conversely, a firm's negative engagement with the environment may decrease the firm's competitive resources. In line with the previous arguments, eco-harmful activities may waste valuable resources (e.g., energy or material). In addition, companies may incur reputation losses, which in turn may deter customers and other strategic partners. Also, legal and cleanup costs associated with eco-harmful incidents may be substantial. For example, in the case of BP's oil spill described above, the *Wall Street Journal* reported: "So far, it [BP] has spent about $22 billion on cleanup and payments to individuals and businesses affected by the spill, and reached a civil settlement that could cost it another $7.8 billion" (2012). For all these reasons, eco-harmful behavior may decrease the company's competitive resources. This leads to the following hypothesis:

Hypothesis 2. Shareholders react negatively to the announcement of eco-harmful corporate events.

This view of environment-as-a-resource is the underlying framework in my analysis. In the following, I extend this framework by arguing that the value of environment-as-a-resource depends on both external norms of environmental CSR and internal levels of environmental CSR.

External Pressure

Corporations are facing external pressure to behave responsibly toward the environment, which in turn may affect the value of environmental CSR. Such external pressure can come from many different stakeholders. It includes, for example, environmental regulations, media attention to environmental CSR, and customers' sensitivity to environmental concerns.

Over recent decades, external pressure to engage in environmental CSR has increased tremendously. In the following, I document several stylized facts that confirm this trend.

Environmental regulations. In their analysis of environmental regulations, Allen and Shonnard (2011: 71) have documented that the number of federal environmental laws and amendments has increased almost continuously during the past few decades. In particular, they report that this number has increased from about 70 in the early 1980s to roughly 120 in the early 2000s.

Media attention to environmental CSR. Companies' behavior towards the environment has come under increasing scrutiny by the media. To obtain a quantitative proxy for media attention, I searched through Factiva and counted, for each year, the number of unique newspaper articles that referenced the terms "environment" and "corporate social responsibility" from five of the most widely read newspapers (*New York Times*, *Washington Post*, *USA Today*, *Wall Street Journal*, and *Financial Times*). The article counts are plotted in Figure 1 (solid line) for the sample years (1980–2009). As can be seen, there has been a substantial increase in the number of articles on environmental CSR over the years: while the average number of articles was 20 in the 1980s, it was about six times higher (117) in the 2000s.

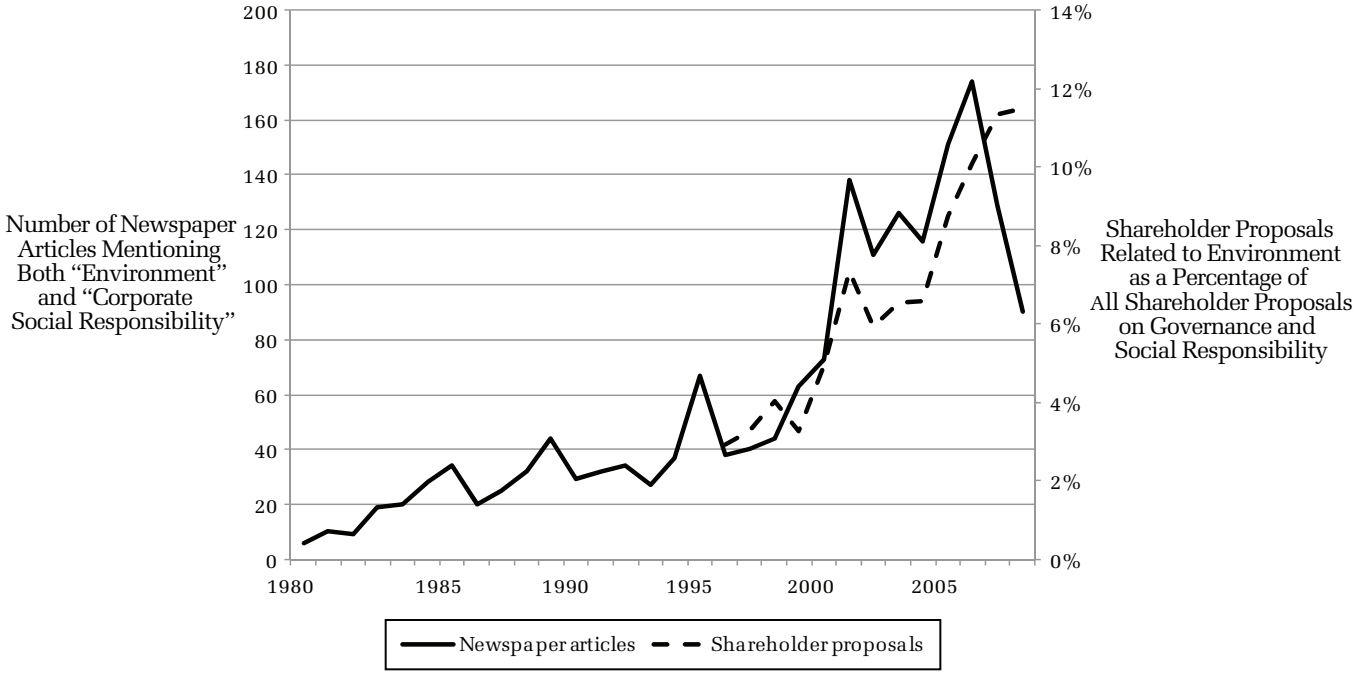
Environmental performance. Parallel to the increase in external pressure, companies seem to be implementing more green initiatives. This trend is consistent with anecdotal evidence (e.g., *Economist*, 2011) and survey evidence (e.g., Accenture & UNGC, 2010). To further document this trend toward stronger environmental performance, I looked at the evolution of the KLD subindex of environmental strengths (described below in the Data and Methodology section) in my sample. Specifically, the average number of strengths increased from 0.62 in the 1990s to 1.02 in the 2000s. This 64 percent increase was significant at all reasonable significance levels ($p = .000$).

Shareholder proposals on environmental CSR. A more direct way to quantify shareholders' consciousness toward the environment is to look at the number of shareholder proposals pertaining to the environment. To do so, I used data from RiskMetrics that covered all shareholder proposals of S&P 1500 companies related to either corporate governance or corporate social responsibility from 1997 onward. For each proposal, the data include a short description ("resolution type") that I used to determine whether a given proposal pertains to environmental CSR (as opposed to social responsibility). In each calendar year, I then counted the number of such proposals and expressed it as a fraction of all proposals listed in the database. This measure is plotted in Figure 1 (dashed line) and shows that the fraction of proposals has increased substantially during the study period, by roughly four times (from 1997, the starting year of the RiskMetrics database, to 2009, the last year of my sample).

In addition to these stylized facts, other recent developments also suggest an increase in environmental consciousness. One example is the rise of "green consumers" (i.e., consumers who are supportive of environmental causes to the extent of switching allegiance from one product to another, even if doing so entails higher cost) and the corresponding literature on "green marketing" (e.g., Miles & Covin, 2000). Also, the fact that CSR is beginning to include environmental responsibility (as opposed to only social responsibility) is rather recent and suggests an important shift in environmental consciousness. This shift is reflected in, for example, the literature on social entrepreneurship, in which environmental stewardship is increasingly seen as an aspect of social action (e.g., Hall, Daneke, & Lenox, 2010).

As these examples illustrate, there has been a general trend toward higher environmental consciousness over the past decades. The evidence suggesting that companies are reacting to stronger external pressure by implementing more green initiatives is consistent with institutional theory—the view that companies do what is most legitimized in their field and that (changes in) institutional conditions may lead companies to engage in environmental CSR (e.g., Bansal, 2005; Bansal & Roth, 2000; Barnett & King, 2008; Chatterji & Toffel, 2010; Delmas & Toffel, 2004; Hoffman, 1999, 2001; Jennings & Zandbergen, 1995). Similarly, research in stakeholder theory has argued that stakeholder pressure may lead companies to go green (e.g., Kassinis & Vafeas, 2006; Sharma & Henriques, 2005). Although these studies focus on the motiva-

FIGURE 1
Evolution of Media Attention and Shareholder Proposals Related to Environmental CSR



tion for companies to go green, much less is known about whether external pressure affects the relationship between environmental CSR and stock prices. The view of environmental CSR as a resource helps to characterize this relationship. Arguably, external pressure affects the value of environmental CSR. In particular, higher external pressure may amplify shareholders' negative reaction to the announcement of eco-harmful behavior; in times of higher environmental awareness, such announcements are more likely to deteriorate a company's reputation and scare off customers, suppliers, strategic partners, and others. In other words, the more that becoming green is institutionalized as the norm and the more that eco-friendly behavior is widespread across firms, the more shareholders punish companies for eco-harmful behavior. This argument leads to the following hypothesis:

Hypothesis 3. Shareholders' negative reaction to the announcement of eco-harmful corporate events increases over time.

