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CORPORATE BOARDS AND OUTSIDE STAKEHOLDERS AS DETERMINANTS OF ENVIRONMENTAL LITIGATION

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Each year, hundreds of firms are prosecuted for violating environmental laws and hundreds of millions of dollars in penalties are assessed. At the same time, a much larger number of firms escape the various costs associated with litigation by adhering to the provisions of the same laws and regulations. It is not a priori apparent why this dichotomy exists. In this paper we draw on corporate governance and stakeholder theories to empirically investigate environmental lawsuits. Specifically, we compare the pre-lawsuit profile of 209 violators to a sample of matched control firms between 1994 and 1998. We find that the likelihood of becoming a lawsuit defendant increases with board size, with the fraction of directors in industrial firms, and with the fraction of inside ownership, and decreases with the number of directorships held by outside directors. These findings are robust to alternative dependent variable specifications. Together, our results suggest that managers, researchers, and policy-makers need to direct their attention to the corporate board as the core decision-making unit forming corporate environmental policies.

INTRODUCTION

During the last 30 years, increasingly stringent environmental regulations and stakeholder pressures have placed the natural environment on the strategic agenda of virtually all firms (Elkington, 1994; Hart, 1995; Rugman and Verbeke, 1998). Responses to such pressures have varied both in degree and success and entailed both costs and opportunities for the firms involved (Porter and van der Linde, 1995; Walley and Whitehead, 1994). Moreover, an active debate has developed among researchers regarding the relationship and trade-offs between firm economic and environmental performance (e.g., Gray, 1994; Klassen and McLaughlin, 1996; Russo and Fouts, 1997; Shrivastava, 1995).

In practice, a large number of U.S. firms are charged each year for violating environmental laws. The strategic importance of corporate environmental violations is accentuated by the magnitude of environmental litigation costs that can be both direct and indirect. Specifically, each year, hundreds of firms are investigated and prosecuted by the EPA and the Department of Justice and suffer hundreds of millions of dollars in direct costs through administrative, civil, and criminal penalties, injunctive relief, and supplemental environmental projects (Karpoff, Lott, and Rankine, 1998; U.S. EPA, 1996). Furthermore, the negative stock market response to the news that a firm is targeted in an environmental lawsuit (Jones and Rubin, 1999; Karpoff *et al.*, 1998; Muoghalu, Robinson, and Glascock, 1990) may reflect these direct and other indirect costs such as reputation losses. Interestingly, in contrast to violators, other

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firms consistently escape the costs of litigation by adhering to the provisions of the same environmental laws and regulations. It is not *a priori* clear why some firms adhere to the provisions of environmental laws and others do not.

In this paper, we address this question by empirically investigating the determinants of the likelihood that firms violate environmental laws. We focus on two categories of potential explanatory factors: factors that arise from within the firm, focusing on the firm's governance structure, and factors that emerge externally, capturing the extent of stakeholder pressures. Using primary data on environmental crimes and penalties imposed on publicly traded U.S. firms in the period 1994–98, we find that the likelihood of becoming a lawsuit defendant increases with board size, suggesting that larger boards are less effective in preventing behavior that leads to environmentally based lawsuits. Second, the likelihood of a lawsuit increases with the fraction of directors in peer firms, consistent with corporate directors in industrial firms being ineffective or unwilling to monitor proper environmental performance by management. Third, environmental wrongdoing increases with the fraction of inside ownership. Finally, the likelihood of a lawsuit decreases with the number of directorships held by outside directors, suggesting more reputable directors may act so as to prevent environmental litigation. Contrary to our findings on board structure, our findings on outside stakeholders indicate that stakeholder pressures may be a weak deterrent, at best, of poor environmental performance as proxied by environmental litigation exposure.

The paper is organized as follows. In the next section, we develop and discuss our hypotheses, while in the section thereafter we discuss the data and methodology we use. In the fourth section, we present and discuss our results. In the last one, we conclude.

THEORETICAL DEVELOPMENT AND RESEARCH HYPOTHESES

The fundamental question we try to answer in this paper is what distinguishes firms that 'break the law' from those that manage to conduct their activities within its confines. More specifically, we investigate the determinants of the likelihood that a firm violates an environmental law and gets penalized for doing so. We focus on two sets of potential explanatory factors: those internal to the firm and those external to it. In the former, we examine characteristics of the firm's governance structure such as board size and composition, board directorships, and ownership structure. In the latter, we explore the potential influence a firm's external stakeholders may have on its environmental practices and look particularly at the potential effect of stakeholders such as communities, political/legislative actors, and regulators.[1]

The board of directors and its impact on environmental practices

The board of directors is at the apex of the decision-making process in public corporations. Every major operational or strategic decision, including a firm's policy toward the natural environment, must go through the board. Therefore, even though boards sometimes exert little real power over decision making, boards are ultimately responsible for corporate environmental strategy, whether that strategy is proactively pursued or passively rubber-stamped. To address environmental policy issues, boards may, for example, create separate standing committees dealing with environmental issues. Further, boards have the discretionary power to seek legal or other expert advice as an additional resource for ensuring sound environmental policy. Finally, the extent, depth, and sincerity of discussion on environmental matters in the board room itself are likely to determine, to a great extent, the quality of corporate environmental policies. Clearly, the likelihood that a firm becomes the target in a lawsuit due to its policy towards the environment is likely to be influenced by its board's attitude towards environmental issues.

Accordingly, in searching for the determinants of environmental litigation in this study, we focus on the corporate board as the core decision-making unit within the firm shaping corporate environmental policies. To this end, we draw on prior research to identify characteristics of corporate boards that

[1] It is also possible that other contingent factors such as technology, internal structures, corporate culture, the quality of a firm's legal department, and profitability are related to the likelihood of a lawsuit. As shown later in the paper, we, at least partly, account for the effect of other factors through our matched-pairs research design and the selection of our control variables.

are likely to make a difference in determining the quality of a firm's environmental practices. Below, we discuss how three such characteristics—board size, board composition, and board directorships—in addition to board and management ownership, are likely to affect the likelihood of committing an environmental crime.

