ESG UQÀM

Cahier de recherche
2006-07

Chaire d'information financière et organisationnelle

THE ASSOCIATION BETWEEN MEDIA LEGITIMACY AND CORPORATE ENVIRONMENTAL COMMUNICATION

Walter Aerts
Professor
Faculty of Applied Economics
University of Antwerp
Prinsstraat 13
2000 Antwerpen, Belgium
(003232204110; walter.aerts@ua.ac.be)

Denis Cormier
Professor
École des sciences de la gestion
UQAM
C.P. 8888, succ. Centre-ville
Montreal, Quebec, CANADA H3C 1P8
(514-987-3000 X 8358; cormier.denis@uqam.ca)

August 2006

The authors acknowledge the financial support of the Social Sciences and Humanities Research Council of Canada, Fonds québécois de la recherche sur la société et la culture (FQRSC), and Autorité des Marchés Financiers (Québec).

THE ASSOCIATION BETWEEN MEDIA LEGITIMACY AND CORPORATE ENVIRONMENTAL COMMUNICATION

Using a media measure of environmental legitimacy, this paper provides an integrated analysis of the interrelationships among (1) environmental legitimacy, (2) environmental news exposure, and (3) corporate environmental communication (periodic disclosure and/or environmental press releases). Based on the argument that a company's environmental communication strategy simultaneously affects these variables, we endogenize the related variables in simultaneous equations models. The sample comprises North American firms (Canada and the United States). The results obtained show that environmental legitimacy is significantly and positively affected by the quality of environmental disclosure or reactive environmental press releases. It also appears that environmental disclosure can serve as a substitute of proactive press releases while the opposite is true for reactive press releases. Moreover, our results suggest that lack of environmental legitimacy is a driver of reactive environmental press releases, but not of environmental disclosure. Finally, environmental news exposure is associated with both environmental disclosure and environmental press releases.

Key words: Impression management, legitimacy, media exposure, environmental reporting, press releases.

LA LÉGITIMITÉ PERÇUE DES MÉDIAS ET LA COMMUNICATION ENVIRONNEMENTALE DES ENTREPRISES

Dans cette recherche, la légitimité environnementale de la firme est fonction de la perception des médias. Nous nous intéressons aux relations entre la légitimité environnementale, le degré d'exposition de la firme aux médias et ses stratégies en matière de communication environnementale. L'échantillon est composé de firmes canadiennes et américaines. Il ressort de nos résultats que la légitimité environnementale est directement reliée au niveau de communication environnementale dans le rapport annuel et aux communiquée de presse à caractère réactif en ce qui concerne la gestion environnementale. Nos résultats sont également à l'effet que la communication environnementale dans le rapport annuel a un plus grand impact sur la légitimité que les communiqués de presse proactifs alors que les communiqués de presse réactifs ont un plus grand impact que la communication dans le rapport annuel. Une carence dans la légitimité de la firme semble associée à plus de communiqués de presse réactifs. Enfin, plus la firme est exposée aux médias, plus elle a recours à la communication environnementale, autant par le rapport annuel que par les communiqués de presse.

Mots clés : Gestion des impressions, légitimité, exposition aux médias, communication environnementale, communiqués de presse.

INTRODUCTION

This paper provides an integrated analysis of the interrelationships among environmental legitimacy, environmental news exposure, and corporate environmental communication. Based on the argument that a company's environmental communication strategy simultaneously affects these variables, we endogenize the related variables in simultaneous equations models.

Empirically, studying legitimacy issues has its methodological challenges, such as the practical problems of assessing subjective perceptions and beliefs of relevant publics. We use public media data to assess generalized perceptions of a firm's environmental legitimacy. Public media content captures the perspective of the general public and has been used as a proxy for normative legitimacy issues (Elsbach and Sutton, 1992; Deephouse, 1996; Bansal and Clelland, 2004). In concert with legitimacy theory, we contend that firms use corporate communication media (like annual report disclosure and press releases) to manage perceived environmental legitimacy by signalling to relevant publics that their behavior is appropriate and desirable and, at the same time, react to public pressures by increasing the level and quality of their environmental information dissemination processes. In this vein, we study both the antecedents and outcomes of corporate environmental communication. Different media may be used as complements or supplements. By analyzing both annual report disclosures and press releases, we explore the relative role of these two common information dissemination channels.

Our results show that environmental legitimacy is significantly and positively affected by the extent and quality of annual report environmental disclosures and by reactive environmental press releases. It appears that annual environmental disclosure can serve as a substitute of proactive press releases while the opposite is true for reactive press releases. Moreover, our results suggest that environmental legitimacy as reflected through the media is a driver of reactive environmental press releases, but not of annual environmental disclosure. Finally, environmental news exposure is associated with both annual environmental disclosure and environmental press releases.

The remainder of the paper is organized as follows. Section 2 presents a theoretical framework for analyzing the interplay of environmental legitimacy and corporate environmental communication as well as hypotheses. The study's empirical models and sample are described in section 3. Findings are reported in section 4. Finally, section 5 provides a discussion regarding the potential implications of our findings.

2. THEORETICAL BACKGROUND AND DEVELOPMENT OF HYPOTHESES

Organizational legitimacy perspective

The legitimacy concept, with its roots in institutional theory and socio-political research, is one of the most influential theoretical perspectives within the domain of corporate environmental reporting research. The main tenet of this perspective is that an organization is seen to be legitimate to the extent that its means and ends appear to conform to social norms, values and expectations (Ashforth and Gibbs, 1990). Legitimacy is not directly observable and has to be conceived as a social assessment or appraisal of acceptance, appropriateness and/or desirability (Zimmerman and Zeitz, 2002). The institutional perspective on legitimacy tends to characterize it as a global impression, representing how a collective perceive a firm (Fombrun, 1996; Rao, 1994). It refers to a collective awareness and recognition of an organization in its organizational field as appropriate and acceptable. Suchman (1995), for example, argues that legitimacy is "a generalized perception or assumption that actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (p.574). Organizational activities, social perceptions of adequate behavior and the prevailing norms, values and beliefs combine as the driving forces behind organizational legitimacy (Aldrich and Fiol, 1994; Bansal and Clelland, 2004; Zimmerman and Zeitz, 2002). In the same vein, legitimation refers to "the characteristic of being legitimized by being placed within a framework through which something is viewed as right and proper" (Tyler, 2006, p.376).

Although the legitimacy concept is frequently portrayed at a generic level, it is a multi-faceted and multidimensional phenomenon. Multiple sources of legitimacy can

be distinguished, while, as a social construct, it is linked to a variety of stakeholders. It is generally recognized that there are different reasons why an organization's behaviour may be perceived as appropriate and adequate. In this vein, Scott (1995) distinguishes between regulative, normative and cognitive legitimacy. Legitimacy, as treated in corporate environmental reporting research, is mainly of a normative nature, in the sense that environmental legitimacy is based on a wider societal system of norms and values which serve as a reference for the perceptions of what is considered appropriate and adequate. Norms specify how things should be done, while values indicate what is preferred or desirable. Normative legitimacy incorporates a significant regulatory component. Laws, regulations and formal rules constitute objective reference points and provide formalized and objective assessment parameters. They allow an organization to claim legitimacy based on its conformity to current regulation or to demonstrate conformity through corporate environmental communication. In a more general sense, norms and values represent shared understandings that create expectations about organizational behaviour. The closer an organization's behaviour aligns with the relevant norms and values, the higher its normative legitimacy. Norms and value expectations may be general and applicable to all organizations or domain-specific. They may vary from industry to industry.

Organizational theory generally construes legitimacy as an intangible asset that determines the ability of organizations to garner capital and personnel, and thereby ultimately influences the survival of organizations (Pfeffer and Salancik, 1978; Hannan and Freeman, 1989; Zimmerman and Zeitz, 2002). Legitimacy has an important role in securing support for an organization's functioning. It shapes a "reservoir of support", sometimes besides immediate self-interest, which shapes reactions to their policies (Weatherford, 1992). "Such a reservoir is of particular value during times of crises or decline, when it is difficult to influence people by appealing to their immediate self-interest, and when there are risks concerning whether they will receive the long-term gains usually associated with continued loyalty to the group." (Tyler, 2006). Bansal and Clelland (2004) show, for example, that firms viewed as legitimate are more highly insulated from unsystematic variations in their stock prices.

Media legitimacy

Previous studies have attempted to measure environmental legitimacy using a variety of indirect or proxy measures related to the sources of legitimacy (e.g. lawsuits for environmental matters, environmental disaster in oil and gas industry). In this study we used a direct measure of environmental legitimacy.