Similarly, the more companies are enacting the institutional norm of going green, the lower the competitive value of eco-friendly initiatives, and the less shareholders reward companies for eco-friendly behavior. Thus, I propose the following hypothesis:

Hypothesis 4. Shareholders' positive reaction to the announcement of eco-friendly corporate initiatives decreases over time.

Environmental Strengths and Concerns

Arguably, the value of environment-as-a-resource not only depends on external norms of environmental CSR, but also on internal levels of environmental performance, as measured by, for example, KLD scores on environmental strengths and concerns. To see why this is the case, I use an argument in the spirit of neoclassical economic theory. The assumption of standard neoclassical models is typically that decreasing marginal returns of production factors (e.g., capital and labor). By the same reasoning, environmental resources may exhibit decreasing marginal returns as well: As companies keep "investing" in green initiatives, the marginal return of an additional green initiative decreases. Intuitively, in the early stages of, for example, pollution reduction, it is fairly easy and inexpensive to improve environmental performance by harvesting the "low-hanging fruit." As a company's environmental footprint improves, however, it may become progressively more difficult and costly to reduce pollution.

Accordingly, companies with stronger environmental performance (i.e., companies with a larger stock of environmental resources) may benefit relatively less from the introduction of an additional green initiative. Conversely, companies subject to more severe environmental concerns may benefit relatively more from the introduction of an eco-friendly initiative. Thus, I propose the following hypotheses:

Hypothesis 5a. Shareholders of companies with stronger environmental performance react less positively to the announcement of eco-friendly initiatives.

Hypothesis 5b. Shareholders of companies subject to more severe environmental concerns react more positively to the announcement of eco-friendly initiatives.

Similarly, shareholders of companies with stronger environmental performance may react less negatively to the announcement of eco-harmful corporate behavior. Having a larger stock of environmental resources may act as insurance to comfort investors that the current eco-harmful event is an anomaly rather than a pattern, thus mitigating shareholders' negative reaction. This reasoning is in line with the insurance-based view of CSR (e.g., Fombrun, Gardberg, & Barnett, 2000; Godfrey, 2005; Peloza, 2006), according to which CSR can develop goodwill and trust that insures the company against socially irresponsible actions.[1] Conversely, shareholders of companies that have lower stocks of environmental resources may react more negatively to the announcement of eco-harmful events, since they are less insured against such events. These arguments lead to the following hypotheses:

Hypothesis 6a. Shareholders of companies with stronger environmental performance react less negatively to the announcement of eco-harmful behavior.

[1] Another strand of literature (e.g., Baron, 2009; Baron & Diermeier, 2007) makes the opposite claim: CSR may increase a company's vulnerability as it faces increased public demands and scrutiny, thereby increasing the risk of not meeting the public's expectations.

Hypothesis 6b. Shareholders of companies subject to more severe environmental concerns react more negatively to the announcement of eco-harmful events.

DATA AND METHODOLOGY

Eco-Friendly and -Harmful Corporate Events

This study examined the stock market reaction to the announcement of corporate news related to the environment. For this purpose, I used Factiva, one of the major newspaper databases, to search the *Wall Street Journal* (*WSJ*) for relevant press coverage, and obtained the stock market data from the Center for Research in Security Prices (CRSP). The sample period was from January 1, 1980, to December 31, 2009. I selected this period for the availability of its data; 1980 was the first year in which Factiva had full coverage of the *WSJ*, and 2009 was the last year of the CRSP data.

To identify *WSJ* articles about environment-related corporate issues, three graduate student assistants and I performed a search in Factiva using the following keywords (variations of which are indicated in parentheses): "pollution," "contamination" ("radiation"), "oil spill," "hazardous waste" ("toxic waste"), "ecosystem preservation," "recycling," "emission" ("carbon"), "global warming" ("climate change"). For each keyword, we also considered basic variations (e.g., for "pollution," we also searched for "polluted," "pollutes"). This was easily done in Factiva by using "wildcards" (e.g., searching for "pollut*," where * is the wildcard indicator). We then read each article to ensure that it was indeed about environment-related corporate behavior.[2]

A potential concern with this analysis—as with any keyword search—is that the keyword list might be too narrow. Nevertheless, there is no reason to believe that our keyword selection would introduce any systematic bias into the analysis. It could only reduce the power of our tests (since potentially relevant articles might be omitted), which would go against finding any significant results.

The identified articles could refer to either eco-harmful or eco-friendly corporate behavior. For example, hazardous waste is generally assumed to be harmful to the environment. However, if a company decides to reduce its hazardous waste, then this event is considered to be eco-friendly. Accordingly, when reading the articles, we classified them as "eco-friendly events" or "eco-harmful events." Articles reporting both types of behavior at the same time were excluded.[3]

To obtain the final data set, I applied standard data filters. Specifically, articles were excluded in the following cases: (1) other significant activities (e.g., leadership changes, earnings announcements) were mentioned (see McWilliams & Siegel, 1997), (2) the company of interest was not publicly traded at a US stock market, (3) no stock market information was available during the estimation period, and (4) the article had been previously published in the *WSJ*. (I will show in robustness checks that the results are robust to using additional data filters.) These criteria left me with a sample of 273 *WSJ* articles on corporate news regarding environmental issues: 117 referring to eco-friendly events and 156 referring to eco-harmful events. Appendix A lists all these events as well as the corresponding keyword category.

Having compiled the list of relevant articles, I then extracted the company name from each article and matched it to the corresponding company name in CRSP. I then used firm-level identifiers from CRSP to link my data set to other databases (Compustat, IBES, and KLD) that are described in the section below on regression specification.

Event Study

The event study methodology examines the stock price reaction to news or events. The stock market reaction is captured by the average cumulative abnormal return (CAR) during an "event window." CAR is a measure of how much a stock price deviates from its expected value during an event window. The calculation of CAR is described in detail in Appendix B.

[2] In collecting the data, at least two researchers processed each keyword. Interrater agreement was 99 percent. In almost all cases, assessment of an article's relevance was straightforward. Articles were typically rejected because (1) the keyword was used in a different context (e.g., "contamination" can also be used in a medical context), or (2) they did not refer to a specific company, but rather to the government (e.g., in the context of legislations), society, a particular industry, and so on.

[3] Interrater agreement for categorizing the articles was 96 percent. I obtained similar results throughout including only those events with 100 percent agreement.

A large body of literature in finance has used event studies to quantify the market reaction to the announcement of corporate news in the *WSJ*. This literature has examined a broad variety of issues, including the announcement of stock splits, equity issues, credit rating downgrades, and so on (e.g., for review articles see Kothari and Warner [2007] and MacKinlay [1997]). The common practice in this literature is to set the event date (i.e., day 0) as the day of an article's publication in the *WSJ*. One drawback of this practice is that the publication date is not necessarily the date of the *actual* event, as it may have happened on the previous day (before the closing of the stock exchange). This problem is known as "event uncertainty" in the finance literature. The usual method of handling this issue is to expand the event window to two days (day –1 and day 0), thus considering the two-day interval (−1, 0) as event window (for a discussion, see MacKinlay [1997]). Another common approach is to consider the three-day interval (−1, 1). In this article, I use the two-day event window (−1, 0) in my main specification and show that the results are virtually identical if (−1, 1) is used instead. I also experimented with longer event windows and show that the results are robust (albeit a bit weaker) if the windows (−1, 2) and (−1, 3) are used instead. Such extensions of the event window account for the fact that it might take time to establish the characteristics of certain events (e.g., eco-harmful incidents); therefore, the market could still receive information in the few days following the events (for a similar argument, see Barnett and King [2008: 1169]).[4]

[4] Further extending the event window may be problematic. Several studies in the finance literature have shown that using longer event windows severely reduces the power of event study tests such as *z*-statistics (e.g., Brown & Warner, 1980, 1985; Campbell, Lo, & MacKinlay, 1997; Kothari & Warner, 2007; MacKinlay, 1997). Similarly, in the management literature, McWilliams and Siegel (1997) advocated the use of an event window that is as short as possible, arguing that the stock price may in fact fully adjust within a few minutes or hours (1997: 636). A key argument in their article—similar to the power issue emphasized in the finance literature—was that longer event windows would be more likely to capture confounding effects, making it harder to obtain reliable statistical inference.

