



## **Muddying or Clarifying the Waters?**

### **The Impact of Environmental Disclosure on Financial Markets and Society**

Denis Cormier\*  
ESG UQAM  
Canada

Michel Magnan  
John Molson School of Business  
Concordia University  
Canada

May 2012

We acknowledge financial support from l'Autorité des marchés financiers (Québec), Social Sciences Humanities Research Council of Canada (SSHRC), PricewaterhouseCoopers and the Lawrence Bloomberg Chair (Concordia). All usual caveats apply.

\*Corresponding address:  
P.O. Box 8888, downtown station  
Montréal, Québec, Canada H3C 2P8  
[Cormier.denis@uqam.ca](mailto:Cormier.denis@uqam.ca)  
Tel: 514 987 3000 (ext. 8358)

## **Muddying or Clarifying the Waters?**

### **The Impact of Environmental Disclosure on Financial Markets and Society**

#### **Abstract**

Relying on a conceptual framework that integrates information economics and legitimacy theory, we explore the impact of environmental disclosure as a legitimation tool and on analysts' forecast properties. Our empirical approach uses a direct measure of environmental legitimacy. Results show that a firm's environmental disclosure enhances the information available to financial markets to forecast its future growth. Moreover, financial markets' participants seem to be able to decipher environmental information, discounting discourses which are inconsistent with a firm's environmental performance. Moreover, we observe that a firm's environmental disclosure serves another purpose as it influences how its other stakeholders (beyond financial ones) perceive its legitimacy and its place within society. Our results also suggest that prior work's dichotomization of environmental disclosure as being "hard" or "soft" may misrepresent their actual informational properties.

Key words: Environmental disclosure, environmental legitimacy, environmental performance, forecasts' properties.

#### **Résumé**

Dans cet article, nous utilisons une mesure directe de la légitimité environnementale pour explorer l'impact de la divulgation environnementale en tant qu'outil de légitimation et de son impact sur les propriétés des prévisions de résultats des analystes financiers. S'appuyant sur un cadre conceptuel qui intègre l'économie de l'information et la théorie de la légitimité, les résultats montrent que la divulgation environnementale d'une entreprise améliore l'information disponible sur les marchés financiers pour prédire les résultats futurs. En outre, les participants aux marchés financiers semblent être en mesure de déchiffrer l'information environnementale qui est incompatible avec la performance environnementale de la firme. De plus, nos résultats pourraient signifier que la divulgation environnementale sert un autre but, car elle influence la façon dont les autres parties prenantes que les marchés financiers perçoivent la légitimité et la place de la firme dans la société. Enfin, nos résultats laissent à penser que la dichotomie du discours économique versus non économique peut dénaturer leurs propriétés réelles en matière d'information.

Mots clés : Légitimité environnementale, performance environnementale, reporting environnemental, propriétés des prévisions d'analystes.

## **Introduction**

This paper relies on the view that a firm's management determines its environmental disclosure strategy with both financial markets and non-financial stakeholders in mind. Hence, management's ultimate goal is to convey information that will reduce information asymmetry in financial markets while raising the firm's legitimacy within the community, with legitimacy further enhancing the value of environmental information to financial markets. In that context, we argue that a firm's environmental performance validates or undermines its legitimization efforts and, ultimately, the value of environmental disclosure to financial markets. Therefore, we put forward a conceptual model, and associated econometric tests, in which environmental disclosure, legitimacy and financial markets participants' actions are determined in a simultaneous manner while taking into account a firm's environmental performance.

The paper aims to contribute to the on-going debate surrounding corporate environmental reporting (CER) and its adequacy as a representation of a firm's environmental performance. In that regard, two contrasting views are typically put forward. On one hand, CER may represent an opportunistic manoeuvre by executives seeking legitimacy for the firm's environmental management through impression management. On the other hand, CER may offer a mean for executives to convey relevant and reliable information about a firm's underlying environmental activities and performance to the firm's stakeholders, especially financial ones such as analysts or investors. Underlying the debate are such issues as the informational properties of environmental disclosure, the needs and uses of environmental disclosure by the firm's

various stakeholders and the actual reliability of environmental disclosure as a proxy for a firm's environmental performance.

These two opposing perspectives on CER rest on comprehensive conceptual and empirical foundations. For instance, using a methodological design that considers a firm's reporting, environmental and financial strategies as being integrated and determined in a simultaneous manner, Al-Tuwaijria et al. (2004) find that "good" environmental performance is significantly associated with "good" economic performance. Moreover, they also observe that "good" environmental performance translates into more elaborate quantitative CER of specific pollution measures and occurrences. Furthermore, in an analysis of the determinants of CER, Clarkson et al. (2008) conclude that CER is mostly driven by economic considerations with firms seeking to provide information that provides a reliable and useful perspective on their underlying environmental performance, the ultimate goal being the reduction of information asymmetry. Their evidence shows that firms having superior (poor) environmental performance provide more (less) extensive CER. They conclude also that there is scant evidence of firms attempting to manage impressions about their environmental performance to enhance their legitimacy. Focusing on climate change disclosure, Dawkins and Fraas (2011) also find a positive relation between firms' actual environmental performance and their climate change disclosure.

In contrast, Cho and Patten (2007) and Cho, Roberts and Patten (2010) argue, and provide evidence that is consistent with, that firms use disclosure as a legitimizing tool, with poorly performing firms exhibiting more extensive CER patterns. Villiers and Van

Staden (2006) also observes that legitimization objectives can be achieved by modifying the type of disclosure, i.e., between general and specific, or by reducing the volume of environmental disclosures. Consistent with a legitimization objective and focusing on climate change disclosure, Reid and Toffel (2009) show that private (shareholder activists) and public (regulators and law-makers) political pressures increase a firm's propensity to disclose practices consistent with the aims of the related social movement.

These divergent findings are confounding, especially considering that firms' environmental performance and management are increasingly under the scrutiny of investors, communities, regulators, clients and other stakeholders (e.g., Cormier et al. 2004; Dawkins and Fraas, 2011). The emergence of global societal concerns about climate change and carbon emissions by firms further raises the attention directed to CER, which is one mean by which stakeholders can monitor a firm's environmental activities (e.g., Busch 2011).

In our view, the reconciliation of these findings rests on an integration of both economic and legitimacy perspectives. There is evidence that a firm's success in legitimizing its activities does translate into a positive stock market valuation effect (e.g., Doh et al., 2010), thus suggesting that there is potentially an interface between a firm's legitimacy and financial markets. In fact, it appears that actions and initiatives that are consistent with CSR and raise a firm's visibility and legitimacy within the community positively affect its stock market valuation as well as its long term performance. Moreover, a firm's legitimacy enhances the positive relation between its environmental/social performance and its financial performance and stock market value

(e.g., Margolis and Walsh, 2003; Fowler and Hope, 2007). However, our understanding of the mechanisms by which corporate environmental performance and legitimacy map into a firm's stock market valuation is still limited. Prior research such as Clarkson et al. (2008) only considers the determinants underlying environmental disclosure, not their effects on intended audiences such as analysts and other stakeholders. Al- Tuwajjria et al. (2004) do take a comprehensive approach to explain a firm's environmental disclosure, considering both its underlying environmental performance as well as economic implications, but they leave aside alternative explanations or frameworks.

However, we consider that firms' executives may seek to attain dual economic and legitimacy objectives when determining their environmental disclosure strategy as they seek to reach two different audiences, financial markets' participants as well as non-financial stakeholders such as communities, governments, regulators, suppliers or customers. On one hand, a firm needs to convey useful and relevant information, financial, social and/or environmental, to financial markets to reduce information asymmetry and enhance the firm value (e.g., Bushman et al., 2004). On the other hand, to maintain and expand its operations, a firm needs to legitimize its environmental management and actions to other non-financial stakeholders (Orlitzky et al., 2003). Both decisions are most likely determined simultaneously by a firm's executives. Moreover, enhancing a firm's legitimacy may bring economic benefits in terms of social and political reputation (Pfarrer et al., 2010).

Hence, our investigation of CER relies on a conceptual framework that integrates information economics and legitimacy theory. We argue that environmental disclosure is

both a legitimization tool as well as mean to for firms to improve the informational environment on financial markets. Moreover, both objectives interact with one another. We use a direct measure of legitimacy to capture the impact of a firm's legitimization activities through its environmental disclosure. We rely on analysts' forecasts to reflect the impact of environmental disclosure on financial markets. Our analyses rest on a simultaneous equation approach that reflects the links between environmental disclosure, legitimacy and financial analysts' forecasts. Focusing on a sample of Canadian and U.S. firms, our results show that a firm's environmental disclosure enhances the information available to financial markets to forecast its future growth. Moreover, financial markets' participants seem to be able to decipher environmental information, discounting discourses that are inconsistent with a firm's environmental performance. However, we also observe that a firm's environmental disclosure serves another purpose as it influences how its other stakeholders (beyond financial ones) perceive its legitimacy and its place within society. Our results also suggest that prior work's dichotomization of environmental disclosure as being "hard" or "soft" may misrepresent their actual informational properties.

Overall, our study contributes to the environmental accounting literature by pulling together and reconciling various research strands, i.e., environmental disclosure determination, relation between environmental disclosure and environmental performance, impact of environmental disclosure, users and potential uses of environmental disclosure.

First, our results show that a firm's environmental disclosure affects analysts' earnings forecasts directly and, indirectly, through legitimacy. Therefore, in contrast to arguments and findings reported in prior research who put forward unidirectional perspectives (e.g., Clarkson et al., 2008; Cho and Patten, 2007), it appears that both economic and legitimization considerations underlie environmental disclosure. Such findings extend prior research on the relation between CSR and financial markets (Pfaffer et al., 2010).

Second, the legitimacy (e.g., Basu and Palazzo, 2008; Aerts and Cormier, 2009; Cho, Guidry and Hageman, 2012) and economic (e.g., Dhaliwal et al., 2011) perspectives on disclosure in general, and on environmental disclosure in particular, have evolved more or less in parallel over the years, each putting forward an alternative explanation. Our results suggest that corporate motivations underlying environmental disclosure combine legitimization and economic considerations and that there may be a double loop effect between legitimacy and analysts' forecasts. As such, our research extends some prior work that models corporate environmental actions and disclosure decisions by incorporating both economic and political incentives (e.g., Kim and Lyon, 2011).

Third, we shed additional light on the relation between environmental performance and environmental disclosure. Clarkson et al. (2008) and Al-Tuwaijria et al. (2004) argue and find a positive relation between environmental performance and environmental disclosure, suggestive that firms engage in environmental disclosure with transparency intents. In contrast, Cho and Patten (2007) observe that there is a negative relation between both variables, indicative that a deception game may be taking place.

Our findings provide a more complex picture. More extensive environmental disclosure seems to enhance both the accuracy of analysts' forecasts and the legitimacy of the firm. However, poor environmental performance does moderate such relations by reducing them, i.e., analysts and non-financial stakeholders seem to discount environmental disclosure by firms with poor environmental performance.