Board size

There is an ongoing debate regarding the effect of board size on the quality of board decisions (see Dalton *et al.*, 1999). First, a resource dependence view suggests that larger boards enhance company performance by ensuring a greater ability for firms to form links to their environment to secure critical resources (Goodstein, Gautam, and Boeker, 1994). Greater resources would allow larger corporate boards valuable financial leeway toward achieving more environmentally responsible behavior. Also, as the number of corporate directors rises, there are more people to draw on, providing management with otherwise unobtainable expert advice (Zahra and Pearce, 1989). Expert advice is vital on matters of environmental responsibility and the dangers of litigation because of the litigious environment surrounding issues of social responsibility and because of the high uncertainty regarding the link between environmental policies and outcomes. Thus, a greater number of directors may reduce the likelihood of litigation for corporations. In this vein, Birnbaum (1984) finds that uncertainty and lack of information are mitigated by larger board sizes.

By contrast, Goodstein *et al.* (1994) suggest that large boards are not as apt to initiate strategic action, in line with the view that larger boards are less participative and cohesive than smaller ones. In this vein, larger boards performing less strategic planning may encounter more problems in setting and implementing an acceptable agenda on the environment. Further, agency theory suggests that larger boards experience process losses, while they also hinder the free exchange of ideas among board members. This may allow opportunistic CEOs to sidestep unwelcome board monitoring on environmental policy matters. Consistent with these arguments, Yermack (1996) and Eisenberg, Sundgren, and Wells (1998) document a higher market valuation of firms with a small board of directors. In sum, given mixed prior evidence on board size, the role of board size on the likelihood of an environmental lawsuit is an open empirical question.

Hypothesis 1: The likelihood of environmental litigation is related to board size.

Board composition

In studying board composition, prior research (e.g., Dalton *et al.*, 1998) has generally focused on the importance of board independence as a measure of board effectiveness. Drawing on agency theory, this line of research has suggested that independent boards are more likely to monitor management effectively, thus reducing agency costs and raising performance. Importantly, unlike corporate governance policies, environmental policies give rise to a different set of conflicts, where management and shareholder interests are likely to be aligned and focused on maximizing profits, and against the interests of the community at large. Given this relative alignment of interests between management and shareholders, we argue that it is not important to discern and separate directors who are likely to protect shareholders over management. Instead, what is at issue in this case is to discern those directors who are likely to protect the community over management *and* shareholders. To this end, we propose that directors serving in industrial firms, that are also more likely to follow poor environmental policies, will be more likely to side with management in tolerating poor environmental performance (see Table 2 for descriptive evidence that industrial affiliation is an important determinant of environmental wrongdoing). First, these decision-makers are likely to share a similar outlook toward the environment that is motivated by an overriding concern with profit maximization. Further, interlocking directors may aspire to receiving more direct benefits from management through 'tolerant' treatment in setting their own firms' environmental policies. By contrast, other types of directors such as academics, members of the military and clergy, and politicians will be less likely to tolerate environmental irresponsibility because their interests are more closely aligned with the interests of the community at large. Further, lawyers and consultants are likely to be more skilful in sidestepping the risk of litigation because of their training and experience. Therefore,

Hypothesis 2: The likelihood of environmental litigation is positively related to the fraction of industrial firm executives serving on the board of directors.

Directorships

According to Fama and Jensen (1983) outside directors serve on corporate boards to signal that they are decision experts. Therefore, the extent of outside director service is both a signal of a director's knowledge and experience and a proxy for a director's reputation capital. An environmental lawsuit and the imposition of penalties may be detrimental to a company's image; in addition, they are likely to tarnish the image of the top decision-makers in that company. Therefore, the reputation of corporate directors in firms being targeted in environmental lawsuits is likely to suffer (despite corporate directors being usually protected against lawsuits by liability insurance). In this vein, Kaplan and Reishus (1990) find that corporate directors who decide to cut or omit dividends because of poor performance subsequently experience a significant reduction in the number of board seats they hold. Thus, the market for corporate directors is driven, at least in part, by reputation effects. Taken together, these arguments suggest that boards with directors holding more board seats will be less likely to become lawsuit targets because directors holding more board seats have, on average, more experience in protecting the firm. Further, given director competence, holding many board seats makes directors less willing to allow illegal behavior because their valuable reputation capital is at stake. Therefore,

Hypothesis 3: The likelihood of environmental litigation is negatively related to the number of directorships held by corporate directors.

Inside ownership

The fraction of common stock owned by officers and directors has often been used as a proxy for the incentives of insiders to protect the firm's interests. Prior research has documented the positive role of inside ownership in enhancing corporate performance (e.g., McConnell and Servaes, 1990). Focusing on the incidence of corporate crime in general, Alexander and Cohen (1999) document evidence that the likelihood of corporate crime is inversely related to the level of inside ownership, probably because crime is costly to shareholders, and because shareholder-like interests motivate management to act so as to prevent criminal behavior by a corporation. In the same spirit, we expect that firms where top management and directors own a high fraction of shares will be less likely to be named as targets in an environmental lawsuit and penalized for violating environmental laws.

Hypothesis 4: The likelihood of environmental litigation is negatively related to the fraction of equity ownership held by officers and directors as a group.

Stakeholder salience and its impact on firm environmental practices

Research has long established the importance of both internal and external factors to the creation of competitive advantage (Andrews, 1971; Hansen and Wernerfelt, 1989; Penrose, 1959). Research has also pointed that 'competitive advantage must be created within a broader scope of social legitimacy' (Hart, 1995: 998). More explicitly, researchers argue that to be successful, firms must address external demands such as those made by their stakeholders and match them with their internal resources and practices (Collis and Montgomery, 1995). Hence, stakeholder demands or preferences are expected to have an influence on crafting and implementing a firm's strategy.

In his landmark work, Freeman (1984: 46) defines stakeholders as 'any group or individual who can affect or is affected by the achievement of the organization's objectives.' In turn, Mitchell, Agle, and Wood (1997) argue that the degree to which managers give priority to competing stakeholder claims is a function of managers' perceptions of three key stakeholder attributes: power, legitimacy, and urgency. Recently, the work of Agle, Mitchell, and Sonnenfeld (1999) provided empirical support to Mitchell *et al.*'s (1997) theory as it applies to specific decisions made by CEOs. Among the main stakeholder areas that influence corporate decision making and which are linked to performance, analysts point to communities, legislatures (the political/legislative actors), governments (regulators), the natural environment, customers, employees, and, of course, shareholders (Berman *et al.*, 1999;

Elkington, 1994). Specifically, prior literature suggests that stakeholder relationships may affect firm financial performance. For example, Berman *et al.* (1999) found that concern for stakeholders is motivated by the perception that such concern can improve financial performance, while Ogden and Watson (1999) examine the ability of firms to balance competing demands of shareholders and customers and find that increases in customer service levels are linked to increases in market value.

