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# Continuous Environmental Disclosure Obligations under Canadian Stock Market Regulations: The Impact on Analyst Forecasts

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## Abstract

This paper investigates whether mandated environmental disclosure enhance the information available to financial analysts. Results show that continuous environmental disclosures released in accordance with CSA National Instrument 51-102 do improve the information set available to financial analysts. Moreover, financial analysts are able to assess if there are inconsistencies between a firm`s disclosure and its actual environmental performance. Our results suggest also a substitution effect between environmental disclosure and the presence of an environmental committee on the board of directors in terms of impact on forecast precision. Similar results are obtained with a more comprehensive definition of governance. While many investors and other stakeholders express concerns that continuous environmental information does not always provide meaningful information, our results suggest that these concerns may not be justified.



Key words: Analyst forecast precision, corporate governance, environmental disclosure.



## Résumé

Dans cet article, nous nous penchons sur la question suivante : l'information environnementale en continu publiée conformément au Règlement 51-102 des autorisations canadiennes en valeurs mobilières améliore-t-elle l'information disponible sur les marchés financiers pour prédire les résultats futurs ? Les résultats montrent que l'information environnementale en continue est pertinente pour les prévisions des analystes financiers. En outre, les analystes financiers semblent être en mesure de déchiffrer l'information environnementale, notamment celle incompatible avec la performance environnementale de la firme. Enfin, nos résultats montrent un effet de substitution entre la divulgation environnementale et la présence d'un comité de l'environnement sur le conseil d'administration ainsi qu'une gouvernance efficace dans leur impact sur les prévisions des résultats par les analystes financiers. Les investisseurs et autres parties prenantes ont exprimé des préoccupations à l'effet que l'information environnementale en continu ne fournit pas toujours des renseignements utiles aux investisseurs. Nos résultats laissent à penser que ces préoccupations ne sont pas justifiées.



Mots clés : Gouvernance, prévisions des analystes, reporting environnemental.

## 1. Introduction

This paper investigates whether environmental disclosure released under National Instrument 51-102 - *Continuous Disclosure Obligations* (NI 51-102) (Ontario Securities Commission, 2004) enhances the information available to financial markets. Specifically, we address the following research questions: 1) Do continuous environmental disclosures improve financial analysts' ability to forecast a firm's future earnings? 2) Does a firm's membership in an environmentally sensitive industry as well as its environmental performance relative to the industry influence the relevance of environmental disclosures to financial analysts? 3) Does the quality of corporate governance influence the association between environmental disclosure and earnings forecasts?

In April 2009, the Ontario Legislature called upon the Ontario Securities Commission (OSC) to undertake a broad consultation to establish better reporting standards on corporate social responsibility and environmental, social and governance matters (the corporate sustainability reporting initiative). The OSC agreed to review existing disclosure requirements, consult with investors and other stakeholders, and recommend changes to disclosure requirements by the end of 2009 (Ontario Securities Commission, 2009). The consultation with investors and other stakeholders revealed they were concerned about the relevance, reliability and comparability of environmental disclosures. Investors and stakeholders felt that material information regarding environmental matters was often only found in voluntary reports and not in regulatory filings; that the information provided was not necessarily complete, reliable or comparable among issuers, and that it did not always provide the meaningful information

they needed.[1] Our study takes advantage of these cross-sectional differences in firms' environmental disclosures to test whether better disclosure enhances the information available to financial analysts.

We build a coding instrument based on the reporting requirements of NI 51-102 to measure the quantity and quality of environmental diclosures in continuous disclosure documents. Disclosures are grouped in five categories: 1) environmental liabilities; 2) asset retirement obligations; 3) financial and operational effects of environmental protection requirement; 4) environmental policies fundamental to operations; and 5) environmental risks. Our rating system awards three points for an item described in monetary or quantitative terms, two points for an item described specifically, and one point for an item discussed in general terms. Environmental disclosures are collected from financial statements, the MD&A and the remainder of the annual information form. We eliminate any overlap in disclosure.

We use a system of simultaneous equations to test for the association between the environmental disclosure score and analyst forecasts. Simultaneous equations are necessary because we find that sample firms' information environments simultaneously affect their disclosure score and analyst forecasts. Four variables are used to measure forecast characteristics: forecast dispersion, forecast errors, consensus and uncertainty.

[1] In 2010, Canadian Securities Administrators (CSA) issued Staff Notice 51-333 – *Environmental Reporting Guidance* to provide guidance to reporting issuers on satisfying existing continuous disclosure requirements with respect to environmental concerns. The Notice does not introduce new legislation or obligations. Specifically, Staff Notice 51-333 is intended to assist issuers in determining what information about environmental matters needs to be disclosed by reporting issuers based on the requirements found in National Instrument 51-102 *Continuous Disclosure Obligations* (NI 51-102), National Instrument 58-101 *Disclosure of Corporate Governance Practices* (NI 58-101) and National Instrument 52-110 *Audit Committees* (NI 52-110).

Our results show that environmental disclosures that more closely match the regulation`s intent reduce forecast dispersion and uncertainty, and improve the consensus, consistent with the view that mandated environmental disclosure enhances the information available to financial analysts to forecast its future earnings.

We expect continuous environmental disclosure to be less relevant to analysts when they consider firms that operate in environmentally sensitive industries, and for firms that perform poorly relative to their industry. Consistent with our expectation, we find that the influence of mandated environmental disclosure on forecast dispersion, uncertainty and consensus is reduced for firms that operate in environmentally sensitive industries. However, the relevance of mandated environmental disclosure for analyst earnings forecasts does not appear to be affected by a firm's poor environmental performance relative to its industry.

Finally, we consider how a firm`s governance, either environmental or general, act as a substitute or a complement to mandated environmental disclosure in improving analyst forecasts. We find that they act as substitutes.