Essentially, legitimacy is about perception. Central to the concept of legitimacy are the perceptions held by relevant publics and by society at large. As such, legitimacy may be more about the interpretation of cues than about actual behavior. The institutional perspective on legitimacy tends to characterize it as a global impression, representing how a collective perceive a firm (Fombrun, 1996; Roa, 1994). The collective awareness and recognition of an organization in its organizational field as appropriate, acceptable and/or desirable is based on a culmination of impressions. General impressions of firms will develop through information exchanges and social influence among various actors interacting in an organizational field. (Rindova et al., 2005). Especially for unobtrusive issues individual stakeholders will look to the opinions and choices of others to make up their own mind. As a result, the formation of public opinion tends to follow a "social influence" logic, with stakeholder uncertainty being reduced through "social proof" (Rao et al., 2000, 2001).

This social influence process is facilitated by the presence and actions of institutional intermediaries. Institutional intermediaries are entities that specialize in disseminating information about organizations or in evaluating their outputs (Fombrun, 1996; Rao, 1998). They are deemed to play a pivotal role to the extent that they are believed to have superior ability to access and disseminate information by virtue of their institutional roles or structural positions (Rao, 1998, 2001). The actions and choices of such intermediaries are closely followed and highly influential because of their perceived superiority in evaluating firms. In this vein, the behaviour of institutional intermediaries may introduce systematic disparities in the availability of information about different organizations, thereby making some more salient and central in the public mind (Rao, 2001) (leading some organizations to gain disproportionate amounts of public attention and support on the basis of rather general and non-specific impressions and beliefs). For example, Pollock and Rindova (2003) showed that the volume of media coverage a firm receives is positively related to the performance of

its IPO. Overall, the information they convey makes some firms more prominent in their organizational fields (Rao, 1994). Both general and expert intermediaries may influence prominence. General intermediaries are those that provide general information on a broad set of issues

Public media are the primary example of general institutional intermediaries. By virtue of their specialization in collecting and disseminating information, the public media are likely to be viewed as having superior access to information and/or expertise in evaluating organizations (Rao, 1998). Further, the information and evaluations provided by public media about an organization tend to be distributed more broadly than the opinions of the average stakeholder. As a result, they are likely to have a high degree of influence on which organizations become prominent in the minds of stakeholders. The impact of public media on stakeholders' perceptions derives primarily from their ability to focus public attention on the issues and entities that they select to report on (Deephouse, 2000; Pollock and Rindova, 2003).

The agenda-setting hypothesis on media behaviour posits that media do not mirror public concerns, but actively influence them, particularly through the transfer of salience from the media agenda to the public agenda (McCombs and Shaw, 1972; Caroll and McCombs, 2003). In this vein, media research within the agenda-setting and framing paradigm has demonstrated a close alignment between the content of public media and public opinion (or the degree of salience that different topics have for the general public), indicating that the media are actively involved in social impression constructing processes of the public (Gamson et al., 1992). Moreover, the agenda-setting effect is especially strong for unobtrusive issues (or issues with which individuals have little personal contact and for which they rely on the media as the primary (and sometimes only) source of information. Environmental issues are generally perceived as unobtrusive (Ader, 1995), reinforcing the relevance of the media proxy for environmental legitimacy.

Corporate environmental communication and media legitimacy

Strategic (as opposed to institutional) legitimacy theory suggests that legitimacy is to a certain extent controllable by organizations. It contends that organizations are able to exercise strategic choice to alter their legitimacy status and to cultivate the resource

through corporate actions, by adapting their activities and changing perceptions (Ashforth and Gibbs, 1990; Oliver, 1991). Organizations might take various actions to ensure that their behaviour is perceived to be legitimate. One of the main options is to attempt, through communication, to become identified with symbols, values, and methods of operation with institutions, values, or outputs that are strongly believed to be legitimate, and, as such, to demonstrate congruence between its organizational practices and the values professed by its social environment (Dowling and Pfeffer, 1975; Lindblom, 1994).

To the extent that legitimacy can be defined as the collective impressions of the stakeholders as a social group about the general disposition of an organization, the management of impressions through communication is indeed a viable option to affect the strength and homogeneity of the individual impressions within a group. This strategic legitimacy perspective has been quite popular in environmental disclosure research in recent years and several studies explicitly adopt such a perspective (Hogner, 1982; Guthrie and Parker, 1989; Patten, 1991; 1992, 2005; Gray, Kouhy and Lavers, 1995; Deegan and Rankin, 1996; Deegan and Gordon, 1996; Walden and Schwartz, 1997; Brown and Deegan, 1998; Neu, Warsame and Pedwell, 1998; Buhr, 1998; Savage, Rowlands and Cataldo, 1999; Wilmshurst and Frost, 2000; Cormier and Gordon, 2001; Deegan, Rankin and Tobin, 2002; O'Donovan, 2002; O'Dwyer, 2002; Bansal and Clelland, 2004). Legitimacy theory argues that since firms operate within society, voluntary environmental disclosure legitimizes their environmental management and prevents social and government sanctions. Hence, according to legitimacy theory, firms will enhance their voluntary environmental disclosure activities in reaction to ecological accidents or to political crises. In other words, the social-political context drives differences in environmental disclosure across firms and over time (Patten, 2000). So far, evidence as to extent of legitimization efforts by firms is inconclusive (see, for example, Hogner, 1982; Guthrie and Parker, 1989; Gray, Kouhy and Lavers, 1995; Buhr, 1998; Savage, Rowlands and Cataldo, 1999; Wilmshurst and Frost, 2000). For instance, some studies report that specific socio-political events (e.g., Exxon Valdez accident, prosecution attempts, lobby group pressures) do appear to influence managers' decisions with respect to their firm's environmental disclosure (Patten, 1992; Gray, Kouhy and Lavers, 1995; Buhr, 1998;

Savage, Cataldo and Rowlands, 2000; Deegan, Rankin and Tobin, 2002). However, the events do vary across studies, which impedes generalizations.

Furthermore, findings from several studies that appear consistent with legitimacy theory may be interpreted also in light of explanations put forward by Verrechia (1983) and Dye (1985). In other words, increased voluntary environmental disclosure by a firm following an ecological accident may be an attempt to legitimize its environmental management (legitimacy theory) but it can also be a mean to avoid new regulations for its industry or actions by pressure groups (reduction of proprietary costs). Findings by Patten (1991, 1992), Deegan and Rankin (1996), Deegan and Gordon (1996), Brown and Deegan (1998), Walden and Schwartz (1997), Alnajja (2000), Cormier and Gordon (2001) and Cormier and Magnan (2003) fall into this category.

A shortcoming of extant research related to the legitimacy theory perspective on corporate environmental reporting is that the legitimacy construct is seldom measured directly. It is common for researchers to infer legitimation processes and effects by examining relationships between observable corporate performance attributes or third-party actions and environmental reporting measures. In this study, we used a direct measure of organizational legitimacy and framed it as both antecedent and outcome of corporate environmental communication efforts.

Given the potential relevance of corporate environmental communication as a legitimation tool, we posit the following hypothesis:

> ***Hypothesis* 1.** Enhanced corporate environmental communication (annual report disclosures and press releases) is associated with higher environmental legitimacy.

Effect of industry

Entire industries can have more or less legitimacy that can be conferred upon the firms operating within them (Aldrich and Fiol, 1994; Scott, 1995; Suchman, 1995). Industries have varying degrees of legitimacy, based on a variety of actions and consequences stemming from the collective action of industry members. Industry-

level legitimacy has to do with the degree to which the operations and business processes of firms in a given industry and their products and services offered are accepted as appropriate and useful by broader publics (Hannan and Freeman, 1989; Scott, 1995). For example, the oil industry's reputation has been tarnished by highly visible oil spills. The chemical industry has been attacked in the past by environmental groups, which may have lowered its legitimacy. However, many well-established industries have a high level of legitimacy like banking and medicine (Zimmerman and Zeitz, 2002). Industry-level legitimacy may function as a constraining a priori impression. It will influence later observations and may be particularly resistant to change. Belonging to an environmentally sensitive industry (with its negative connotations) may be the first observation one has of a firm. This may lead to discounting of later positive messages coming from a firm and impede the effectiveness of legitimacy-enhancement efforts.