In addition, the relation between environmental disclosure and legitimacy is reduced for firms operating in environmentally sensitive industries, i.e., legitimization efforts are discounted for firms in sensitive sectors. However, firms in environmentally sensitive industries do provide more extensive environmental disclosure. Hence, we extend findings by Cho and Patten (2007: 642) who hypothesize that environmental information is more likely to be disclosed by firms in environmentally sensitive industries because such firms 'face greater exposure to the public policy process than companies from non-environmentally sensitive industries.' Nevertheless, our results indicate that firms' disclosure efforts do not pay off in terms of legitimization. Finally, it appears that environmental disclosure increases analysts' consensus and reduces overall uncertainty in forecasts' estimation, thus suggesting that it carries positive information properties.

## **Background and hypotheses**

### ***Environmental disclosure and financial markets***

Prior evidence suggests there is a two-way interface between a firm's environmental disclosure and financial markets. On one hand, firms will determine the extent and content of their environmental disclosure on the basis of considerations

derived or inferred from financial markets. On the other hand, if the information released by firms is deemed relevant, financial markets' participants such as investors or financial analysts will integrate it into their valuation or forecasting work.

With respect to the determination of CER, there is extensive empirical evidence suggesting that market-related attributes or dimensions play a critical role. Berthelot, Cormier and Magnan (2003) review earlier work documenting that a firm's leverage, its reliance on external financing, its ownership structure, its market regulatory oversight and its potential information asymmetry with investors as a result of its volatile performance all drive the extent its environmental disclosure. Clarkson et al, (2008) extend such findings and conclude that economic considerations, driven by a firm's market dynamics, underlie its environmental disclosure. Thus, there is evidence that firms' executives perform an extensive analysis of the costs and benefits to be derived from further environmental disclosure, relying on market inputs in the process.

However, while it seems firms' executives do pay attention to the perceived environmental information needs of financial markets, do the latter deem CER to be relevant or useful? With respect to environmental disclosure, many information items have a direct impact on a firm's future earnings and, ultimately, its value: environmental capital expenditures, contingent environmental liabilities, fines and penalties, etc. (e.g., Clarkson *et al.*, 2004; Cormier and Magnan, 2008). Focusing on financial analysts, Aerts et al. (2008) show that enhanced environmental disclosure translates into more precise earnings forecasts by analysts. However, such effect is reduced for firms operating in environmentally sensitive industries as well as for firms with poor environmental

performance. Hence, it may be inferred that a firm's actual environmental situation (sector and performance) affects the credibility of its CER.

Overall, prior empirical evidence suggests that there is simultaneity between CER and financial markets, with financial markets participants drawing upon CER to assess firms' value and future performance, while executives react to financial markets in determining their firms' CER.

### *Environmental disclosure and legitimacy*

The concept of environmental legitimacy has been widely used in the design of studies to gain a better understanding of firms' underlying motivation to provide environmental disclosure or to explain the impact of such disclosure (Hogner, 1982; Guthrie and Parker, 1989; Patten, 1991; 1992, 2005; Gray et al., 1995; Deegan and Rankin, 1996; Deegan and Gordon, 1996; Walden and Schwartz, 1997; Brown and Deegan, 1998; Neu et al., 1998; Buhr, 1998; Savage et al., 1999; Wilmshurst and Frost, 2000; Cormier and Gordon, 2001; Deegan et al., 2002; O'Donovan, 2002; O'Dwyer, 2002; Bansal and Clelland, 2004; Chow and Patten, 2007; Aerts and Cormier, 2009).

While environmental legitimacy can be defined, both conceptually and empirically, in many ways, we retain the definition put forward by Bansal and Clelland (2004, p. 94), for whom environmental legitimacy is "the generalized perception or assumption that a firm's corporate environmental performance is desirable, proper, or appropriate". For instance, Bansal and Hunter (2003) show that firms that are early adopters of an ISO 14001 certification enhance their environmental legitimacy with their

various stakeholders. However, it is critical to understand that environmental legitimacy is based on perceptions of a firm's environmental performance, not its actual performance, thus implying that it may or may not correspond to high environmental performance if perceptions are managed.

Aerts and Cormier (2009) explore the impact of annual reports environmental disclosure and environmental press releases as environmental legitimization tools. Their results show that the quality of the economic-based segments of annual reports environmental disclosure and reactive environmental press releases positively affect environmental legitimacy. However, proactive press releases do not seem to have any impact on legitimacy.

While environmental disclosure may allow a firm to manage perceptions regarding its underlying environmental performance and raise its legitimacy, legitimacy may also drive disclosure. For instance, Aerts and Cormier (2009) also show that legitimacy can affect disclosure, with negative media legitimacy being a driver of environmental press releases but not of annual report environmental disclosures.<sup>1</sup> In fact, prior legitimacy-based research in CER (Brown and Deegan, 1998; Bewley and Li, 2000; Deegan et al., 2000; Patten, 2002a) elaborates on the effect of media exposure on environmental disclosure, mainly establishing that higher public media coverage of environmental issues puts public pressure on firms to increase environmental disclosure. Brown and Deegan (1998) show a strong association between the number of industry-

---

<sup>1</sup> Neu et al. (1998) argue that environmental disclosures focus on relevant publics that are dominant and not on the peripheral and 'critical' ones. For managers, media evaluations may be the only persistent and long-term proxy for collective legitimacy impressions on which it can benchmark and model its environmental communication strategy.

wide environmental articles that are negative in tone and the volume of “positive” corporate environmental disclosures. These studies focus mainly on the level of firm-specific media coverage as a proxy for public concerns regarding environmental issues.

Hence; similar to the two-way relation between CER and financial markets, there is ample evidence that CER determination and legitimacy outcomes do intersect in a bilateral way.

### ***Roles of Environmental Disclosure and Environmental Performance***

To understand the roles that environmental disclosure and environmental performance play in the relation between legitimacy and financial markets, it is necessary to consider that legitimacy is earned at both industry- and firm-specific levels. Being active in an environmentally sensitive industry usually implies that a firm is subject to greater environmental scrutiny than other firms (Cowen et al., 1987; Patten, 1991; Hackston and Milne, 1996). The level of legitimacy attained by an industry relies on an appreciation of its operations and business processes as well as on the level of acceptance of their products and services (Hannan and Freeman, 1989; Scott, 1995). For example, the chemical industry’s legitimacy was greatly affected by the Bhopal tragedy, thus potentially lowering how investors value its social and environmental performance. Firms in environmentally sensitive industries also typically exhibit higher levels of environmental disclosure (e.g. Aerts and Cormier, 2009; Cho et al., 2007). Furthermore, Patten (2002) documents a lower relationship between environmental performance and environmental disclosure for more environmentally sensitive industries. This implies that environmental disclosure is more likely to reflect environmental performance in less

environmentally sensitive industries. Overall, these findings are consistent with a legitimacy perspective, i.e., firms with low legitimacy provide more environmental disclosure but their low legitimacy undermine the impact of such disclosure on financial markets.

***Hypothesis 1***

*The relevance of environmental disclosure for analysts' earnings forecasts will be lower for firms operating in more environmentally sensitive industries.*

At the firm-specific level, CER's credibility and, hence, a firm's legitimacy, should be validated through a positive association between environmental performance and environmental disclosure. However, empirical evidence is mixed at best. Ingram and Frasier (1980), Jaggi and Freedman (1982), Wiseman (1982), Rockness (1985), Freedman and Wasley (1990), and Fekrat et al. (1996) do not observe an association between environmental disclosure (in the annual report or in the 10K report) and environmental performance while Patten (2002) finds a negative relationship. Some recent work documents a positive association between environmental performance and discretionary environmental disclosures, thus undermining the potential role of legitimacy in this regard (Al-Tuwaijri et al., 2004; Clarkson et al., 2008). In contrast to most prior research, Al-Tuwaijri et al. (2004) consider that environmental disclosure, environmental performance, and economic performance must be considered jointly as their effects are simultaneous. Comparing legitimacy and economic explanations of environmental disclosure, Clarkson et al. (2008) conclude that the positive relation that

they observe between environmental performance and environmental disclosure is consistent with economic considerations driving disclosure.

***Hypothesis 2***

*The relevance of environmental disclosure for analysts' earnings forecasts will be lower for firms with poor environmental performance relative to their industry.*

***Financial Markets and Legitimacy***

The bilateral links between, on one hand, environmental disclosure and financial markets and, on the other hand, between environmental disclosure and legitimacy raise the following question: is there is a relation between financial markets' actions or decisions regarding a firm and its legitimacy?

Recent evidence suggests that there is an interface between a firm's environmental legitimacy and financial markets. In fact, it appears that actions and initiatives that are consistent with Corporate Social Responsibility (CSR) and raise a firm's visibility and legitimacy within the community positively affect its stock market valuation as well as its long term performance (e.g., Margolis and Walsh, 2003; Bird, Hall et al., 2007, and Orlitzky et al., 2003, who provide a review of such research). Doh et al. (2010) report that "A consensus has emerged from this literature that virtuous firms are often rewarded in the marketplace for being socially responsible."

In addition, there is an extensive body of research linking a firm's environmental performance and its stock market value as well as its financial performance (see Ambec and Lanoie, 2008, for a review), with good(poor) environmental performance translating into higher(lower) financial and stock market performance. A firm's legitimacy enhances

the positive relation between a firm's environmental performance and its stock market value (Siegel, 2009).

However, our understanding of the mechanisms by which corporate environmental performance and legitimacy map into a firm's stock market valuation is still limited. Hence, while there is extensive research on the positive relation between social performance and financial performance (Orlitzky et al., 2003), the process by which social performance indicators are valued by markets is relatively unexplored (Fowler and Hope, 2007). Doh et al. (2010) argue that socially responsible investing (SRI) is one mechanism by which investors and other market participants may express their appreciation of a firm's CSR. They show that expert and institutional endorsements, as reflected by inclusion in CSR or sustainability indices, convey legitimacy to a firm and facilitate investors' appreciation of its stock market value (Doh et al., 2010).

Focusing on environmental legitimacy, Bansal and Clelland (2004) show that there is a link between a firm's environmental legitimacy and its stock market risk. Hence, prior research does suggest that there is a positive relation between a firm's environmental legitimacy and its appreciation by financial markets, with legitimacy based upon a firm's environmental disclosure. However, we argue that a firm's environmental disclosure affects analysts' earnings forecasts directly and, indirectly, through its legitimacy. Therefore, in contrast to arguments and findings reported in prior research who put forward unidirectional perspectives (e.g., Clarkson et al., 2008; Cho and Patten, 2007), it appears that both financial and legitimization considerations underlie environmental disclosure.

