The Relationship between Environmental Performance and Environmental Disclosure: Empirical Evidence from Australia

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ABSTRACT
Previous studies in U.S. and Canada have found mixed results on the relationship between environmental performance and environmental disclosure. The voluntary nature of environmental reporting in Australia has given firms the option to disclose their environmental information or not. If they choose to disclose, they still have discretion to determine the breadth and depth of environmental reporting. Using a sample of 53 ASX200 Australian listed companies, the findings showed environmental performance, measured by Environmental rating and Firm Emission to environment, was not significantly associated with the level of environmental disclosure. However, it was found that company size and the level of capital investment influenced firms to disclose more environmental information.

Keywords: Corporate social responsibility, Social auditing and reporting, Sustainability, Triple bottom line.

The degradation of the environment in general, pollution to water, air, and land, and specifically, the emission of greenhouse gases, are of great concern for society. It has been argued that businesses need to operate in a cleaner manner and operate more environmentally friendly production processes for society’s survival, if not their own continued functioning (Hawken 1993; Rasmussen 1997). As a consequence, firms’ environmental performance has received greater scrutiny from stakeholders who demand firms disclose greater information regarding their environmental practices.

However, the voluntary nature of environmental reporting in Australia has given firms the option to disclose their environmental information or not (Mitchell, Percy & McKinlay 2006). If they choose to disclose, they have discretion to determine the breadth and depth of reporting. These conditions may make the users of such information question whether voluntary environmental disclosure in a firm’s annual or sustainability report accurately reflects its actual level of environmental performance. This link between environmental performance and environmental disclosure is not clear, although it has been studied extensively. The current study examines whether this discretionary (non-mandatory) Environmental Disclosure has any relation to Environmental Performance in Australia.

Environmental Responsibility: The CSR Perspective

Corporate Social Responsibility (CSR) is a perspective in which firms are seen as accountable for all of their actions which affect society, the community and the environment. Firms are viewed as part of
a larger economic system in which their operations might affect components of the system, and consequently the system itself (Hawken 1993; Rasmussen 1997). The notion of a responsible business community is thus inevitable as firms’ negative externalities such as the production of waste and emissions to the air, water, land, have been shown to degrade the environment (Hawken 1993; Labatt & White 2002). Thus, there is increased interest in firms’ environmental responsibilities particularly with the findings on climate change (Olson 2009; Watson & MacKay 2003). As environmental performance is not directly observable to stakeholders, the only way that stakeholders may know how a company performs is through its disclosure of its environmental practices (and their consequences). One view is that companies which integrate environmental responsibility as part of their management systems would be expected to disclose their responsible practices to society. Concurrently, firms may also disclose their environmental practices as a response to changing societal values such as consumer preferences for more environmentally conscious companies and environmentally friendly products (Olson 2009). However, there are competing views.

Competing Theories on the Relationship between Environmental Performance and Environmental Disclosure

**Voluntary disclosure theory**

Voluntary disclosure theory attempts to explain why firms make different level of disclosure (Bewley & Li 2000). It suggests that firms are hiding something when they fail to make full disclosures (Grossman 1981, Milgrom 1981 cited in Bewley & Li 2000). It also assumes that the disclosures actually made are credible because of the possibility of litigation and other legal issues for misrepresentation. These, the theory suggests, will prevent poor performing firms from misrepresenting themselves (Clarkson, Dontoh, Richardson & Sefcik 1992). In this model, firms will disclose environmental information voluntarily when they consider that the perceived benefits exceed associated costs, especially when the firms want to maximize their market value (Clarkson et al. 1992). Therefore, voluntary disclosure theory suggests that full disclosure will only occur if
companies are certain that their environmental performance is good, and it will be done to distinguish such organisations from the bad or average performers who will be less likely to disclose.