The industry a firm belongs to, may also affect the credibility of its corporate environmental communication efforts. The credibility of corporate environmental communication efforts would generally be validated through a positive association between environmental performance and environmental communication content, but previous research failed to demonstrate such association (Ingram and Frazier, 1980; Wiseman, 1982; Freedman and Wasley, 1990; Hughes, Anderson and Golden, 2001). Some minor evidence of a significant positive relationship could be established for very specific pollution disclosure (e.g. Patten, 2002b; Al-Tuwaijri et al., 2004), but surely not for more comprehensive disclosure measures. Moreover, Patten (2002b) documents a lower relationship between environmental performance and environmental disclosure for more environmentally sensitive industries, suggesting that environmental disclosure will be seen as less credible for highly sensitive industries. In our sample, we consider the four following industries to be environmentally sensitive: Energy; Chemicals and drugs; Industrials; and Materials (Resources). The effects of industry-level environmental legitimacy and related credibility issues give rise to our second hypothesis:

> ***Hypothesis 2.*** The association between the level of corporate environmental communication and environmental legitimacy will be lower for those firms operating in more environmentally sensitive industries.

Information richness of environmental communication media

Annual report disclosures and press releases differ in their capacity to process rich information. Daft and Lengel (1984) define information richness as the ability of communication media to change understanding within a time interval, with face-to-face communication having the highest richness and periodic statistical documents positioned at the lower end. The general idea is that performance improves when managers use richer media for equivocal tasks and leaner media for nonequivocal tasks, with equivocality referring to the presence of multiple and possibly conflicting interpretations to the available information (Daft and Lengel, 1986). Information richness depends on the mediums capability of immediate feedback (the most important aspect), the number of cues and channels utilised, personalisation and language variety. Rich information media will generally be more effective in directing attention, establishing prominence and changing impressions. For our purposes, the main information richness criteria to differentiate annual report disclosures and press releases are timeliness (and related feedback capability) and topical extensiveness. Press releases can be used in a more timely, more elaborate and more focused fashion than annual report disclosures to confront environmental issues. They may also be more effective in signalling commitment.

We hypothesize that these communication media characteristics will enhance the effectiveness of press releases relative to annual report disclosures in affecting environmental legitimacy as reflected through media coverage.

> ***Hypothesis* 3.** The association between environmental press releases and environmental legitimacy will be higher relative to the association between environmental disclosures and environmental legitimacy.

The use and effectiveness of information rich media will be more pronounced when timeliness (reaction speed) is important from a self-presentational perspective (Sheer and Chen, 2004). From an impression management perspective, press releases can be used in a proactive or defensive fashion. Proactive (or assertive) content would stress the importance, relevance and scope of positive environmental outcomes or actions, whereas more defensive content would focus on downplaying the significance of

negatively perceived or evaluated events related to the natural environment. In this vein, proactive environmental press releases would express commitment to environmental concerns and generally focus on the positive aspects of corporate environmental performance. On the other hand, defensive press releases would tackle more equivocal concerns. From an information richness perspective, defensive press releases would be more effective than proactive press releases. By enabling equivocal information to be conveyed quickly, the timely use of defensive press releases can be used as a normalizing account, separating a negative environmental event from larger assessments of the firm as a whole (Suchman, 1995), thus preventing image damage from negative environmental events or issues.

> ***Hypothesis 4*.** The association between environmental defensive press releases and environmental legitimacy will be higher relative to the association between environmental proactive press releases and environmental legitimacy.

3. THE SAMPLE SELECTION AND EMPIRICAL MODELS

3.1. Sample

The initial sample is comprised of 623 North American firms (205 from Canada and 418 from the U.S.). From the sample of 623 firms, we find environmental news exposure for 165 firms. These firms constitute our final sample. Environmental disclosure is collected from corporate annual reports on Internet sites, including 48 environmental reports. Environmental disclosure is coded from the firms' annual reports and environmental reports for the year 2002. We identified all non-financial firms represented on S&P500 (U.S.) and S&P/TSX300 (Canada). Financial data is collected from Worldscope and from firms' Internet sites. The sample firms operate in the following industries (S&P classification):

- Consumer goods and services
- Energy
- Chemicals and drugs
- Industrials

- Information technology, Telecom & Media
- Utilities

3.2. Models

This study attempts to provide an integrated analysis of firms' overall environmental disclosure strategy. We posit that this strategy affects environmental disclosure, environmental news exposure and corporate environmental legitimacy. Two sets of structural equations model summarize the approach to be adopted in the empirical analysis. The first set integrates a firm's environmental disclosure while the second set integrates a firm's press releases concerning environmental matters:

(1.1) Environmental legitimacy $_{it}$ =

f(Capital intensity, Age of assets, Environmental disclosure, Disclosure*Environmentally sensitive industries, Environmentally sensitive industries, Lag Legitimacy, Size)$_{it}$ (1.1)

(1.2) Environmental disclosure $_{it}$ =

f(Beta, Capital intensity, Lag Legitimacy, Lag legitimacy*Environmentally sensitive industries, Environmentally sensitive industries, Leverage, Concentrated ownership, Return on assets, Environmental news exposure, Country)$_{it}$ (1.2)

(1.3) Environmental news exposure $_{it}$ =

f(Return on assets, Foreign listing, Capital intensity, Size, industry, Country)$_{it}$ (1.3)

(2.1) Environmental legitimacy $_{it}$ =

f(Capital intensity, Firm age, Press releases, Press releases*Environmentally sensitive industries, Environmentally sensitive industries, Lag Legitimacy, Size)$_{it}$ (1.1)

(2.2) Press releases $_{it}$ =

f(Beta, Capital intensity, Lag Legitimacy, Lag legitimacy*Environmentally sensitive industries, Environmentally sensitive industries, Leverage, Concentrated ownership, Return on assets, Environmental news exposure, Country)$_{it}$ (1.2)

(2.3) Environmental news exposure $_{it}$ =

f(Return on assets, Foreign listing, Capital intensity, Size, industry, Country)$_{it}$ (1.3)

3.3. Description of variables

Environmental legitimacy: To assess corporate environmental legitimacy, we rely on content analysis of press media coverage of corporate environmental issues. Institutionalists have suggested that content analysis of press media sources may be particularly useful in studying legitimation processes, as detailed archives of media coverage exists for many industries and analyzing the content of those public sources would offer a potentially powerful technique for operationalizing legitimation (Baum and Powell (1995)).

News media content is extracted from ABI Inform database and from three distinct sources:

(1) *Business, Economics: local and regional business publications* (local and regional business news coverage of large corporations, privately held companies, local start-ups, executive profiles, marketing, finance, and industry news. ABI Inform provides access to business information not typically found in national news sources. Contains news and analysis, information on local markets, and more gathered from major business tabloids, magazines, daily newspapers, wire services, and city, state, and regional business publications;

(2) *Business, Finance, Economics: journals, company profiles, Wall Street Journal* (most scholarly and comprehensive way to explore and understand business research

topics. It includes nearly 1800 worldwide business periodicals for in-depth coverage of business and economic conditions, management techniques, theory, and practice of business, advertising, marketing, economics, human resources, finance, taxation, computers, and more. Constitutes an expanded international coverage with fast access to information on more than 60,000 companies with business and executive profiles);

(3) *Canadian Newsstand,* which offers unparalleled access to the full text of Canadian newspapers (Montreal Gazette, National Post and Toronto Star). We extracted articles using firm's name and the following keywords: "environment", "sustainable development", "recycling", "pollution", "toxic", "ISO14000", "conservation", "remediation", "spills", "waste management", "energy", "awards", "environmental audit".

The legitimacy measure is computed for 2003 and 2002 (lag measure). In Summer 2005, two research assistants found 319 articles: 165 of good news nature, 148 of bad news nature and 6 as neutral news. Each article was coded in terms of its impact on the firm's environmental legitimacy, i.e. neutral, negative, or positive (See appendix 1). Good news stories are those that convey environmental commitment and that emphasize the positive aspects of a firm's activities. Examples good news stories include investment in facilities that will reduce energy consumption, or the reduction of greenhouse gas emissions. The legitimacy score is computed based on this coding. The two coders agreed on 81% of good news, 87% of bad news and 96% of neutral news. Internal consistency estimates (Cronbach's alpha) computed over 2002 and 2003 period show that the variance between the two coders' scores is quite systematic (alpha= 0.888 for good news, 0.926 for bad news and 0.864 for neutral news). This suggests a high level of intercoder reliability (Weber, 1990). A researcher reconciled all coding disagreements between the two coders.

Annual legitimacy measures were calculated using the Janis-Fadner coefficient of imbalance (Bansal and Clelland, 2004; Janis and Fadner, 1965). The Janis-Fadner coefficient ranges from -1.0 to +1.0; a high presence of favourable articles in a given year yields a value closer to +1.0, and a high presence of unfavourable articles yields a value closer to -1.0. The formula is as follows:

$$\text{Janis-Fadner coefficient} = \frac{(e^2 - ec)}{t^2} \text{ if } e > c$$

$$\frac{(ec - c^2)}{t^2} \text{ if } c > e$$

Where e is the number of favourable environmental articles in a given year, c is the number of unfavourable environmental articles in a given year and t is the sum of e and c.