We predict that legitimacy has a mediating effect on the impact of environmental disclosure on analysts' earnings forecasts. The effect of environmental disclosure on analyst forecasts' properties should depend on environmental legitimacy. We anticipate a direct effect of environmental disclosure on analysts' forecasts and an indirect effect through environmental legitimacy.

***Hypothesis 3***

*Legitimacy has a mediating effect on the impact of environmental disclosure on financial markets.*

Figure 1 captures the links predicted in the study and to be tested in our empirical analyses.

[Insert Figure 1]

**Method**

***Sample***

The initial sample is comprised of 623 non-financial North American firms (217 from S&P/TSX300 for Canada and 416 from S&P500 for the U.S.). From the sample of 623 firms, 46 have no forecasts dispersion and 54 have no forecasts error. We also remove from the sample firms with forecasts dispersion and forecast error exceeding 1.5. This provides a final sample of 559 firms for forecasts dispersion and 488 firms for forecasts error (see table 1). The sample firms operate in the following industries (S&P classification): Consumer discretionary; consumer staple; energy; real estate; industrials; health care; information technology; telecom & media; materials (resources); utilities.

[Insert table 1]

### ***Empirical models***

We consider the possibility that a corporate communication strategy might simultaneously affect key variables in our research setting (environmental disclosure, legitimacy and analysts' forecast properties). Prior studies on environmental disclosure (Al-Tuwaijri et al., 2004; Aerts et al. 2008) suggest such interdependencies and established the importance of controlling for them. Within our research setting, endogeneity between legitimacy and disclosure on the one hand, and between disclosure and analysts' forecast properties on the other, might critically affect our results. Endogeneity tests (reported in the results section) confirm such interrelations and justify relying on a system of simultaneous equations. The following structural equations summarize the approach adopted in this paper.

$$(1.1) \quad ANFOR_{it+1} = f(DISC, DISC*ENVSENS + DISC*LENVP + ENVSENS + LENV + LEGI + ANFOLL + BETA + NEGEPS + COUNTRY)_{it}$$

$$(1.2) \quad LEGI_{it+1} = f(DISC + DISC*ENVSENS + DISC*LENVP + ENVSENS + LENVP + LEGI + SIZE + POSMED + COUNTRY)_{it}$$

$$(1.3) \quad DISC_{it} = f(MED + SIZE + LEV + ROA + ENVSENS + LENVP + LAGDISC + LEGI + COUNTRY)_{it}$$

Where:

*ANFOR* = Analysts' forecast properties

<i>DISC</i>	= Environmental disclosure
<i>ENVSENS</i>	= Environmentally-sensitive industries
<i>LENVP</i>	= Low environmental performance
<i>LEGI</i>	= Legitimacy
<i>POSMED</i>	= An indicative variable taking the value of 1 if there is at least one article published about a firm from 2006 to 2008, 0 otherwise
<i>ANFOLL</i>	= Number of analysts following a firm
<i>BETA</i>	= Systematic risk, beta
<i>NEGGEPS</i>	= An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise
<i>SIZE</i>	= LnAssets
<i>LEV</i>	= Long term debt /total assets
<i>ROA</i>	= Return on assets
<i>LAGDISC</i>	= Lagged environmental disclosure
<i>COUNTRY</i>	= An indicative variable if the country is Canada

Four different variables are used as proxies for analysts' forecast properties:

Forecasts' dispersion (*FORDISP*); forecasts' errors (*FORERROR*); precision of common information to analysts (consensus) (*CONSENSUS*); and overall uncertainty (*OVUNC*).

### ***Definition and measurement of dependent variables***

#### **Analysts' forecast properties**

In addition to forecasts' dispersion and forecasts' errors (scaled by the absolute value of the mean forecast), we rely on analysts' forecast properties developed by Barron et al. (1998) to assess whether environmental disclosure affects analysts' consensus and overall uncertainty. According to Barron et al. (1998), analysts make forecasts of earnings based on common (h) and private (s) information.

$$h = \frac{SE - D/N}{[(1-1/N)D + SE]^2}$$

$$s = \frac{D}{[(1-1/N) D + SE]^2}$$

Where:

D = dispersion in analysts' forecasts, i.e., the sample variance of the individual forecasts around the mean forecast

SE = Squared error of the mean forecast

N = Number of analysts

These two equations allow for calculate analysts' consensus ( $p$ ).

$$p = h/(h+s)$$

$P$  captures the level of consensus among analysts and measures the ratio precision of common information to the precision of their total information.  $P$  captures the consensus of analysts. Consensus is the degree to which analysts' beliefs covary relative to the overall level of uncertainty. It measures how much the mean belief reflects common versus private information (Barron et al., 1998).

Finally,  $U$  captures the overall uncertainty, which is expressed as:

$$U = (1 - 1/N) D + SE$$

In the current paper, we scaled  $U$  by the mean forecast EPS.

## **Legitimacy**

News media content is extracted from ABI/Inform Global 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 a 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 2009 and 2008 (lag measure in legitimacy). In summer 2010, two research assistants found 299 articles for 2009 (433 for

2008): 214 of good news nature (370 for 2008), 29 of bad news nature (49 for 2008) and 56 as neutral news (62 for 2008). 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. An example of a good news story includes investment in facilities that will reduce energy consumption. This coding serves to compute the legitimacy score. Internal consistency estimates (Cronbach's alpha) computed for 2008 and 2009 show that the variance is quite systematic (alpha= 0.756 for 2008 (0.742 for Canada and 0.757 for the U.S.) and 0.749 for 2009 (0.737 for Canada and 0.753 for the U.S.)). This suggests a high level of intercoder reliability (Weber, 1990). A researcher reconciled all coding disagreements between the two coders.

The legitimacy score is 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 positive articles in a given year yields a value closer to +1.0, and a high presence of negative 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.

## **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 1. Environmental disclosure is collected from corporate Internet sites, i.e. the annual report and the sustainability reports. We eliminate any overlap in disclosure.

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.<sup>2</sup>

### ***Definition and measurement of independent variables***

#### **Determinants of analysts' forecast properties**

In addition to voluntary disclosure, six control variables are added to the model of analysts' forecast properties: Beta (*BETA*); Negative earnings (*NEGEPS*), analyst following (*ANFOLL*), environmentally-sensitive industries (*SENSIND*), environmental performance (*LENVP*), and lag legitimacy (*LAGLEGI*).

Hope (2003) documents a relation between forecasts' properties, analyst following and negative earnings. Patton and Verardo (2010) observe that the increase in betas is greater for earnings announcements with larger positive or negative surprises, and with greater analysts' forecast dispersion. Furthermore, the increase in betas is greater for stocks with higher analyst coverage. We expect that *BETA* and *NEGEPS* should increase forecasts' dispersion, forecasts' error, precision of common information to all analysts (*p*) and overall uncertainty (*U*). We expect analyst following to be

---

<sup>2</sup> A coding manual documenting coding instructions as well as standardized coding worksheets were initially prepared. 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.

associated with less for forecast dispersion, forecast errors and overall uncertainty ( $U$ ), and with more precise common information ( $p$ ).

*Environmentally sensitive industries (SENSIND)*. *SENSIND* is a binary variable taking the value of 1 if a firm belongs to an environmentally sensitive industry. In our sample, we consider the four following industries to be environmentally sensitive: Energy; Utilities; Industrials; and Materials (Resources). We expect *SENSIND* to be related to forecasts' properties, with no predicted sign. We expect coefficient on interaction terms  $DISC*SENSIND$  to be positively associated with forecasts' dispersion, forecasts' errors and overall uncertainty ( $U$ ), and negatively associated with analysts' consensus ( $p$ ).

*Environmental performance (LENVP)*. There is prior empirical evidence that of a firm's polluting activities might be directly discounted in how the media perceive a firm's environmental posture (Aerts and Cormier, 2008). Environmental performance is proxied by the Toxics Release Inventory (TRI), a public database available from Environmental Protection Agency (EPA) for US and the National Polluting Release Inventory (NPRI) from Environmental ministry in Canada. These databases contain information on toxic chemical releases and other waste management activities reported annually by manufacturing facilities. Toxic Release Inventory is the sum of all chemicals released in air, water and land in 2008. The measure is computed by summing all facilities for an individual company in pounds deflated by 1 000\$ of sales. Higher values of the variable imply worse environmental performance. *LENVP* is a binary variable taking the value of 1 if environmental performance scaled by the mean value for the

industry is positive, zero otherwise. We expect *LENVP* to be related to forecasts' properties, with no predicted sign. We expect coefficient on interaction terms *DISC\*LENVP* to be positively associated with forecasts' dispersion, forecasts' errors and overall uncertainty (*U*), and negatively associated with analysts' consensus (*p*).

### **Determinants of legitimacy**

In addition to environmental disclosure, which is expected to be positively associated with legitimacy, the following variables are added to the legitimacy model: Environmentally sensitive industries (*SENSIND*), environmental performance (*LENVP*), lag legitimacy (*LAGLEGI*), firm size (*SIZE*), and country effect (*COUNTRY*). Finally, we control for environmental media exposition. Since our legitimacy variable contains observations with no media exposure for a given year (value of zero), we add the variable Positive media exposure *POSMED* that takes the value of 1 if there is at least one article published about a firm from 2006 to 2008, zero otherwise.

The association between the level of environmental disclosure and legitimacy should be lower for firms operating in more environmentally sensitive industries. Hence, we expect *SENSIND* and *LENVP* to be negatively associated with legitimacy. We also anticipate a negative association between coefficients on interaction terms *DISC\*SENSIND* and *DISC\*LENVP* and legitimacy.

*Legitimacy (LEGI)*. Legitimacy can reproduce itself over time (Schultz et al., 2001; Aerts and Cormier, 2009). Hence, the lagged environmental legitimacy variable is

introduced to capture routine factor. We expect legitimacy in year t to be positively related to legitimacy in year t+1.

*Firm Size (SIZE)*. Firm size affects the firm's media visibility and tends to generate increased public scrutiny (Baum and Oliver, 1991; Deephouse and Carter, 2005). Firm size, measured as  $\ln(\text{Assets})$ , is introduced as a control variable, with no directional prediction.

### **Determinants of environmental disclosure**

*Media exposure (MED)*. 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 (Li *et al.*, 1997; Brown and Deegan, 1998; Deegan *et al.*, 2000; Bewley and Li, 2000; Patten, 2002). A positive relationship is expected between *MEXP* and environmental disclosure.

*Firm size (SIZE)*. Prior evidence is consistent in showing a positive relation between the extent of corporate disclosure and firm size (Scott, 1994; Neu *et al.*, 1998). Firm size also proxies other factors, such as the extent of monitoring by analysts. Firm size, measured as  $\ln(\text{Assets})$ , is introduced with an expectation of a positive relationship with environmental disclosure.