Our paper contributes to the literature in the following ways. First, in contrast to most prior research that either focuses on financial statements' disclosures or voluntary disclosure, our study encompasses mandated disclosure beyond financial statements to include MD&A and annual information form information releases. Hence, we consider both retrospective and prospective environmental disclosures, the latter dimension including environmental risks. Therefore, we are able to assess the impact and merits of new disclosure regulations beyond financial statements. Second, prior research suggests that a firm's governance may improve the relevance and reliability of corporate disclosure.

In that regard, we investigate if mandated disclosure acts as a substitute or as a complement to corporate governance, either environmental or in general, in terms of enhancing financial analysts' information environment.

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature and presents the research hypotheses. The study's method is described in section 3. Results are presented in section 4. Finally, section 5 provides a discussion of the potential implications of the results.

## 2. Literature Review and Research Hypotheses

### 2.1 Mandatory Environmental Disclosure and Analyst Forecasts

Mandatory disclosure can make it possible to alleviate informational asymmetry between investors and managers as well as the social costs generated by investors' active search for information (Lev, 1988)

Several studies focus on the value relevance of mandated disclosure under SEC requirements. Typically, they examine share price reactions to specific events related to SEC decisions. In these studies, the environmental disclosure variable is an aggregate measurement of environmental information developed from a content analysis technique (Blacconiere and Patten, 1994; Blaconniere and Northcut, 1997] or a measurement of the characteristics of information disclosed (i.e., no disclosure, disclosures of a qualitative nature or disclosures of quantitative nature) (Freedman and Stagliano, 1991).

Blacconiere and Patten (1994) examine the Bhopal ecological catastrophe while Blacconiere and Northcut (1997) analyze the adoption of the *Superfund Amendments and*

*Reauthorization Act* (SARA) by Congress in 1986. In general, their results suggest that firms that disclose more environmental information under SEC requirements at the time of the event are less penalized by investors than those that disclose less information. Blacconiere and Northcut (1997) observe the same results even when information variables published by the Environmental Protection Agency (EPA) (i.e., decontamination costs that sample firms will incur) are included in the regression model. These results indicate that information concerning contaminated sites disclosed under SEC requirements complements information available from the EPA.

Freedman and Stagliano (1991) look at a US Supreme Court decision that upheld the legality of more severe standards for cotton dust rates. Their results show that firms having disclosed only environmental information of a descriptive nature as well as those not having disclosed information on their 10K report prior to the Supreme Court decision were more severely penalized by investors in the four days following the decision than firms having released quantitative disclosures. Also in a U.S. context, Clarkson et al. (2004) provide evidence indicating that there are incremental economic benefits associated with environmental capital expenditure investment by low-polluting firms but not high-polluting firms. They also find that investors use environmental performance information to assess unbooked environmental liabilities, which they interpret to represent the future abatement spending obligations of high-polluting firms in the pulp and paper industry.

In the Canadian context, Li and McConomy (1999) and Berthelot et al. (2003) examine the value relevance of accounting provisions under the Canadian Institute of Chartered Accountants' (CICA) standard for future expenses related to site removal and

remediation. Between 1990 and 2003, under Section 3060 of *the CICA Handbook*, Canadian firms made provisions in their financial statements when removal and remediation expenses could be reasonably estimated and it was probable that they would be incurred. Results from both studies suggest that disclosure made in accordance with Section 3060 provided new and relevant information to investors. More specifically, recognized provisions for site removal and remediations were associated with market value, with larger provisions translating into lower stock market valuations.

Our investigation is based on public interest theory and interest group theory. The public interest theory of regulation suggests that regulation is a result of a public demand for correction of market failures, essentially associated with information asymmetry. In this theory, it is assumed that the regulator does its best to regulate so as to maximize social welfare (Stigler, 1971; Scott, 2009).

The interest group theory of regulation takes the view that an industry operates in the presence of numerous interest groups. These various groups will lobby for different types of regulations. For example, environmentalists may lobby for emission control (Scott, 2009). This theory takes the view that regulation is a commodity for which there is a demand and supply. The commodity (mandated environmental disclosure in this case) will be allocated to stakeholders with the most political power (e.g. managers, environmentalists, investors, customers).

We assert that if mandated disclosure reduces information asymmetry between managers and investors, it will help to maximize social welfare by better informing investors, regulators and environmentalists.

Consistent with the view that a firm's environmental disclosure enhances the information available to financial markets to forecast its future earnings, we posit the following hypotheses.

***Hypothesis 1***

*Mandated environmental disclosures improve analyst earnings forecasts.*

***Hypothesis 2***

*The relevance of mandated environmental disclosure for analyst earnings forecasts is lower for firms operating in environmentally sensitive industries.*

***Hypothesis 3***

*The relevance of mandated environmental disclosure for analyst earnings forecasts is for firms with poor environmental performance relative to their industry.*

## 2.2 Corporate Governance and Analyst Forecasts

Bhat et al. (2006) document that governance transparency is positively associated with analyst forecast accuracy. Furthermore, they show that governance-related disclosure plays a bigger role in improving the information environment when financial disclosures are less transparent. Ajinka et al. (2005) and Karamanou and Vafeas (2005) also note that management earnings forecasts are more accurate in firms with more independent boards, which can reasonably lead to a decrease in analyst forecast errors.

.In a Canadian context, Cormier et al. (2009) show that some formal governance attributes (board and audit committee size) do reduce information asymmetry. There is a

documented association between governance, environmental disclosure and information asymmetry.

We can argue that efficient corporate governance may help financial analysts to frame the interpretation of environmental disclosures. In this case, governance would complement the disclosure. However, while complementarity has beneficial implications for financial markets' stakeholders, such is not the case for substitution.

At this stage, there is a lack of empirical evidence to the fact that corporate governance and environmental disclosures substitute or complement each other in increasing analysts' forecast precision. Hence, our research attempts to test the following alternative hypotheses.