Environmental disclosure: Environmental disclosure is measured using a coding instrument in a way that is similar to Wiseman (1982), Cormier and Magnan (2003), and Al-Tuwaijri et al. (2004). The grid comprises 39 items measuring environmental disclosure quality where the items are grouped into six categories as follows: Expenditures and risk; laws and regulation; pollution abatement; sustainable development; land remediation; and environmental management. The rating is based on a score from one to three, three points are awarded for an item described in monetary or quantitative terms, two when an item is described specifically, and one for an item discussed in general. The information is coded according to the grid presented in appendix 2.

We believe that the use of a coding scale to qualify a firm's environmental disclosure is appropriate for the following reasons. First, it allows for some integration of different types of information into a single figure that is comparable across firms in terms of relevance. Second, while other disclosure studies rely on word counts to measure environmental disclosure (e.g., Neu *et al.* 1998; Williams and Ho Wern Pei, 1999), a qualitative scale allows for the researcher's judgment to be utilized in rating the value or quality of the disclosures made by a firm. While this process is more subjective, it ensures that irrelevant or redundant generalities are not considered strategic environmental disclosure.

To ensure consistency across firms, two persons reviewed all individual scores independently. All disagreements were subsequently reviewed by one of the co-researchers.[1]

Press releases: We collected press releases related to environmental information from firms' web sites for year 2002 for 144 firms. Since the information was not available on the web page for 21 firms, we completed the data collection from Lexis/Nexis database. We search press releases using the same keywords used for articles pertaining to environmental legitimacy. Two research assistants found 236 press releases, 153 classified as proactive news and 83 as reactive news (see appendix 1). Proactive news are seen as accommodative (positively oriented) impression management tactics while reactive news are more defensive tactics (negatively oriented). The coders agreed on 77% of proactive news and 89% of reactive news. Internal consistency estimates (Cronbach's alpha) show that the variance between the two coders' scores is quite systematic (alpha= 0.825 for proactive news and 0.834 for reactive news). A researcher reconciled all coding disagreements between the two coders. Smaller disagreements were resolved by the two coders themselves.

Environmental news exposure: The importance of news exposure in determining environmental disclosure indicates that firms' need to achieve social legitimacy with their environmental management, i.e., their ultimate intent is strategic.

1 A coding manual documenting coding instructions as well as standardized coding worksheets were prepared before hand. Each coder then applied the following coding sequence: (1) independent identification of the occurrence of items relative to the different coding categories; (2) independent coding of the items according to quality level of content and (3) timed reconciliation on a subset of company reports. The coders were intensively trained in applying coding instructions and in using the coding worksheets. They were unaware of the research hypotheses. Initial differences in identifying grid items accounted for on average 6% of the maximum number of items identified. Of the information quality level coding, less than 10% had to be discussed for reconciliation. Disagreement between coders mostly happened at the beginning of the coding process (essentially the first 20 firms in each country and the first 5 firms by industry). A researcher reconciled coding disagreements exceeding 5% of the highest total score between the two coders. Smaller disagreements were resolved by the two coders themselves. Overall, we think that this coding process provides a reliable measure of environmental reporting. Internal consistency estimates (Cronbach's alpha on score components) show that the variance is quite systematic (alpha= 0.803). This is higher than Botosan (1997) who finds an alpha of 0.64 for an index including five categories of disclosure in annual reports. Cronbach's alpha estimates the proportion of variance in the test scores that can be attributed to true score variance. It can range from 0 (if no variance is consistent) to 1.00 (if all variance is consistent). According to Nunnaly (1978), a score of 0.70 is acceptable.

The concerns of Government and local communities are difficult to ascertain directly. However, prior work does suggest that environmental news exposure is an appropriate proxy for community concerns (Deegan and Rankin, 1996). A firm's environmental news exposure is computed by taking the average number of articles concerning environmental issues for the period 1998 through 2002, as contained in the ABI Disclosure database. We searched for articles using keywords mentioned above. The reason for this choice is that disclosure this year (2002) may be affected by the amount and types of articles that have been published about a firm in the recent past. A total of 764 relevant stories were identified over the period. We expect that as environmental news exposure increases, the firm will increase its environmental disclosure. Hence, a positive relationship is expected between environmental media coverage and environmental disclosure.

Determinants of environmental legitimacy

Capital Intensity: The magnitude of a firm's capital investment makes it less flexible with respect to regulatory or government actions on social or environmental issues. Moreover, physical plant and equipment makes a firm much more visible to the public and the community at large. In addition to industry membership, a firm's capital intensity is likely to be related to polluting activities. Hence, we expect that the level of capital investment intensity, as measured by the ratio of gross property, plant and equipment divided by total assets, is associated with less environmental legitimacy.

Age of assets: On the other hand, in the absence of other disclosure, the media may rely on a firm's age of assets to assess the firm's environmental performance, with older assets indicating more polluting activities. Since polluting activities are likely to decrease a firm's environmental legitimacy, a negative relationship between Age of assets and legitimacy could be inferred. Age of assets is measured by the ratio of Accumulated depreciation on property, plant and equipment divided by the annual depreciation expense.

Size. Size has been shown to be an antecedent of legitimacy (Baum and Oliver, 1991; Deephouse and Carter, 2005). Firm size will affect the firm's visibility to the general

public and tends to engender increased public scrutiny. Firm size, measured as ln(Assets), is introduced as a control variable, with no directional prediction.

Prior environmental legitimacy. Reputation and legitimacy issues have been argued to be largely sticky (Schultz, Mouristen and Gabrielsen, 2001). Like reputation, legitimacy can be inertial or durable and having the tendency to reproduce itself over time. Hence, the lagged environmental legitimacy variable is introduced to capture the inertia factor. Adding the lagged dependent variable also implies control for omitted firm characteristics, including the fact that specific environmental norms and value expectations may vary from industry to industry.

Alternatively, we could have expressed the dependent variable as a change variable. We chose not to do so because such a procedure constrains the coefficient of the lagged variable to equal one and we preferred to model the inertia factor as theoretically relevant determinant.

Determinants of environmental disclosure

Risk. The higher a firm's volatility or risk, as measured by its beta, the more difficult it is for investors to precisely assess a firm's value and the more likely they are expected to incur information costs to assess its risk drivers (Foster, 1986). In that respect, corporate environmental management is now increasingly recognized as one key risk driver (e.g., International Auditing Standards). Hence, it appears that investors in high Beta firms reduce their information costs if they are provided with additional environmental disclosure (Lang and Lundholm, 1993). A positive relation is expected between Risk and the extent of environmental disclosure.

Capital Intensity*:* Since a firm's capital intensity is likely to be related to polluting activities, we expect that the level of capital investment intensity is associated with more environmental disclosure.

Concentrated Ownership: Firms with closely-held ownership structures are not expected to be responsive to public investors' claims since the dominant shareholders

typically have access to the information they need. Concentrated ownership is measured as a dichotomous variable taking a value of one (1) when an investor, or a related group of investors, owns more than 20% of a firm's outstanding voting shares, and zero (0) otherwise.[2] A negative relationship is expected to exist between concentrated ownership and the extent of environmental disclosure.

Leverage: It is expected that, for firms able to withstand potential proprietary costs from the disclosure of environmental information benefit from more open disclosure (firms in good financial condition) are likely to outweigh the costs from the disclosure of environmental information. By widely disseminating information about their environmental management and showing their ability to shoulder environmental obligations, these firms establish their credibility as a reliable and socially responsible partner. Roberts (1992), and Richardson and Welker (2001) find a positive relationship between leverage and social disclosure while Elijido-Ten (2004) does not find any significant relationship between Leverage and environmental disclosure. Conversely, Cormier and Magnan (2003) document a negative relationship between Leverage and environmental disclosure.[3] We measure leverage by the ratio of long-term financial debt over equity (Long term financial debt/Equity). Since the actual impact of leverage on environmental disclosure is unclear, no directional predictions are made for the variable.

Return on Assets*:* Many studies document a positive association between a firm's level of disclosure and its financial performance (Mills and Gardner, 1984; Cochran and Wood, 1984; McGuire, Sundgren and Schneeweis, 1988; Cormier and Magnan, 1999, 2003). Murray et al. (2006) document that firms with consistently higher returns tend to have higher levels of total and voluntary social and environmental disclosure. In this vein, we expect a positive relationship between profitability, as measured by return on assets, and environmental disclosure.

[2] According to International Accounting Standards (IAS No. 28, 2000), an ownership stake of 20% defines significant influence over a firm's affairs. Results remain unchanged using a cut-off varying between 15% and 30%.