In this paper, we expand on the relationship between stakeholder influence and corporate decision making. Specifically, we develop and test three hypotheses linking stakeholder pressures to the likelihood of environmental litigation. Given the overlapping nature and origin of the three sources of stakeholder pressures relating to the firm's environmental record, we opted to structure and present these as alternative measures of a single stakeholder hypothesis.

Communities

As alluded to above, the natural environment and its treatment by firms is an area of increasing stakeholder interest and one of the main issues that motivates stakeholder pressures on firms. Outside stakeholder groups that include governments (regulators), legislatures (political/legislative actors), and communities in general apply pressures related to a firm's environmental record (Gladwin, 1993; Hart, 1995). Here, we focus on consumers and communities at large and the pressures they exert on firms to improve their environmental performance (Elkington, 1994; Porter, 1991; Rugman and Verbeke, 1998). We use state-level data because we expect, as Mitchell *et al.* (1997) and Agle *et al.* (1999) point out, the power, legitimacy, and urgency of the claims of these stakeholders to be more intense in the states where the firm is headquartered and where it has its major operations; in other words, where its decision-makers come in closer contact with them. We thus expect that firms exposed to more intense stakeholder pressures emanating from their surrounding communities, and the scrutiny that such pressures entail, will be less likely to violate environmental laws and thus become the target of a lawsuit. We use the ratio of members of environmental organizations per thousand state residents as a proxy for the revealed environmental preferences of the community.

Hypothesis 5a: The likelihood of environmental litigation is negatively related to the environmental preferences of the residents in states where the firm operates.

Political/legislative actors and regulators

As noted, the literature identifies a number of stakeholders responsible for changing corporate attitudes towards the natural environment. However, the regulatory, political/legislative environment, with the multiple carrots and sticks at its disposal, may provide the most important source of pressure on firms (Rugman and Verbeke, 1998). As a result of such pressures and the promulgation of environmental regulations by governments and legislatures, a firm's external environment has been reshaping. Firms have been forced to reevaluate their strategic approach towards the natural environment (Shrivastava, 1995), while business leaders acknowledge that environmental protection measures have and will continue to have a growing influence on how companies operate (Schmidheiny, 1992; Smart, 1992). It must be noted, however, that the extent and nature of the impact of the actions of regulators and political/legislative actors—most notably, environmental regulations—on firms remains an issue of intense and ongoing discussion (e.g., Clarke, 1994; Esty, 1994; Porter and van der Linde, 1995; Wells, 1994).

Based on the above, we develop two related hypotheses. First, we hypothesize that the likelihood that a firm will be the target of a lawsuit for violating an environmental law decreases as a function of the pro-environment position of the state's elected delegation to Congress (political/legislative actors). We use the voting record of the state's congressional delegation on major environmental issues as a proxy for its pro- or anti-environment position. We expect that the voting record of members of Congress reflects the preferences of the electorate of the state. We expect such pressures and scrutiny to be more intense in the states where the company is headquartered and where it has major operations since it is there that its decision-makers come in closer contact with the community. As in the case of communities, we expect that corporate decision-makers' perceptions of key stakeholder attributes will influence their priorities regarding environmental protection.

Thus, corporate decision-makers will give priority to such demands.

Hypothesis 5b: The likelihood of environmental litigation is negatively related to the environmental voting record of the Congressional delegation in states where the firm operates.

Second, in order to explore pressures emanating specifically from governments (regulators), we hypothesize that the likelihood that a firm will be the target of a lawsuit for violating an environmental law decreases as a function of the pressures exerted on it by the regulatory environment of the states where it operates. We expect that a stricter regulatory environment will exert stronger pressures on a firm to conform to environmental laws, a fact that may reduce the likelihood of violation and litigation. As was the case with political/legislative actors above, we expect regulatory pressures to be more intense in the states where the firm has significant operations. We thus use information on the firm's locus of operations and follow King and Lenox (2000b) in developing a third measure of stakeholder pressure, based on the toxic emissions released in a state, that is, a proxy for the *regulatory stringency* of the states where the firm operates. We thus assume that greater amounts of toxic emissions in states where a firm operates are associated with a lower level of regulatory stringency facing that firm. This measure takes into account the fact that environmental regulations, and hence penalties imposed on violators, vary across states.

Hypothesis 5c: The likelihood of environmental litigation is negatively related to the level of toxic emissions released in states where the firm operates.

DATA AND METHODOLOGY

In order to identify firms that have violated environmental laws we search through the 'Enforcement and Compliance Assurance Accomplishments Report', which is issued annually by the Office of Enforcement and Compliance Assurance of the U.S. Environmental Protection Agency (EPA). Among other information, this report details 'significant criminal, civil, and administrative enforcement actions and the results achieved on behalf of the American public and the environment' (U.S. EPA, 1996: 1-1). Information on such actions is provided to the Office of Enforcement and Compliance by EPA's regional offices. The report states that '[These actions] continue to be a highly effective means of ensuring broad-based compliance ... and demonstrate the immense value of this part of the enforcement and compliance program.' We review these enforcement actions to identify

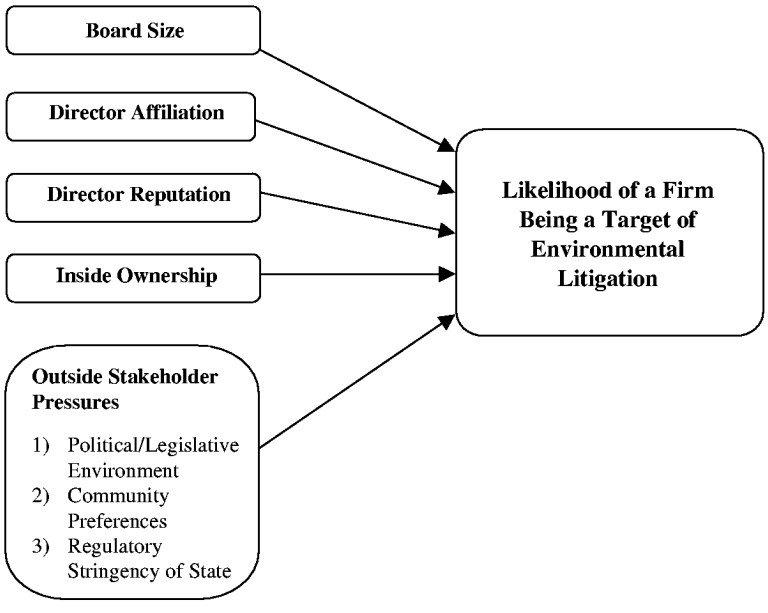

Figure 1. Corporate boards and outside stakeholders as determinants of environmental litigation