**Socio-political theories: legitimacy theory and stakeholder theory**

Legitimacy and stakeholder theories have also been used to explain the relationship between environmental performance and environmental disclosure. They suggest that firms disclose simply to maintain their relationship with society. This implies the possibility of inaccurate presentation of environmental information (Gray, Owen & Adams 1996; Melé 2008; Owen & O’Dwyer 2008; Patten 2002b). Firstly, legitimacy theory assumes a company will use disclosures to manage stakeholder impressions of its environmental impacts (Magness 2006; Tilt 1994; Wilmshurst & Frost 2000). The firm may then try to legitimise its actions by influencing perceptions of how it addresses environmental issues (Wilmshurst & Frost 2000). Secondly, stakeholder theory challenges the moral principle of shareholders of firms as the prime stakeholder of the firm in relation to the rest of the stakeholders, and suggests that firms have a duty to care for other stakeholders (Berman 1998; Freeman 1984). Stakeholder theory has been used to explain environmental disclosure behaviours as a way of handling stakeholder interests or expectations (Gray, Owen & Adams 1996; Roberts 1992).

**Previous Studies on the Relationship between Environmental Performance and Environmental Disclosure**

Some early studies in this area found no significant association between environmental disclosure and environmental performance (e.g. Freedman & Wasley 1990; Ingram & Frazier 1980; Wiseman 1982). However, some later studies found a positive relationship between environmental performance and environmental disclosure, and reported good environmental performers tended to disclose more environmental information (Al-Tuwaijri, Christensen & Hughes II 2004; Clarkson, Li, Richardson & Vasvari 2006). Other studies found that companies were misrepresenting their environmental performance, and suggested poor performing companies were disclosing their environmental performance inaccurately to obtain a positive image to stakeholders (Bewley & Li 2000; Fekrat, Inclan

For example Patten (2002b) examined the relation between the environmental disclosures in the 1990 annual reports of a sample of 131 U.S. companies and their environmental performance, based on toxic release data from 1988, and found a significant negative relationship between environmental performance and disclosure of the sample firms after controlling for firm size and industry classification. He found that organisations with bad environmental performance measured by emission levels normalised by sales were disclosing more information (measured by the presence of a statement about their environmental performance in 8 areas) than the good environmental performers.

On the other hand, Al Tuwaijri, Christensen & Hughes (2004) found that good environmental performers from 198 U.S. S&P 500 companies disclosed more pollution-related environmental information than did poor performers. They measured firms’ environmental performance using their waste recycled to total waste emitted ratio. Environmental disclosure was measured by a content analysis of environmental information in the firms’ U.S. Securities and Exchange Commission (SEC) Forms 10-K which comprise four categories: toxic waste, oil and chemical spills, potential responsible parties’ designation and environmental fines. Similarly, Clarkson et al. (2006) tested the relationship between environmental disclosure and environmental performance of 191 public U.S. companies, and found a positive association between environmental performance and the extent of discretionary environmental disclosures.

This study will test how much the environmental disclosure of a group of large Australian companies may be predicted by their environmental performance.

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1 SEC Forms 10-K is annual report of firm’s business and financial condition, which is required by the U.S. SEC. This is different from the annual report that firm produces to its shareholders as it covers more comprehensive areas of firm’s environmental information (U.S. Securities and Exchange Commission 2009).
METHOD

Sample and Data Collection

This study uses Australian companies listed on the Australian Stock Exchange (ASX) which lodged emissions data on the National Pollutant Inventory (NPI) database (Department of the Environment and Water Resources 2007) and were rated by Corporate Monitor (2007). The final sample consisted of 53 companies out of ASX 200 (Table 1). The sources of data for all the variables were obtained from the NPI database, the Annual Report database, the Datastream database, Corporate Monitor, firm websites and the Corporate Register.

Measures

Dependent Variable: Voluntary Environmental Disclosure Rating (VED)

The study tests how much environmental disclosure is predicted by environmental performance. Environmental disclosure is measured using Clarkson et al.’s (2006) environmental disclosure rating system based on the Global Reporting Initiative (GRI) 2002 reporting framework. The rating provides mapping to the GRI 2002 Guidelines and shows clear linkages between the items in the rating and the principles, guidelines, and measures in GRI. There are seven main categories in the rating which are divided into two categories: hard and soft disclosures. The hard disclosures are information that can be verified by users and where any untrue information can lead to litigation. As such, they are weighted highly in the rating scale. In contrast, the soft disclosures are mainly qualitative claims made by firms regarding their environmental performance, and may not always be true (e.g. in the case of “greenwashing”) (Watson & MacKay 2003). They thus are weighted less strongly than the hard disclosures. The score was obtained by rating companies’ environmental information from their annual reports, environmental reports, CSR or sustainability reports and company websites. Inter rating processes for 10 sample companies were carried out by an independent research assistant to ensure the reliability of the rating process. A copy of the rating system can be obtained from the first author.
Independent Variables: Environmental Performance Indicators