[3] An explanation for the inverse relationship (positive association for social disclosure and negative association for environmental disclosure) could be that social disclosure is more likely to be good news than environmental disclosure.

Media exposure

A number of studies document that higher levels of media exposure relative to environmental issues increase public concerns and thus public policy pressure, to which companies react through greater environmental disclosure (Brown and Deegan, 1998; Deegan et al., 2000; Patten, 2002a, Li et al., 1997; Bewley and Li, 2000).

Industry

Companies in environmentally sensitive industries are generally subject to greater environmental scrutiny than other companies (Cowen et al., 1987; Patten, 1991; Hackston and Milne, 1996) and have been documented to exhibit higher levels of ED

Determinants of environmental news exposure

We introduce four variables that determine a firm's exposure to environmental news and its environmental "riskiness": Firm size; Return on assets; Foreign listings; and Capital intensity.

Firm Size: Prior evidence is consistent in showing a positive relation between the extent of media coverage and firm size (e.g. Deephouse, 2000; Schultz, Mouristen and Gabrielsen, 2001; Carroll and McCombs, 2003). We predict a positive relationship between size and environmental news exposure.

Return on assets: Since that firms with consistently higher returns tend to have higher levels of total and voluntary social and environmental disclosure, we expect that such disclosure will attract environmental news media.

Foreign Listings: The degree to which firms are listed internationally can influence news coverage and public awareness. It may also be an indicator of diversification. Based on Hope's study (2003), a listing on a domestic exchange and on foreign exchanges (except U.S. listings and London) are given a weight of 1 per listing, London stock exchange and US listings are give a weight of 1.5 because of their importance. The score for each firm is summed. We expect a positive association between the variable stock exchange listings and the level of environmental news exposure.

***Capital Intensity**:* Since a firm's capital intensity is likely to be related to polluting activities, we expect that the level of capital investment intensity is associated with more environmental news exposure.

4. RESULTS

4.1. Univariate results

As illustrated in Table 1, the level of environmental disclosure varies from a mean score of 27.56 for Technology, Telecom & Media to 104.77 for Energy. Among the seven industries, the four industries for which firms' activities are more likely to affect the environment exhibit the highest environmental scores: Energy 104.77; Chemicals and drugs 96.77; Industrials 91.06; and Resources 88.14. This result is consistent with Patten (2002b) who finds that those firms operating in environmentally sensitive industries report more environmental information. Finally, we can see that Print Environmental Disclosure is driven by those firms in highly polluting industries.

Table 2 provides some descriptive statistics regarding the sample firms' variables. The 2003 mean legitimacy score is positive at 0.135. The 2002 mean environmental news exposure is approaching one article per firm. As expected there are twice proactive press releases compared to reactive ones. Firm size is quite large since mean total asset is around 27 billion dollars. The free float is quite high with only 8% of diffuse ownership.

Table 3 presents correlations for legitimacy model, disclosure model and news exposure model. Capital intensity (-0.142) and Reactive press releases (0.181) are significantly correlated with legitimacy. Environmental disclosure is correlated with Beta (-0.125), Capital intensity (0.235), environmentally-sensitive industries (0.229), and size (0.128). Finally, environmental news exposure is correlated with size (0.39) and Foreign listing (0.404).

4.2. Multivariate results

4.2.1. Selection bias

The initial sample of 623 firms is composed of observations with no environmental media coverage. Specifically, 165 of the 623 observations have media coverage over the last 5 years. Because legitimacy is only measured for firms covered by the media, there might be a problem of selection bias (Heckman, 1979). To correct this potential bias, Heckman's two-step procedure was used. In the Heckman procedure (Heckman, 1979; Lee, 1983), the residuals of the selection equation in a Probit/Logit analysis (News exposure / No news exposure) are used to construct a selection bias control factor, i.e. the Inverse Mills ratio:

Expected value of News exposure / No news exposure =

$\alpha + \alpha_1$Return on assets + α_2Foreign listing + α_3Firm' size + α_4 Capital intensity + α_5Environmental disclosure

Table 4 shows descriptive statistics of the control variables for the selected sample and the rest of the population with no media coverage over the selected period. We find that all the five control variables exhibit larger mean values for the selection firms and the differences are all statistically significant. The third column of Table 5 gives the results of the first-stage Logit regression (industry dummies not shown).[4] The model is well specified with a pseudo-R-square of 37.0% and a classification rate of 80.1%. All coefficients except Return on assets are statistically significant. This might be an indication of the presence of selection bias.

In the second step of the Heckman procedure, from the expected probability value, we will use the selection bias control factor (Inverse Mills Ratio - Lambda) as an

4 A disadvantage of the procedure PROBIT is that this procedure cannot directly compute predicted values. Lee (1983) has developed a method to estimate the selection model with logit analysis that offers a less laborious alternative for computing LAMBDA. Hence, we compute LAMBDA based on the following procedure: (1) save predicted probabilities in LOGIT regression (IKL); (2) using the inverse cumulative distribution function of the normal distribution, these individual probabilities are translated into the form they would have had when they would have been computed on the basis of a probit model (IPS = probit (IKL); (3) the variable IPS now contains the quasi-probit scores and can be used to compute LAMBDA in the same way as when using a probit selection model: LAMBDA = ((1/sqrt(2*3.141592654))*(exp (-IPS*IPS*0.5)))/cdfnorm (IPS).

additional independent variable that will control the selection bias in corporate communication regressions.

4.2.2. Simultaneous test of legitimacy, environmental disclosure, and environmental news exposure

Since we posit that a firm's communication strategy affects environmental legitimacy, environmental disclosure, and environmental media exposure, we first assess whether or not endogeneity exists between these variables using the Hausman test. Using this procedure, the Hausman test confirms endogeneity between Environmental legitimacy and Environmental disclosure ($t= 1.839$; $p < 0.068$). We also reject the null hypothesis of no endogeneity with respect to environmental disclosure and Media exposure ($t= 1.620$; $p < 0.100$). Therefore, it is important to control for firms' incentives to disclose environmental information as well as the characteristics of firms facing environmental media exposure in assessing the determinants of a firm's environmental legitimacy.

Table 5 provides evidence regarding the simultaneous test of environmental legitimacy, (eq. 1.1), total environmental disclosure (eq. 1.2) and environmental news exposure (eq. 1.3). Concerning the determinants of environmental legitimacy, consistent with hypothesis 1, there is a positive relationship between environmental disclosure and environmental legitimacy (0.004, $p < 0.01$). Consistent with hypothesis 2, the interaction term *"Disclosure X Environmentally sensitive industries"* is negative and significant (-0.003; $p < 0.05$) suggesting that environmental disclosure has a lower impact on legitimacy for those firms operating in more environmentally sensitive industries. Moreover, as expected, Capital intensity, a proxy for polluting activities is negatively related to a firm's legitimacy (-0.417; $p < 0.01$). As expected, a firm's prior legitimacy is related to its current level of legitimacy (0.163; $p < 0.01$). Finally, contrary to our expectations, the coefficient of Size variable is negative (-0.061; $p < 0.05$). As a sensitivity analysis, we added separately to the model the variables Market-to-Book and Return on assets. None of the coefficient are significant while not affecting our results.

Concerning the determinants of environmental disclosure, there is a relationship between Capital intensity (82.879; $p < 0.01$), Environmentally-sensitive industries

(26.304; $p < 0.01$), Leverage (-67.791; $p < 0.05$), and environmental disclosure. Furthermore, we find a positive association between Environmental News Exposure and disclosure (23.606; $p < 0.01$). Self selection bias related to news exposure does not appear to be an issue in this regression model. As for the determinants of environmental news exposure, results show that a firm's potential visibility, as measured by Size (0.376; $p < 0.01$) and Foreign listing (0.431; $p < 0.01$) lead to more environmental news coverage while the opposite is true for Capital intensity (-0.623; $p < 0.05$).

Essentially, environmental disclosure can be split in two categories: economic-based information (essentially regrouped in four components: Expenditure and risk; law and regulation conformity; pollution abatement; and land remediation and contamination) and social-based related information (sustainable development and environmental management). Since disclosure about sustainable development and environmental management is likely to be less factual, we expect this kind of disclosure to have a lower impact on a firm's environmental legitimacy. In our sample, environmental disclosure is mostly composed of economic-based information for North American firms (74% of total disclosure) while more social related information is reported by environmentally-sensitive industries (30% of total disclosure for Chemicals and drugs and Materials). Since disclosure about sustainable development and environmental management is likely to be less factual, we estimate our model separately. Results presented in table 6 suggest that economic-based environmental disclosure affects a firm's legitimacy (0.005; $p < 0.01$) in a larger extent than "social-related" environmental information (0.012; $p < 0.10$). For economic-based environmental disclosure, consistent with hypothesis 2, the interaction term "Disclosure X Environmentally sensitive industries" is significant (-0.003; $p < 0.05$) suggesting that environmental disclosure has a different impact on legitimacy for those firms operating in more environmentally sensitive industries.