cases where firms (rather than individuals, other organizations, etc.) are named as defendants in environmental lawsuits brought by EPA or the Department of Justice and settled in the period 1994–98. Among firms, we focus on those that are publicly traded because they fit the profile described earlier and because of wider data availability for such firms. As indicated, our search spans a five-year period starting in 1994, the year of the reorganization of EPA's enforcement and compliance program, and ending in 1998, the last calendar year for which data were available at the start of our analysis. Finally, firms are deleted if they are not listed in both databases we use in this study (S&P's Compustat financial database and SEC's EDGAR database containing electronic filings of annual proxy statements and company reports).

Given that several firms are repeat offenders and may have been convicted in many years, or many times in a single year, we select the first time each firm's name appears in the report and consider that an event year. Therefore, the focus of our analysis is firms, not events. The reason for this choice is that our concern is to separate innocent firms from all others. It thus seems to us that the extent of guilt is of second order importance.

The final sample comprises 209 firms that were convicted and penalized for breaking an environmental law in the United States between 1994 and 1998.[2] Table 1 provides descriptive information on the types of violations (Panel A), types of penalties assessed by the EPA (Panel B), and the geographic dispersion of violations (Panel C), based on EPA's geographic categorizations. Focusing first on Panel A, a total of seven types of law violations were represented in our sample with six or more cases. The most commonly violated law was the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which was the basis for 68 lawsuits (32.5% of the sample), followed by the Resource Conservation and Recovery Act (RCRA) ($n = 35$), the Clean Air Act ($n = 29$), and the Clean Water Act ($n = 27$). Turning next to the types of enforcement actions taken against violators (Panel B), we observe that injunctive relief ($n = 83$; 39.7%) and civil penalties ($n = 62$; 29.7%) are the most frequent types of enforcement actions.[3] No firm in our sample faced criminal sanctions as a result of breaking an environmental law. Finally, descriptive evidence from Panel C suggests that the lawsuits are fairly well dispersed across geographic regions. The highest number of violations ($n = 31$; 14.8%) was recorded in Region 4, representing the southern U.S. states, and the least number ($n = 11$; 5.3%) were recorded in Region 1, representing the New England states. In 10 instances, the EPA's Office of Regulatory Enforcement, rather than one of the 10 regional offices, investigated and prosecuted the cases. The following examples illustrate the variety of laws being broken and enforcement actions taken that are represented in our sample:

- In 1996, the General Motors Corporation agreed to spend more than $45 million to settle government charges that it had put illegal devices to defeat pollution controls inside nearly 500,000 Cadillacs since 1991 that resulted in carbon monoxide emissions of up to three times the legal limit. The case is the largest ever brought under the Clean Air Act for cars and trucks emissions and the first judicial auto recall to curb damage to the environment.
- In 1998, an administrative law judge imposed the largest administrative penalty in EPA's history—$1.89 million—against DuPont for ignoring EPA orders to stop shipping pesticides with inadequate labels (FIFRA violation).
- In 1998, in a precedential settlement of a multimedia case, EPA reached an agreement with ASARCO, Inc. that required the national mining and smelting company to spend in excess

[2] The degree of multinationality of our sample firms may confound the results since some firms with extensive global production may outsource their polluting activities, thereby incurring fewer violations in the United States.

[3] Enforcement actions include administrative, civil, and criminal penalties, injunctive relief, and supplementary environmental projects (SEPs). SEPs are projects voluntarily undertaken by members of the regulated community in conjunction with case settlements to provide some level of environmental benefit usually unrelated to the nature of the violations committed. In exchange for SEP performance, the facility is granted penalty relief equaling some fraction of the total value of the stipulated penalty. Types of SEPs may include, among other things, pollution prevention, environmental restoration, environmental audits, and public awareness (U.S. EPA, 1996). Generally, injunctive relief is action ordered of a violator defendant by a federal District Court Judge. It may be ordered either as a term of an order consented to by the parties in a lawsuit or after a contested trial before the Judge. However, EPA uses the term 'injunctive relief' to refer to activity required by both court and administrative orders (issued by EPA) so that the violator ceases his violative behavior. Actions that may fall under injunctive relief may include, but are not limited to, the installation of pollution control equipment and the conduct of audits or pollution prevention studies.

Table 1. Descriptive information on the types of environmental violations, types of penalties imposed, and geographic dispersion of the violations

Panel A: Types of violations	Number of firms	Percent of sample
Comprehensive Env. Response, Compensation, and Liability Act (CERCLA)	68	32.5
Clean Air Act	29	13.9
Clean Water Act	27	12.9
Emergency Planning and Community Right-to-know Act (EPCRA)	10	4.8
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)	6	2.9
Resource Conservation and Recovery Act (RCRA)	35	16.8
Toxic Substances Control Act (TSCA)	17	8.1
Other	17	8.1
Total	**209**	**100.0**
Panel B: Types of enforcement actions[a]	Number of firms	Percent of sample
Administrative penalties	37	17.7
Civil penalties	62	29.7
Injunctive relief	83	39.7
Supplementary Environmental Projects (SEPs)	16	7.6
Criminal sanctions	0	0.0
Undetermined	11	5.3
Total	**209**	**100.0**
Panel C: Geographic dispersion of violations[b]	Number of firms	Percent of sample
Region 1	11	5.3
Region 2	25	11.9
Region 3	29	13.9
Region 4	31	14.8
Region 5	24	11.5
Region 6	21	10.0
Region 7	15	7.2
Region 8	13	6.2
Region 9	14	6.7
Region 10	16	7.7
Office of Regulatory Enforcement	10	4.8
Total	**209**	**100.0**

[a] Types of enforcement actions as defined by EPA.
[b] The EPA has divided the United States into geographic regions as follows: (1) Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont; (2) New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands; (3) Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia; (4) Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee; (5) Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin; (6) Arkansas, Louisiana, New Mexico, Oklahoma, and Texas; (7) Iowa, Kansas, Missouri, and Nebraska; (8) Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming; (9) Arizona, California, Hawaii, Nevada, and Pacific Islands and Tribal Nations subject to U.S. law; (10) Alaska, Idaho, Oregon, and Washington. In 10 instances in our sample, the EPA's Office of Regulatory Enforcement prosecuted the cases.

of $50 million to resolve and correct hazardous waste and water violations. The agreement marked the first time the federal government has entered into a consolidated settlement that resolves violations of different statutes at more than one of a company's facilities.