Firm’s emission level data/ National Pollutant Inventory (NPI)

The first measure of environmental performance uses the NPI. This Australian measure provides data on the actual emission level that is released to the environment by firms operating in the country (Department of the Environment and Water Resources 2007). The data is reported by facilities or plants that emit the pollutants. Although it is based on estimation by the emitters, state and territory environment agencies check the data for accuracy and then forward the data to the Australian government, which publishes the data on a public internet database. NPI measures the total emission from firms’ operations at the facility or plant level. The emissions amounts are then normalized by the total sales value of each individual firm to control the size effect. Initial analysis showed that NPI had some problems with normality with relatively high skewness and kurtosis. Square root transformation was therefore used to meet the assumptions of normality (Tabachnick & Fidell 2007; Tharenou, Donohue & Cooper 2007).

Corporate Monitor’s Environmental rating data (ER)

The second measure of environmental performance is the Corporate Monitor rating data. A monthly environmental performance rating of ASX 200 companies is produced by Corporate Monitor. Companies are assessed on their environmental performance using several criteria such as details of the environmental impact of their products and services, and company reports on their contribution to the environment (Corporate Monitor 2007). This rating complements the NPI data as it assesses a firm’s environmental performance using a wider range of criteria and gives rating scores from 1 to 5. ER is the mean of the 12 monthly environmental ratings for 2006 for each company.

Control Variables

Previous studies have found that there are several firm factors affecting the level of environmental disclosure besides firm environmental performance (Al-Tuwaijri et al. 2004; Alnajjar 2000; Clarkson et al. 2006; Patten 2002b). Financial considerations influence the level of environmental disclosure as
firms need to consider the cost-benefits of disclosing information. The perceived financial benefits which firms may receive by disclosing environmental information include lower cost of capital (equity), increased share price, better future financial performance, and lower cost of debts (Clarkson et al. 2006). These perceived financial benefits have created incentives for firms to disclose their environmental practices. However, there are also some perceived costs in disclosing such information, such as production and political costs. The production cost of environmental disclosure is a function of corporate size (Alnajjar 2000; Deegan & Gordon 1996). Larger firms are more likely to be scrutinized by the general public and environmentally sensitive pressure groups. Meanwhile, political costs are linked to industry classification. Firms from industries with higher sensitivity to environmental issues tend to disclose more environmental information (Li et al. 1997; Patten 2002b). In addition, firms with greater capital spending or newer equipment will be expected to have better environmental performance (Healy & Palepu 2001). Therefore, they may disclose more to inform stakeholders. These factors are used as control variables.

*Tobin Q* - was calculated from the sum of market value of common equity plus book value of preferred stock, book value of long term debt and current liabilities, and then divided by the book value of total assets.

*Volatility (Vol)* - Stock price volatility is measured through Beta that measures the movement of stock return in relation to the overall market.

*Return on Assets (ROA)* –was derived from the Net Income for the 2007 financial year divided by the total assets in the end of 2006 financial year. Initial analysis showed some problems with normality with relatively high skewness and kurtosis. Square root transformation was again used to meet the assumptions of normality (Tabachnick & Fidell 2007; Tharenou, Donohue & Cooper 2007).

*Leverage (LEV)* –is the ratio of total debt divided by total assets at the end of the financial year 2006.

*Firm size (Size)* –is the natural logarithm of the total asset value measured as of the end of the fiscal year 2006.

*Industry classification (IND)* –is a binary code of one or zero, which was designed to control for industry membership. A firm received a score 1 if it was considered to in an environmentally sensitive
industry [i.e. metal and mining, oil and gas, pulp and paper, chemical, and utilities; these classifications are similar to those of Patten (2002b), Li et al. (1997) and Clarkson et al. (2006)]. Firm belonging to less environmentally sensitive industries (those industries not included in the classifications above, such as health care and consumer staples) received a score of 0.

