

Environmental Disclosure and Financial Characteristics of the Firm: The Case of Denmark

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ABSTRACT

Drawing on the importance of social accounting for sustainable development, we study practices of environmental disclosure on the websites of companies listed on the Copenhagen Stock Exchange. The first part of this paper produces and discusses descriptive evidence on environmental reporting practices by listed companies with respect to the content of disclosed information. We then undertake an explanatory task in order to identify the factors that determine environmental reporting for firms listed on the Copenhagen Stock Exchange. Firm size, financial leverage, the market-to-book ratio, and profitability are significantly associated with the breadth environmental disclosure. Copyright © 2012 John Wiley & Sons, Ltd and ERP Environment.

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Introduction

ENVIRONMENTAL RESOURCES ARE SCARCE. AS THEIR EMPLOYMENT AFFECTS SOCIAL WELFARE, THEIR EMPLOYMENT NEEDS to be accounted for (Martin-Ortega *et al.*, 2011). Companies need to disclose their environmental targets, risks, and performance because the dissemination of information is part of the managerial decision-making process; the outcome of this decision-making process is more likely to be accepted by affected stakeholders if they have been included in this process through communication of information relevant to their interests (Solomon and Lewis, 2002). Moreover, the dissemination of environmental information reduces perceived uncertainty by providers of capital; capital can then be accessed at lower required rates of return (Cowton and Thompson, 2000; Plumlee *et al.*, 2010). Dissemination of environmental information is a process of communication that aims at shaping the stakeholders' views and expectations of the company's environmental responsibility (Gray *et al.*, 2010). In this analysis, we see that an index of environmental disclosure, focusing on aspects that are quantifiable and relevant to stakeholders, can be a principal apparatus in the assessment of corporate communication. By measuring environmental disclosure in companies with diverse financial structure, size, and performance, this paper aims at identifying disclosure practices and their cross-sectional variations across diverse corporate organizations.

While information on environmental elements of corporate identity can be disseminated through a variety of media, we focus on corporate websites. Our investigation on the extent and the financial determinants of environmental disclosure is focused on corporate websites for two main reasons. The first is that environmental reporting on the

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Internet is a fundamental technology for organizational self-representation and the pursuit of corporate legitimacy (Cho and Roberts, 2010). The second is the plethora of evidence that the extent of environmental information that is disclosed on corporate websites is larger than the amount of information that is disclosed in annual reports (Chatterjee and Mir, 2008; Bolivar, 2009). Most corporate websites of (listed) companies include the annual report as part of disclosed material. Moreover, compared to hard-copy reports whose content is largely based on regulation, information that is disseminated on corporate websites is more customized to reflect the identity of a company and the nexus of its stakeholders. Furthermore, the frequent updating of online information, the increased and unmediated interactivity between suppliers of environmental information and the stakeholders that use it, as well as the speed of information dissemination make corporate websites more pertinent to the analysis of environmental disclosure.

While previous national case studies focused mostly on markets where the emphasis on the environmental effect of business activities is in an early stage (Zhang *et al.*, 2007; Monteiro and Aibar-Guzmán 2010), this paper discusses disclosure in a market where sustainable development is a key principle of economic activity. We place our emphasis on Denmark and, having researched the prior work in this field, we believe that this is the first paper to map the cross-sectional variations of environmental reporting practices of Danish corporations. We focus on Denmark because sustainable development is a principal pillar of the Danish government's strategy for growth (Danish Government, 2002). Sustainable development also constitutes a key element for the Danish Government and the private sector's strategy for competitiveness (Danish Council for Sustainable Business Development, 2008; Danish Government, 2010).

Review of Prior Research

Literature on the quality, the quantity, and the determinants of environmental disclosure has been mostly subsumed in the literature on corporate social responsibility (CSR) reporting (Mikkilä and Toppinen, 2008; Tagesson *et al.*, 2009; Mio, 2010). The natural environment, however, unlike other stakeholders, is not an agent of intentional action. It can be explored separately. So far, the study of corporate responsibility with respect to the environment, the associated disclosure practices, and the cross-sectional variations in disclosed information have been restricted to samples of national specificity; most papers have tried to quantify the breadth of disclosure by counting the number of relevant sentences in corporate texts and websites or by summing binary scores of disclosure across a wide range of environmental criteria. Some studies have also tried to explore the determinants of corporate environmental disclosure, and most papers focus on large, listed companies.