Regression Specification

To empirically examine whether the stock market reaction to the announcement of eco-friendly and eco-harmful corporate behavior changed over time, I report the average CAR for each of the three decades covered by my sample (1980–89, 1990–99, and 2000–09). To refine this analysis—and, importantly, to rule out alternative stories—I also used a regression-based approach. Specifically, I estimated the following regression (separately for eco-friendly and -harmful events):

$$CAR_{ijst} = \alpha_j + \alpha_s + \beta \times trend_t + \gamma' \boldsymbol{X}_{ijst} + \varepsilon_{ijst},$$

where *i* indexes firms, *j* indexes events, *s* indexes industries, and *t* indexes years. Event and industry fixed effects are denoted by α_j and α_s respectively; *CAR* is the individual cumulative abnormal return in the two-day event window (−1, 0); *trend* is a linear time trend (i.e., *trend* = 1980, 1981, . . . 2009); $\boldsymbol{X}$ is a vector of control variables; and ε is the error term. Heteroscedasticity-robust standard errors were used. (I obtain similar results if instead standard errors are clustered at the industry or event level.) The coefficient of interest is β, which measures how the stock market reaction evolved over time.

The control variables in $\boldsymbol{X}$ include size, age, profitability, the market-to-book ratio, and the number of analysts following a company. These variables were obtained from Standard & Poor's Compustat, except the number of analysts, which was obtained from Thomson Reuters' IBES. *Size* is the logarithm of total assets; *age* is the logarithm of the number of years since the company was first covered in Compustat; *profitability* is the return on assets (ROA), defined as is the ratio of net income to total assets; *market-to-book ratio* is the ratio of the market value of equity to the book value of equity; *analysts following* is the logarithm of the number of analysts following the company in IBES.

Given the sample size of 117 eco-friendly and 156 eco-harmful events, including industry fixed effects, requires a broad industry classification. Accordingly, I partitioned industries at the Standard Industrial Classification (SIC) division level.[5]

[5] SIC divisions are broader than two-digit SIC codes. The ten SIC divisions are as follows (the corresponding two-digit SIC codes are indicated in parentheses): agriculture, forestry, and fishing (01–09); mining (10–14); construction (15–17); manufacturing (20–39); transportation, communications, and public utilities (40–49);

Lastly, I included event fixed effects, defined at the "environmental issue" level (see Appendix A). Including event fixed effects mitigates concerns that unobserved heterogeneity at the event level could drive the results. Importantly, such fixed effects control for differences in the size of the events across categories (e.g., oil spills may be more detrimental to the environment than pollution and therefore yield more negative CARs).[6]

Finally, to test Hypotheses 5a, 5b, 6a, and 6b, I augmented the above specification by including firm-level measures of environmental performance as additional explanatory variables. The KLD database provides two indexes of environmental performance: "environmental strengths" and "environmental concerns." The index of environmental strengths ranges from 0 to 7, adding one index point for each of seven possible strengths. Similarly, the index of environmental concerns ranges from 0 to 7, adding one index point for each potential concern. The specific strengths and concerns are described in Appendix C, based on the description in KLD (2006). To ensure that the KLD indexes were not affected by the events, I lagged the KLD indexes by one year. Since KLD data were available as of 1991 and covered a subset of the companies in the sample, merging my data set with KLD data reduced the sample size to 55 eco-friendly and 47 eco-harmful events.[7]

Table 1 provides summary statistics (means, standard deviations, and pairwise correlations) for all variables described in this section. These statistics are reported separately for the 117 eco-friendly events (upper panel of the table) and the 156 eco-harmful events (lower panel). As can be seen, the summary statistics are suggestive of my six hypotheses. In particular, I find that the mean CAR is positive (negative) for the announcement of eco-friendly (-harmful) events, in keeping with the view that shareholders reward companies for eco-friendly initiatives and punish them for eco-harmful behavior (Hypotheses 1 and 2). Further, the correlation between CAR and the time trend is negative for both eco-friendly and -harmful events, suggesting that the reward for eco-friendly initiatives has decreased over time, while punishment for eco-harmful behavior has increased (Hypotheses 3 and 4). Finally, the correlations between CAR and the KLD indexes of environmental strengths and concerns are consistent with the argument that environmental CSR is a resource with decreasing marginal returns and insurance-like features (Hypotheses 5a, 5b, 6a, and 6b). In the next section, I provide more rigorous tests of my hypotheses using the event-study and regression-based methodologies outlined above.

RESULTS

Stock Market Reaction to Environmental Issues

My event study analysis starts with a test of Hypothesis 1, concerning whether shareholders react positively to the announcement of eco-friendly corporate initiatives. The results are presented in the left-hand panel of Table 2. For each event window, I report the average CAR as a percentage (with the corresponding *z*-statistics in parentheses), as well as counts of positive and negative individual CARs (with the corresponding generalized sign *z*-statistics in parentheses). In support of Hypothesis 1, the average CAR in the two-day event window is 0.84 percent and significant at the 1 percent level ($z = 3.57$). In addition, a large majority of the 117 individual CARs are positive (79 positive CARs versus 38 negative). All other intervals before and after the two-day event window yielded CARs that are small and insignificant, which confirms that the results are not driven by unrelated trends around the event dates.

The announcement of eco-harmful corporate behavior, in contrast, leads to negative abnormal returns. As the right-hand panel of Table 2 shows, the average CAR is negative (−0.65%) and significant at the 1 percent level ($z = -3.49$). Furthermore, 96 out of 156 individual CARs are negative. Finding a negative average CAR is supportive of Hypothesis 2, namely, that shareholders react negatively to the

wholesale trade (50, 51); retail trade (52–59); finance, insurance, and real estate (60–67); services (70–88); and public administration (91–99).

[6] Including event fixed effects controls for the size of the events *across* categories. Ideally, one would also control for the size of the event *within* each category. However, on the basis of the information provided in the newspaper reports, it is very difficult to construct a metric that objectively quantifies the "size" of eco-harmful or -friendly behavior and would be comparable across the variety of events in this sample.

[7] A few of the specific strengths and concerns were not surveyed every year from 1991–2009, which could lead to inconsistencies in the measurement of environmental performance over time. However, I verified that similar results are obtained if, instead of using the full indexes, I construct strength and concern indexes that consist only of those items surveyed in all years.

TABLE 1
Descriptive Statistics and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8
Eco-friendly events[b]										
1. CAR (−1, 0)	0.84	1.96								
2. Trend	1,997.45	8.41	−.37							
3. Size[c]	10.24	1.91	−.29	.52						
4. Age[c]	3.59	0.44	−.20	.14	.40					
5. Profitability	0.05	0.05	−.01	.04	.08	.07				
6. Market-to-book	2.51	2.28	.10	.07	−.05	−.09	.58			
7. Analysts following[c]	2.02	1.41	.02	.19	.14	.19	.20	.19		
8. KLD environmental strengths	0.95	1.03	−.24	.35	.01	.19	.04	.21	−.07	
9. KLD environmental concerns	2.49	1.73	.16	.03	.03	.26	.02	−.19	.10	.07
Eco-harmful events[d]										
1. CAR (−1, 0)	−0.65	2.42								
2. Trend	1,991.73	6.06	−.21							
3. Size[c]	9.75	2.00	.23	.31						
4. Age[c]	3.57	0.47	.14	.18	.54					
5. Profitability	0.04	0.07	−.05	.24	.21	.35				
6. Market-to-book	2.10	1.53	−.12	.29	.18	.12	.40			
7. Analysts following[c]	1.25	1.50	.06	.35	.01	.13	.12	.23		
8. KLD environmental strengths	0.75	1.01	.19	.17	.01	.10	.02	.18	−.07	
9. KLD environmental concerns	2.74	1.57	−.27	.06	.15	.24	.04	−.14	.11	.13

[a] "CAR" is cumulative abnormal return; "KLD" is Kinder, Lydenberg, Domini Research & Analytics.
[b] $n = 117$ ($n = 55$ in eco-friendly events rows 8 and 9); all correlations larger than |.18| (|.27| in rows 8 and 9) are significant at $p < .05$ (two-tailed test).
[c] Natural logarithms.
[d] $n = 156$ ($n = 47$ in eco-harmful events rows 8 and 9); all correlations larger than |.16| (|.29| in rows 8 and 9) are significant at $p < .05$ (two-tailed test).

announcements of eco-harmful corporate behavior. Lastly, the CARs in the intervals before and after the two-day event window are again all small and insignificant.