*Leverage (LEV)*. Roberts (1992), Richardson and Welker (2001) and Elijido-Ten (2004) do not find any significant relationship between leverage and social disclosure while Clarkson *et al.* (2008) find a positive relationship between leverage and environmental disclosure based on Global Reporting Initiative Guidelines. Conversely,

Cormier and Magnan (2003) document a negative relationship between leverage and environmental disclosure. Since the actual impact of leverage on environmental disclosure is unclear, no directional predictions are made for the variable.

*Environmentally sensitive industries (SENSIND)*. Cowen et al. (1987), Patten (1991) and Hackston and Milne (1996) have been documented that firms exhibit higher levels of environmental disclosure. *SENSIND* is a binary variable taking the value of 1 if a firm belongs to an environmentally sensitive industry. We expect a positive relationship between *SENSIND* and environmental disclosure.

*Environmental performance (LENVP)*. Many authors examine the association between environmental disclosure and a firm's environmental performance. Results are mixed. Ingram and Frasier (1980), Jaggi and Freedman (1982), Wiseman (1982), Rockness (1985), Freedman and Wasley (1990), and Fekrat et al. (1996) do not find a significant association between environmental disclosure (in the annual report or in the 10K report) and the CEP index of environmental performance while Patten (2002) establishes a negative relationship. Some recent works document a positive association between environmental performance and the extent of discretionary environmental disclosures (Clarkson et al., 2008; Al-Tuwaijri *et al.*, 2004). According to Al-Tuwaijri *et al.* (2004), a positive relationship conjectures that prior literature's mixed results describing their interrelations may be attributable to the fact that researchers have not jointly considered environmental disclosure, environmental performance, and economic performance. Legitimacy theory predicts a negative association between environmental performance and environmental disclosure. This relationship suggests that environmental

disclosure is a function of social and political pressures facing firms (Aerts and Cormier, 2009). Consistent with prior studies on legitimacy theory (e.g. Patten, 2002; Aerts and Cormier, 2009), we expect a positive relationship between *DISC* and *LENVP*.

*Legitimacy (LEGI)*. Brown and Deegan (1998) show a strong association between the industry-wide number of environmental articles that were negative in tone and the amount of “positive” environmental disclosures. In line with strategic legitimacy theory arguments, we expect a negative relationship between *LEGI* and environmental disclosure.

*ROA*. Many studies document a positive association between a firm’s level of disclosure and its financial performance (Mills and Gardner, 1984; McGuire et al., 1988; Cormier and Magnan, 2003). Firms with superior earnings performance have a higher propensity to reveal their “good news”. Hence, 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 and CSR disclosure.

*Lag environmental disclosure (LAGDIS)*. By controlling for lagged disclosure, we are cognizant of the fact that disclosure evolves incrementally over time (Cormier et. al., 2010). No directional predictions are made for this variable.

## Results

### *Descriptive statistics*

Table 2 provides some descriptive statistics about sample firms' environmental and financial variables. Sample firms are relatively large (total assets averaging \$19 billion) and followed by twelve analysts on average. Systematic risk (*BETA*) is close to the stock market risk, averaging 1.19, suggesting that our sample is a good representation of the Stock Exchanges. We observe large differences between U.S. firms and Canadian firms for firm *SIZE*, *ANFOLL* and forecasts' properties. Forecasts' consensus and forecasts' errors are much lower in the U.S. This is why it is important to control for the country effect in our multivariate analyses.

Concerning environmental variables, we observe that the mean legitimacy score (*LEGI*) is positive at 0.134 and much higher for U.S. firms. The same result is observed for low environmental performance (*LENVP*) since 20% of Canadian firms have polluting activities (Toxic Release Inventories) higher than their industry mean while this percentage is 11% for U.S. firms.

As illustrated in Table 2, environmental disclosure score (*DISC*) averages 13.48 for the total sample with U.S. firms showing much higher scores (mean of 17.5 versus 4.47 for Canadian firms). Internal consistency estimates (Cronbach's alpha on score components) show that the variance is quite systematic (alpha varying from 0.69 for Sustainable development and environmental management [*SDEMDISC*] to 0.72 for Economic-based disclosure [*ECDISC*]). For the six components of the disclosure score, alpha reaches 0.83. This is slightly 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 variances are consistent). According to Nunnally (1978), a score of 0.70 is acceptable.

[Insert table 2]

Table 3 presents correlations. *DISC* is negatively correlated with *FORDISP* (-0.07) and *FORERROR* (-0.08), suggesting that voluntary environmental disclosure affect analyst forecast precisions. *DISC* (0.13), *MED* (0.15), *ANFOLL* (-0.10), *LENVP* (-0.10), *SENSIND* (-0.10) are significantly correlated with *LEGI*. These correlations are consistent with expectations. *LENVP* is marginally correlated with economic-based *DISC* (0.08) and *SENSIND* (0.22), indicating that poor environmental performers are inclined to communicate more environmental information. This result is consistent with prior research arguing that environmental disclosure is a function of social and political pressures facing firms (Patten, 2002). Media exposure (*MED*) is positively associated with *DISC* (0.44). Overall, bivariate correlation results are consistent with our expectations regarding the impact of environmental disclosure on legitimacy as well as its impact on analysts' forecast properties.

[Insert table 3]

### ***Multivariate Analyses***

Since we posit that a firm's information dynamics affect environmental disclosure, environmental legitimacy and analysts' forecast properties simultaneously, we first assess whether or not interaction exists between these variables using Hausman tests.

Based on this procedure, we reject the null hypothesis of no endogeneity with respect to *LEGI* and *DISC* ( $t=-2.36$ ;  $p < 0.019$ ), *FORDISP* and *DISC* ( $t=1.98$ ;  $p < 0.049$ ), and *FOREERROR* ( $2.32$ ;  $p < 0.021$ ). Therefore, these variables are treated endogenously. In light of this diagnostic, we rely on a three-stage estimation model for the simultaneous test of forecasts' dispersion or forecasts' error, legitimacy and environmental disclosure. 3SLS (which combines 2SLS and Seemingly Unrelated Least Square - SURE) may improve the efficiency of parameter estimates when there is contemporaneous correlation of errors across equations. Moreover, the greater the intra-equation multicollinearity, the more likely 3SLS is to have a considerable gain in efficiency for the entire system of SURE (Binkley, 1982). In practice, the contemporaneous correlation matrix is estimated using OLS residuals. For *FORDISP* simultaneous regressions, we observe a significant correlation of errors across equations ( $-0.07$  between *FORDISP* and *LEGI* equations and  $0.05$  between *FORDISP* and *DISC* equations). Concerning intra-equation multicollinearity, we observe that interaction terms are highly correlated. *DISC* is correlated at  $0.85$  with *DISC\*SENSIND* and  $0.81$  with *DISC\*LENVP*. Since multicollinearity could be an issue, SURE is likely to improve the efficiency of the entire system (Binkley, 1982). With respect to *CONSENSUS* ( $p$ ) ( $-0.43$ ;  $p < 0.666$ ) and *OVUNC* ( $U$ ) ( $1.04$ ;  $p < 0.298$ ), we do not observe endogeneity with *DISC*. For these regressions, we will rely to OLS estimations. The software being used is STATA. Finally, we exclude from regressions observations with standardized residuals exceeding two.

In the third column of table 4, we present results of the 3SLS regression on the determinants of forecasts' dispersion (*FORDIS*), legitimacy (*LEGI*) and total

environmental disclosure (*DISC*). From panel A, we show that the coefficient on *DISC* is negatively related to *FORDIS* (-0.002;  $p < 0.05$ ), consistent with the view that a firm's environmental disclosure enhances the information available to financial markets to forecast its future growth. Consistent with hypothesis 2, the coefficient on the interaction term *DISC\*LENVP* is positively associated with *FORDIS* (0.001;  $p < 0.10$ ). The relevance of environmental disclosure for analysts' earnings forecasts appears to be lower for firms with poor environmental performance relative to their industry. Student t-test show that the sum of coefficients on *DISC* and the interaction term on *DISC\*LENVP* is statistically equal to zero (1.14;  $p < 0.28$ ). Concerning control variables, as expected, *BETA* (0.106;  $p < 0.01$ ) and *NEGEPS* (0.162;  $p < 0.01$ ) are positively associated with forecasts' dispersion.

In panel B, we show results for the legitimacy regression. As expected, environmental disclosure is associated with more environmental legitimacy (0.003;  $p < 0.01$ ), while this association is largely reduced for firms operating in environmentally sensitive industries (*SENSIND*) (-0.002;  $p < 0.05$ ) and those with a poor environmental performance relative to their industry (*LENVP*) (-0.002;  $p < 0.05$ ). Finally, from panel C, consistent with prior literature, we observe that media exposure (*MED*) (6.689;  $p < 0.01$ ), firm size (*SIZE*) (6.989;  $p < 0.01$ ), and *SENSIND* (9.545;  $p < 0.01$ ) are positively related to environmental disclosure.

Results (not tabulated) for economic-based disclosure (*ECDISC*) and disclosure about sustainable development and environmental management (*SDEMDISC*) not diverge from those presented for total disclosure (*DISC*). The only difference is that for

*SDEMDISC*, the relation between forecasts' dispersion and the interaction term on *DISC\*LENVP* is not significant. For social-based disclosure (*SDEMDISC*), the negative relationship between environmental disclosure and analysts' forecast dispersion remain irrespective of the level of polluting activities. This suggests that environmental disclosure reduces analysts' forecast dispersion is only firms with a good environmental performance relative to their industry.

Results from the fourth column are based on analysts' forecast errors (*FORERROR*). As for forecasts' dispersion, *DISC* is negatively related to *FORERROR*. However, coefficients on interaction terms *DISC\*SENSIND* and *DISC\*LENVP* are not significantly associated with *FORERROR*. Results are similar for *DISC*, *ECDISC* and *SDEMDISC* regressions.

[Insert table 4]

In table 5, we report results of OLS regressions on the determinants of precision of common information to analysts (*CONSENSUS*) (*p*) and overall uncertainty (*OVUNC*) (*U*). *P* captures the degree to which analysts' beliefs covary relative to the overall level of uncertainty. As expected, the coefficient on *DISC* is positively related to *p* (0.002;  $p < 0.01$ ) and negatively related to *U* (-0.065;  $p < 0.05$ ), consistent with the view that a firm's environmental disclosure enhances the information available to financial analysts. Consistent with hypothesis 1, the coefficient on the interaction term *DISC\*SENIND* is negatively associated with *p* (-0.001;  $p < 0.10$ ) and positively associated with *U* (0.074;  $p < 0.05$ ). Also Consistent with hypothesis 2, the coefficient on the interaction term *DISC\*LENVP* is negatively associated with *p* (-0.003;  $p < 0.01$ ) while firm -specific

environmental performance does not appear to affect the relationship between environmental disclosure and overall uncertainty (U). Results (not tabulated) do not differ for *ECDISC* and *SDEMDISC* regressions. For all regressions, Student t-tests show that the sum of coefficients on environmental disclosure (*DISC*, *ECDISC* and *SDEMDISC*) and interaction terms on disclosure\**SENSIND* and disclosure\**LENVP* is statistically equal to zero. This suggests that environmental disclosure is only relevant for analysts' consensus and overall uncertainty for firms operating in non-environmentally sensitive industries and for firms with a good environmental performance relative to their industry. This result support hypotheses 1 and 2.