Table 2 provides the time of the first conviction and industry distribution of the sample firms. As shown, while there is adequate dispersion of lawsuits across industries, environmental litigation most frequently targets chemical (19.1%), manufacturing (13.4%), and transportation (9.6%)

Table 2. SIC and time distribution of 209 firms being targeted by the EPA for environmental violations between 1994 and 1998

	2-digit SIC	1994	1995	1996	1997	1998	Total	Freq.
Metal Mining	10	4	1	0	2	0	7	3.3
Oil and Gas	13	3	1	4	1	0	9	4.3
Food Products	20	5	1	2	4	2	14	6.7
Paper Products	24–27	2	2	6	3	1	14	6.7
Chemical Products	28	14	12	6	7	1	40	19.1
Petroleum Refining	29	4	2	3	1	0	10	4.8
Manufacturing	30–34	16	4	2	3	3	28	13.4
Computer Equipment and Services	35,73	2	2	2	1	5	12	5.7
Electronic Equipment	36	5	4	5	3	0	17	8.1
Transportation	37, 39–47	9	3	4	3	1	20	9.6
Scientific Instruments	38	2	2	1	0	0	5	2.4
Utilities	49	6	6	2	0	0	14	6.7
Non-Durable Goods	51	1	0	1	1	0	3	1.4
Retail	52–57, 59	1	0	0	3	0	4	1.9
Financial Services	60–69	2	2	0	1	0	5	2.4
Entertainment Services	70, 78, 79	1	1	0	0	0	2	1.0
Health Services	80, 87	1	0	0	0	0	1	0.5
All others	1, 22, 48	0	3	0	0	1	4	1.9
Total								100.0%

firms. Not surprisingly, retail firms and service providers are only sparsely represented in our sample. Finally, given that we only study the first conviction for each firm during the sample period, there is a steady decline in the number of environmental lawsuits being studied through time.

To examine factors that distinguish environmental offenders from other public firms, we construct a portfolio of non-offenders that comprises firms that were not convicted of environmental crimes over the sample period (the control sample). Given that the likelihood of violating an environmental law is likely to be correlated with the industry in which a firm belongs and with the scale of its operations, we use a matched pairs design in selecting the sample of control firms. We match each experimental firm to a control firm based on SIC code, a proxy for industry affiliation, and sales, a proxy for firm size. Specifically, for each environmental offender, we select a control firm in the same 4-digit SIC code with sales that are as close to the experimental firm as possible. It is also possible that the likelihood of a lawsuit is related to corporate performance. However, given that we cannot effectively control for performance through the matching process given our existing matching criteria, we have opted to control for performance by adding a performance variable in our cross-sectional model, as described later in the paper. Further, the confounding effect of other factors such as technology and internal structures is likely to be controlled, at least in part, by the correlation between these factors and industry affiliation and firm size.

The variable capturing environmental performance is binary; it is set to one for lawsuit targets and zero otherwise. The factors that are proposed to distinguish between lawsuit targets and control firms are defined as follows: *Board size* is the sum of all corporate directors at the end of the last fiscal year before the lawsuit settlement. The *Fraction of directors in peer firms* is the sum of all corporate directors who are active executives in other industrial firms. This category excludes consultants, lawyers, financiers, academics, politicians, members of the clergy and the military, and private investors. This category includes all inside directors who are, by definition, members of an industrial firm. As it turns out, the inclusion of insiders in the construction of this variable has no bearing on the results. *Directorships per director* is the average number of directorship posts held by a corporate director and it proxies for director reputation. *Inside ownership* is the fraction of common stock owned by officers and directors as a group. All data on corporate boards

and ownership are collected from annual proxy statements, as those are filed in SEC's EDGAR database at the end of the last fiscal year before the lawsuit.

To measure the extent of stakeholder pressure each firm faces, we focus, as we indicated earlier, on three such stakeholders: communities, political/legislative actors, and regulators. We assume that such pressure will be most pronounced in the state where the firm is headquartered and in the states where it has significant operations. We identified headquarter locations (i.e., the 'home state' of each company) by searching the web page of each experimental and control company in our sample. Further, we identified states where the firms had significant operations by searching items 1 and 2 of the 10-K reports, as those were filed electronically in the EDGAR database. In a few cases where firms specified that they operated in more than 20 states, we assumed a nationwide average measure of stakeholder pressure for such firms.

We obtained an estimate of the community's interest in environmental issues in each state by measuring the *Environmental preferences* of its population. This variable is a measure of revealed preference and is defined as the number of paying members of major U.S. environmental and conservation organizations (with an annual budget exceeding $1 million or membership exceeding 2000) per 1000 state residents (Andrews, 1994).

In addition, we measure stakeholder pressure emanating from political/legislative actors by the *Voting record* of each state's Congressional delegation (members of the U.S. House of Representatives and the U.S. Senate) on environmental issues (e.g., broad issues such as biodiversity and natural resources, energy and global warming, and pollution and health and more specific ones that include endangered species, wetlands conservation, mining, and coal subsidies). The data were obtained from the scorecards of the League of Conservation Voters. The League keeps track of what approximately 30 of the major U.S. environmental groups believe are the most important pieces of legislation each year and records how senators and representatives voted on those issues. Voting records capture the percentage of times that members of Congress voted for an environmental measure. Separate voting records for the House and Senate were recorded and utilized for the years before the lawsuit was settled and the penalty assessed (i.e., from 1993 to 1997).