I have performed a series of robustness checks, which I present in Table 3, that address potential concerns. In the following section, I briefly discuss each of them in turn.

Cross-sectional correlation. Standard event study methodology assumes that the sample consists of independent events. Since some of the events cluster around certain dates, this assump-

TABLE 2
CARs around the Announcement of Eco-Friendly and -Harmful Corporate Behavior[a]

	Eco-Friendly Events				Eco-Harmful Events			
Event Time	CAR		Positive: Negative		CAR		Positive: Negative	
(−40, −21)	0.17	(0.12)	64:53	(1.43)	−0.88	(−0.92)	73:83	(−0.41)
(−20, −11)	0.32	(0.62)	60:57	(0.69)	0.75	(0.39)	72:84	(−0.57)
(−10, −6)	−0.45	(−1.18)	55:62	(−0.23)	0.05	(−0.12)	79:77	(0.55)
(−5, −2)	−0.20	(−0.77)	57:60	(0.14)	−0.12	(−0.86)	75:81	(−0.09)
(−1, 0)	0.84**	(3.57)	79:38**	(4.21)	−0.65**	(−3.49)	60:96*	(−2.49)
(1, 5)	0.16	(0.38)	59:58	(0.51)	−0.15	(−0.47)	74:82	(−0.25)
(6, 20)	−0.49	(−1.21)	54:63	(−0.42)	−0.04	(−0.26)	73:83	(−0.41)

[a] For eco-friendly events, $n = 117$; for eco-harmful events, $n = 156$. Event time is expressed in days; "CAR" is "cumulative abnormal return" and is expressed as a percentage.
* $p < .05$
** $p < .01$
Two-tailed tests.

tion may be violated. Nevertheless, in row 1 of Table 3 I show that my results are robust if z-statistics are computed using the "crude dependence adjustment" (CDA) of Brown and Warner (1980, 1985).

Precision-weighted CARs. When computing the average CAR, each stock is given the same weight. An alternative is to compute the precision-weighted average CAR, which gives more weight to less volatile (i.e., more precisely estimated) abnormal returns. As is shown in row 2 of Table 3, the results are robust to using precision-weighted average CARs.

Exxon's oil spill. As can be seen from the event list in Appendix A, Exxon received a lot of press coverage regarding its environmental footprint after the 1989 oil spill incident. Thus, one may be concerned that the sample is dominated by this one firm. A related concern is that, although all these articles convey relevant new information about Exxon's behavior, they may be all somewhat related to the original oil spill incident. To ensure that my results were not driven by these articles, I re-estimated the CARs, excluding all events pertaining to Exxon. As is shown in row 3 of Table 3, excluding Exxon has little impact on the results.

Alternative asset-pricing models. So far, I have used the market model to estimate abnormal returns (see Appendix B). A concern is that the abnormal returns may reflect other factors (e.g., size, book-to-market, or past performance) that are priced during the sample period. However, I show in rows 4 and 5 of Table 3 that I obtain very similar results if, instead of the market model, I use the three-factor model of Fama and French (1993) or the four-factor model of Carhart (1997).[8]

Industry-adjusted CARs. To ensure that the results were not driven by industry effects, I reran the event study using industry-adjusted returns at the three-digit SIC code level (industry-adjusted returns are obtained by subtracting the average return across all stocks on a given trading day and in a given three-digit SIC industry). As can be seen in row 6 of Table 3, the CARs are very similar to before. I have also verified that the results are robust if instead I define industries at the two- and four-digit SIC level, or if I use the 48 industries of Fama and French (1997).

Confounding events. A concern with the event study methodology is that confounding events may complicate statistical inference (McWilliams & Siegel, 1997). This concern is very much minimized here for two reasons. First, when selecting *WSJ*

[8] The Fama-French three-factor model includes, in addition to the market factor, the size factor ("small minus big," or "SMB") and the book-to-market factor ("high minus low," or "HML"). Carhart's four-factor model extends Fama-French three-factor model by the addition of the momentum factor ("up minus down," or "UMD"). Including these factors is similar to controlling for size, book-to-market, and past performance in a cross-sectional regression. I obtained the data on the SMB, HML, and UMD factors from Kenneth French's website.

TABLE 3
Robustness[a]

Variable	Eco-Friendly Events CAR	Eco-Harmful Events CAR
1. Cross-sectional correlation	0.84** (3.81)	−0.65** (−3.01)
2. Precision-weighted CARs	0.65** (3.27)	−0.57** (−2.82)
3. Excluding Exxon's oil spill	0.89** (3.50)	−0.61* (−2.49)
4. Three-factor model of Fama and French	0.91** (4.70)	−0.70** (−3.47)
5. Four-factor model of Carhart	0.89** (4.60)	−0.69** (−3.41)
6. Industry-adjusted CARs	0.82** (3.89)	−0.61** (−3.73)
7. Excluding confounding events	0.82** (3.83)	−0.60** (−3.59)
8. Alternative event window: (−1, 1)	0.83** (2.88)	−0.76** (−3.83)
9. Alternative event window: (−1, 2)	0.67* (2.13)	−0.78** (−3.17)
10. Alternative event window: (−1, 3)	0.66[†] (1.93)	−0.62* (−2.48)

[a] For eco-friendly events, $n = 117$ ($n = 105$ in row 3, $n = 115$ in row 7); for eco-harmful events, $n = 156$ ($n = 120$ in row 3, $n = 152$ in row 7). "CAR" is cumulative abnormal return and is expressed as a percentage.

[†] $p < .10$

* $p < .05$

** $p < .01$

Two-tailed tests.

TABLE 4
Cumulative Abnormal Return (−1, 0) across Decades[a]

Time Period	Eco-Harmful Events		Eco-Friendly Events	
1980−89	−0.42	(−1.11)	1.19**	(2.72)
1990−99	−0.66*	(−2.53)	0.89*	(2.04)
2000−09	−1.12**	(−2.69)	0.68[†]	(1.76)

[a] Eco-friendly events: $n = 117$; eco-harmful events: $n = 156$.
[†] $p < .10$
* $p < .05$
** $p < .01$
Two-tailed tests.

articles, I excluded articles that referenced other significant corporate events (e.g., leadership changes, earnings announcements; see the Data and Methodology section). Second, the short (two-day) event window considered in this study reduces the likelihood of confounding events. Nevertheless, one remaining concern was that confounding events not mentioned in the *WSJ* articles might be affecting the results. To address this concern, I used data from CRSP on dividend announcements, from IBES on earnings announcements, and from SDC Platinum on acquisition and merger announcements. I then re-estimated the CARs excluding events for which such announcements coincided with the two-day event window. As is shown in row 7 of Table 3, the CARs are virtually identical.

Alternative event windows. In my main specification, I relied on a two-day event window, following common practice in the finance literature for conducting event studies around the publication date of *WSJ* articles (e.g., see MacKinlay, 1997). Nevertheless, in rows 8–10 of Table 3, I show that the results are robust if instead I use the three-day window (−1, 1), the four-day window (−1, 2), or the five-day window (−1, 3).

Changes in Shareholders' Reaction to Environmental Issues over Time

To study how the relationship between environmental CSR and stock prices has evolved over time, I repeat the analysis in Table 2 separately for events that occurred in the first decade of the sample (1980–89), the second decade (1990–99), and the third decade (2000–09).

The results are presented in Table 4. For eco-harmful events, I found that the average CAR in the two-day event window for the years 1980–89 was −0.42 percent, which is insignificant ($z = -1.11$). The negative impact of eco-harmful behavior becomes stronger and increasingly significant over time. For the years 1990–99, average CAR was −0.66 percent, which is significant at the 5 percent level ($z = -2.53$). For the most recent years (2000–09), average CAR was –1.12 percent, which is significant at the 1 percent level ($z = -2.69$). This pattern is supportive of Hypothesis 3, which predicts that, over time, companies are increasingly penalized by their shareholders for irresponsible behavior toward the environment.