[Insert table 6]

### ***Path analysis***

Path standardized coefficients between environmental disclosure and forecasts' properties are taken from regressions in table 6. The direct effect of environmental disclosure on forecasts' properties is represented by the path coefficient between disclosure and forecasts' properties. The standardized coefficients between disclosure and legitimacy are taken from table 4 (R-squares: *DISC*, 9.4%; *ECDISC*, 9.6%; *SDEMDISC*, 8.3%). The indirect effect of environmental disclosure on forecasts' properties through the relation with legitimacy is obtained by multiplying the paths together.

We estimate the direct effect of legitimacy on analysts' forecast properties with the following model (R-square of 14.4% for *p* and 4.6% for *U*):

$$\text{Forecasts properties } (p/U)_{I, t+1} = f(\text{SIZE} + \text{ANFOLL} + \text{BETA} + \text{NEGEPS}, \text{LEGI} + \text{COUNTRY})_{I, t}$$

Where:

<i>SIZE</i>	= LnAssets
<i>ANFOR</i>	= Analysts' forecast properties
<i>BETA</i>	= Systematic risk, beta
<i>NEGGEPS</i>	= An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise
<i>COUNTRY</i>	= An indicative variable if the country is Canada

Figures 1a and 1b present results of the path analysis for analysts' forecast consensus ( $p$ ) and overall uncertainty ( $U$ ). We observe a direct and indirect effect of environmental disclosure on analysts' forecast properties. Consistent with hypothesis 3, for both  $p$  and  $U$ , legitimacy has a mediating effect on the impact of environmental disclosure on analysts' earnings forecasts. Results suggest that the effect of environmental disclosure on analyst forecasts' properties is enhanced when its effect on legitimacy is high. It appears that when environmental disclosure is relevant for environmental stakeholders, it increases its relevance for stock market participants. As we can see from figure 1a, Economic-based environmental disclosure has the most total effect on analysts' consensus ( $p$ ) ( $ECDISC$  on  $p = 0.141 (0.115 + 0.404*0.064)$ ). The indirect effect of  $ECDISC$  on  $p$  through  $LEGI$  is 0.023 ( $0.404*0.064$ ). The indirect effect accounts for 18% of the impact of  $ECDISC$  on analysts' consensus ( $0.026/0.141$ ). The total effect of  $LEGI$  on  $p$  is 0.110 while the indirect effect of  $LEGI$  on  $p$  through  $ECDISC$  is 0.046 ( $0.404*0.115$ ), accounting for 42% of the impact of  $LEGI$  on  $p$  ( $0.046/0.110$ ).

As for overall uncertainty ( $U$ ), there are no significant differences between total disclosure ( $DISC$ ) and economic-based disclosure ( $ECDISC$ ). However, disclosure about sustainable development and environmental management ( $SDEMDISC$ ) exhibits a lower total effect on analysts' consensus and overall uncertainty compared with  $DISC$  and  $ECDISC$ .

From figure 1b, we observe the same direct and indirect effects of disclosure through legitimacy for the measure of overall uncertainty.

In summary, our results show that a firm's environmental disclosure affects analysts' earnings forecasts directly and, indirectly, through legitimacy. Such findings extend prior research on the relation between CSR and financial markets. Therefore, in contrast to arguments and findings reported in prior research who put forward unidirectional perspectives, it appears that both economic and legitimization considerations underlie environmental disclosure.

[Insert table 6]

## **Conclusion**

In this paper, we argue and test if a firm's environmental performance validates or undermines its legitimization efforts and, ultimately, the value of environmental disclosure to financial markets. Our conceptual approach integrates both legitimacy theory and information economics. Our analyses are performed on a sample of North American firms. Our results can be summarized as follows. First, consistent with Hypothesis 1, the relevance of environmental disclosure for analysts' earnings forecasts is lower for firms operating in more environmentally sensitive industries. More precisely, analyst forecast properties (accuracy, dispersion, consensus, uncertainty) are less desirable for firms within these industries. Second, consistent with Hypothesis 2, the relevance of environmental disclosure for analysts' earnings forecasts is lower for firms with poor environmental performance relative to their

industry. Hence, disclosure from firms with a poor relative environmental record undermines financial analysts' informational environment. Third, consistent with Hypothesis 3, legitimacy has a mediating effect on the impact of environmental disclosure on financial markets. In other words, firms' environmental disclosure may affect financial markets indirectly through its impact on a firm's other stakeholders. Finally, our results also suggest that prior work's dichotomization of environmental disclosure as being either "hard" or "soft" may misrepresent their actual informational properties.

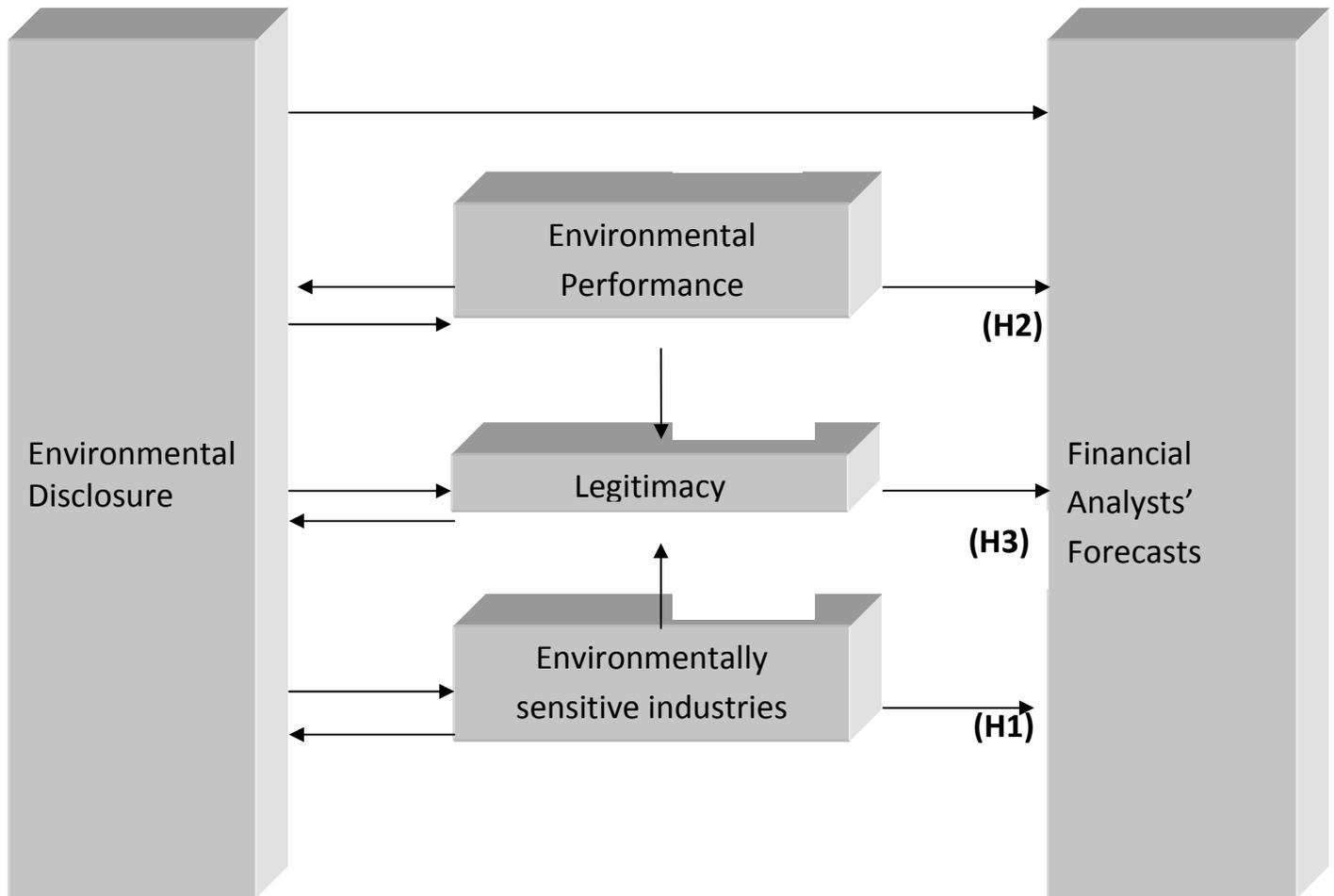
Overall, our study contributes to the environmental accounting literature by reconciling two differing perspectives, i.e., information economics and legitimacy and leads us to revisit prior research which considered environmental disclosure as being either economically relevant or legitimacy driven. In our view, such an integrative perspective is more consistent with the need by both managements and boards to take into consideration the interests and views of a broad set of stakeholders before making disclosure and other environmental decisions. The results also suggest that environmental issues are important to financial markets and their effect is both direct and indirect. The indirect effect is most likely through stakeholders' reactions.

The results of this study should be interpreted with caution at least for four reasons. First, our measure of environmental disclosures is based upon a coding instrument that makes some explicit assumptions about the value and relevance of information. Second, our measure of environmental performance relies on Toxics Release Inventory from Environmental Protection Agency for the US and the National Polluting Release Inventory from Environmental ministry in Canada, a single source that does not capture all of a firm's

environmental impacts. Third, our measure of legitimacy might raise questions about the generalizability of our findings since it largely depends on the extent of media coverage database and the reliability of the measurement of that coverage. Fourth, bias inherent to independent variables of our models might also affect results.

Future research may extend the scope of the study to firms from other countries. This would allow considering different types of financial markets, with different informational environments, as well as different types of pressures for legitimization.