Finally, we calculate *Regulatory stringency*, a proxy for the pressures exerted on a firm by a state's regulatory environment. This measure takes into account the fact that environmental regulations, and hence the penalties imposed on violators, vary across states. Following King and Lenox (2000b), we base this measure on a state's toxic emissions (the total amount of on- and off-site toxic releases) in which a firm operates. We collect such data from EPA's Toxics Release Inventory (TRI) database, one of the few sources of longitudinal data on the performance of U.S. industrial facilities (King and Lenox, 2000a). TRI stores information that is self-reported annually since 1987 from industries that conduct manufacturing operations. Facilities are required to report to the TRI program if they have 10 or more full-time equivalent employees and manufacture or process more than 25,000 pounds or otherwise use more than 10,000 pounds of any listed chemicals during the calendar year (U.S. EPA, 1999). The amount of toxic emissions is deflated by total employment in each state (to account for differences in the level of economic activity across states), log-transformed, and inverted. Employment figures for each state were obtained from the U.S. Census Bureau. We thus assume that greater amounts of toxic emissions in states where a firm operates are associated with a lower level of regulatory stringency facing that firm, and a lower value for this variable. Based on the above, for all three stakeholder proxies that we employ (*Environmental preferences*, *Congressional voting record*, and *Regulatory stringency*), we construct a firm-level measure by calculating the average of each proxy of all the states in which a firm has significant operations. For all three, greater variable values imply greater amounts of stakeholder pressure facing the firm.

Finally, in our analysis, we control for two exogenous factors that may potentially determine the risk of litigation. *Sales* is used as a proxy for firm size and is equal to net annual sales, while *Return on assets* is the ratio of income before extraordinary items to total assets and proxies for financial performance. Data on sales and return on assets are gathered from Compustat for the last fiscal year before the lawsuit.

RESULTS

To examine the importance of factors determining environmental wrongdoing, we initially examine univariate differences for each variable between the experimental and control firms. The parametric *t*-test and the nonparametric signed-ranks Wilcoxon test are used toward this end. The advantage of the nonparametric test is that it tones down the effect of outliers while it is almost as powerful as the parametric test. Results from these tests are presented in Table 3. Notably, lawsuit targets have larger boards than control firms, consistent with the notion that larger boards are more inefficient, leading to a diffusion of responsibility that increases the likelihood of environmental wrongdoing. Further, in target firms there is a higher fraction of corporate directors from peer firms, who are presumably more prone to 'overlooking' environmentally irresponsible behavior. The results on board size and board composition are statistically significant at the 0.02 level or better using both the *t*-test and the Wilcoxon test, and are both consistent with our expectations as posited in the hypotheses development section. Finally, in line with the notion that poor financial performance is associated with poor environmental performance, we document that the return on assets in the year before the settlement is marginally lower for lawsuit targets compared to control firms.

The remaining comparisons do not reveal any consistent differences across groups. Corporate directors in lawsuit targets hold marginally fewer directorships than in control firms, while officers and directors in lawsuit targets hold a higher (median) fraction of company stock. Furthermore, environmental voting records are not significantly different in the states where lawsuit targets operate compared to control firms; measures of environmental preferences, as proxied by membership in environmental organizations, and regulatory stringency, as defined earlier, are similarly indistinguishable across the two groups. Together, these results suggest that stakeholder pressures are not related to the likelihood of environmental wrongdoing. Finally, the two groups of firms are indistinguishable in terms of sales, by sample construction. Importantly, some of the univariate differences documented in Table 3 may be spurious because of the possibility that the variables are correlated among them. Therefore, while univariate comparisons are informative, more conclusive evidence on

Table 3. Comparison of 209 environmental lawsuit target firms and matched control firms

Variable		Targets	Control	Difference	*t*-Value	Wilcox.-*z*
# of firms		209	209			
Board size	Mean	10.80	10.06	0.74	2.41**	2.41**
	Median	11.00	10.00	1.00		
Directors in peer firms (%)	Mean	54.63	49.97	4.70	2.58**	3.02***
	Median	54.55	50.00	4.55		
Directorships per director	Mean	1.29	1.51	−0.22	−1.69*	−1.09
	Median	0.96	1.04	−0.08		
Inside ownership (%)	Mean	9.71	9.17	0.54	0.34	−2.05**
	Median	2.00	2.94	−0.94		
Environmental preferences	Mean	17.78	17.39	0.39	0.82	0.78
	Median	18.00	18.00	0.00		
Voting record: Senate	Mean	45.22	45.94	−0.72	−0.41	−0.38
	Median	46.00	46.00	0.00		
Voting record: House	Mean	43.24	43.69	−0.45	−0.40	−0.44
	Median	45.00	45.00	0.00		
Regulatory stringency	Mean	0.63	0.65	−0.02	−1.14	−1.28
	Median	0.63	0.63	0.00		
Sales ($ bill.)	Mean	128.00	133.36	−5.36	0.22	1.05
	Median	8.53	7.14	−1.39		
Return on assets (%)	Mean	3.45	5.01	−1.56	−2.17**	−1.75*
	Median	4.30	4.40	−0.10		

All governance information is collected from the sample firms' proxy statements and financial information is collected from Compustat for the year before the lawsuit. The right-hand column reports the statistic for the signed-ranks Wilcoxon test.
Significant at the *0.10, **0.05, and ***0.01 level.

the factors distinguishing between lawsuit targets and control firms is provided through the logistic regressions described below.

Table 4 presents pairwise Pearson correlations between the proposed determinants of environmental lawsuits. All variables are defined as described in the data section and tested in Table 3, with two exceptions. First, the environmental voting records for the Senate and House of Representatives are consolidated into a single variable because of the high overlap between the two measures. The new *Voting record* variable is set to one when the majority of proposals (>50%) received a favorable vote by a firm's 'weighted' average locus of operations in both the Senate and the House and zero otherwise. Second, the variable *Sales* was log-transformed to tone down the unduly influential effect of a few observations with extreme sales values.

Consistent with univariate evidence from Table 3, pairwise correlations presented in Table 4 suggest that lawsuit targets have larger boards with more peer directors who hold fewer directorships; lawsuit targets also have a lower return on assets. Larger firms (firms with greater sales) have a larger board and their corporate directors hold more directorships; firm size is inversely related to ownership concentration. These correlations suggest that firm size is an important control variable for the subsequent logistic regressions.

Importantly, the three measures of stakeholder pressures used here are highly correlated among them even though they are constructed from markedly different data sources, suggesting that these constructs measure stakeholder pressures in a given state well. Specifically, *Environmental preferences* has a correlation of 0.50 both with *Voting record* and *Regulatory stringency*, while *Regulatory stringency* has a correlation of 0.38 with *Voting record*. All such correlations are significant at $p < 0.001$. These correlations suggest that members of Congress are sensitive to the environmental outlook of their constituents, and that more regulatory stringency exists in the presence of environmentally sensitive constituents.