As for eco-friendly events, the stock price increase was strongest for 1980–89; specifically, the average CAR was 1.19 percent, which is significant at the 1 percent level ($z = 2.72$). Over time, this positive stock market reaction has monotonically decreased: the average CAR was 0.89 percent ($z = 2.04$) for 1990–99 and 0.68 percent ($z = 1.76$) for 2000–09. Interestingly, although the stock market reaction to the announcement of eco-friendly initiatives had weakened over time, the effect was still positive and significant for the most recent decade. This overall pattern is consistent with Hypothesis 4, which predicts that the reward for eco-friendly behavior decreases over time.[9]

To assess the robustness of these findings—and in particular to rule out alternative explanations of the results—I used the regression-based approach described under methodology; in other words, I regressed the two-day CAR on a time trend and controls. The results of this regression are presented in Table 5 for three variations of the regression specification introduced above. In model 1, I include only firm-level controls. In model 2, I also include industry fixed effects. Finally, in model 3, I further include event fixed effects. Including firm-level controls mitigates concerns that the results are the outcome of omitted time trends in these characteristics. Including industry and event fixed effects addresses the issue of unobserved heterogeneity at the industry and event level, respectively.

The results for eco-harmful events are reported in the left-hand panel of Table 5. As is shown, in model 1 the coefficient on the time trend is −0.04 percent and highly significant ($t = 3.52$). This coefficient corresponds to a decrease of −0.40 percent

[9] For brevity, in Table 4 I do not report CARs in the windows preceding and following the two-day event window (−1, 0). However, I have verified that the corresponding CARs are always small and insignificant. I have also verified that the results in Table 4 are robust if I conduct the robustness checks performed in Table 3.

TABLE 5
Regression Analysis of Cumulative Abnormal Return (−1, 0)

Variable	Eco-Harmful Events						Eco-Friendly Events					
	Model 1		Model 2		Model 3		Model 1		Model 2		Model 3	
Time trend	−0.040**	(3.52)	−0.043**	(3.69)	−0.049**	(3.90)	−0.025**	(3.23)	−0.021*	(2.49)	−0.026**	(3.15)
Size	0.410**	(3.57)	0.403**	(3.21)	0.634**	(4.22)	−0.069	(0.60)	−0.147	(1.09)	−0.224	(1.53)
Age	0.125	(0.25)	0.235	(0.46)	0.416	(0.78)	−0.526	(1.22)	−0.481	(1.02)	−0.579	(1.19)
Profitability	−0.067	(0.21)	−0.059	(0.16)	0.326	(0.82)	−0.284	(0.69)	0.048	(0.11)	0.210	(0.44)
Market-to-book	−0.173	(1.28)	−0.212	(1.52)	−0.235	(1.27)	0.124	(1.32)	0.036	(0.38)	0.057	(0.60)
Analysts following	0.103	(0.77)	0.183	(1.20)	0.176	(1.07)	0.085	(0.69)	0.028	(0.20)	0.033	(0.23)
Industry fixed effects	No		Yes		Yes		No		Yes		Yes	
Event-type fixed effects	No		No		Yes		No		No		Yes	
Observations	156		156		156		117		117		117	
R^2	.15		.20		.34		.18		.26		.36	

* $p < .05$
** $p < .01$
Two-tailed tests.

(−0.04% × 10) from one decade to the next, which is in the ballpark of what I found in Table 4 when comparing decades.[10] The coefficient on the time trend is very similar in models 2 and 3.

In the right-hand panel of Table 5, I repeat the same analysis for eco-friendly events. As is evident, the coefficient on the time trend is negative and significant, regardless of the model specification. The economic magnitudes are consistent with the CARs in Table 4. For example, in model 1, the coefficient on the time trend is −0.025 percent, which corresponds to a decrease of −0.25 percent (−0.025% × 10) from one decade to the next. This decrease is again in the ballpark of what I found in Table 4 when comparing decades.

Environmental Strengths and Concerns

Table 6 shows how the analysis changes when controlling for environmental performance, for which the KLD indexes on environmental strengths and concerns in the year preceding an event serve as proxy. Since these indexes are only available for a subset of firms as of 1991, the relevant sample size is smaller than in the previous analysis.[11]

The results for eco-friendly events are presented in the right-hand panel of Table 6. In model 1, I replicated the regression from model 1 of Table 5 with the smaller sample size. In model 2, I further included the two KLD indexes as explanatory variables. This specification disentangles between external and internal moderators (proxied by the time trend and the two KLD indexes, respectively). As is shown, the coefficient on the time trend in model 1 is similar to the full sample estimate from model 1 of Table 5. It is smaller but still significant in model 2. Most importantly, the coefficient on environmental strengths is significantly negative, while the coefficient on environmental concerns is significantly positive. These findings are supportive of Hypotheses 5a and 5b's predictions that shareholders of companies with stronger environmental performance and fewer environmental concerns, respectively, react less positively to the announcement of eco-friendly events.

In the left-hand panel of Table 6, I repeated the analysis for eco-harmful events. The coefficient on the time trend in model 1 is again similar to the full sample estimate from model 1 of Table 5. This coefficient remains negative and significant with the included KLD indexes as explanatory variables in model 2. Importantly, the coefficient on environmental strengths is significantly positive, while the coefficient on environmental concerns is significantly negative. These findings are consistent with Hypotheses 6a and 6b, according to which shareholders of companies with stronger environmental performance and fewer environmental concerns,

[10] I obtained qualitatively similar results if, instead of using a time trend as proxy for external pressure, I used the number of newspaper articles referencing environmental CSR or the number of shareholder proposals pertaining to the environment (from Figure 1).

[11] Owing to the reduced sample size, I did not include industry and event fixed effects in the regressions.

TABLE 6
Regression Analysis of Cumulative Abnormal Return (−1, 0), Controlling for Environmental Strengths and Concerns[a]

Variable	Eco-Harmful Events				Eco-Friendly Events			
	Model 1		Model 2		Model 1		Model 2	
Time trend	−0.052**	(3.10)	−0.038*	(2.18)	−0.034**	(2.79)	−0.023†	(1.89)
KLD environmental strengths			0.259†	(1.75)			−0.206†	(1.90)
KLD environmental concerns			−0.286*	(2.31)			0.128†	(1.85)
Size	0.294	(0.99)	0.518	(1.64)	0.073	(0.45)	0.069	(0.42)
Age	1.093	(1.45)	1.407	(1.53)	0.277	(0.42)	0.343	(0.47)
Profitability	0.552	(0.64)	1.506	(1.60)	−0.110	(0.23)	−0.426	(0.81)
Market-to-book	−0.344	(1.24)	−0.384	(1.40)	0.172	(1.38)	0.210	(1.42)
Analysts following	−0.001	(0.00)	0.050	(0.20)	0.065	(0.33)	−0.020	(0.10)
Observations	47		47		55		55	
R^2	0.29		0.40		0.24		0.30	

[a] "KLD" is Kinder, Lydenberg, Domini Research & Analytics.
† $p < .10$
* $p < .05$
** $p < .01$
Two-tailed tests.

respectively, react less negatively to the announcement of eco-harmful behavior.

DISCUSSION AND CONCLUSION

Are shareholders sensitive to the announcement of eco-harmful corporate behavior and eco-friendly corporate initiatives? And if so, has their perception changed over time? My findings suggest that the answer to these questions is yes. In this study, I argue that a company's positive engagement with the environment generates new and competitive resources for the firm. Extending this view of environment-as-a-resource, I further argue that the value of environmental CSR depends on both external norms and internal levels of environmental CSR. By developing this framework and empirically testing its predictions, I obtain three main insights.

First, in keeping with the view that environmental CSR is a resource for firms, I find that shareholders react positively to the announcement of eco-friendly initiatives, and negatively to the announcement of eco-harmful behavior.

Second, I argue that external pressure to become green is setting the institutional norm of environmental CSR. The more that becoming green is institutionalized as the norm, the more that eco-harmful behavior has a negative effect on perceptions of a firm, because firms are punished for not following the norm. Similarly, the more that companies enact the institutional norm of going green, the less that shareholders reward firms for eco-friendly initiatives. In support of these hypotheses, I show that, over time, the positive reaction to the announcement of eco-friendly initiatives has significantly decreased, while the negative reaction to the announcement of eco-harmful behavior has significantly increased.

Third, I posit that environmental CSR is a resource with decreasing marginal returns. Companies with a larger stock of environmental resources may benefit relatively less from implementing an additional green initiative. At the same time, these companies may experience a smaller loss in the case of an eco-harmful event, as they are better insured against such events. In keeping with these arguments, I find that the higher the stock of environmental CSR, the less that shareholders reward companies for eco-friendly initiatives, and the less they punish them for eco-harmful behavior.