**Figure 1 – Conceptual Framework Linking Environmental Performance, Legitimacy and Financial Analysts’ Forecasts**



**Table 1**  
**Sample selection**

Non-financial firms	Total U.S. and Canada	S&P 500	S&P/TSX
<b>Forecasts dispersion sample</b>			
Initial sample	633	416	217
No forecast dispersion	<u>46</u>	<u>14</u>	<u>32</u>
Forecasts dispersion sample	587	402	185
Forecasts dispersion $\geq 1.5$	<u>28</u>	<u>14</u>	<u>14</u>
Final sample	559	388	171
<b>Forecasts error sample</b>			
Initial sample	633	416	217
No forecast error	<u>54</u>	<u>19</u>	<u>35</u>
Forecasts error sample	579	397	182
Forecasts error $\geq 1.5$	<u>91</u>	<u>57</u>	<u>34</u>
Final sample	488	340	148

**Table 2**  
**Descriptive statistics**

<b>N = 559</b>	<b>Min.</b>	<b>Max.</b>	<b>Mean</b>	<b>Std Dev.</b>	<b>Canada</b>	<b>U.S.</b>
<b>Environmental</b>						
<i>LEGI</i>	-1	1	0.134	0.371	0.077	0.159
<i>DISC</i>	0	215	13.478	32.352	4.466	17.498
<i>ECDISC</i>	0	127	7.203	17.627	2.742	9.193
<i>SDEMDISC</i>	0	123	6.275	17.346	1.724	8.305
<i>LENVP</i>	0	1	0.142	0.349	0.202	0.115
<i>MED</i>	0	14	0.538	1.265	0.162	0.707
<b>Financial</b>						
<i>SIZE</i> (million \$)	63	797,769	19,186	46,563	10,243	23,176
<i>LEV</i>	0	1	0.235	0.170	0.237	0.234
<i>ROA</i>	-1.175	0.344	0.031	0.138	0.022	0.034
<i>ANFOLL</i>	0	42	12.176	7.437	6.640	14.646
<i>BETA</i>	-0.53	3.23	1.186	2.425	1.082	1.211
<i>NEGEPS</i>	0	1	0.199	0.399	0.224	0.187
<i>FORDISP</i>	0.003	1.313	0.159	0.216	0.240	0.121
<i>FORERROR</i> (N = 488)	0.000	1.498	0.329	0.351	0.359	0.316
<i>CONSENSUS</i> ( <i>p</i> ) (N = 550)	-0.993	0.999	0.729	0.339	0.613	0.777
<i>OVUNC</i> ( <i>U</i> ) (N = 550)	0.000	48.526	1.867	5.844	1.357	2.078

*FORDISP*: Forecasts' dispersion; *FORERROR*: Forecasts errors; *p*: *CONSENSUS*: Analysts' consensus (*p*); *OVUNC*: Overall uncertainty (*U*); *DISC*: Environmental disclosure; *ECDISC*: Economic-based environmental disclosure; *SDEMDISC*: Sustainable development & environmental management disclosure; *LENVP*: Low environmental performance; *LEGI*: Legitimacy; *ANFOLL*: Number of analysts following a firm; *BETA*: Systematic risk (beta); *NEGEPS*: An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise; *SIZE*: LnAssets; *LEV*: Long term debt /total assets; *ROA*: Return on assets.

**Table 3**  
**Correlations**

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 <i>LEGI</i> (t+1)	*-0.13	-0.04	-0.01	0.03	*0.13	*0.14	*0.11	*0.15	0.03	0.01	-0.03	*-0.10	-0.02	*-0.10	*-0.10
2 <i>FORDISP</i>	1	*0.40	-0.02	*0.50	*-0.07	-0.04	*-0.09	-0.01	*-0.18	*0.16	*-0.29	*-0.11	*0.32	0.02	*0.26
3 <i>FORERROR</i>		1	*-0.13	*0.10	*-0.08	*0.09	-0.06	*-0.09	*-0.20	-0.02	*-0.09	*-0.07	*-0.24	-0.03	-0.02
4 <i>CONSENSUS</i>			1	*0.09	-0.04	-0.06	-0.02	-0.07	-0.02	-0.02	-0.03	*0.08	-0.03	*-0.07	*-0.27
5 <i>OVUNC</i>				1	-0.03	-0.02	-0.03	-0.04	*-0.08	-0.02	*-0.09	*-0.07	0.02	0.01	-0.04
6 <i>DISC</i>					1	*0.87	*0.94	*0.44	*0.41	-0.01	-0.02	*-0.16	-0.10	0.01	*0.08
7 <i>ECDISC</i>						1	*0.65	*0.21	*0.34	0.01	-0.02	-0.05	-0.03	*0.08	*0.22
8 <i>SDEMDISC</i>							1	*0.54	*0.40	-0.01	-0.02	*-0.21	*-0.13	-0.04	-0.02
9 <i>MED</i>								1	*0.08	*-0.07	-0.03	*-0.22	-0.03	*-0.11	*-0.10
10 <i>SIZE</i>									1	-0.01	*0.13	*0.22	*-0.20	*0.15	0.03
11 <i>LEV</i>										1	*-0.33	*-0.36	*-0.14	*0.07	0.03
12 <i>ROA</i>											1	*0.15	*-0.27	0.04	0.07
13 <i>ANFOL</i>												1	0.05	*-0.18	*-0.07
14 <i>BETA</i>													1	0.01	*0.20
15 <i>LENVP</i>														1	*0.07
16 <i>SENSIND</i>															1

\*Significant at 0.10

*FORDISP*: Forecasts' dispersion; *FORERROR*: Forecasts errors; *p*: *CONSENSUS*: Analysts' consensus (*p*); *OVUNC*: Overall uncertainty (*U*); *DISC*: Environmental disclosure; *ECDISC*: Economic-based environmental disclosure; *SDEMDISC*: Sustainable development & environmental management disclosure; *ENVSENS*: Environmentally sensitive industries; *LENVP*: Low environmental performance; *LEGI*: Legitimacy; *ANFOLL*: Number of analysts following a firm; *BETA*: Systematic risk (beta); *NEGEPS*: An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise; *SIZE*: LnAssets; *LEV*: Long term debt /total assets; *ROA*: Return on assets; *LAGDISC*: Lagged environmental disclosure.

**Table 4**  
**3SLS Regressions on the Determinants of Environmental Legitimacy, Environmental Disclosure, and Analysts' Forecast Dispersion (Paper Disclosure)**

	Sign	Forecasts dispersion (t+1)	Forecasts error (t+1)
<b>Panel A – Analysts' forecasts</b>			
<i>ANFOLL</i>	-	0.001	0.001
<i>DISC</i>	-	**_-0.002	**_-0.005
<i>DISC*SENSIND</i>	<i>H1</i> +	0.001	0.001
<i>DISC*LENVP</i>	<i>H2</i> +	*0.001	0.001
<i>SENSIND</i>	+/-	***0.065	0.017
<i>LENVP</i>	+/-	**0.046	-0.076
<i>LEGI</i>	+/-	0.017	0.045
<i>BETA</i>	+	***0.106	-0.001
<i>NEGEPS</i>	+	***0.162	***0.323
<i>COUNTRY</i>	+/-	***0.083	-0.023
Chi2/P		258.2/0.00	87.6/0.00
Test of coefficient difference			
<i>DISC</i> and <i>DISC*SENSIND</i>		15.51 (0.00)	27.11 (0.00)
<i>DISC</i> and <i>DISC*LENVP</i>		1.14 (0.28)	2.09 (0.14)
<b>Panel B - Legitimacy (t+1)</b>			
<i>DISC</i>	+	***0.003	***0.005
<i>DISC*SENSIND</i>	-	**_-0.002	**_-0.003
<i>DISC*LENVP</i>	-	***_-0.002	***_-0.003
<i>SENSIND</i>	-	-0.001	-0.001
<i>LENVP</i>	-	-0.005	0.005
<i>LEGI</i>	+	**0.028	**0.033
<i>SIZE</i>	+/-	0.003	-0.001
<i>POSMED</i>	+/-	***0.029	***0.025
<i>COUNTRY</i>	+/-	0.009	0.023
Chi2/P		83.2/0.00	93.7/0.00
Test of coefficient difference			
<i>DISC</i> and <i>DISC*SENSIND</i>		26.22 (0.00)	36.69 (0.00)
<i>DISC</i> and <i>DISC*LENVP</i>		2.06 (0.15)	3.47 (0.06)
<b>Panel C - Disclosure (t)</b>			
<i>MED</i>	+	***6.689	***5.801
<i>SIZE</i>	+	***6.989	***6.470
<i>LEV</i>	+/-	-2.285	1.556
<i>SENSIND</i>	+	***9.545	***9.433
<i>LAGLEGI</i>	-	4.129	1.681
<i>ROA</i>	+	-12.198	-3.974
<i>LENVP</i>	+	3.063	1.681
<i>LAGDISC</i>	+/-	**_-0.092	-0.077
<i>COUNTRY</i>	+/-	-1.906	-3.673
Chi2/P		151.9/0.00	118.4/0.00
N = 559		50 outliers	41 outliers

*DISC*: Environmental disclosure; *ENVSENS*: Environmentally sensitive industries; *LENVPERF*: Low environmental performance; *LEGI*: Legitimacy; *POSMED*: An indicative variable taking the value of 1 if there is at least one article published about a firm from 2006 to 2008, 0 otherwise; *ANFOLL*: Number of analysts following a firm; *BETA*: Systematic risk (beta); *NEGEPS*: An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise; *SIZE*: LnAssets; *LEV*: Long term debt /total assets; *ROA*: Return on assets; *LAGDISC*: Lagged environmental disclosure; *COUNTRY*: An indicative variable if the country is Canada.

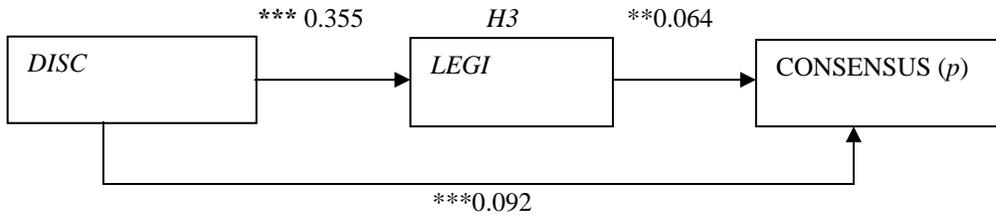
**Table 5**

**OLS Regressions on the Determinants of Analysts' Forecast Properties (with robust Standard Errors)**

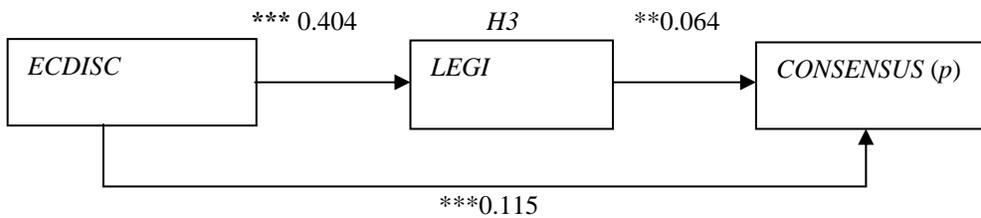
N = 550	Sign	Consensus ( <i>p</i> )	Overall Uncertainty ( <i>U</i> )
<i>ANFOLL</i>	+	***0.026	-0.234
<i>DISC</i>	+	***0.002	**_-0.065
<i>DISC*SENSIND</i>	<i>H1</i> -	*_-0.001	**0.074
<i>DISC*LENVP</i>	<i>H2</i> -	***_-0.003	-0.096
<i>SENSIND</i>	+/-	***_-0.076	-1.142
<i>LENVP</i>	+/-	***0.157	3.046
<i>LEGI</i>	+/-	**0.087	13.420
<i>BETA</i>	+	***0.244	4.765
<i>NEGEPS</i>	+	0.049	**11.119
<i>COUNTRY</i>	+/-	***0.224	-2.859
R-Square/F test/P		13.1%/76.86/0.00	6.3%/3.00/0.00
Test of coefficient difference			
<i>DISC</i> and <i>DISC*SENSIND</i>		0.31(0.57)	0.08(0.77)
<i>DISC</i> and <i>DISC*LENVP</i>		1.46(0.22)	2.02(0.15)
Outliers		27	2

*DISC*: Environmental disclosure; *ENVSENS*: Environmentally sensitive industries; *LENVP*: Low environmental performance; *LEGI*: Legitimacy; *ANFOLL*: Number of analysts following a firm; *BETA*: Systematic risk (beta); *NEGEPS*: An indicative variable taking the value of 1 if there earnings is negative, 0 otherwise; *COUNTRY*: An indicative variable if the country is Canada.