***Hypothesis 4a***

*There is a substitution effect between corporate governance and continuous environmental disclosures in increasing analysts' forecast precision.*

***Hypothesis 4b***

*There is a complementary effect between corporate governance and continuous environmental disclosures in increasing analysts' forecast precision.*

## 3. Method

### 3.1 Sample

The initial sample is comprised of 191 Canadian composing the S&P/TSX (except for the banking sector). Forecast errors are not available for 14 firms, leaving 177

observations; and forecast dispersion is not available for 19 firms, leaving 172 observations. Sample firms operate in the following industries (S&P classification): consumer discretionary; consumer staple; energy; real estate; insurance; industrials; health care; information technology; telecom; materials (resources); and utilities.

### 3.2 Models

We consider the possibility that a firm's information dynamics affect environmental disclosure and analyst forecasts simultaneously. Within our research setting, endogeneity between disclosure and analyst forecasts 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) $$ANFOR_{it+1} = f\,(BETA + NEGEPS + DISC + DISC*ENVSENS + DISC*LENVP + ENVSENS + LENVP)_{it}$$

(1.2) $$DISC_{it} = f(GOVSCORE + SIZE + LEV + ROA + ENVSENS + LENVP)_{it}$$

Where:

| | |
|---|---|
| *ANFOR* | = Analyst forecasts |
| *DISC* | = Environmental disclosure |
| *ENVSENS* | = Environmentally sensitive industries |
| *LENVP* | = Low environmental performance |
| *GOVSCORE* | = Governance score |
| *BETA* | = Systematic risk, beta |
| *NEGGEPS* | = An indicative variable taking the value of 1if there earnings is negative, 0 otherwise |
| *SIZE* | = LnAssets |
| *LEV* | = Long term debt /total assets |
| *ROA* | = Return on assets |

Four different variables are used as proxies for analyst forecasts: Forecast dispersion (*FORDISP*); forecast errors (*FORERROR*); precision of common information to analysts (consensus) (*CONSENSUS*); and overall uncertainty (*OVUNC*).

### 3.3 Definition and Measurement of Variables

*Environmental disclosure (DISC).* National Instrument 51-102 *Continuous Disclosure Obligations* (NI 51-102) requires reporting issuers to disclose information about environmental matters in their continuous disclosure (CD) documents. Our disclosure grid is based on reporting requirement under National Instrument 51-102 which groups disclosure in five categories: Environmental liabilities; Asset retirement obligations; Financial and operational effects of environmental protection requirement; Environmental policies fundamental to operations; and Environmental risks. 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 rating awards three points for an item described in monetary or quantitative terms, two

points for an item described specifically, and one point for an item discussed in general.[2] The information is coded according to the grid presented in Appendix 1. Environmental disclosure is collected from financial statements, the MD&A and the rest of the annual report. We eliminate any overlap in disclosure.

*Analyst forecasts (ANFOR).* In addition to forecast dispersion and forecast errors (scaled by stock price), we use consensus and uncertainty as measured by Barron et al. (1998) to assess whether environmental disclosure affects the properties of analysts' information environment. According to Barron et al. (1998), analysts make forecasts of earnings based on common (h) and private (s) information.

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

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

[2] A coding manual documenting coding instructions as well as standardized coding worksheets were prepared in advance. Each coder 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 5% of the maximum number of items identified. Of the information quality level coding, less than 8% had to be discussed for reconciliation. Disagreement between coders mostly happened at the beginning of the coding process (essentially the first 20 firms. 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.

Where:

D = Dispersion in analyst 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 following a firm

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. 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 $U = (1 - 1/N) D + SE$. We scale U by the mean forecast EPS.

Four variables are added to the model of analyst forecast in addition to environmental disclosure: Beta (*BETA*); Negative earnings (*NEGEPS*), environmentally sensitive industries (*SENSIND*), and environmental performance (*LENVP)*. We expect that *BETA* should increase forecast dispersion, forecast errors, precision of common information to all analysts (*p*) and overall uncertainty (*U*). *NEGEPS* should increase forecast dispersion, forecast errors, and overall uncertainty (*U*) and decrease the precision of common information to all analysts (*p*).

*Environmentally sensitive industries (ENVSENS). ENVSENS* is a binary variable taking the value of 1 if a firm belongs to an environmentally sensitive industry. Patten (2002) documents a lower relationship between environmental performance and

environmental disclosure for environmentally sensitive industries, suggesting that environmental disclosure may be perceived as less credible for highly sensitive industries. In our sample, we consider the four following industries to be environmentally sensitive: Energy; Utilities; Industrials; and Materials (Resources).

*Environmental performance (LENVP)*. Environmental performance is proxied by the Toxics Release Inventory (TRI), a public database available from the National Polluting Release Inventory (NPRI) from Environmental ministry in Canada. This database contains 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 thousands of sales Aerts and Cormier, 2009; Clarkson et al., 2008). 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 fort the industry is positive, zero otherwise. We expect *SENSIND* and *LENVP* to be related to analyst forecasts, with no predicted signs. We expect coefficients on interaction terms *DISC*ENVSENS* and *DISC*LENVP* to be positively associated with forecast dispersion, forecast errors and overall uncertainty (*U*), and negatively associated with analysts' consensus (*p*).

In addition to *ENVSENS* and *LENVP*, three variables are added to the model of environmental disclosure: Governance score (*GOVSCORE*); firm size (*SIZE*); Leverage (*LEV*); and return on assets (*ROA*). We expect *SENSIND* and *LENVP* to be positively related to environmental disclosure (Cowen et al., 1987; Patten, 1991; Hackston and Milne, 1996).

*Governance score (GOVSCORE).* The governance score is based on Board Games (The Globe and Mail annual report on corporate governance). The grid is based on four components: Board composition; Shareholding and compensation: Shareholder rights: Disclosure. Since the actual impact of corporate governance on environmental disclosure is unclear, no directional predictions are made for the variable.

*Firm size (SIZE).* Prior evidence shows 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(Assets), is introduced with an expectation of a positive relationship with environmental disclosure.

*Leverage (LEV).* 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.

*Return on assets* (*ROA*). Prior 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; Murray et al., 2006). We expect a positive relationship between profitability and environmental disclosure.