My findings make several contributions to the literature. To the best of my knowledge, this study is the first to theorize and provide empirical evidence on how the relationship between environmental CSR and stock prices has evolved over time. The comprehensive nature of my data set makes this analysis possible, since it spans three decades from 1980 to 2009. Also, the study is the first to examine how shareholders' reactions depend on corporate environmental performance (as measured by KLD scores on environmental strengths and concerns). The specific findings on the insurance-like features of environmental CSR are related

to recent research in general CSR. In particular, they are in line with Godfrey, Merrill, and Hansen (2009), who showed that the negative stock market reaction to the announcement of legal actions against companies (e.g., patent infringements, quality control issues, bribery) is significantly mitigated for firms that participate in institutional CSR activities. Further related evidence for the insurance-based view is provided in Bansal and Clelland (2004), who showed that environmentally legitimate firms incur less unsystematic risk than illegitimate firms.

As for the analysis of shareholders' reactions to the announcement of eco-harmful and -friendly events on average (i.e., the average CAR for all years studied), my results are consistent with the findings of four related articles. First, Klassen and McLaughlin (1996) examined whether the announcements of environmental awards affect stock prices. Using a sample of 140 award announcements from 1987 to 1991, they found a positive stock market reaction, similar to my finding of a positive reaction following the announcement of eco-friendly corporate initiatives. Second, Hamilton (1995) studied how the stock market reacted to the release of data on toxic chemical releases by the Environmental Protection Agency (EPA) in June 1989. He documented a decrease in stock prices, a result consistent with this study's finding that the announcement of eco-harmful behavior triggers a negative stock market reaction. Similarly, Shane and Spicer (1983) examined how the stock market reacted to the release of eight studies conducted by the Council on Economic Priorities between 1970 and 1977 regarding companies' pollution control. They documented a negative association between pollution and stock prices and showed that this negative association is mitigated for firms with higher pollution control performance. Lastly, Gunthorpe (1997) investigated whether the detection of illegal corporate activities affected stock prices, using a sample of 69 announcements (including three EPA violations) from 1988–92. Her results showed a negative stock market reaction, results consistent with the findings of this study. However, shareholders' reactions to illegal activities (that include mainly white-collar violations such as corporate fraud and bribery) may not be representative of shareholders' reactions to (illegal and legal) eco-harmful corporate events.

A limitation of my analysis—like any event study—is that these results only address the short-run stock market reaction. A related question is whether environmental CSR affects shareholder value and firm performance in the long run. To examine this question, one could regress long-run measures of firm value (e.g., Tobin's *Q*) and firm performance (e.g., return on assets, net profit margin) on proxies for environmental CSR or, more broadly, on proxies for general CSR (for reviews of the literature that examines the relationship between CSR and accounting measures of performance, see Margolis, Elfenbein, and Walsh [2007] and Margolis and Walsh [2001, 2003]). However, CSR is likely endogenous with respect to firm value and firm performance, which makes such analysis difficult. Overcoming this challenge provides an interesting avenue for future research.

Another interesting avenue for research is whether the conceptual framework presented in this article would apply to CSR *in general*. In particular, how has shareholders' perception of CSR evolved over time? Also, does CSR exhibit decreasing marginal returns?

Finally, my findings have potentially significant implications for many areas of management, including strategy, innovation, intrapreneurship, and corporate venturing. For instance, since shareholders' short-term reactions indicate that they value eco-friendly behavior and view environmental CSR as a valuable resource, managers and boards of directors may find it worthwhile to design and implement effective environmental CSR policies to pursue their long-term objectives. The same applies to innovation and R&D programs targeted at improving environmental performance. Furthermore, since eco-friendly and -harmful business strategies matter to shareholders, research in management science could benefit from explicitly integrating environmental considerations into managerial decision making. Finally, and perhaps most importantly from a policy perspective, legislators may benefit from coordinating environmental regulations with companies; since legislators and shareholders seem to share basic views of the environment, increased cooperation may prove to be fruitful.

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APPENDIX A

Events Listed by Type

TABLE A1
Eco-Friendly Events

Company Name	Environmental Issue	Announcement Date
Inco Ltd.	Emission	2/11/1980
Southern Co.	Contamination	4/21/1981
Stauffer Chemical Co.	Hazardous waste	5/26/1982
Stanadyne Inc.	Emission	3/1/1983
Du Pont E I De Nemours & Co.	Global warming	8/24/1983
Monsanto Co.	Recycling	9/17/1984
United States Steel Corp.	Recycling	5/31/1985
Canadian Pacific Ltd.	Pollution	9/18/1985
Alcan Aluminum Ltd.	Recycling	12/15/1987
Scott Paper Co.	Recycling	9/13/1988
Dow Chemical Co.	Recycling	9/27/1988
Procter & Gamble Co.	Recycling	10/27/1988
Exxon Corp.	Oil spill	3/27/1989
British Petroleum PLC	Oil spill	4/12/1989
Church & Dwight Inc.	Emission	4/14/1989
Exxon Corp.	Oil spill	4/20/1989
Procter & Gamble Co.	Recycling	4/21/1989
Browning Ferris Industries Inc.	Recycling	5/3/1989
British Petroleum PLC	Emission	8/16/1989
Southern Co.	Emission	8/17/1989
Exxon Corp.	Oil spill	10/24/1989
Du Pont E I De Nemours & Co.	Recycling	12/13/1989
Monsanto Co.	Hazardous waste	2/13/1990
Eastman Kodak Co.	Emission	3/30/1990
Heinz H J Co.	Recycling	4/9/1990
Exxon Corp.	Oil spill	4/12/1990
Royal Dutch Petroleum Co.	Emission	4/12/1990
Mobil Corp.	Recycling	5/16/1990
Colgate Palmolive Co.	Recycling	5/18/1990
Unilever PLC	Recycling	5/18/1990

Table continues

TABLE A1
(Continued)

Company Name	Environmental Issue	Announcement Date
Browning Ferris Industries Inc.	Recycling	6/8/1990
James River Corp. Va.	Recycling	6/15/1990
Browning Ferris Industries Inc.	Recycling	6/27/1990
Stone Container Corp.	Recycling	7/17/1990
Fuji Photo Film Ltd.	Recycling	9/25/1990
Acme United Corp.	Recycling	12/4/1990
Asarco Inc.	Recycling	2/7/1991
Exxon Corp.	Oil spill	2/14/1991
Cooper Industries Inc.	Pollution	2/22/1991
Coca Cola Co.	Recycling	3/13/1991
Weyerhaeuser Co.	Emission	6/5/1991
Mobil Corp.	Emission	6/21/1991
Du Pont E I De Nemours & Co.	Emission	7/3/1991
Coca Cola Co.	Recycling	8/28/1991
Ohio Edison Co.	Emission	9/13/1991
Sears Roebuck & Co.	Recycling	11/14/1991
American Cyanamid Co.	Emission	1/29/1992
Ashland Oil Inc.	Emission	1/31/1992
First Brands Corp.	Recycling	2/27/1992
New England Electric System	Ecosystem preservation	8/4/1992
Allied Signal Inc.	Emission	3/3/1993
Equitable Resources Inc.	Emission	3/3/1993
International Paper Co.	Recycling	5/24/1993
International Paper Co.	Recycling	12/2/1993
Texaco Inc.	Pollution	2/16/1994
Crown Cork & Seal Co. Inc.	Recycling	3/30/1994
Dell Computer Corp.	Recycling	11/5/1996
Cinergy Corp.	Emission	9/24/1997
Mobil Corp.	Emission	5/24/1999
B P Amoco PLC	Global warming	5/4/2000
Toyota Motor Corp.	Emission	10/2/2000
International Business Machs Co.	Recycling	11/14/2000
Dominion Resources Inc. Va. New	Emission	11/17/2000
U S X Marathon Group	Hazardous waste	5/14/2001
Eog Resources Inc.	Global warming	1/15/2002
Domtar Inc.	Ecosystem preservation	4/25/2002
Ford Motor Co. Del.	Emission	8/20/2002
Corning Inc.	Emission	10/2/2002
Staples Inc.	Recycling	11/13/2002
Exxon Mobil Corp.	Oil spill	12/9/2002
Ford Motor Co. Del.	Emission	5/8/2003
United Technologies Corp.	Emission	6/27/2003
Exxon Mobil Corp.	Oil spill	8/25/2003
K B Home	Ecosystem preservation	8/25/2003
Staples Inc.	Ecosystem preservation	8/25/2003
Intel Corp.	Global warming	2/26/2004
Toyota Motor Corp.	Emission	7/7/2004
Sony Corp.	Global warming	7/28/2004
General Motors Corp.	Emission	10/12/2004
Cinergy Corp.	Emission	12/2/2004
Ford Motor Co. Del.	Global warming	3/31/2005
JP Morgan Chase & Co.	Global warming	4/25/2005
Exxon Mobil Corp.	Emission	10/12/2005
Ford Motor Co. Del.	Emission	12/20/2005
Smithfield Foods Inc.	Pollution	1/23/2006
Weyerhaeuser Co.	Emission	6/22/2006