Next, we turn to Table 5, which presents results from the multivariate logistic regressions. Due to the potential danger of multicollinearity that exists because of the high overlap among our measures of stakeholder pressure, we estimate four different models. Each of the first three models examines the variables capturing a firm's internal governance structure, and includes the financial variables as controls; each of the three models introduces a different stakeholder measure. Model 4 in Table 5 includes all three stakeholder measures together. Importantly, each of the four models is statistically

Table 4. Pearson correlation coefficients for the variables used in the logit regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Lawsuit dummy	1.00									
2. Board size	0.12**	1.00								
3. Directors in peer firms (%)	0.13**	−0.07	1.00							
4. Directorships per director	−0.08*	−0.33***	0.17***	1.00						
5. Inside ownership (%)	0.02	−0.26***	−0.03	0.33***	1.00					
6. Environmental preferences	0.04	0.05	−0.12**	−0.03	0.02	1.00				
7. Congressional voting record	0.05	−0.08*	−0.10*	0.07	0.01	0.50***	1.00			
8. Regulatory stringency	−0.05	−0.06	−0.14***	0.05	−0.01	0.50***	0.38***	1.00		
9. Log (Sales)	0.03	−0.24***	−0.05	0.23***	0.15***	0.06	0.11**	0.09*	1.00	
10. Return on assets (%)	−0.11**	0.09*	−0.07	−0.01	0.01	0.08	0.08	0.05	0.03	1.00

All governance information is collected from the sample firms' proxy statements and financial information is collected from Compustat for the year before the lawsuit.
Significant at the *0.10, **0.05, and ***0.01 level.

Table 5. Logit regressions of the probability that a firm becomes the defendant in an environmental lawsuit

	(1)	(2)	(3)	(4)
Intercept	−2.36***	−2.18***	−1.63**	−1.66**
	(9.53)	(11.21)	(4.57)	(4.04)
Board size	0.10**	0.11***	0.11**	0.11**
	(6.28)	(7.07)	(6.52)	(6.52)
Directors in peer firms (%)	1.98***	2.03***	1.84***	1.95***
	(9.34)	(9.79)	(8.12)	(8.90)
Directorships per director	−0.17*	−0.17*	−0.16*	−0.17*
	(2.85)	(2.99)	(2.71)	(2.77)
Inside ownership (%)	0.01*	0.01*	0.01*	0.01*
	(2.77)	(2.93)	(2.71)	(2.72)
Environmental preferences	0.02			0.02
	(0.58)			(0.42)
Congressional voting record		0.60		0.74*
		(2.59)		(2.77)
Regulatory stringency			−0.59	−1.25*
			(0.99)	(3.16)
Log (sales)	0.10*	0.09*	0.10*	0.10*
	(3.33)	(3.00)	(3.81)	(3.28)
Return on assets	−0.03**	−0.04**	−0.03**	−0.04**
	(4.51)	(4.80)	(4.30)	(4.89)
Sample size	362	362	362	362
−2 Log-likelihood	26.57***	28.64***	26.99***	31.92***

All governance information is collected from the sample firms' proxy statements and financial information is collected from Compustat for the year before the lawsuit. Wald χ^2 statistics are in parentheses. Significant at the *0.10, **0.05, and ***0.01 level.

significant at the 0.01 level or better as evidenced by the −2log-likelihood ratio.

The importance of the governance variables is generally uniform across the four models. In general, multivariate logistic regression results are consistent with earlier univariate comparisons. First, the likelihood of becoming a lawsuit defendant increases with board size, suggesting larger boards are less effective in preventing behavior that leads to environmentally based lawsuits. Second, consistent with Hypothesis 2, the likelihood of a lawsuit increases with the fraction of directors in peer firms, consistent with other corporate directors being ineffective (or unwilling) to monitor proper environmental performance by management. Third, consistent with Hypothesis 3, environmental litigation is less likely where corporate directors hold many other board seats, and therefore have a more valuable reputation capital. Finally, in contrast to expectations and Hypothesis 4, the likelihood of environmental wrongdoing increases with the fraction of inside ownership.

Results from Models 1–3 suggest that *Environmental preferences*, *Voting record*, and *Regulatory stringency* measures respectively are not significant in helping to prevent environmental wrongdoing. Thus, stakeholder pressures seem to be a weak deterrent, at best, of poor environmental performance as evidenced, at least in part, by environmental litigation exposure. When all three stakeholder variables are added in a single model, the *Regulatory stringency* variable becomes positively related and the *Voting record* variable becomes negatively related to the likelihood of environmental litigation. However, because of the fairly high Variance Inflation Factors (VIFs) for these variables, such results should be interpreted with caution. (VIFs were near two for each of the three variables, suggesting that around 50% of the variation in each of these variables could be explained by the other independent variables in the model.)

Finally, results from all four models suggest that the likelihood of an environmental lawsuit is marginally higher for larger firms, consistent with larger firms eliciting unwarranted public attention and facing higher political costs. The likelihood of becoming a lawsuit target is inversely related to a firm's return on assets, a finding that sides with

arguments of poor financial performers becoming poor environmental performers (e.g., Russo and Fouts, 1997). In sum, the results from Table 5 generally suggest that proxies for board effectiveness are related to the likelihood of environmental litigation, but proxies for stakeholder pressures are not.

In additional tests (results not tabulated) we attempted to account for the imperfect correlation between environmental lawsuits and environmental performance; i.e., to account for the possibility that noncompliance with the law may erroneously go undetected, while compliance with the law may erroneously get penalized. To address this potential measurement bias, we alternatively measure environmental performance with the amount of toxic emissions released by each of the lawsuit defendant and control firms in our sample. We find that the average lawsuit defendant released 7.1 million pounds of TRI listed chemicals in the year before its conviction compared to 2.1 million pounds for each control firm, rendering support for our measure of environmental performance (the Wilcoxon z-statistic for the cross-sample difference is 4.56, and is significant at $p < 0.001$).

To probe further into this issue, we classified firms into guilty and not-guilty categories based on whether they reported having released any TRI listed chemicals. We then used this binary variable, instead of the lawsuit target vs. control categorization, as the dependent variable in our logistic regressions. Interestingly, the logistic regression results from this model were very similar to results reported in Model 4 of Table 5. Specifically, the likelihood of disclosing TRI emissions rises with board size ($p < 0.01$) and the fraction of directors in peer firms ($p < 0.05$), and declines with the number of board seats held by directors ($p < 0.09$). The remaining variables in the model are not statistically significant at any conventional level. In sum, this test validates to a great extent the ability of our dependent variable to capture the behavior of our sample firms toward the environment.