Prior research on the extent and the determinants of environmental disclosure can be distinguished in two groups: the papers that measured disclosure and the papers that also investigated the causal determinants of the measured disclosure scores.

Kolk (2003) investigated the extent of environmental reporting in an international sample, consisting of the Fortune Global 250 companies. Exploring annual and environmental reports, she discovered an increasing trend in environmental disclosure between 1998 and 2001, which she attributed to the increasing importance of environmental awareness and also an international diversity of the extent of environmental disclosure, which she attributed to the international variety of the institutional context of business activity and corporate reporting. While Kolk's (2003) analysis was based on the content of environmental information, Lodhia (2006) assessed environmental disclosure, investigating the extent to which the communicative characteristics of the Internet were efficiently employed in environmental reporting. In a sample of 14 companies of the Australian minerals industry, he discovered that the Internet was not efficiently employed in terms of immediacy, the multiplicity of available means of communication on the Internet, the available variety of linguistic expression, and the medium's ability to convey feelings and emotions. In a subsequent study, extending the length of Kolk's (2003) longitudinal analysis, Zhang *et al.* (2007) explored environmental reporting practices on the Internet in a four-year sample of 20 Chinese companies with large market capitalization. Their analysis was based on the voluntary character of environmental reporting and the expansion of the Internet in China over the sample period. They measured the number of companies that met each disclosure criterion in a list covering seven major aspects of environmental reporting and they discovered a trend of increasing amounts of disclosed environmental information over the sample period. Subsequent research in this area enriched the nexus of environmental disclosure criteria that were studied. Chatterjee and Mir (2008) explored the disclosure practices of the 45 largest Indian companies, based on their

market capitalization. Working with the 2003/2004 period, they measured disclosure with the number of sentences that addressed major areas of environmental disclosure practice: monetary and non-monetary evidence of corporate environmental practice (like environmental expenditures and environmental policy statements), the location of environmental disclosure in corporate websites, and news types (positive, negative or neutral). They found that even though environmental disclosure was not compulsory, large Indian companies disclosed a large amount of environmental information and that corporate websites are more informative of environmental practice than annual reports. In the same line of research, focusing on the identification of disclosure practices and measurement of disclosure quantity, Bolivar (2009) explored the content of environmental disclosure on the websites of Spanish firms that belong to the utility and resource industries. Drawing on the guidelines of the Global Reporting Initiative, the framework of compulsory financial reporting and some core principles of web design, he identified three sections of web disclosure: non-financial environmental disclosure, financial environmental disclosure, and website characteristics. Working with a disclosure index that summed binary scores –1 for disclosed, 0 for absent- across all three types of disclosure and employing a sample of nine firms, he discovered evidence of industry-specific disclosure practices and a lack of standardized corporate practices of environmental disclosure. Finally, in a recent study, Creel (2010) investigated the extent of environmental reporting, working with the sample of the 100 largest firms in the United States, according to the Fortune 100 list. He found that most firms discussed the environment on their websites and had separate environmental reports; however, for the majority of firms in the sample, environmental reporting did not conform to the principles of the Global Reporting Initiative and was not audited by an independent, outside source. While the results in these papers are interesting in identifying the content of environmental disclosure, the scope of these papers was limited by the small sample size and also the lack of analysis on the organizational characteristics that drive environmental disclosure. These drawbacks were tackled in another stream of research, that studied a larger sample and also included the cross sectional variations of environmental disclosure.