## 4. Results

### 4.1 Descriptive statistics

Table 2a shows that the mean total environmental score is 27.88 (9.22 from financial statements, essentially relating to asset retirement obligations [mean of 7.02]; 4.64 from MD&A and 12.90 from the rest of the annual report). The highest mean score relates to disclosure about asset retirement obligation. This is not surprising since there are measurement and disclosure requirements under Canadian accounting standards (CICA, Section 3110). Internal consistency estimates (Cronbach's alpha on score components) show that the variance is quite systematic (alpha varying from 0.71 to 0.93 for different components). 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 Nunnaly (1978), a score of 0.70 is acceptable.

Table 2b reports environmental disclosure mean scores by industry. As expected, industries classified as environmentally sensitive obtain the highest disclosure scores (from 28.10 for Industrials to 35.60 for Energy).

[Insert Table 2a and Table 2b)

Table 3 provides some descriptive statistics about sample firms' financial and governance variables. Sample firms are relatively large (total assets averaging $11 billion) and with low leverage (long term debt averaging 18% of total assets). Systematic risk (*BETA*) is close to the stock market risk, averaging 1.10, suggesting that our sample is a

good representation of the Stock Exchanges. Forecast dispersion averages 3% while the absolute value of forecast errors averages 9% of stock price. Close to two thirds of sample firms are classified in environmentally sensitive industries. 19% of sample firms have lower environmental performance than their industry. 58% of sample firms have an environmental committee on the board of directors. Finally, the average governance score is slightly higher than two thirds of the maximum possible (68 out of 100 marks).

[Insert Table 3]

### 4.2 Multivariate analyses

Since we posit that a firm's information dynamics affect environmental disclosure and analyst forecasts 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 *CONSENSUS* and *DISC* ($t= -8.11$; $p < 0.001$). We reach the same conclusion for other forecast properties. Therefore, these variables are treated endogenously. In light of this diagnostic, we rely on a two-stage estimation model for the simultaneous test of forecast dispersion or forecast errors, legitimacy and environmental disclosure. The software being used is STATA. Finally, we exclude from regressions observations with standardized residuals exceeding two.

Consistent with hypothesis 1, the coefficient on *DISC* is negatively associated with forecast dispersion (-0.006; $p < 0.01$), and overall uncertainty (-0.109; $p < 0.10$), and positively related to consensus (0.044; $p < 0.01$). These results are consistent with the view that a firm's environmental disclosure enhances the information available to financial markets to forecast its future earnings.

Consistent with hypothesis 2, the coefficient on the interaction term *DISC*ENVSENS* is positively associated with forecast dispersion (0.006; $p < 0.01$), and uncertainty (0.123; $p < 0.10$), and negatively related to consensus (-0.043; $p < 0.01$). As expected, the relevance of continuous environmental disclosure for analysts' earnings forecasts appears to be lower for firms operating in environmentally sensitive industries. Contrary to hypothesis 3, the relevance of environmental disclosure for analyst earnings forecasts does not appear to be affected by a firm's poor environmental performance relative to its industry. However, poor environmental performance in itself is associated with a higher overall uncertainty (*OVUNC*) (2.329; $p < 0.01$).

Finally, consistent with prior literature, we observe that firm size (*SIZE*), leverage (*LEV*), environmentally sensitive industries (*SENSIND),* and low environmental performance *(LENVP)* are positively related to environmental disclosure, consistent with prior disclosure research.

[Insert Table 4]

Continuous environmental disclosure obligations contain both retrospective and prospective information. This allows us to investigate the impact of this dimension on analyst forecast. Essentially, disclosure about asset retirement obligations (*ARO*) and environmental liabilities (*ENVLIA*) represent retrospective information while other disclosure components are more forward-oriented disclosures. Table 5 presents results for the relation between environmental disclosure and analysts' consensus by disclosure components. Results do not differ significantly among components. This suggests that retrospective and prospective disclosures are both relevant for analyst earnings forecasts.

[Insert Table 5]

Table 6 presents results on the combined effect of corporate governance and environmental disclosures on analysts' forecast precision. We use two measures of corporate governance: 1) the presence of an environmental committee on the board, and 2) the overall governance score. Results are consistent with hypothesis 4a, in that there appears to be a substitution effect between corporate governance and continuous environmental disclosures in increasing analysts' forecast precision.

First, the presence of an environmental committee on the board of directors leads to more disclosure (9.493; $p < 0.01$) and to a higher consensus among analysts (0.242; $p < 0.05$). However, environmental disclosure in itself has a lower impact on analysts' consensus since the coefficient on the interaction term *DISC*ENVCOM* is negative and significant (-0.013; $p < 0.01$). This suggests a substitution effect between environmental disclosure and the presence of an environmental committee on their impact on forecasts' precisions. This is consistent hypothesis 4a.

Second, efficient governance attributes as proxied by the Board Games governance score is associated with a higher consensus among analysts (0.011; $p < 0.01$). As is the case for the presence of an environmental committee on the board, environmental disclosure in itself has a lower impact on analysts' consensus since the coefficient on the interaction term *DISC*GOVSCORE* is negative and significant (-0.001; $p < 0.01$). This is once again consistent with hypothesis 4a, suggesting a substitution effect between environmental disclosure and the presence of an efficient governance on their impact on forecasts' precisions.

[Insert Table 6]

### 4.3 Sensitivity analyses

First, we assess the impact of *DISC* on the implied cost of equity capital based on the Easton (2004) approach that measures the cost of capital as the inverse of the price-earnings-growth ratio, calculated as the square root of the difference between the average analysts' earnings per share forecasts for year-end 2008 and year-end 2009 scaled by stock price at year-end 2008.[3] This model requires EPS t +1 and EPS t+2 to be positive and EPS t+1 < EPS t+2, which imposes sample restrictions on our study. We lose 78 observations. Results (untabulated) based on as sample of 99 observations are quite similar to those presented in table 3. The coefficient on *DISC* is negative and significant (-0.035; $p < 0.05$) while the coefficient on the interaction term *DISC*SENSIND* is positive and significant (0.034; $p < 0.05$).