Table continues

TABLE A1
(Continued)

Company Name	Environmental Issue	Announcement Date
Ford Motor Co. Del.	Emission	7/18/2006
Wal-Mart Stores Inc.	Recycling	8/21/2006
Caterpillar Inc.	Recycling	9/15/2006
Ciba Specialty Chemicals Hdg. In.	Contamination	10/2/2006
Exxon Mobil Corp.	Global warming	11/8/2006
Nissan Motor Co. Ltd.	Emission	12/12/2006
Exxon Mobil Corp.	Global warming	1/11/2007
Du Pont E I De Nemours & Co.	Emissions	2/6/2007
JP Morgan Chase & Co.	Global warming	2/27/2007
Conocophillips	Emission	4/11/2007
Nissan Motor Co. Ltd.	Emission	4/19/2007
Citigroup Inc.	Global warming	5/9/2007
Dell Inc.	Emission	6/6/2007
Ford Motor Co. Del.	Emission	7/10/2007
Morgan Stanley Dean Witter & Co.	Emission	8/15/2007
Citigroup Inc.	Recycling	9/5/2007
Coca Cola Co.	Recycling	9/6/2007
Chevron Corp. New	Global warming	10/18/2007
Daimler A G	Emission	11/13/2007
General Motors Corp.	Emission	1/14/2008
Nokia Corp.	Recycling	2/13/2008
Environmental Power Corp.	Emission	2/27/2008
Wal-Mart Stores Inc.	Emission	3/24/2008
Anheuser Busch Cos. Inc.	Recycling	4/22/2008
Exxon Mobil Corp.	Global warming	4/30/2008
Wal-Mart Stores Inc.	Ecosystem preservation	10/22/2008
Coca Cola Co.	Recycling	4/8/2009
Royal Dutch Shell PLC B	Emission	4/21/2009
Exxon Mobil Corp.	Global warming	7/15/2009
Exelon Corp.	Emission	10/19/2009
American Electric Power Co. Inc.	Emission	12/9/2009

TABLE A2
Eco-Harmful Events

Company Name	Environmental Issue	Announcement Date
Allied Products Corp. De.	Hazardous waste	6/2/1980
Dart Industries Inc.	Hazardous waste	6/2/1980
Allied Corp.	Hazardous waste	8/11/1982
General Electric Co.	Hazardous waste	9/21/1982
R S R Corp.	Pollution	5/3/1983
Dow Chemical Co.	Hazardous waste	3/2/1984
Nissan Motors	Emissions	3/13/1984
Du Pont E I De Nemours & Co.	Contamination	3/27/1984
Westinghouse Electric Corp.	Hazardous waste	4/16/1984
Todd Shipyards Corp.	Hazardous waste	5/1/1984
Ethyl Corp.	Emissions	5/16/1984
Aluminum Company American	Hazardous waste	6/4/1984
General Motors Corp.	Emissions	6/22/1984
General Motors Corp.	Pollution	6/29/1984
Diamond Shamrock Corp.	Hazardous waste	9/10/1984
L T V Corp.	Emissions	9/19/1984
Standard Oil Co. Ind.	Oil spill	3/5/1985
Rohm & Haas Co.	Hazardous waste	5/22/1985
British Petroleum PLC	Recycling	8/9/1985
Beatrice Company	Hazardous waste	8/28/1985
General Motors Corp.	Emissions	5/8/1986
Ashland Oil Inc.	Pollution	6/26/1986
Phelps Dodge Corp.	Emissions	7/10/1986
Kerr Mcgee Corp.	Contamination	8/25/1986
Union Carbide Corp.	Hazardous waste	11/3/1986
Xerox Corp.	Hazardous waste	11/21/1986
Mapco Inc.	Hazardous waste	5/18/1987
Atlantic Richfield Co.	Hazardous waste	5/29/1987
United Technologies Corp.	Hazardous waste	7/22/1987
International Technology Corp.	Hazardous waste	9/14/1987
Chrysler Corp.	Emissions	12/24/1987
Commercial Metals Co.	Hazardous waste	6/28/1988
Ashland Oil Inc.	Oil spill	7/7/1988
Commercial Metals Co.	Hazardous waste	7/29/1988
Chevron Corp.	Hazardous waste	9/2/1988
General Host Corp.	Pollution	11/25/1988
Tenneco Inc.	Contamination	12/8/1988
Exxon Corp.	Oil spill	3/28/1989
Exxon Corp.	Oil spill	3/30/1989
Exxon Corp.	Oil spill	3/31/1989
Exxon Corp.	Oil spill	4/5/1989
Exxon Corp.	Oil spill	4/11/1989
Exxon Corp.	Oil spill	5/3/1989
Exxon Corp.	Oil spill	5/17/1989
Exxon Corp.	Oil spill	5/19/1989
British Petroleum PLC	Pollution	7/6/1989
Exxon Corp.	Oil spill	7/7/1989
Exxon Corp.	Oil spill	7/26/1989
Exxon Corp.	Oil spill	7/31/1989
Exxon Corp.	Oil spill	8/16/1989
Exxon Corp.	Oil spill	8/17/1989
Exxon Corp.	Oil spill	9/5/1989
Exxon Corp.	Oil spill	9/15/1989
Detrex Corp.	Pollution	10/24/1989
Diceon Electronics Inc.	Hazardous waste	11/2/1989
Exxon Corp.	Oil spill	1/5/1990
Exxon Corp.	Oil spill	1/8/1990

Table continues

TABLE A2
(Continued)

Company Name	Environmental Issue	Announcement Date
British Petroleum PLC	Oil spill	2/5/1990
Exxon Corp.	Oil spill	2/5/1990
Exxon Corp.	Oil spill	2/8/1990
Exxon Corp.	Oil spill	2/14/1990
Exxon Corp.	Oil spill	2/28/1990
Exxon Corp.	Oil spill	3/5/1990
Diceon Electronics Inc.	Hazardous waste	3/26/1990
Bethlehem Steel Corp.	Pollution	4/6/1990
Chrysler Corp.	Emissions	5/8/1990
Coors Adolph Co. B	Pollution	6/20/1990
Exxon Corp.	Oil spill	9/10/1990
Occidental Petroleum Corp.	Hazardous waste	9/13/1990
Exxon Corp.	Oil spill	10/1/1990
Rockwell International Corp.	Hazardous waste	11/28/1990
Coca Cola Co.	Recycling	12/5/1990
Exxon Corp.	Oil spill	1/31/1991
Exxon Corp.	Oil spill	2/8/1991
Exxon Corp.	Oil spill	2/19/1991
Du Pont E I De Nemours & Co.	Emissions	2/25/1991
General Motors Corp.	Emissions	3/7/1991
General Electric Co.	Pollution	3/15/1991
Chemical Waste Mgmt Inc.	Hazardous waste	3/19/1991
General Motors Corp.	Contamination	3/19/1991
Coastal Corp.	Contamination	4/19/1991
Exxon Corp.	Oil spill	5/3/1991
United Technologies Corp.	Hazardous waste	5/15/1991
Wheeling Pittsburgh Corp.	Pollution	5/16/1991
Eljer Industries Inc.	Contamination	6/4/1991
Ford Motor Co. Del.	Emissions	6/25/1991
International Paper Co.	Hazardous waste	7/5/1991
Unifirst Corp.	Hazardous waste	7/9/1991
Dial Corp Arizona	Pollution	7/10/1991
United Technologies Corp.	Pollution	7/24/1991
Boeing Co.	Hazardous waste	7/29/1991
Westinghouse Electric Corp.	Contamination	7/30/1991
Intermet Corp.	Hazardous waste	8/8/1991
Merck & Co. Inc.	Pollution	8/9/1991
British Petroleum PLC	Pollution	8/23/1991
Exxon Corp.	Contamination	8/23/1991
Coors Adolph Co. B	Pollution	10/4/1991
Bristol Myers Squibb Co.	Emissions	10/11/1991
American Cyanamid Co.	Emissions	10/23/1991
Stone Container Corp.	Hazardous waste	11/6/1991
Ford Motor Co. Del.	Emissions	11/26/1991
Mobil Corp.	Oil spill	1/10/1992
Amoco Corp.	Oil spill	1/27/1992
Ford Motor Co. Del.	Emissions	1/27/1992
United Technologies Corp.	Hazardous waste	2/5/1992
Corning Inc.	Emissions	3/13/1992
General Motors Corp.	Emissions	3/30/1992
Ford Motor Co. Del.	Emissions	4/10/1992
Rockwell International Corp.	Hazardous waste	6/2/1992
Monsanto Co.	Pollution	6/17/1992
Kinark Corp.	Hazardous waste	10/8/1992
Texaco Inc.	Oil spill	2/11/1993
Georgia Pacific Corp.	Contamination	3/10/1993
Asarco Inc.	Pollution	4/27/1993
Chevron Corp.	Oil spill	5/21/1993
Allied Signal Inc.	Hazardous waste	6/18/1993