O'Dwyer (2003) studied the extent of environmental disclosure in annual reports and standalone environmental reports of all listed Irish companies. Employing content analysis within the context of legitimacy theory, he discovered that, even though Irish companies exhibit an increasing trend in environmental disclosure, extensive environmental reporting is practiced only by companies with easily observable environmental impact. He also discovered that environmental reporting was more often internal than external and that the extent of environmental disclosure is positively associated with corporate size and the environmental sensitivity of the company's industry. Further exploring the determinants of environmental disclosure, Cormier *et al.* (2005) investigated the case of listed German firms who make up the DAX30 and DAX 70 indices. They identified disclosure quality through the sum of three-scaled ratings that they assigned to each of 37 disclosure criteria; the criteria covered major dimensions of corporate environmental policy, such as environmental expenditures and risks, compliance to environmental legislation, pollution abatement, land contamination, environmental management practices. This paper's contribution extended beyond the identification of the quality of environmental disclosure and also discovered the economic incentives and institutional factors that drive the quantity and quality of environmental disclosure. Producing financial proxies for information costs and corporate performance and employing media exposure as a proxy for public pressure, they found that financial risk, ownership concentration, the age of fixed assets, and firm size are significant determinants of the quality of environmental disclosure. Moreover, being the first researchers to employ panel data in disclosure analysis, they found that disclosure practices are time specific and that routine is also a major driver of environmental disclosure, with similar companies progressively adopting similar disclosure practices. In the same area of inquiry, investigating the cross section of environmental disclosure, Brammer and Pavelin (2006) worked with a sample of 450 companies of the FTSE All-Share Index. Exploring the annual reports, they measured environmental disclosure in five different, but complementary, categories of environmental practice, ranging from environmental policy to environmental audit. For each of these dependent variables, logit regressions were employed to discover cross-sectional variations in the quality of environmental disclosure. The authors discovered that larger companies, belonging to environmentally sensitive industries were tended to disclose more of their environmental practices. The findings in Brammer and Pavelin (2006) were in the same vein as the results of O'Dwyer (2003) on the importance of size and industry classification and these results were further corroborated by the findings in Buniamin (2010). However, the financial and sectoral attributes of the firm do not fully account for the determinants of environmental reporting practices. In an attempt to account for the institutional context of environmental reporting, Vormedal and Ruud (2009) studied the breadth and the institutional determinants of sustainability reporting in a sample of the 100 largest Norwegian companies. They investigated both mandatory and voluntary sustainability disclosure in three media of corporate

reporting: board of directors' reports, annual reports, and non-financial reports. They found that sustainability reporting was more extensive in high-profile companies with direct environmental impact; they also documented that the practice of sustainability reporting was influenced by the societal, political, and regulatory characteristics of corporate reporting in Norway.

Employing the methodological set-up of O'Dwyer (2003), Buniamin (2010) explored the quality and quantity and the determinants of environmental disclosure in annual reports of listed Malaysian companies, having excluded financial companies due to their limited direct impact to natural environment. He measured quantity with the number of relevant sentences in annual reports; quality was measured with a disclosure index that summed binary variables which covered all major aspects of listed companies' environmental impact. This study showed that there was limited quantity and quality of environmental disclosure in the annual reports of listed Malaysian companies. It also showed that the quality and quantity of environmental disclosure was positively associated with the size and the environmental sensitivity of the listed companies. In identifying the content and exploring the cross-sectional variations in environmental disclosure, Huang and Kung (2010) worked with the largest sample so far; they investigated the effect of stakeholder pressure on the quantity of environmental disclosure. Working with a two-year sample of 759 Taiwanese companies, they identified the extent of environmental disclosure for each company largely following the methodology of Cormier *et al.* (2005). Their disclosure index was the sum of grades for each environmental criterion, in a range of criteria that covered the principal aspects of corporate environmental policy. The pressure of internal, external, and intermediary stakeholder groups for the voluntary and the non-voluntary diffusion of environmental information could not be identified directly but it was approximated with a group of measurements that demonstrated the impact of stakeholder pressure: number of employees, return on assets, financial leverage, inventory turnover, total sales, environmental sensitivity of the industry, and others. They found that larger companies, with a greater number of employees, with dispersed ownership, and with a record of environmental fines will tend to be more diligent and disclose a greater amount of environmental information. Huang and Kung's (2010) conclusions on the causal significance of size for environmental disclosure were also corroborated by Monteiro and Aibar-Guzmán (2010) who worked with a sample of 109 large Portuguese banks. While these studies produced rich insight on the determinants of corporate environmental disclosure, their focus was restricted to annual reports. Focusing on such regulated texts, they have not incorporated the organization-specific character of organizational communication, and have bypassed the versatility, flexibility and the organization-specific identity of corporate websites as means of disseminating environmental information.

Addressing the problem of organization-specific environmental practice, this paper is about the breadth and cross-sectional variations of environmental disclosure on corporate websites. Moreover, rather than exploring the practices of the largest companies, this paper studies all listed companies in the Copenhagen Stock Exchange, thus exploring the most representative productive organizations in an economy that has adopted sustainable development as a principal strategic orientation.