Second, the reliance on 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 *COSTCAP* simultaneous regressions, we observe an insignificant correlation of errors across equations (-0.07; $p < 0.35$ between *COSTCAP* and *DISC* equations). Concerning intra-equation multicollinearity, we observe that interaction terms are highly correlated. *DISC* is correlated at 0.83 with *DISC*SENSIND* and 0.51 with *DISC*LENVP*. Since

[3] As an alternative to implied cost of capital, we could use weighted average cost of capital relying on the Capital Asset Pricing Model. However, stock markets suffered from a major downturn in 2008 since the S&P/TSX lost more than 40%.

multicollinearity could be an issue, SURE is likely to improve the efficiency of the entire system (Binkley, 1982). Results (not tabulated) remain similar relying on 3SLS estimations instead of 2SLS.

## 5. Conclusion

In this paper, we investigate whether continuous environmental disclosure released under Canadian securities regulation enhances the information available to financial markets to forecast a firm's future earnings.

First, results show that a firm's continuous environmental disclosure enhances the information available to financial analysts to better forecast future earnings. Second, financial analysts seem to be able to interpret environmental information, i.e. discounting communications that are inconsistent with a firm's environmental performance. Third, our results suggest a substitution effect between environmental disclosure and the presence of an environmental committee on the board as well as efficient governance on their impact on forecasts' precisions.

Investors and other stakeholders expressed concerns that mandated environmental information released is not necessarily complete, reliable or comparable among issuers, and does not always provide meaningful information to investors. Our results suggest that these concerns may not be justified.

Finally, we expect that insights into the determination of continuous environmental disclosure will help market regulators in the development of new and effective disclosure policies.

The results of this study should be interpreted with caution at least for three 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. However, such an approach is consistent with recent research efforts (e.g., Clarkson *et al*., 2008). Second, our measure of environmental performance relies on the Canadian National Polluting Release Inventory, a single source that does not capture all of a firm's environmental impacts. However, we can infer that bad performance on this indicator is likely to be associated with poor performance on other dimensions of environmental performance. Third, we rely on a single external measure of corporate governance. In this vein, Baghal et al. (2008) point out that there is no consistent relation between governance indices and measures of corporate performance. In the authors' view, there is no one "best" measure of corporate governance. The most effective governance system depends on the context and firms' specific circumstances.

**Table 1**
**Variable measurement**

| | |
|---|---|
| *ERROR* | Forecast errors. The absolute value of EPS for 2009 minus mean forecasted EPS for 2008 scaled by stock price at the end of 2008. |
| *DISP* | Forecast dispersion. Standard deviation of mean forecast for 2009 scaled by stock price at the end of 2008. |
| *OVUNC (U)* | Overall uncertainty. 1 – 1/N* forecast dispersion + Squared error of the mean forecast. The number is scaled by the mean forecast EPS. |
| *CONSENSUS (p)* | Precision of common information to analysts. *P* captures the level of consensus among analysts and measures the ratio precision of common information (h) to the precision of their total information (h+s). |
| *BETA* | Beta is extracted from Stock Guide database and is computed based on percentage stock price change week over week for a period of 260 weeks ending at the end of 2008 fiscal year. |
| *EPS* | tive earnings in 2008. An indicative variable taking the value of 1if there earnings is negative, 0 otherwise; |
| *ENVSENS* | Environmentally sensitive industries. Energy, Industrials, Materials, Utilities. |
| *LENVP* | Low environmental performance is based on Toxic Release Inventory which 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. *LENVP* is binary variable taking the value of 1 if environmental performance scaled by the mean value fort the industry is positive, zero otherwise. |
| *SCORE* | Governance score for 2008. Based on Board Games (The Globe and Mail annual report on corporate governance). The grid is based on 100 marks. Board composition; 31 marks; Shareholding and compensation: 26 marks; Shareholder rights: 31 marks; Disclosure: 12 marks. |
| *ENVCOM* | Environmental committee. An indicative variable taking the value of 1 if there an environmental committee, 0 otherwise. |
| *SIZE* | Natural log of total assets at the end of 2008. |
| *LEV* | Leverage. Long term debt to total assets at the end of 2008. |
| *ROA* | Return on assets. Earnings/Total assets for 2008. |

**Table 2a**
**Environmental scores by components**

| N: 177 | Min. | Max. | Mean | Median | Std Dev. | Cronbach Alpha |
|---|---|---|---|---|---|---|
| *DISC* | 0 | 84 | 27.88 | 24 | 20.23 | 0.70 |
| *ARO* | 0 | 47 | 14.02 | 10 | 13.44 | 0.93 |
| *ENVLIA* | 0 | 35 | 2.52 | 0 | 5.54 | 0.87 |
| *ENVRISK* | 0 | 12 | 3.36 | 4 | 2.79 | 0.71 |
| *ENVPOLIC* | 0 | 12 | 3.63 | 4 | 2.84 | 0.73 |
| *FINOP* | 0 | 33 | 4.35 | 1 | 5.92 | 0.90 |

*DISC:* Environmental disclosure; *ARO*: Asset retirement obligations; *ENVLIA*: Environmental liabilities; *ENVRISK*: Environmental risk; *ENVPOLICY*: Environmental policies fundamental to operations; *FINOP*: Financial & operational effects of environmental protection requirement.