Table 7 provides evidence regarding the simultaneous test of environmental legitimacy, (eq. 2.1), environmental press releases (eq. 2.2) and environmental news exposure (eq. 2.3). Inconsistent with hypothesis 3, total press releases is not associated with a firm's legitimacy (0.034; $p < 0.17$ one-tailed). In table 8, we present separate regressions for Proactive and Reactive Press releases. Consistent with

hypothesis 6, our results suggest that only Reactive Press releases increase a firm's legitimacy (0.158; $p < 0.01$) while there is no impact for proactive press releases (-0.021; $p < 0.752$). Moreover, the interaction term *"Reactive Press releases X Environmentally sensitive industries"* is negative and significant (-0.097; $p < 0.10$) suggesting that press releases has a lower impact on legitimacy for those firms operating in more environmentally sensitive industries.

In order to assess whether environmental disclosure and environmental press releases can be surrogates, we include both variables in simultaneous regressions of Legitimacy, Environmental Press releases and Environmental disclosure. We restrict the analysis to economic-based environmental disclosure. Consistent with hypothesis 4, results reported in table 9 suggest that environmental disclosure (0.004; $p < 0.01$) has a larger impact on legitimacy than Proactive press releases while the opposite is true, but to a lesser extent, for Reactive press releases (0.076; $p < 0.10$).

5. CONCLUSION

Previous environmental reporting studies mainly focused on one communication channel (annual report disclosures). However, in most cases, annual report disclosures are only one part of a corporate communication strategy and the use of one channel will probably affect the use and effectiveness of other channels. Moreover, different channels may not be equally efficient or effective in reaching specific communication goals (such as legitimacy enhancement). In this study, we will look at the complementary or substitutional roles of the content of two primary communication media: annual report disclosures and environmentally-related press releases (arbitrage of cost/benefits of different media use).

The results obtained in this paper suggest that environmental legitimacy is positively affected by the quality of environmental disclosure or reactive environmental press releases. It also appears that environmental disclosure can serve as a substitute of proactive press releases while the opposite is true for reactive press releases. Moreover, our results suggest that environmental legitimacy is a driver of reactive environmental press releases, but not of environmental disclosure. Finally,

environmental news exposure is associated with both environmental disclosure and environmental press releases.

Our measure of legitimacy might raise questions about the generalizability of our findings since they largely depend on the extent of comprehensiveness of the media coverage database and the reliability of the measurement of that coverage. Second, in a future research, it would be important to assess temporal trends in communication modes and their influence on firms' environmental legitimacy. An argument can be made that public pressures may evolve over time thereby explaining shifts in the environmental disclosure strategy of firms. This disclosure strategy includes web reporting. Finally, to better capture the impact of stakeholders' influence on environmental disclosure strategy, interviews and questionnaires could serve to contrast managers' perceptions from reality in different settings.

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Table 1
Environmental legitimacy and Environmental disclosure Mean scores by Industry

	Sample	Legitimacy	Expenditures and risks	Laws and regulations conformity	Pollution abatement	Sustainable development	Land remediation and contamination	Environmental management	Total
Consumer goods and services	35	0.000	11.54	4.88	13.97	5.77	4.45	10.65	61.28
Energy	22	0.074	24.72	13.04	20.09	5.00	26.68	15.22	104.77
Chemicals and drugs	9	0.000	12.22	10.78	24.44	9.44	20.44	19.44	96.77
Industrials	16	0.437	18.00	9.94	19.31	7.25	25.93	10.62	91.06
Information technology, Telecom & Media	12	0.187	0.25	1.50	8.86	4.06	2.56	10.27	27.56
Materials (resources)	49	0.096	20.62	10.40	16.10	7.14	14.54	19.34	88.14
Utilities	19	0.231	19.20	17.25	25.30	6.90	18.05	9.20	95.90
Total	165	0.133	16.46	9.53	17.35	6.39	14.71	14.11	78.56

Table 2
Descriptive statistics
Financial, legitimacy, and Environmental news exposure Variables

	Min.	Max.	Mean	Std Dev.
Legitimacy	-1	1	0.13	0.46
Environmental news exposure	0.20	7.33	0.71	1.09
Capital intensity	0	0.93	0.45	0.24
Press releases – Proactive	0	18.00	0.93	2.20
Press releases – Reactive	0	18.00	0.50	1.76
Total Assets (million $)	349	500 000	27 000	54 000
Beta	-0.46	3.19	0.77	0.62
Leverage (Debt/Assets)	0	0.68	0.24	0.13
Concentrated ownership	0	0.77	0.08	0.07
Profitability (ROA)	-0.56	0.20	0.03	0.08
Firm age (accumulated depreciation/Gross fixed assets)	0	1.00	0.44	0.15
Foreign listing	0	4	0.86	1,27

Table 3A
Correlations
Legitimacy model

		2	3	4	5	6	7	8	9	10	11
1	Legitimacy	*-0.142	*0.212	0.028	0.067	0.033	0.052	-0.020	0.012	0.077	*0.181
2	Capital intensity	1	*-0.231	*-0.164	*-0.268	*0.235	*0.246	*0.148	*0.315*	-0.035	-0.037
3	Lag Legitimacy		1	0.073	-0.036	-0.091	-0.078	-0.097	*-0.145	0.026	0.009
4	Size			1	*-0.142	*0.128	*0.166	0.007	*-0.284	0.359	0.214
5	Age of assets				1	0.016	-0.009	0.070	*0.214	-0.015	-0.072
6	Total disclosure					1	*0.967	*0.810	*0.229	0.040	0.070
7	Economic-based disclosure						1	*0.633	*0.237	0.068	0.068
8	Social-based disclosure							1	*0.152	-0.033	0.056
9	Sensitive industry								1	-0.089	-0.079
10	Press release – Proactive									1	0.643
11	Press releases – Reactive										1

Table 3B
Correlations
Disclosure model

		1	2	3	4	5	6	7	8
1	Total disclosure	1	*0.967	*0.811	*-0.125	*0.235	-0.091	*0.229	*0.128
2	Economic-based disclosure		1	*0.633	*-0.137	*0.246	-0.078	*0.237	*0.166
3	Social-based disclosure			1	-0.064	*0.148	-0.097	*0.152	0.007
4	Beta				1	*-0.347	0.091	*-0.176	0.069
5	Capital intensity					1	*-0.231	*0.314	*-0.164
6	Lag legitimacy						1	*-0.145	0.070
7	Sensitive industry							1	*-0.284
8	Size								1

Table 3C
Correlations
News exposure model

		1	2	3	4	5
1	News exposure	1	-0.078	*0.390	-0.087	*0.404
2	Return on assets		1	*0.111	-0.079	-0.052
3	Size			1	*-0.164	*0.263
4	Capital intensity				1	-0.089
5	Foreign listing					1

Table 4
Test of self-selection bias
Control variable mean values

	Total Population	Selection	Mean difference p value
Return on assets	0.009	0.029	0.088
Foreign listing	0.697	0.857	0.013
Firm size (lnAssets)	22.031	23.275	0.000
Capital intensity	0.341	0.453	0.000
N	458	165	

Table 5
LOGIT and 3SLS Regressions on the Determinants of Environmental Legitimacy, Environmental news exposure and Environmental Disclosure

		LOGIT	3SLS		
	Predicted sign	Environmental news exposure 1/0	Legitimacy	Disclosure	Environmental news exposure
Legitimacy					
Capital intensity	-		***-0.417		
Age of assets	-		0.067		
Disclosure	+		***0.004		
Disclosure* Environmentally sensitive industries	-		**-0.003		
Environmentally sensitive industries	+/-		0.141		
Lag Legitimacy	+		***0.163		
Size	+		**-0.061		
Disclosure					
Beta	+/-			-12.792	
Capital intensity	+			***82.879	
Lag Legitimacy	-			-8.811	
Lag legitimacy* Environmentally sensitive industries	+			20.341	
Environmentally sensitive industries	+/-			***26.304	
Leverage	-			**-67.791	
Concentrated ownership	-			24.196	
Return on assets	+			-66.117	
Environmental news exposure	+			***23.606	
Inverse Mills Ratio	+/-			-60.985	
Environmental news exposure					
Return on assets	+	0.775			-0.744
Foreign listing	+	**0.194			***0.431
Firm's size	+	***0.881			***0.376
Capital intensity	+/-	*0.487			**-0.623
Nagelkerke R-square		37.0%			
Chi-square = 182.24 (0.000)					
Overall classification rate = 80.1%					
R-Square			12.8%	26.2%	35.2%
Chi-square p value			0.000	0.000	0.000
N		623	165	165	165