Setting up the hypotheses

Large firms are more visible than small ones (Udayasankar, 2008). They are also producers, employers, taxpayers, and debtors of increased economic and social impact; therefore they attract an increased demand for information from a rich network of interested stakeholders (investors, political institutions, employees, researchers, and so forth). Such information is not only focused on the firms' production or distribution activities but also on the employment of social and environmental resources which affect the stakeholders' welfare. In the context of the legitimacy theory, larger firms face increased public pressure to disclose their compliance to the social contract that gives them access to the society's resources (Cowen *et al.*, 1987; Patten, 1991). Increased demand for information is likely to invoke increased supply and therefore corporate size is likely to be positively associated with the extent of environmental reporting; there is also empirical evidence on this association (Adams *et al.*, 1998; Déjean and Martinez, 2009; Monteiro and Aibar-Guzmán, 2010). Thereof, we can form our first hypothesis:

Hypothesis 1: *The greater the size of the firm, the greater will be the breadth of environmental information that will be disclosed on the firm's website.*

We expect more profitable firms to disclose more of information on their environmental practices. There are two reasons for this. The first is that more profitable firms are more likely to have available the necessary funds for activities like environmental reporting (Brammer and Pavelin 2006), which, while enhancing the firm's relations to its stakeholders, are peripheral to its core business and are long-term in terms of their impact on shareholder wealth. The second is that profit-seeking organizations may want to expand the social acceptance of their profitable operations so that society continues to provide these organizations with necessary resources such as legitimacy of their existence and growth (Castelló and Lozano, 2011). This is especially the case when corporate operations may invoke negative externalities on their stakeholders and the environment (Woodward *et al.*, 1996; Palazzo and Scherer, 2006). These arguments motivate our second hypothesis:

Hypothesis 2: *The profitability of a firm is positively associated with the extent of environmental disclosure on the web.*

Environmental reporting is associated with the firm's use of capital and the market valuation of shareholders' wealth (Brammer and Pavelin, 2006). As the firm's management needs access to capital, it strives to lower the cost of capital and a principal element of this effort is the reduction of the investors' perceived uncertainty. In the case of firms with large deviations between the book value and the market value of equity, market valuation is largely driven by perceived company prospects, especially focusing on the off-balance sheet, non-codified drivers of value. One such source of market value is the firm's socially responsible practices (Becchetti and Ciciretti, 2009; Plumlee *et al.*, 2010). As investors are the principal audience of social and environmental reports (Spence, 2009), more detailed reporting practices on these drivers of value will provide information to the investors, thus reducing their perceived uncertainty about the firm's operations and, therefore, reducing the cost of capital and increasing the firm's valuation in the capital market. Based on this argument, we form our third hypothesis:

Hypothesis 3: *The greater the ratio of the market value of equity capital over the book value, the greater will be the extent of environmental disclosure on the firm's website.*

Environmental disclosure is also associated with the reporting firm's financial structure. The use of external financing is well-known to be associated with agency problems; the suppliers of capital need to design the contracts and employ monitoring mechanisms so that the users of capital make the best use of the available funds. The suppliers of external capital are major stakeholders and, to the extent that a stakeholder's resources are critical to the success of a corporation, there is higher probability that the stakeholder's demands will be satisfied (Ullmann, 1985). In this setting, environmental reporting is affected by capital structure in a two-fold manner. On the one hand, environmental disclosure informs the creditors about the ways in which the firm makes use of extra-contractually employed resources, such as the environment, in the firm's production process that is financed by the mix of debt and equity capital. On the other hand, excessively leveraged firms may not available the required funds for largely discretionary practices of communication with stakeholders, such as environmental reporting. The negative effect of financial leverage on the extent of CSR and environmental reporting has also been documented with empirical evidence in the literature (Brammer and Pavelin, 2006; Andrikopoulos and Samitas, 2011). Drawing on this evidence and our contract-theoretic argument, we form our fourth hypothesis.

Hypothesis 4: *The use of debt in the firm's capital structure negatively affects the extent of environmental disclosure on the web.*