**Table 2b**
**Environmental mean scores by industry**

| | Non environmentally sensitive industries | | | | | | | Environmentally sensitive industries | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Insurance | ons. Disc. | Cons. staple | Real estate | ealth care | Inf. Tech. | Telecom | Energy | Industrials | Materials | Utilities |
| *DISC* | 7.17 | 17.44 | 19.54 | 18.73 | 5.16 | 11.60 | 14.20 | 35.60 | 28.10 | 33.93 | 30.44 |
| *ARO* | 0 | 4.22 | 4.85 | 4.09 | 5 | 4.80 | 9.20 | 21.78 | 11.95 | 18.57 | 15.56 |
| *ENVLIA* | 0 | 1.05 | 1.85 | 0.09 | 0.16 | 0.20 | 0 | 1.94 | 4.05 | 4.57 | 3.00 |
| *ENVRISK* | 3.33 | 3.55 | 3.08 | 3.64 | 0 | 1.60 | 1.60 | 3.74 | 3.60 | 3.34 | 3.56 |
| *ENVPOLICY* | 3.33 | 3.78 | 3.38 | 4.36 | 0 | 2.40 | 1.60 | 4.00 | 3.60 | 3.55 | 3.56 |
| *FINOP* | 0.50 | 4.83 | 6.38 | 6.54 | 0 | 2.60 | 1.80 | 4.14 | 4.90 | 3.89 | 4.78 |
| | 5 | 18 | 13 | 9 | 5 | 5 | 4 | 47 | 19 | 46 | 5 |

*DISC:* Environmental disclosure; *ARO*: Asset retirement obligations; *ENVLIA*: Environmental liabilities; *ENVRISK*: Environmental risk; *ENVPOLICY*: Environmental policies fundamental to operations; *FINOP*: Financial and operational effects of environmental protection requirement.

**Table 3**
**Financial and governance variables**

| N: 177 | Min. | Max. | Mean | Median | Std Dev. |
|---|---|---|---|---|---|
| *FORERROR* | 0.000 | 1.94 | 0.09 | 0.04 | 0.17 |
| *FORDISP* (N: 172*)* | 0.001 | 1.09 | 0.03 | 0.01 | 0.09 |
| *OVUNC* (N: 172) | 0.001 | 34.27 | 1.82 | 0.33 | 4.40 |
| *CONSENSUS* (N: 172) | -0.92 | 0.99 | 0.79 | 0.95 | 0.34 |
| *BETA* | 0.07 | 4.61 | 1.10 | 0.98 | 0.69 |
| *NEGEPS* | 0 | 1 | 0.18 | 0 | 0.39 |
| *ENVSENS* | 0 | 1 | 0.64 | 0 | 0.48 |
| *LENVP* | 0 | 1 | 0.19 | 0 | 0.39 |
| *GOVSCORE* | 27 | 98 | 68.18 | 68 | 14.89 |
| *ENVCOM* | 0 | 1 | 0.58 | 1 | 0.49 |
| *SIZE* (in million$) | 2 | 376 405 | 10 537 | 2 653 | 33 412 |
| *LEV* | 0 | 0.67 | 0.18 | 0.15 | 0.16 |
| *ROA* | -1.98 | 0.33 | 0.01 | 0.05 | 0.26 |

*FORDISP*: Forecast dispersion; *FORERROR*: Forecast errors; *OVUNC*: Overall uncertainty (*U*); *CONSENSUS*: Analysts' consensus (*p*); *BETA:* Systematic risk (beta); *NEGEPS:* An indicative variable taking the value of 1if there earnings is negative, 0 otherwise; *ENVSENS:* Environmentally sensitive industries; *LENVP:* Low environmental performance; *GOVSCORE*: Governance score; *ENVCOM*: An indicative variable taking the value of 1if there an environmental committee, 0 otherwise; *SIZE:* LnAssets; *LEV:* Long term debt /total assets; *ROA:* Return on assets.

**Table 4**
**2SLS Regressions on the Relation between Environmental Disclosure and Analyst Forecasts**

| | | *FORDISP* | *FORRROR* | *OVUNC* | | *CONSENSUS* |
|---|---|---|---|---|---|---|
| *BETA* | + | ***0.019 | ***0.039 | 0.199 | + | 0.049 |
| *NEGEPS* | + | **0.023 | ***0.038 | 0.142 | - | **-0.212 |
| *DISC* | - | ***-0.006 | -0.002 | *-0.109 | + | ***0.044 |
| *DISC*ENVSENS* | + | ***0.006 | 0.002 | *0.123 | - | ***-0.043 |
| *DISC*LENVP* | + | 0.001 | -0.001 | **-0.049 | - | -0.005 |
| *ENVSEN* | /- | ***-0.092 | -0.039 | *-2.252 | +/- | ***0.701 |
| *LENVP* | /- | -0.018 | 0.046 | ***2.329 | +/- | 0.332 |
| R-square | | 33.2% | 17.2% | 8.2% | | 8.9% |
| F-Statistic | | 11.6(0.00) | 6.39(0.00) | 2.02(0.05) | | 1.97(0.05) |
| ***DISC*** | | | | | | |
| *GOVSCORE* | /- | -0.117 | -0.100 | -0.117 | | -0.117 |
| *SIZE* | + | ***2.834 | ***2.666 | ***2.889 | | ***2.834 |
| *LEV* | /- | *12.244 | **15.578 | 11.482 | | *12.243 |
| *ROA* | + | 2.038 | 1.991 | 2.407 | | 2.038 |
| *ENVSENS* | + | ***16.220 | ***16.170 | ***16.224 | | ***16.220 |
| *LENVP* | + | ***12.474 | ***12.617 | ***11.706 | | ***12.474 |
| R-square | | 26.5% | 26.3% | 25.6% | | 26.5% |
| F-Statistic | | 9.9(0.00) | 9.9(0.00) | 9.2(0.00) | | 9.9(0.00) |
| N | | 172 | 177 | 172 | | 172 |
| Outliers | | 0 | 3 | 5 | | 0 |

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$.One-tailed if directional prediction, two-tailed otherwise. *FORDISP*: Forecast dispersion; *FORERROR*: Forecast errors; *OVUNC*: Overall uncertainty (*U*); *CONSENSUS*: Analysts' consensus (*p*); *DISC:* Environmental disclosure; *ENVSENS:* Environmentally sensitive industries; *LENVP:* Low environmental performance; *BETA:* Systematic risk (beta); *NEGEPS:* An indicative variable taking the value of 1if there earnings is negative, 0 otherwise; *GOVSCORE*: Governance score; *SIZE:* LnAssets; *LEV:* Long term debt /total assets; *ROA:* Return on assets.