Table continues

TABLE A2
(Continued)

Company Name	Environmental Issue	Announcement Date
Sherwin Williams Co.	Hazardous waste	7/19/1993
General Electric Co.	Contamination	8/16/1993
C S X Corp.	Pollution	9/28/1993
Unocal Corp.	Hazardous waste	10/8/1993
Coors Adolph Co. B	Emissions	2/22/1994
Sun Inc.	Emissions	5/27/1994
Tenneco Inc.	Hazardous waste	8/12/1994
Exxon Corp.	Oil spill	9/19/1994
Cambrex Corp.	Hazardous waste	10/24/1994
Texas Industries Inc.	Hazardous waste	9/18/1995
Publicker Industries Inc.	Hazardous waste	1/11/1996
Weirton Steel Corp.	Pollution	10/31/1996
Smithfield Foods Inc.	Pollution	12/18/1996
Viacom Inc. A	Hazardous waste	3/4/1997
Buffton Corp.	Pollution	7/15/1997
Cinergy Corp.	Emissions	5/20/1998
Exxon Mobil Corp.	Global warming	1/10/2000
Wal-Mart Stores Inc.	Hazardous waste	5/3/2000
Coastal Corp.	Emissions	6/5/2000
Willamette Industries Inc.	Emissions	7/21/2000
Wal-Mart Stores Inc.	Pollution	6/8/2001
Exxon Mobil Corp.	Hazardous waste	12/14/2001
Chevrontexaco Corp.	Pollution	1/9/2003
Toyota Motor Corp.	Emissions	3/10/2003
General Motors Corp.	Emissions	5/8/2003
General Motors Corp.	Emissions	5/19/2003
Exxon Mobil Corp.	Oil spill	12/9/2003
Ford Motor Co. Del.	Hazardous waste	3/2/2004
ChevronTexaco Corp.	Oil spill	8/20/2004
ConocoPhillips	Emissions	1/28/2005
FirstEnergy Corp.	Pollution	3/21/2005
Exxon Mobil Corp.	Global warming	3/28/2005
Newmont Mining Corp.	Pollution	4/4/2005
Exxon Mobil Corp.	Contamination	6/1/2005
Wal-Mart Stores Inc.	Pollution	8/16/2005
Wal-Mart Stores Inc.	Hazardous waste	12/21/2005
Dow Chemical Co.	Emissions	7/17/2006
Du Pont E I De Nemours & Co.	Contamination	10/2/2006
Exxon Mobil Corp.	Global warming	1/4/2007
Dow Chemical Co.	Contamination	6/4/2008

APPENDIX B

Calculation of Cumulative Abnormal Returns

The event study methodology examines the stock price reaction around the announcement of an event. I follow common practice by using the publication date of the corresponding *WSJ* article as the event date (day 0). Furthermore, I account for the possibility that the event documented in the *WSJ* article may have happened on the previous day by including the previous trading day (day –1) in the event window (see MacKinlay, 1997). This two-day event window is denoted by (−1, 0). To see if there is any impact of the event on the stock price before or after the two-day event window, I also considered the time intervals (−40, −21), (−20, −11), (−10, −6), (−5, −2) prior to, and the time intervals (1, 5), (6, 20) after the event window. In robustness checks, I also considered the event windows (−1, 1), (−1, 2), and (−1, 3).

For each firm *i*, I computed the abnormal returns using the market model. The coefficients α_i and β_i of the market model are estimated by ordinary least square on the basis of 200 trading days prior to the first time interval (i.e., the 200 trading days used in the estimation correspond to the interval [−240, −41]) using daily return data from CRSP. Formally, I estimated

$$R_{it} = \alpha_i + \beta_i \times R_{mt} + e_{it},$$

where R_{it} is the return on the stock of company i on day t, α_i is the intercept, β_i is the systematic risk of stock i, R_{mt} is the daily return of the equally weighted CRSP market portfolio, and e_{it} is the daily risk-adjusted residual for firm i. The corresponding estimated return on the stock of firm i on day t is given by

$$\hat{R}_{it} = \alpha_i + \beta_i \times R_{mt}.$$

I then calculated the abnormal daily return (AR) of company i on day t as follows:

$$AR_{it} = R_{it} - \hat{R}_{it}.$$

Finally, I computed the cumulative abnormal returns (CARs) for each time interval by summing up the abnormal returns within the specific time window (e.g., $[-1, 0]$).

To examine whether eco-friendly and -harmful behavior is perceived differently by the stock market, I divided the sample into eco-friendly and -harmful events. Accordingly, I computed the CARs separately for both types of events. To examine whether shareholders' perceptions had changed over time, I further split the sample into three decades (1980–89, 1990–99, and 2000–09) and computed CARs separately for each decade.

APPENDIX C

KLD's Environmental Strengths and Concerns

The KLD index of environmental strengths consists of the following strengths (see KLD, 2006):

- *Beneficial products and services*. The company derives substantial revenues from innovative remediation products, environmental services, or products that promote the efficient use of energy, or it has developed innovative products with environmental benefits. (The term "environmental service" does not include services with questionable environmental effects, such as landfills, incinerators, waste-to-energy plants, and deep injection wells.)
- *Pollution prevention*. The company has notably strong pollution prevention programs, including both emissions reductions and toxic-use reduction programs.
- *Recycling*. The company either is a substantial user of recycled materials as raw materials in its manufacturing processes, or a major factor in the recycling industry.
- *Clean energy*. The company has taken significant measures to reduce its impact on climate change and air pollution through use of renewable energy and clean fuels or through energy efficiency. It has demonstrated a commitment to promoting climate-friendly policies and practices outside its own operations.
- *Communications*. The company is a signatory to the CERES Principles, publishes a notably substantive environmental report, or has notably effective internal communications systems in place for environmental best practices.
- *Property, plant, and equipment*. The company maintains its property, plant, and equipment with above-average environmental performance for its industry.
- *Other strength*. The company has demonstrated a superior commitment to management systems, voluntary programs, or other environmentally proactive activities.

The KLD index of environmental concerns consists of the following concerns (see KLD, 2006):

- *Hazardous waste*. The company's liabilities for hazardous waste sites exceed $50 million, or it has recently paid substantial fines or civil penalties for waste management violations.
- *Regulatory problems*. The company has recently paid substantial fines or civil penalties for violations of air, water, or other environmental regulations, or it has a pattern of regulatory controversies under the Clean Air Act, Clean Water Act, or other major environmental regulations.
- *Ozone-depleting chemicals*. The company is among the top manufacturers of ozone-depleting chemicals such as HCFCs, methyl chloroform, methylene chloride, or bromines.
- *Substantial emissions*. The company's legal emissions of toxic chemicals (as defined by and reported to the EPA) from individual plants into the air and water are among the highest of the companies followed by KLD.
- *Agricultural chemicals*. The company is a substantial producer of agricultural chemicals (i.e., pesticides or chemical fertilizers).
- *Climate change*. The company derives substantial revenues from the sale of coal or oil and its derivative fuel products, or indirectly from the combustion of coal or oil and its derivative fuel products. Such companies include electric utilities, transportation companies with fleets of vehicles, auto and truck manufacturers, and other transportation equipment companies.
- *Other concern*. The company has been involved in an environmental controversy that is not covered by other KLD ratings.