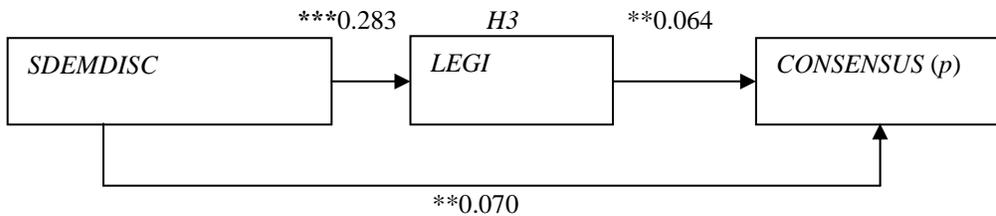
**Figure 1a**  
**Path Analysis**  
**Disclosure, Legitimacy and Analysts' Consensus (*p*)<sup>‡</sup>**



Direct effect *DISC* on *LEGI* = 0.355  
 Total effect *DISC* on *p* = 0.115 (0.092 + 0.355\*0.064). Indirect effect of *LEGI* 0.023 (0.355\*0.064)  
 Total effect *LEGI* on *p* = 0.097 (0.064 + 0.355\*0.092). Indirect effect of *DISC* 0.033 (0.355\*0.092)



Direct effect *DISC* on *LEGI* = 0.404  
 Total effect *DISC* on *p* = 0.141 (0.115 + 0.404\*0.064). Indirect effect of *LEGI* 0.026 (0.404\*0.064)  
 Total effect *LEGI* on *p* = 0.110 (0.064 + 0.404\*0.115). Indirect effect of *DISC* 0.046 (0.404\*0.115)



Direct effect *DISC* on *LEGI* = 0.283  
 Total effect *DISC* on *p* = 0.088 (0.070 + 0.283\*0.064). Indirect effect of *LEGI* 0.018 (0.283\*0.064)  
 Total effect *LEGI* on *p* = 0.084 (0.064 + 0.283\*0.070). Indirect effect of *DISC* 0.020 (0.283\*0.070)

\*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$  two-tailed.

<sup>‡</sup>We use standardized regression coefficients (Beta) as path coefficients.

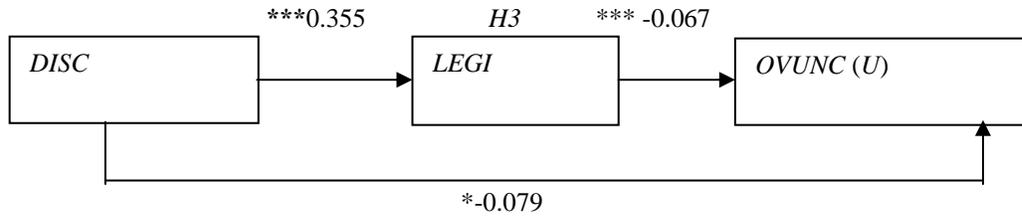
*DISC* = Environmental disclosure

*ECDISC* = Economic-based environmental disclosure

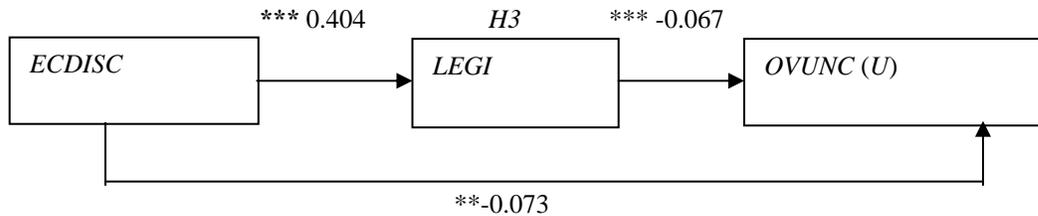
*SDEMDISC* = Sustainable development & environmental management disclosure

*CONSENSUS (p)* = Analysts' consensus

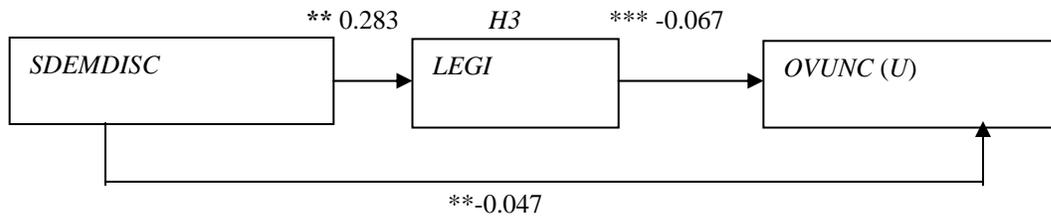
**Figure 1b**  
**Path Analysis**  
**Disclosure, Legitimacy and Overall Uncertainty (U) <sup>‡</sup>**



Direct effect *DISC* on *LEGI* = 0.355  
 Total effect *DISC* on *U* = -0.103 (-0.079 + 0.355\*-0.067). Indirect effect of *LEGI* -0.024 (0.355\*-0.067)  
 Total effect *LEGI* on *U* = -0.095 (-0.067 + 0.355\*-0.079). Indirect effect of *DISC* -0.028 (0.355\*-0.079)



Direct effect *DISC* on *LEGI* = 0.355  
 Total effect *DISC* on *U* = -0.100 (-0.073 + 0.404\*-0.067). Indirect effect of *LEGI* -0.028 (0.404\*-0.067)  
 Total effect *LEGI* on *U* = -0.124 (-0.067 + 0.404\*-0.073). Indirect effect of *DISC* -0.029 (0.404\*-0.073)



Direct effect *DISC* on *LEGI* = 0.355  
 Total effect *DISC* on *U* = -0.066 (-0.047 + 0.283\*-0.067). Indirect effect of *LEGI* -0.019 (0.283\*-0.067)  
 Total effect *LEGI* on *U* = -0.080 (-0.067 + 0.283\*-0.047). Indirect effect of *DISC* -0.013 (0.283\*-0.047)

\*:  $p < 0.10$ ; \*\*:  $p < 0.05$ ; \*\*\*:  $p < 0.01$  two-tailed.

<sup>‡</sup>We use standardized regression coefficients (Beta) as path coefficients.

*DISC* = Environmental disclosure

*ECDISC* = Economic-based environmental disclosure

*SDEMDISC* = Sustainable development & environmental management disclosure

*OVUNC (u)* = Overall uncertainty

## Appendix 1

### Environmental disclosure grid

---

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

---

**Rating scale:**

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

## References

- Aerts, W., Cormier, D. (2009), Media Legitimacy and Corporate Environmental Communication. *Accounting, Organizations and Society*, 34(1): 1-27.
- Aerts, W., Cormier, D., Magnan, M. (2008). Corporate Environmental Disclosure, Financial Markets and the Media: An International Perspective. *Ecological Economics*, 64(3): 643-659.
- Al-Tuwaijri, S., Christensen, T.E. and Hughes II, K.E. (2004). The Relations among Environmental Disclosure, Environmental Performance, and Economic Performance: A Simultaneous Equations Approach. *Accounting, Organizations and Society*, 29(5/6): 447-471.
- Ambec, S. and Lanoie, P. (2008). Does it Pay to Be Green? A Systematic Overview. *Academy of Management Perspectives*, 22(4): 45-62.
- Bansal, P, and Hunter, T. 2003. Strategic Explanations for the Early Adoption of ISO 14001. *Journal of Business Ethics*, 46(3): 289–99.
- Bansal, P. and Clelland, I. (2004). Talking Trash: Legitimacy, Impression Management, and Unsystematic Risk in the Context of the Natural Environment. *Academy of Management Journal*, 47(1):93-103.
- Barron, O.E., O. Kim, S. Lim and Stevens, D.E. (1998). Using Analysts' Forecasts to Measure Properties of Analysts' Information Environment. *The Accounting Review*, 73(4): 421-433.
- Basu, K. and Palazzo, G. (2008). Corporate Social Responsibility: A Process Model of Sensemaking. *Academy of Management Review*, 33(1): 122-136.
- Baum, J.A.C. and Oliver, C. (1991). Institutional linkages and organizational mortality. *Administrative Science Quarterly*, 36, 187-218.
- Berthelot, S., M. Magnan and Cormier, D. (2003). Environmental Disclosure Research: Review and synthesis. *Journal of Accounting Literature*, 22, 1-44.
- Bewley, K. and Li, Y. (2000). Disclosure of Environmental Information by Canadian Manufacturing Companies: A Voluntary Disclosure Perspective. *Advances in Environmental Accounting and Management*, 1: 201-226.
- Binkley, J.K. (1982). The Effect of Variable Correlation on the Efficiency of Seemingly Unrelated Regression in a Two-Equation Model. *Journal of the American Statistical Association*, 77(380), 890-895.
- Bird, R., Hall, A.D., Momente, F. and Reggiani, F. (2007). What Corporate Social Responsibility Activities are Valued by the Market? *Journal of Business Ethics*, 76(1): 189–206.
- Botosan, C.A. (1997). Disclosure Level and the Cost of Equity Capital. *The Accounting Review*, 72(3), 323-350.
- Brown, N. and Deegan, C. (1998). The Public Disclosure of Environmental Performance Information – A Dual Test of Media Agenda Setting Theory and Legitimacy Theory. *Accounting and Business Research*, 29(1): 21-41.