**Table 5**
**2SLS Regressions on the Relation between Environmental Disclosure Components and Analyst Consensus (*p*)**

| | | *ARO* | *ENVLIA* | *ENVRISK* | *ENVPOLICY* | *FINOP* |
|---|---|---|---|---|---|---|
| *BETA* | + | ***0.237 | ***0.287 | ***0.182 | ***0.168 | ***0.241 |
| *NEGEPS* | - | **-0.153 | **-0.176 | ***-0.210 | ***-0.198 | ***-0.219 |
| *DISC* | + | ***0.039 | ***0.065 | ***0.100 | ***0.098 | ***0.038 |
| *DISC*ENVSENS* | - | ***-0.037 | ***-0.070 | ***-0.095 | ***-0.107 | ***-0.032 |
| *DISC*LENVP* | - | -0.007 | 0.007 | *-0.039 | -0.027 | -0.018 |
| *ENVSENS* | +/- | 0.444 | ***0.419 | ***0.531 | ***0.600 | ***0.449 |
| *LENVP* | +/- | 0.276 | 0.112 | **0.287 | 0.251 | *0.225 |
| ıare | | 8.8% | 7.4% | 9.5% | 10.1% | 8.9% |
| tistic | | 2.3(0.02) | 1.9(0.06) | 2.5(0.01) | 2.7(0.01) | 2.3(0.02) |
| ***DISC*** | | | | | | |
| *GOVSCORE* | +/- | -0.117 | -0.117 | -0.117 | -0.117 | -0.117 |
| *SIZE* | + | ***2.834 | ***2.834 | ***2.834 | ***2.834 | ***2.834 |
| *LEV* | +/- | **12.243 | **12.243 | **12.243 | **12.243 | **12.243 |
| *ROA* | + | 2.038 | 2.038 | 2.038 | 2.038 | 2.038 |
| *ENVSENS* | + | ***16.221 | ***16.221 | ***16.220 | ***16.221 | ***16.221 |
| *LENVP* | + | ***12.474 | ***12.474 | ***12.474 | ***12.474 | ***12.474 |
| R-square | | 26.5% | 26.5% | 26.5% | 26.5% | 26.5% |
| F-Statistic | | 9.9(0.01) | 9.9(0.01) | 9.9(0.01) | 9.9(0.01) | 9.9(0.01) |
| N | | 172 | 172 | 172 | 172 | 172 |
| Outliers | | 0 | 0 | 0 | 0 | 0 |

*: p < 0.10; **: p < 0.05; ***: p < 0.01.One-tailed if directional prediction, two-tailed otherwise.
*ARO*: Asset retirement obligations; *ENVLIA*: Environmental liabilities; *ENVRISK*: Environmental risk; *ENVPOLICY*: Environmental policies fundamental to operations; *FINOP*: Financial & operational effects of environmental protection requirement; *DISC:* Environmental disclosure; *ENVSENS:* Environmentally sensitive industries; *LENVP:* Low environmental performance; *BETA:* Systematic risk (beta); *NEGEPS:* An indicative variable taking the value of 1if there earnings is negative, 0 otherwise; *GOVSCORE*: Governance score; *SIZE:* LnAssets; *LEV:* Long term debt /total assets; *ROA:* Return on assets.

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**Table 6**
**2SLS Regressions on the Relation between Environmental Disclosure and Analysts' Consensus – Controlling for the Presence of an Environmental Committee on the Board**

| | | | |
|---|---|---|---|
| *BETA* | + | 0.065 | -0.01 |
| *NEGEPS* | - | ***-0.236 | ***-0.164 |
| *DISC* | + | ***0.044 | ***0.031 |
| *DISC*ENVSENS* | - | ***-0.032 | **-0.007 |
| *DISC*LENVP* | - | 0.004 | -0.002 |
| *DISC*ENVCOM* | + | ***-0.013 | - |
| *DISC*GOVSCORE* | + | - | ***-0.001 |
| *ENVSENS* | +/- | ***0.507 | 0.075 |
| *LENVP* | +/- | 0.270 | 0.181 |
| *ENVCOM* | +/- | **0.242 | -0.047 |
| *GOVSCORE* | +/- | | ***0.011 |
| R-square | | 8.5% | 8.3% |
| F-Statistic | | 1.8(0.08) | 1.8(0.08) |
| ***DISC*** | | | |
| *GOVSCORE* | +/- | -0.117 | -0.109 |
| *SIZE* | + | ***2.257 | ***2.287 |
| *LEV* | +/- | **14.522 | *12.695 |
| *ROA* | + | 4.334 | 4.132 |
| *ENVSENS* | + | ***12.698 | ***13.001 |
| *LENVP* | + | ***12.693 | ***12.564 |
| *ENVCOM* | + | ***9.493 | ***9.196 |
| R-square | | 31.4 | 31.4% |
| F-Statistic | | 10.7(0.00) | 10.2(0.00) |
| N | | 172 | 172 |
| Outliers | | 0 | 5 |

*: $p < 0.10$; **: $p < 0.05$; ***: $p < 0.01$.One-tailed if directional prediction, two-tailed otherwise.

*CONSENSUS*: Analysts' consensus (*p*); *DISC:* Environmental disclosure; *ENVSENS:* Environmentally sensitive industries; *LENVP:* Low environmental performance; *ENVCOM*: An indicative variable taking the value of 1if there an environmental committee, 0 otherwise; *BETA:* Systematic risk (beta); *NEGEPS:* An indicative variable taking the value of 1if there earnings is negative, 0 otherwise; *GOVSCORE*: Governance score; *SIZE:* LnAssets; *LEV:* Long term debt /total assets; *ROA:* Return on assets.

**References**


Aerts, W. and Cormier, D. (2009). Media Legitimacy and Corporate Environmental Communication. *Accounting, Organizations and Society*, 34(1), 1-27.