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if there is a predicted sign, two-tailed otherwise.
Coefficients for industry-specific and country dummies not reported

Table 6
3SLS Regressions on the Determinants of Environmental Legitimacy, Environmental news exposure and Environmental Disclosure

		Economic-Based (Expenditures / Remediation / Pollution Abatement and Norms)			Sustainable development and environmental management		
	Predicted sign	Legitimacy	Disclosure	Environmental news exposure	Legitimacy	Disclosure	Environmental news exposure
Legitimacy							
Capital intensity	-	***-0.420			**-0.314		
Age of assets	-	0.094			0.064		
Disclosure	+	***0.005			*0.012		
Disclosure* Environmentally sensitive industries	-	**-0.003			-0.010		
Environmentally sensitive industries	+/-	0.094			0.164		
Lag Legitimacy	+	***0.156			***0.160		
Size	+	**-0.061			-0.038		
Disclosure							
Beta	+		**-11.981			-1.265	
Capital intensity	+		***65.712			**17.283	
Lag Legitimacy	-		-5.507			-3.098	
Lag legitimacy* Environmentally sensitive industries	+		*16.234			3.886	
Environmentally sensitive industries	+/-		***21.946			4.352	
Leverage	-		*-37.738			**-25.538	
Concentrated ownership	-		18.759			5.714	
Return on assets	+		56.170			-10.136	
Environmental news exposure	+		***17.289			***6.556	
Inverse Mills ratio	+/-		-56.937			-4.641	
Environmental news exposure							
Return on assets	+			-0.737			-0.710
Foreign listing	+			***0.431			***0.432
Firm's size	+			***0.378			***0.378
Capital intensity	+/-			*-0.637			*-0.603
R-Square		18.8%	31.6%	35.2%	10.2%	9.3%	35.2%
F-statistic p value		0.000	0.000	0.000	0.000	0.090	0.000
N		165	165	165	165	165	165

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if there is a predicted sign, two-tailed otherwise.
Coefficients for industry-specific and country dummies not reported

Table 7
3SLS Regressions on the Determinants
of Environmental Legitimacy, Environmental news exposure
and Environmental press releases

	Predicted sign	Legitimacy	Environmental Press releases	Environmental news exposure
Legitimacy				
Capital intensity	-	**-0.287		
Age of assets	-	0.180		
Press releases	+	0.034		
Press releases* Environmentally sensitive industries	-	-0.025		
Environmentally sensitive industries	+/-	0.045		
Lag Legitimacy	+	***0.142		
Size	+	-0.044		
Press releases				
Beta	+		-0.587	
Capital intensity	+		-0.796	
Lag Legitimacy	-		-0.364	
Lag legitimacy* Environmentally sensitive industries	+		0.598	
Environmentally sensitive industries	+/-		*-0.853	
Leverage	-		1.857	
Concentrated ownership	-		*-1.277	
Return on assets	+		0.066	
Environmental news exposure	+		***0.953	
Inverse Mills Ratio	+/-		-3.805	
Environmental news exposure				
Return on assets	+			-0.732
Foreign listing	+			***0.428
Firm's size	+			***0.380
Capital intensity	+/-			*-0.622
R-Square		25.5%	20.1%	35.2%
F-statistic p value		0.000	0.005	0.000
N		165	165	165

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if there is a predicted sign, two-tailed otherwise.
Coefficients for industry-specific and country dummies not reported

Table 8
3SLS Regressions on the Determinants
of Environmental Legitimacy, Environmental news exposure
and Environmental press releases

		Pro-active Press releases			Reactive Press releases		
	Predicted sign	Legitimacy	Environmental press releases	Environmental news exposure	Legitimacy	Environmental press releases	Environmental news exposure
Legitimacy							
Capital intensity	-	**-0.275			**-0.290		
Age of assets	-	0.187			0.163		
Press releases	+	-0.021			***0.158		
Press releases* Environmentally sensitive industries	-	0.009			*-0.097		
Environmentally sensitive industries	+/-	0.001			0.068		
Lag Legitimacy	+	***0.140			***0.154		
Size	+	-0.013			**-0.060		
Press releases							
Beta	+		-0.325			-0.237	
Capital intensity	+		-0.390			-0.329	
Lag Legitimacy	-		0.218			**-0.488	
Lag legitimacy* Environmentally sensitive industries	+		-0.326			**0.758	
Environmentally sensitive industries	+/-		*-0.535			-0.320	
Leverage	-		-0.212			*1.705	
Concentrated ownership	-		**-0.862			-0.393	
Return on Assets	+		1.699			-1.294	
Environmental news exposure	+		***0.623			**0.362	
Inverse Mills Ratio	+/-		**-3.011			-0.679	
Environmental news exposure							
Return on assets	+			-0.671			-0.732
Foreign listing	+			***0.422			***0.418
Firm's size	+			***0.391			***0.375
Capital intensity	+/-			*-0.637			*-0.607
R-Square		26.4%	17.9%	35.1%	14.3%	19.5%	35.1%
F-stat. p value		0.000	0.003	0.000	0.000	0.053	0.000
N		165	165	165	165	165	165

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if there is a predicted sign, two-tailed otherwise.
Coefficients for industry-specific and country dummies not reported

Table 9
3SLS Regressions on the Determinants of Environmental Legitimacy, Environmental press releases, and Economic-Based environmental disclosure

		Pro-active Press releases			Reactive Press releases		
	Predicted sign	Legitimacy	Environmental press releases	Environmental disclosure	Legitimacy	Environmental press releases	Environmental disclosure
Legitimacy							
Capital intensity	-	***-0.481			**-0.360		
Age of assets	-	0.097			0.108		
Disclosure	+	***0.004			0.001		
Press releases	+	-0.064			*0.076		
Environmentally sensitive industries	+/-	-0.103			-0.018		
Lag Legitimacy	+	***0.148			***0.146		
Size	+	-0.045			**-0.063		
Press releases							
Beta	+		-0.323			-0.245	
Capital intensity	+		-0.286			-0.109	
Lag Legitimacy	-		0.563			*-0.472	
Lag legitimacy* Environmentally sensitive industries	+		*-0.891			***0.739	
Environmentally sensitive industries	+/-		-0.506			-0.337	
Leverage	-		*-1.347			**1.692	
Concentrated ownership	-		*-0.725			-0.383	
Return on Assets	+		2.008			-0.904	
Environmental news exposure	+		***0.582			***0.631	
Inverse Mills Ratio	+/-		**-3.299			0.171	
Environmental Disclosure							
Beta	+			**-12.833			**-12.456
Capital intensity	+			**57.336			***60.785
Lag Legitimacy	-			-9.900			-3.555
Lag legitimacy* Environmentally sensitive industries	+			**22.441			12.530
Environmentally sensitive industries	+/-			***21.290			***22.040
Leverage	-			-20.708			**-42.611
Concentrated ownership	-			14.254			18.361
Return on Assets	+			-62.375			-57.513
Lag Environmental news exposure	+			***13.726			***12.955
Inverse Mills Ratio	+/-			**-74.239			***-76.797
R-Square		6.2%	16.9%	31.3%	24.9%	19.2%	32.2%
F-stat. p value		0.000	0.000	0.000	0.000	0.015	0.000
N		165	165	165	165	165	165

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$. One-tailed if there is a predicted sign, two-tailed otherwise.
Coefficients for industry-specific and country dummies not reported

Appendix 2

Environmental disclosure grid

Expenditures and risks	**Sustainable development**
Investments	Natural resource conservation
Operation costs	Recycling
Future investments	Life cycle information
Future operating costs	**Land remediation and contamination**
Financing for investments	Sites
Environmental debts	Efforts of remediation
Risks provisions	Potential liability- remediation
Risks litigations	Implicit liability
Provision for future expenditures	Spills (number, nature, efforts of reduction)
Laws and regulations conformity	**Environmental management**
Litigations, actual and potential	Environmental policies or company concern for the environment
Fines	Environmental management system
Orders to conform	Environmental auditing
Corrective actions	Goals and targets
Incidents	Awards
Future legislation and regulations	Department, group, service affected to the environment
Pollution abatement	ISO 14000
Emission of pollutants	Involvement of the firm to the development of environmental standards
Discharges	Involvement to environmental organizations (industry committees, etc)
Waste management	Joint projects with other firms on environmental management
Installation and process controls	
Compliance status of facilities	
Noise and odours	

Rating scale:

3: Item described in monetary or quantitative terms; 2: Item described specifically; 1: Item discussed in general

Appendix 1

Press releases

Proactive Press release

Imperial Oil, Sarnia, **ON**, August 15, 2002
Cogeneration facility to improve energy efficiency and reduce emissions
Imperial Oil today confirmed plans to construct a 90-megawatt cogeneration facility at its Sarnia refining and petrochemical complex. The new unit, to cost about $120-million, will use natural-gas-fired turbines to simultaneously produce electricity and steam, using approximately 50 percent less energy than conventional methods.