- Buhr, N. (1998). Environmental Performance, Legislation and Annual Report Disclosure: The Case of Acid Rain and Falconbridge. *Accounting, Auditing and Accountability Journal*, 11(2): 163-190.
- Busch, T. (2011). Organizational Adaptation to Disruptions in the Natural Environment: The Case of Climate Change. *Journal of Industrial Ecology*, 15(1), 160-163.
- Bushman, M. Piotrosky, J.D. and Smith, A.J. (2004). What Determines Corporate Transparency? *Journal of Accounting Research*, 42(2): 207-252.
- Cho, C., Guidry, R.P., Hageman, A.M. and Patten, D. (2012). Do Actions Speak Louder than Words? An Empirical Investigation of Corporate Environmental Reputation. *Accounting, Organizations & Society*, 37(1): 14-25.
- Cho, C., Roberts, R. and Patten, D. (2010). The Language of U.S. Corporate Environmental Disclosure (2010). *Accounting, Organizations and Society*, 35(4): 431-443
- Cho, C.H. and Patten, D.M. (2012). The Role of Environmental Disclosures as Tools of Legitimacy: A Research Note. *Accounting, Organizations and Society* (in press).
- Cho, C.H. and Patten, D.M. (2007). The Role of Environmental Disclosures as Tools of Legitimacy: A Research Note. *Accounting, Organizations and Society*, 32(7/8): 639-647.
- Clarkson, P., Li, Y. and Richardson, G.D. (2004). The Market Valuation of Environmental Capital Expenditures by Pulp and Paper Companies. *The Accounting Review*, 79(2): 329-354.
- Clarkson, P., Li, Y., Richardson, G.D. and Vasvari, F.P. (2008). Revisiting the Relation between Environmental Performance and Environmental Disclosure: An Empirical Analysis. *Accounting, Organizations and Society*, 33(4/5): 303-327.
- Cormier, D., Aerts, W., Ledoux, M.J. and Magnan, M. (2008). Web-Based Disclosure about Value Creation Processes: A Monitoring Perspective. *ABACUS*, 46(3): 320-347.
- Cormier, D. and Gordon, I.M. (2001). An Examination of Social and Environmental Reporting Strategies. *Accounting, Auditing and Accountability Journal* 14 (5): 587-616.
- Cormier, D., Gordon, I. and Magnan, M. (2004). Corporate Environmental Reporting: Contrasting Management's Values with Reality. *Journal of Business Ethics*, 49(2): 143-165.
- Cormier, D. and Magnan, M. (2003). Environmental Reporting Management: A European Perspective. *Journal of Accounting and Public Policy*, 22: 43-62.
- Cowen, S. S., Ferreri, L.B. and Parker, L.D. (1987). The Impact of Corporate Characteristics on Social Responsibility Disclosure: A Typology and Frequency-Based Analysis. *Accounting, Organizations and society*: 111-122.
- Dhaliwal, D.S., Zhen Li, O., Tsang, A. and Yang, Y.G. (2011). Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. *The Accounting Review*, 86(1): 59-100.
- Dawkins, C. and Fraas, J. (2011). Coming Clean: The Impact of Environmental Performance and Visibility on Corporate Climate Change Disclosure. *Journal of Business Ethics*, 100(2): 303-322.
- Deegan, C. and Gordon, B. (1996). A Study of the Environmental Disclosure Practices of Australian Corporations. *Accounting and Business Research*, 26(3): 187-199.

- Deegan, C. and Rankin, M. (1996). Do Australian Companies Report Environmental Disclosures by Firms Prosecuted Successfully by Environmental Protection Authority. *Accounting, Auditing and Accountability Journal*, 9(2): 50-67.
- Deegan, C., Rankin, M. and Tobin, J. (2002). An Examination of the Corporate Social and Environmental Disclosures of BHP from 1983-1997 – A test of legitimacy theory. *Accounting, Auditing and Accountability Journal*, 15(3): 312-343.
- Deegan, C., Rankin, M. and Voght, P. (2000). Firms' Disclosure Reactions to Major Social Incidents: Australian Evidence. *Accounting Forum* 24 (1): 101-130.
- Deephouse, D.L. and Carter, S.M. (2005). An Examination of Differences between Organizational Legitimacy and Organizational Reputation. *Journal of Management Studies*, 42(2), 329-360.
- De Villiers, C.J. and Van Staden, C.J. (2006). Can Less Environmental Disclosure Have a Legitimizing Effect? Evidence from Africa. *Accounting, Organizations and Society*, 31(8): 763-781.
- Doh, J.P., Howton, S.D., Howton, S.W. and Siegel, D.S. (2010). Does the Market Respond to an Endorsement of Social Responsibility? The Role of Institutions, Information, and Legitimacy, *Journal of Management*, 36:1461-1485.
- Fekrat, M. A., Inclan, C. and Petroni, D. (1996). Corporate Environmental Disclosures: Competitive Disclosure Hypothesis Using 1991 Annual Report Data. *The International Journal of Accounting*, 31(2): 175-195.
- Fowler, S.J. and Hope, C. (2007) A Critical Review of Sustainable Business Indices and their Impact, *Journal of Business Ethics*, 76(3), 243-252.
- Freedman, M., and Wasley, C. (1990). The Association between Environmental Performance and Environmental Disclosure in Annual Reports and 10Ks. *Advances in Public Interest Accounting*, 3: 183–193.
- Gray, R., Kouhy, R. and Lavers, S. (1995). Corporate Social and Environmental Reporting: A Review of the Literature and a Longitudinal Study of UK Disclosure. *Accounting, Auditing and Accountability Journal*, 8(2): 47-77.
- Gurthrie, J. and Parker, L.D. (1989). Corporate Social Reporting: A Rebuttal of Legitimacy Theory. *Accounting and Business Research*, 19(76): 343-352.
- Hackston, D. and Milne, M.J. (1996). Some Determinants of Social and Environmental disclosures in New Zealand Companies. *Accounting, Auditing and Accountability Journal*, 25: 77-108.
- Hannan, M.T. and Freeman, J. (1989). *Organizational Ecology*. Cambridge, MA Harvard University Press.
- Hogner, R.H. (1982). Corporate Social Reporting: Eight Decades of Development at U.S. Steel. *Research in Corporate Performance and Policy* 4: 243-250.
- Ingram, R.W. and Frazier, K.B. (1980). Environmental Performance and Corporate Disclosure. *Journal of Accounting Research*, 18 (autumn): 615-22.
- Jaggi, B. and Freedman, M. (1982). An Analysis of the Informational Content of Pollution Disclosures. *The Financial Review*, 142-152.
- Janis, I.L. and Fadner, R. 1965. The Coefficient of Imbalance. In H. Lasswell, N. Leites, and Associates (Eds.), *Language of politics*: 153-169. Cambridge, MA: MIT Press.

- Kim, E.H. and Lyon, T.P. (2011). When Does Institutional Activists Increase Shareholder Value? The Carbon Disclosure Project. *The BE Journal of Economic Analysis and Policy*, 11(1): 93-121.
- Margolis, J.D. and Walsh, J.P. (2003). Misery Loves Companies: Rethinking Social Initiatives by Business. *Administrative Science Quarterly*, 48: 655-689.
- McGuire, J., Sundgren, A. and Schneeweis, T. (1988). Corporate Social Responsibility and Firm Financial Performance. *Academy of Management Journal*, 31(4): 854-872.
- Mills, D. and Gardner, M. (1984). Financial Profiles and the Disclosure of Expenditures for Socially Responsible Purposes. *Journal of Business Research*, 12 (December): 407-424.
- Murray, A., Sinclair, D., Power, D. and Gray, R. (2006). Do Financial Markets Care About Social and Environmental Disclosure? *Accounting, Auditing and Accountability Journal* 19(2): 228-255.
- Neu, D., Warsame, H. and Pedwell, K. (1998). Managing Public Impressions: Environmental Disclosures in Annual Reports. *Accounting, Organizations and Society* 23 (3): 265-282.
- Nunnally, J. (1978). *Psychometric Theory*. McGraw Hill, end Edition, New York.
- O'Donovan, G. (2002). Environmental Disclosures in Annual Report - Extending the Applicability and Power of Legitimacy Theory. *Accounting, Auditing and Accountability Journal*, 15(3): 344-371.
- O'Dwyer, B. (2002). Managerial Perceptions of Corporate Social Disclosure - An Irish Story. *Accounting, Auditing and Accountability Journal*, 15(3): 406-436.
- Orlitzky, M., Schmidt, F.L. and Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies*, 24(3), 403-441.
- Patten, D.M. (1991). Exposure, Legitimacy, and Social Disclosure. *Journal of Accounting and Public Policy*, 10(4): 297-308.
- Patten, D.M. (1992). Intra-Industry Environmental Disclosures in Response to the Alaskan Oil Spill: A Note on Legitimacy Theory. *Accounting, Organizations and Society*, 17(5): 471-475.
- Patten, D.M. (2002). Media Exposure, Public Policy Pressure, and Environmental Disclosure: An Examination of the Impact of Tri Data Availability. *Accounting Forum*, 26(2):153-171.
- Patten, D.M. (2005). The Accuracy of Financial Reports Projections of Future Environmental Capital Expenditures: A Research Note. *Accounting, Organizations and Society*, 30(5): 457-468.
- Pfarrer, M.D., Pollock, T.G. and Rindova, V.P. (2010). A Tale of Two Assets: The Effects of Firm Reputation and Celebrity on Earnings Surprises and Investors' Reactions. *Academy of Management Journal*, 53(5), 1131-1152.
- Reid, E.M. and Toffel, M.W. (2009) Responding to Public and Private Politics: Corporate Disclosure of Climate Change Strategies, *Strategic Management Journal*, 29(10): 1027-1055.
- Savage, A., Rowlands, J. and Cataldo, A.J. (2001). Environmental Disclosure in Annual Reports: A Legitimacy Theory Perspective", *SA Journal of Accounting Research*, 15(2):19-48.

- Scott, T. (1994). Incentives and Disincentives for Financial Disclosure: Voluntary Disclosure of Defined Benefit Pension Plan Information by French Firms. *The Accounting Review*, 69(1): 26-43.
- Scott, W.R. (1995). *Institutions and Organizations*. Thousand Oaks, CA: Sage.
- Schultz, M., Mouritsen, J. and Gabrielsen, G. (2001). Sticky Reputation: Analyzing a Ranking System. *Corporate Reputation Review*, 4(1): 24-41.
- Siegel, D.S. (2009). Green Management Matters Only If It Yields More Green: An Economic/Strategic Perspective. *The Academy of Management Perspective*, 23(2): 5-16.
- Walden, D. W. and Schwartz, B.N. (1997). Environmental Disclosures and Public Policy Pressure. *Journal of Accounting and Public Policy*, 16(2): 125-154.
- Weber, R.P. (1990). *Basic Content Analysis* (2nd edition) Newbury Park, CA: Sage.
- Williams, S.M. and Ho Wern Pei, C.A. (1999). Corporate Social Disclosures by Listed Companies on their Web sites: An International Comparison. *The International Journal of Accounting*, 34(3): 389-419.
- Wilmshurst, T.D. and Frost, G.R. (2000). Corporate Environmental Reporting: A Test of Legitimacy Theory. *Accounting, Auditing and Accountability Journal* 13 (1): 10-26.
- Wiseman, J. (1982). An Evaluation of Environmental Disclosures Made in Corporate Annual Reports. *Accounting, Organizations and Society*, 7(1): 53-63.