Data Set and Method

Our initial sample consisted of all companies that were listed in the Copenhagen Stock Exchange, of the OMX trading platform, on November 10, 2009. We have chosen to work with listed companies since they are often the most visible and influential producers and employers in capitalist economies. Moreover, since December 16, 2008, listed Danish

companies are obliged to publish reports related to their CSR. criterion was satisfied and the value of Of our initial selection of 199 companies, we excluded 58 companies that had a website in Danish only and 4 companies that did not have a website. Table 1 shows the composition of our sample, spanning all sectors of listed companies. For each of these companies we measured disclosure with the Environmental Disclosure Index (EDI). The construction of the index was largely based on Tagesson *et al.* (2009); we adopted these assessment criteria of environmental reporting since they meet United Nations (2008) standards such as comparability, understandability, and relevance. EDI was defined as a sum of eight binary variables. Each of these eight variables took the value of 1 if the relevant disclosure criterion was satisfied and the value of 0 otherwise. The j -th firm's EDI was defined as

$$EDI_j = \sum_{i=1}^8 X_i \quad (1)$$

where

X_1 : Environmental Policy

X_2 : The corporation's effect on the environment

X_3 : Improvements – Environment

X_4 : Consumption

X_5 : Discharge

X_6 : Environmental certification

X_7 : Environmental objectives

X_8 : Follow-up of environmental objectives

Table 2 demonstrates the number of companies that met each of the environmental disclosure criteria that constituted our EDI measure.

In order to test our hypotheses, we measured company size with the logarithm of total assets (*Size*) and the market-to-book ratio (*MTB*) was estimated with the market capitalization of the companies on November 10, 2009 and the book value of equity of the third quarter of 2009. The market capitalization was recorded at a later period than the book value of equity so as to allow for the stock prices to incorporate the news from the publication of financial statements. Financial leverage (*Leverage*) was measured with the ratio of the book value of debt over the book value of equity, at the reported values of the third quarter of 2009. Profitability (*Profitability*) was measured with the return on equity. Table 3 shows the descriptive statistics for the variables of our analysis. We observe a low average score for the disclosure performance in our sample. This is due to the impressive fact that almost two-thirds of the companies in the sample got a score of 0 or 1. The MTB ratio, calculated at a year of unfavorable prospects and severe recession (Gross Domestic Program of Denmark fell by 4.9% in 2009) was not expected to be particularly high; nevertheless, observed values are not quite low, being influenced by the booming private sector of healthcare services, which averages an 8.5 MTB

| Sector | Number of companies | Percentage (%) |
|------------------------|---------------------|----------------|
| Industrial | 39 | 28.67 |
| Healthcare | 16 | 11.76 |
| Financial | 40 | 29.41 |
| Consumer discretionary | 12 | 8.82 |
| Consumer staples | 9 | 6.61 |
| Information technology | 9 | 6.61 |
| Energy | 4 | 2.94 |
| Materials | 7 | 5.14 |
| Sum | 136 | 100 |

Table 1. Number of companies by different sectors of activity

| Number of disclosed items | Number of companies | Percentage (%) |
|---------------------------|---------------------|----------------|
| 0 | 66 | 48.52 |
| 1 | 19 | 13.97 |
| 2 | 19 | 13.97 |
| 3 | 7 | 5.14 |
| 4 | 5 | 3.67 |
| 5 | 2 | 1.47 |
| 6 | 9 | 6.61 |
| 7 | 9 | 6.61 |
| Sum | 136 | 100 |

Table 2. Number of companies by breadth of disclosure

| | Disclosure | Size | Leverage | MTB | Profitability |
|----------------------|------------|-------|----------|-------|---------------|
| Mean | 1.65 | 7.72 | 3.72 | 2.43 | 0.14 |
| Median | 1 | 7.61 | 1.42 | 1.04 | 0.04 |
| Minimum | 0 | 2.15 | 0 | 0.07 | 0 |
| Maximum | 7 | 15.11 | 31.87 | 75.74 | 2.46 |
| Std Deviation | 2.25 | 2.2 | 5.61 | 6.89 | 0.36 |

Table 3. Descriptive statistics

ratio.¹ In the case of leverage, the financial companies the average debt-to-equity ratio of 3.72 is largely due to the extensively leveraged financial companies, averaging 7.2.

In order to investigate the validity of our hypotheses, we performed ordinary least squares regression analysis. Because of the idiosyncratic nature of leverage in the financial industry, we ran two separate regressions: one with all the companies in our sample, but excluding the effects of leverage on disclosure and another regression in which leverage was included in the set of explanatory factors, having though excluded financial companies from the data set. Our regression equation is

$$EDI = a_0 + a_1 Size + a_2 MTB + a_3 Profitability + a_4 Leverage \quad (2)$$

Econometric Results and Discussion

Tables 4 and 5 display the results from our linear regressions; in order to tackle the problem of heteroskedasticity, we estimated regressions with White-consistent standard errors; exploring collinearity issues, we calculated variance inflation factors (VIF) for all regressors and the values were very low in all cases.