"Imperial is a strong proponent of the responsible use of energy and continues to look for cost-effective ways to improve energy efficiency in all of its operations," says Tim Hearn, chairman, president and CEO of Imperial Oil. "Our Sarnia site has a strong focus on energy management and has improved energy efficiency by more than 10 percent since 1994."

Reactive press release
Boliden claims damages from the Spanish construction company Dragados
2002-09-26
Boliden's Spanish subsidiary Boliden Apirsa has filed a notice of litigation against Dragados y Construcciones S.A., a member of the construction company Dragados S.A., listed in Spain, in connection with the failure of the tailings dam at the Los Frailes mine, Spain, in 1998. Boliden's claim against Dragados amounts to a minimum of 1 billion SEK (107 million Euro). The formal claim will be presented to a Spanish court in October.
Boliden Apirsa demands that the Spanish construction company Dragados compensate Boliden Apirsa and its insurance companies for costs in connection with the clean-up operations and the economic compensation to those affected by the accident.
As previously announced, Boliden Apirsa has been acquitted of all responsibility as a result of a criminal investigation and also by an international commission of inquiry, both stated that the failure was caused by defects in the design and construction of the dam.
Boliden's legal representatives have studied the claim raised against Boliden by the Spanish Ministry of the Environment. Their investigation confirms Boliden Apirsa's strong and firm legal position to reject the claim. Further, there is no risk of the corporate veil being pierced.
The question of responsibility has already been investigated and what is now going on in Spain is driven politically and Boliden has been wrongly accused. Our assessment that Boliden will suffer no further losses remains unchanged. We will now initiate a proceeding to obtain compensation for costs incurred, said Boliden's CEO Jan Johansson.
As previously announced, Boliden's mining activities in Spain were terminated at the end of last year after the agreement with the Andalusian regional government and the worker's union concerning the restoration of the area and redundancy payments for the workers. The agreement also states that Boliden owns the right to certain mining equipment that is now in use at the Aitik mine.

Environmental News exposure
Good news (Toronto Star, June 3rd, 2002)
Shell Canada
The process has cut the company's global greenhouse gas emissions by the equivalent of 60 million tonnes of CO2 a year, [Richard Hill] says, including 10 million tonnes from its plant at Maitland, near Brockville, Ont. (CO2 is the global currency used to measure greenhouse gas reductions.)
Meanwhile, oil and gas producer Shell Canada has met its goal of reducing its greenhouse gas emissions to 1990 levels by the year 2000 and gone on to set new ones, said Shell spokesperson [Janet Rowley]. The company plans to reduce emissions from its conventional oil and gas business a further 6 per cent by 2008, she said, citing a target that coincidentally mirrors Kyoto's.
In a pilot project in London, Ont., the company that distributes beer to retail stores, hotels and restaurants in Ontario, says it cut $17,000 a year from its annual fuel bill by changing the behaviour of 19 truck drivers. In the process, The Beer Store says it cut greenhouse gas emissions by 114 tonnes a year. (The Beer Store, in this case, refers not to an individual retail outlet but to the corporate entity responsible for the distribution of beer in Ontario. Three major brewers Labatt, Molson and Sleeman are its joint owners.)

Bad news (Knight Rider Tribune Business Week, February 24th, 2003)
Sunoco
Joanne Rossi has a runny nose. And so, try as she might, she can't smell the whiff of petroleum in the air in South Philadelphia. She is carrying a contraption that will do the smelling for her: a white, five-gallon bucket fitted with plastic tubing, valves, and a small electric vacuum.
Rossi is a member of the Bucket Brigade. Whenever she or one of her fellow brigade members smells -- or gets wind of -- a foul odor, they head outside with their air- sampling buckets, aiming to catch industrial polluters in the act. "The community... needs to take matters into their own hands," said Rossi, 44, who works as a bank teller when not sampling the air. "If we weren't here to do that, the conditions would only get worse." Modeled after groups in California and elsewhere, this is a loosely organized brigade of a dozen retirees, homemakers and professionals who live near the vast Sonoco refinery, which can process 330,000 barrels of oil a day. Five are "samplers," meaning they keep a bucket ready to go in their homes. All are "sniffers," meaning they are constantly on the alert for something noxious in the air. "Sometimes it smells like rotten ham," Rossi said, braving an icy wind near the corner of 26th Street and Penrose Avenue. She and Al Caporali, 65, struggled with their bucket, assembled from $130 in parts, mostly from hardware stores. "This seems loose," Caporali said, fiddling with a valve used to seal off the airtight plastic bag inside the bucket. Standing near a bunch of Sonoco oil tanks, the samplers seemed almost like insects hovering around a giant beast. Yet they are taken seriously. With the help of Clean Water Fund, a local environmental group, the brigade won two $10,000 grants to pursue its work -- one from the city, one from the U.S. Environmental Protection Agency.

To date the brigade members have collected five samples and shipped them off to a lab in California, and some of the results seem to be cause for concern. According to the lab's analysis, the group detected high levels of methyl tertiary butyl ether (MTBE), a controversial gasoline additive that is a suspected carcinogen. The EPA recommends MTBE levels no higher than 1.6 micrograms per cubic meter, over a lifetime of exposure. The brigade got results of 5.6, 8.7 and 15 micrograms per cubic meter on three occasions since June. The brigade suspects that Sonoco is the source. Company spokesman Gerald Davis said automobile and truck exhaust is likely at fault, but stressed that the company welcomes the brigade's efforts and also holds monthly meetings with a community advisory panel. Whatever the source, Rossi said the MTBE and other chemicals are a bad sign. "This is what's in the air that we are breathing, regardless of where it's coming from," said Rossi, who describes her bedroom as a filing cabinet crammed with 12 years of environmental documents. Elsewhere, brigades have gotten results that sparked official reaction.

An Allegheny County, Pa., brigade last year detected acrylonitrile in the air, a chemical that no company in the area was permitted to emit. The finding prompted the county health department to do its own testing for the chemical; to date it has not found it. Brigade members say their work is needed because the government does not do a good enough job. When she or a neighbor smelled an odor, Rossi used to call the city's Air Management Services, which would send an inspector sometimes, and possibly issue a violation if a culprit could be determined. But the agency's inspectors do not carry testing equipment; the city relies on two stationary sites that measure the air for daily average amounts of a variety of toxins. MTBE is not one of them. Agency director Morris Fine said stationary measuring sites are an effective safeguard for human health; they track long-term exposure, which is what EPA standards are based on. Moreover, Fine said, testing in the area of a particular odor isn't necessarily a valid technique. "You smell things all the time that aren't toxic," Fine said. Likewise, "it may be something that is not detectable by the nose that is toxic." Fine said he welcomed the group's efforts. The $10,000 grant from the agency will help the group expand testing citywide. "It gives the citizens a way of participating," he said. "They are filling a gap." Christine Knapp, a Clean Water Fund employee who coordinates the brigade, said the group's goal is to spur the city to conduct more testing and to consider the cumulative effect of permitting industries to operate in Southwest Philadelphia.

Over the long term, the group hopes to goad the state legislature into enacting air quality standards in Pennsylvania. (It currently has none.) The key, said Rossi, is vigilance. She said she is still irritated by a 1997 Johns Hopkins study of Southwest Philadelphia that found no link between pollution and the area's elevated incidence of disease. Researchers did not rule out pollution as a cause, but said the high number of poor, aging and minority residents was a more likely factor. Rossi and her fellow brigade members, each of whom knows a neighbor with cancer or asthma, are unconvinced. "Nobody knows

what we're breathing and how much," she said. "The government perceives everything to be fine. Only when the people see a problem will the government step up and take a look."

Neutral news (National Post, April 2003)
Barrick Gold
Barrick Gold Corp. has won a court challenge that prevents the United States government from including the Canadian gold miner in a list of the nation's worst polluters. In 1999, the U.S. Environmental Protection Agency published a document claiming Barrick's Goldstrike mine in Nevada produced 398 million pounds of toxic material in 1998. Barrick argued the EPA's report unfairly included non-treated waste rock in calculations. Waste rocks are those moved out of the way in order to access gold deposits. Barrick sued the EPA, claiming U.S. legislation says only rocks that have been processed or treated with chemicals can be classified as toxic waste.