Another issue that seems pertinent for the measurement of the dependent variable is whether the total number of convictions per firm matters. That is, it is possible that not all violators are equally guilty; the depth of violation, proxied by the number of offences a firm commits during the sample period, may proxy well for the *extent* of negligence toward the environment. To address this concern we re-estimated Model 4 in Table 5 using OLS methods, and using the total number of violations per firm (logged to tone down the effect of outliers) as the dependent variable. Similar to our logistic regression results, board size ($p < 0.001$), the fraction of directors in peer firms ($p < 0.01$), and congressional voting records ($p < 0.10$) are positively related to the number of violations per firm, while regulatory stringency ($p < 0.02$) and return on assets ($p < 0.01$) are inversely related to the number of violations. Thus, our results on the board variables are substantially robust to this alternative specification of the dependent variable as well, while they also provide weak evidence that the extent of litigation exposure may be related to our proxies for stakeholder pressures as well.

Given that there are many types of convictions over different types of environmental violations, it is also possible that violation type, as captured by the type of penalty assessed by the EPA, influences our results. To examine sensitivity of our results to the types of penalties that were assessed by the EPA, we partition our sample firms into cases where injunctive relief or supplementary environmental projects were imposed ($n = 99$), and cases where the EPA imposed administrative or civil penalties ($n = 99$). The fraction of peer directors and the return on assets are significant in the first case, while board size and inside ownership are significant in the second, the remaining variables being insignificant in both cases. In the absence of clear *a priori* expectations about the results, and given the fact test power is much reduced because of smaller sample sizes, these differences are not convincing toward altering our conclusions. Further breakdowns according to the types of environmental laws being broken are not possible owing to the small subsample sizes, which would result in a substantial loss of test power. Notwithstanding the value of finer partitions of the data, there is a powerful common thread linking all experimental firms in our sample that separates them from the rest: they were convicted for breaking an environmental law. In sum, following alternative dependent variable specifications and sample partitions, our basic finding remains: board related variables seem to matter more than stakeholder proxies in explaining the likelihood of environmental litigation.

DISCUSSION AND CONCLUSIONS

Findings

In this paper, we investigated the determinants of the likelihood that firms violate environmental laws. We focused on potential explanatory factors that included characteristics of the firm's governance structure and its external stakeholders. We employed primary data on environmental crimes and penalties imposed on publicly traded U.S. firms in the period 1994–98. First, we found that the likelihood of becoming a lawsuit defendant increased with board size, a result that is consistent with the notion that larger boards are less effective in preventing behavior that leads to environment-related lawsuits. A second finding was that the likelihood of a lawsuit brought against a firm increased with the fraction of directors in peer firms, consistent with the notion that corporate directors in peer firms are ineffective or unwilling to monitor proper environmental performance by management. Third, we found that firms with more reputable directors on their boards (directors holding more board seats) are less likely to be sued. Finally, we found that environmental wrongdoing increased with the fraction of inside ownership in line with the view that concentrated ownership entrenches managers, leading to socially irresponsible behavior. Together, our results are consistent with prior research on board size, composition, and characteristics. Contrary to the above results and to our expectations, our findings indicate that stakeholder pressures may be a weak deterrent, at best, of poor environmental performance as evidenced by environmental litigation exposure. In sum, our research uncovers the corporate board as a primary, previously overlooked determinant of corporate environmental performance.

Limitations

Two potential caveats of our analysis are worth noting: first, the non-results on the outside stakeholders proposition may have arisen from variable measurement problems. Specifically, membership in environmental organizations may not capture the extent of the community's concerns about the natural environment because of the low membership rate. Also, the environmental voting record of each state's congressional delegation may not accurately represent the constituents' environmental preferences because members of Congress are elected on a platform that includes a large number of issues, not just the protection of the natural environment. Second, the non-results on stakeholder theory may be explained by countervailing effects if the relation sometimes runs from environmental responsibility to constituent preferences and sometimes otherwise. Specifically, as argued earlier, 'greener' constituents may exert pressures on firms so as to deter environmental irresponsibility (and the ensuing litigation). Alternatively, constituents may become more sensitive to the environment following actions of corporate environmental irresponsibility.

Importance and contributions

The contributions of this study revolve around four main axes. First, academically, our study is unique in that it is the first study that empirically investigates and connects issues of corporate governance in general and board structure and characteristics in particular to a corporation's environmental performance—proxied by environmental litigation exposure. Moreover, the study uses a conditional measure of environmental performance (i.e., litigation exposure) that has clear advantages over subjective assessments such as questionnaires. Our classification is a product of an assessment by a U.S. government agency (the EPA) of how a company measures up to the requirements of relevant environmental legislation. This is a binary measure of performance with a high degree of objectivity given the real costs of this assessment. Second, from a practical standpoint, the study's results are useful to corporations as they point to a relationship between board characteristics and the likelihood that a corporation will face environmental litigation. They thus suggest that firms need to take a fresh look at their boards, among other things, if they want to reduce their exposure to environment-related litigation.

Third, our findings have important implications for practicing managers serving on the boards since executive directors are primarily responsible for the board's decision-management functions (Fama and Jensen, 1983). Our results suggest that executive directors need to exercise great care when dealing with or presenting environmental issues to the board because of the cost implications of strategic decisions that may lead to an environment-related lawsuit. Specifically, executive directors

should facilitate outside directors in conceptualizing, comprehending, and appreciating the implications of the board's decisions relating to the environment in a variety of ways. These include the quality of their participation and contribution in board meetings through the extent, depth, and type of discussion they lead. Lastly, our results have value for policy-makers because they point to a specific area of the corporate apparatus where pressure may be directed in order to achieve the environmental quality objectives of public policy.

Future research

Clearly, the relationship between corporate board characteristics and environmental performance could be further explored in a number of ways. First, future research could focus in greater detail on finer director attributes such as education and age as potential determinants of board and corporate attitudes towards the natural environment. Second, a longitudinal, unconditional analysis can be conducted—one that looks at how changes in board structure and characteristics may affect the quality of environmental policies. More generally, future research can further our understanding on the consequences of environmental litigation by examining the post-litigation financial performance of lawsuit targets.

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