Table 4 demonstrates that larger companies disclose more information on their environmental practices, thus producing corroborating evidence for our first hypothesis and coinciding with similar findings in Brammer and Pavelin (2006) for the United Kingdom and Monteiro and Aibar-Guzmán (2010) for Portugal. We also see supporting evidence for our second hypothesis that the higher the deviation of the market value from the book value of equity, the greater will be the extent of environmental disclosure. Non-standardized drivers of value – such as socially responsible corporate

¹As part of the policy response to crisis, the Danish government reduced spending on healthcare and a lot of healthcare services were increasingly provided by the private sector.

| | Coefficient | t – t-stat | P-value | VIF |
|-------------------------|-------------|------------|---------|------|
| Constant | -1.13 | -1.77 | 0.08 | |
| Size | 0.36 | 4.22 | 0 | 1.11 |
| MTB | 0.06 | 2.89 | 0 | 1.04 |
| Profitability | -0.95 | -4.1 | 0 | 1.08 |
| Adjusted R ² | 0.17 | | | |
| F - statistic | 8.14 | | | |

Table 4. OLS Regression Results All Sample

behavior – will be voluntarily disclosed in order to reduce uncertainty on market capitalizations that are not directly associated with ‘fundamentals’. Our regression results are interesting, producing disconfirming evidence on the hypothesized effect of profitability on environmental disclosure. We see that profitability is negatively associated with the extent of online environmental reporting. Drawing on the dependence of CSR practices on national cultural settings (Ringov and Zollo, 2007), our finding is probably due to the fact that corporate competitiveness and private growth are fundamental aspects of Denmark’s strategy for growth (Danish Government 2002; 2010). In this setting, profitable corporations conform to socially acceptable standards with the increase in their own profitability, thus reducing the need to seek legitimacy through other means, such as environmental reporting.

Table 5 shows our results with the inclusion of financial leverage and the exclusion of the financial companies from the sample (38 financial companies were removed). The findings provide support for our fourth hypothesis; restrained managerial discretion on corporate resources, resulting from heavy borrowing, implies a reduction of resources that are invested in activities that are essential such as environmental reporting, yet peripheral to corporate objectives such as short-term liquidity and creditworthiness.

Conclusion

Environmental reporting matters because it accounts for the company’s use of a non-agential stakeholder and scarce productive resource: the environment. Furthermore, efficient use of resources is associated with value creation and wealth accumulation. Sustainable value creation, however, rests upon the legitimacy of profit-making activities, such as the employment of natural resources. Legitimacy depends on stakeholders’ assessment of the externalities of corporate operations. In pursuit of such legitimacy and endorsing assessments, corporations report some of the environmental impact of their operations. This paper produces measures of disclosure performance and, more to the point, its cross-sectional variations. We studied the Danish corporate environmental practice, because of an institutional setting that officially supports both profit-making entrepreneurship and sustainable development. Our evidence shows, on average, quite a small extent of environmental disclosure, which implies that climate-change

| | Coefficient | t – t-stat | P-value | VIF |
|-------------------------|-------------|------------|---------|------|
| Constant | -2.13 | -2.69 | 0.01 | |
| Size | 0.61 | 5.56 | 0 | 1.15 |
| MTB | 0.04 | 2.98 | 0 | 1.18 |
| Profitability | -0.38 | -1.64 | 0.11 | 1.35 |
| Leverage | -0.12 | -0.12 | 0 | 1.15 |
| Adjusted R ² | 0.27 | | | |
| F - statistic | 9.89 | | | |

Table 5. OLS Regression Results- Non-financials

regulators may need to provide incentives for more extensive environmental reporting and also to alert corporate decision-makers and accountants that companies are required to report on their activities with respect to climate change under current Danish law (Act amending the Danish financial statements Act). Furthermore, our findings identify the characteristics of the companies that are least likely to implement the implementation of disclosure; the implication for policy-makers is that the implementation of disclosure regulation should target the most profitable, most levered, smaller firms which are least likely to adequately disclose the effect of their operations on the environment. Our results can be extended to other developed capitalist economies, where factors such as corporate size have also been found to explain environmental reporting both on a mandatory as well as on voluntary basis, as in the case of conforming to the principles of the Carbon Disclosure Project (Stanny and Ely, 2008). Our findings are, in part, extendable also to less developed capital markets where factors such as corporate size affect CSR practices (Imam, 2000). In the case of less developed markets, however, the analysis of CSR will have to integrate the different cultural contexts of the capitalist business enterprise and corporate accountability (Sobhani *et al.*, 2009).