Ajinkya, B.; Bhojraj, S. and Sengupta, P. (2005). The Association between Outside Directors, Institutional Investors and the Properties of Management Earnings Forecasts. *Journal of Accounting Research.* 43(2), 343-376.

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.

Baghal, S., Bolton, B. and Romano, R. (2008). The Promise and Peril of Corporate Governance Indices. Columbia Law Review, 108(8), 1803-1882.

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.

Barth, M.E. and McNichols, M.F. (1994). Estimation and Market Valuation of Environmental Liabilities Relating to Superfund Sites. *Journal of Accounting Research*, 32 (supplement), 177-209.

Berthelot, S., Cormier, D. and M. Magnan. 2003. La gestion stratégique des résultats : le cas des provisions environnementales. *Comptabilité, Contrôle, Audit*, 9(2), 109-135.

Bhat, G., Hope, O.K and Kang, T. (2006). Does Corporate Governance Transparency Affect the Accuracy of Analyst Forecasts? *Accounting and Finance*, 46(5), 715-732.

Blacconiere, W.G. and Patten, D.M. (1994). Environmental Disclosures, Regulatory Costs, and Changes in Firm Value. *Journal of Accounting and Economics,* 18, 357-377.

Blacconiere, W.G. and Northcut, W.D. (1997). Environmental Information and Market Reactions to Environmental Legislation. *Journal of Accounting, Auditing and Finance,* 12 (Spring): 149-178.

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. and Magnan, M. (2003). Environmental Reporting Management: A Continental European Perspective. *Journal of Accounting and Public Policy,* 22: 43-62.

Cormier, D., Ledoux, M.J., Magnan, M. and Aerts, W. (2009). Corporate Governance and Information Asymmetry between Managers and Investors. *Corporate Governance*, 10(5), 574-589.

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.

CSA Staff Notice 51-333 (2010). *Environmental Reporting Guidance,* Canadian Securities Administrators, October.

Fama, E.F. (1980). Agency Problems and the Theory of the Firm. *The Journal of Political Economy,* 88(2), 288-307.

Freedman, M. and Stagliano, A.J. (1995). Disclosure of Environmental Cleanup Costs: The Impact of the Superfund Act. *Advances in Publics Interest Accounting,* 6: 163-176.

Hackston, D. and Milne, M.J. (1996). Some Determinants of Social and Environmental disclosures in New Zeeland Companies. *Accounting, Auditing and Accountability Journal,* 25, 77-108.

Karamanou, I. and Vafeas, N. (2005). The Association between Corporate Boards, Audit Committees, and Management Earnings Forecasts: An Empirical Analysis. *Journal of Accounting Research*, 43(3), 453-486.

Lev, B. 1988. Toward a Theory of Equitable and Efficient Accounting Policy. *The Accounting Review,* 68(1), 1-22.

Li, Y. and McConomy, B.J. (1999). An Empirical Examination of Factors Affecting the Timing of Environmental Accounting Standard Adoption and the Impact on Corporate Valuation. *Journal of Accounting, Auditing & Finance,* 14(3), 279-313.

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.

New, D., Warsame, H. and Pedwell, K. (1998). Managing Public Impressions: Environmental Disclosures in Annual Reports. *Accounting, Organizations and Society*. 23(3), 265-282.

Nunnaly, J. (1978). *Psychometric Theory.* McGraw Hill, 2nd Edition, New York.

Ontario Securities Commission (2009). *OSC Corporate Sustainability Reporting Initiative*

Ontario Securities Commission (2004). National Instrument (NI 51-102).*Continuous Disclosure Obligations.*

Patten, D.M. (1991). Exposure, Legitimacy, and Social Disclosure. *Journal of Accounting and Public Policy*, 10(4), 297-308.

Patten, D.M. (2002). The Relation between Environmental Performance and Environmental Disclosure: A Research Note. *Accounting, Organizations and Society,* 27, 763-773.

Scott, T.W. (1994). Incentives and Disincentives for Financial Disclosure: Voluntary Disclosure of Defined Benefit Pension Plan Information by Canadian Firms. *The Accounting Review*. 69 (1): 26-43.

Stigler, G.J. (1971). The Theory of Economic Regulation. The Bell journal of Economics and Management Science. Spring, 3-21.

Scott, W.R. (2009). *Financial Accounting theory*. Prentice Hall Canada. Scarborough, Ontario.

Wiseman, J. (1982). An Evaluation of Environmental Disclosures Made in Corporate Annual Reports. *Accounting, Organizations and Society*. 7(1), 53-63.

## Appendix 1
### Environmental coding grid

**Environmental liabilities**

***Reported liabilities***

Identify and describe each environmental liability (description, methodology, assumptions, uncertainties)
Explain the significance of the liability and identify the F/S line items affected by the liability
Discuss changes made to liability estimate during past two years
Identify segment of the issuer's business affected and discuss the liability on a segment basis

***Contingent liabilities***

Identify and describe each environmental liability (description, methodology, assumptions, uncertainties)
Explain the significance of the liability and identify the F/S line items affected by the liability
Discuss changes made to liability estimate during past two years
Identify segment of the issuer's business affected and discuss the liability on a segment basis

***Past and pending lawsuits***

Description
Amounts
Likelihood or settlement
Impact on current and future operations

**Asset retirement obligations**

General description
Reconciliation
Key assumptions
Undiscounted cash flows
Timing of payments
Credit-adjusted risk free rate
Facts and reasons for not being able to calculate the FV of an ARO

**Financial and operational effects of environmental protection requirements**

***Current financial year***

Capital expenditures
Earnings
Competitive position

***Future years***

Capital expenditures
Earnings
Competitive position

**Environmental policies fundamental to operations**

Description
Steps taken to implement

**Environmental risks**

Description
Risk management policies and procedures

**Rating scale:**

3: Item described in monetary or quantitative terms; 2: Item described specifically; 1: Item discussed in general. Information coded from financial statements, MD&A and Annual report.