Our evidence indicates that greater visibility and economic impact, being a typical characteristic of larger companies, induces a greater breadth of environmental disclosure. Corporations that produce wealth out of intangible, non-codified value drivers are also prone to disclose information at greater breadth, thus reducing the perceived risk of major stakeholders and especially the suppliers of capital. We also discovered that as environmental reporting is costly, the liquidity constraints of companies with high financial leverage negatively tend to reduce the extent of environmental disclosure. Furthermore, we discovered that in an institutional setting that supports and legitimizes profit-seeking entrepreneurship, increased profitability weakens the incentive to achieve legitimacy through alternative means, such as environmental reporting.

Our contribution is constrained and the scope of our results is constrained by the omission of causal factors for which we had insufficient evidence, such as the degree of ownership concentration; moreover, while focusing on the breadth of environmental disclosure, this study has not investigated the discourse of environmental reporting and has not addressed the ways in which texts of disclosure signify corporate identities and social roles. Overcoming these limitations, future research should explore cross-sectional variations not only of the breadth but also of the content and meaning of texts of environmental reporting; moreover, future research should suggest regulatory frameworks that are more homogeneous, comparable, and easy to use, in a way that environmental reporting can earn credibility among stakeholders and reduce perceived risk among suppliers of capital.

References

- Adams CA, Hill W-Y, Roberts CB. 1998. Corporate social reporting practices in Western Europe: Legitimizing corporate behavior. *The British Accounting Review* 30(1): 1–21.
- Andrikopoulos A, Samitas A. 2011. Corporate social responsibility reporting in financial institutions: Evidence from Euronext. Working paper.
- Becchetti L, Ciciretti R. 2009. Corporate social responsibility and stock market performance. *Applied Financial Economics* 19(16): 1283–1293.
- Bolivar MPR. 2009. Evaluating corporate environmental reporting on the internet: The utility and resources industry in Spain. *Business and Society* 48(2): 179–205.
- Brammer S, Pavelin S. 2006. Voluntary environmental disclosures by large UK companies. *Journal of Business Finance and Accounting* 33(7–8): 1168–1188.
- Buniamin S. 2010. The quantity and quality of environmental reporting in annual reports of public listed companies in Malaysia. *Issues in Social and Environmental Accounting* 4(2): 115–135.
- Castelló I, Lozano JM. 2011. Searching for new forms of legitimacy through corporate social responsibility rhetoric. *Journal of Business Ethics* 100(1): 11–29.
- Chatterjee B, Mir MZ. 2008. The current status of environmental reporting by Indian companies. *Managerial Auditing Journal* 23(6): 609–629.
- Cho CH, Roberts RW. 2010. Environmental reporting on the internet by America's toxic 100: Legitimacy and self-representation. *International Journal of Accounting Information Systems* 11(1): 1–16.
- Cormier D, Magnan M, Velthoven BV. 2005. Environmental disclosure quality in large German companies: Economic incentives, public pressures or institutional conditions? *The European Accounting Review* 14(1): 3–39.
- Cowen SS, Ferreri LB, Parker LD. 1987. The impact of corporate characteristics on social responsibility disclosure: A typology and frequency-based analysis. *Accounting, Organizations and Society* 12(2): 111–122.
- Cowton CJ, Thompson P. 2000. Do codes make a difference? The case of bank lending and the environment. *Journal of Business Ethics* 24(2): 165–178.
- Creel TS. 2010. Environmental reporting practices of the largest US companies. *Management Accounting Quarterly* 12(1): 13–19.
- Danish Government. 2002. The Danish growth strategy.

- Danish Government. 2010. Denmark in the Global Economy: Competitiveness Report 2010. Copenhagen.
- Danish Council for Sustainable Business Development. 2008. The Charter for Sustainable Business Development. Copenhagen, Denmark.
- Déjean F, Martinez I. 2009. Environmental disclosure and the cost of equity. *Accounting in Europe* 6(1): 57–80.
- Gray R, Owen D, Adams C. 2010. Some theories for social accounting? A review essay and a tentative pedagogic categorisation of theorisations about social accounting. In *Sustainability, Environmental Performance and Disclosures, Advances in Environmental Accounting and Management*, Freedman M, Jaggi B (eds). Emerald Group Publishing Limited 4: 1–54.
- Huang C-L, Kung F-H. 2010. Drivers of environmental disclosure and stakeholder expectation. *Journal of Business Ethics* 96(3): 435–451.
- Kolk A. 2003. Trends in sustainability reporting by the Fortune Global 250. *Business Strategy and the Environment* 12(5): 279–291.
- Imam S. 2000. Corporate social reporting. *Managerial Auditing Journal* 15(3): 133–141.
- Lodhia SK. 2006. The world wide web and its potential for corporate environmental information: A study into present practices in the Australian minerals industry. *International Journal of Digital Accounting Research* 6(11): 65–94.
- Martin-Ortega J, Brouwer R, Aiking H. 2011. Application of a value-based equivalency method to assess environmental damage compensation under the European Environmental Liability Directive. *Journal of Environmental Management* 92(6): 1461–1470.
- Mikkilä M, Toppinen A. 2008. Corporate responsibility reporting in larger pulp and paper companies. *Forest Policy and Economics* 10(7/8): 500–506.
- Mio C. 2010. Corporate social responsibility in Italian multi-utility companies: An empirical analysis. *Corporate Social Responsibility and Environmental Management* 17(5): 247–271.
- Monteiro SMS, Aibar-Guzmán B. 2010. Determinants of environmental disclosure in the annual reports of large companies operating in Portugal. *Corporate Social Responsibility and Environmental Management* 17(5): 185–204.
- O'Dwyer B. 2003. The ponderous evolution of corporate environmental reporting in Ireland. Recent evidence from publicly listed companies. *Corporate Social Responsibility and Environmental Management* 10(2): 91–100.
- Palazzo G, Scherer A. 2006. Corporate legitimacy as deliberation: A communicative framework. *Journal of Business Ethics* 66(1): 71–88.
- Patten DM. 1991. Exposure, legitimacy and social disclosure. *Journal of Accounting and Public Policy* 10(4): 297–308.
- Plumlee M, Brown D, Hayes RM, Marshall RS. 2010. *Voluntary environmental disclosure and firm value: Further evidence*. Working paper. University of Utah: Salt Lake City.
- Ringov D, Zollo M. 2007. Corporate responsibility from a socio-institutional perspective: The impact of national culture on corporate social performance. *Corporate Governance* 7(4): 476–485.
- Sobhani FA, Amran A, Zainuddin Y. 2009. Revisiting the practices of corporate social and environmental disclosure in Bangladesh. *Corporate Social Responsibility and Environmental Management* 16(3): 167–183.
- Solomon A, Lewis L. 2002. Incentives and disincentives for corporate environmental disclosure. *Business Strategy and the Environment* 11(3): 154–169.
- Spence C. 2009. Social and environmental reporting and the corporate ego. *Business Strategy and the Environment* 18(4): 254–265.
- Stanny E, Ely K. 2008. Corporate environmental disclosures about the effects of climate change. *Corporate Social Responsibility and Environmental Management* 15(6): 338–348.
- Tagesson T, Blank V, Broberg P, Collin S-O. 2009. What explains the extent and content of social and environmental disclosures on corporate websites: A study of social and environmental reporting in Swedish listed corporations. *Corporate Social Responsibility and Environmental Management* 16(6): 352–364.
- Ullmann AH. 1985. Data in search of a theory: A critical examination of the relationships among social performance, social disclosure and economic performance of U.S. firms. *Academy of Management Review* 10(3): 540–557.
- United Nations. 2008. *Guidance on corporate responsibility indicators*. Geneva and New York: United Nations.
- Udayasankar K. 2008. Corporate social responsibility and firm size. *Journal of Business Ethics* 83(2): 167–175.
- Vormedal I, Ruud A. 2009. Sustainability reporting in Norway – An assessment of performance in the context of legal demands and socio-political drivers. *Business Strategy and the Environment* 18(4): 207–222.
- Woodward DG, Edwards P, Brikin F. 1996. Organizational legitimacy and stakeholder information provision. *British Journal of Management* 7(4): 329–347.
- Zhang T, Gao SS, Zhang JJ. 2007. Corporate environmental reporting on the web: An exploratory study of Chinese listed companies. *Issues in Social and Environmental Accounting* 1(1): 91–108.