Asset newness (NEW) - measured as a ratio of net properties, plant and equipment divided by the gross properties, plant and equipment at the end of financial year 2006.

Capital intensity (CAPIN) –measured as a ratio of capital spending divided by total sales revenue at the end of financial year 2006. Initial analysis again showed moderate skewness and kurtosis values so a log transformation was used (Tabachnick & Fidell 2007; Tharenou, Donohue & Cooper 2007).

RESULTS

Summary Statistics

Table 2 shows the correlations between variables. All were less than .7, so were retained for the regression (Pallant 2007).

To assess the contribution of environmental performance variables in explaining the variance in the level of discretionary environmental disclosure, three reduced multiple regression models and the full model were used. The first set of calculations regressed the two environmental performance variables, NPI and ER, on to Environmental Disclosure to test to what extent these environmental performance measures alone were able to influence the level of discretionary environmental disclosure. Betas and R^2 are shown in Table 3. Environmental performance alone did not significantly predict Environmental Disclosure F(2, 47) = 1.21, p = .31.

The second regression tested the effect of environmental performance on environmental disclosure while controlling for the perceived financial benefits - that is, it included the control variables Tobin Q, Volatility, Return on Assets, and Leverage (Table 3). Again, these variables did not significantly predict Environmental Disclosure, F(6, 43) = 1.43, p = .23.
The third set of calculations added the perceived costs measures of firms’ discretionary environmental disclosure, Size and Industry, to the earlier predictors (Table 3). This time the predictors were significant $F(8, 41) = 5.34$, $p = .000$. Size and Industry were the individual significant predictors of Environmental Disclosure.

The last analysis (complete model) included two more control variables, Asset Newness and Capital Intensity (Table 3). The predictors again explained a significant amount of variance in Environmental Disclosure $F(10, 39) = 5.11$, $p = .000$. However, only two variables, Size and Capital Intensity made a statistically significant contribution.

**DISCUSSION**

The study found that environmental performance does not show a significant association with environmental disclosure. However, when other variables are included, particularly Organisational Size and Capital Intensity, then it is possible to predict the quantity of disclosure made by individual organisations, suggesting firms make decisions about environmental disclosures based upon perceptions of public pressure caused by their size and level of capital investment/expenditures, rather than upon their actual performance.

The finding related to Capital intensity is consistent with previous study (Clarkson et al. 2006). Capital investment in fixed assets could be made due to self-interest, in which firms want to improve their efficiency and reduce their negative environmental impact by utilising newer and more efficient equipment. Firms may wish to capitalise on these benefits by informing their constituents or stakeholders that they have made investments to alleviate or reduce their environmental footprints.

Firm size has also been found to influence level of environmental disclosure in the U.S and Australia (Alnajjar 2000; Deegan & Gordon 1996). Larger companies receive more attention from stakeholders and their activities are more likely to be of interest to the public in general. Their commitment to the environment and any action taken to remedy their environmental footprints may therefore receive greater exposure than medium or small sized firms. They would therefore be likely to capitalise on this
opportunity by disclosing their positive environmental information (González-Benito & González-Benito 2006). In addition, larger companies tend to have more resources that can be devoted to managing their environmental impact (González-Benito & González-Benito 2006) and to promoting their activities.

CONCLUSION

In summary, environmental performance did not show any significant association with the level of environmental disclosure in this sample of large Australian firms. One explanation is that firms’ environmental disclosure may not reflect their actual environmental performance accurately, which makes the value of environmental disclosure questionable. However, firms may disclose environmental information because they are targeted by stakeholders due to their size and spending (investment). This may suggest that they use disclosure practices as public relation tools to satisfy the needs of information from stakeholders, and to reduce tension from stakeholders and to gain benefits for the firms. Alternatively, it may have resulted in significant beta values for the two measures of environmental performance and a significant $R^2$.

Two further strands of research are therefore needed. The first is to repeat this quantitative study with a larger sample of companies. The second is a qualitative study of how and why companies disclose their environmental practices, especially the good and bad environmental performers. This will reveal how Australian businesses consider, decide and disclose their environmental performance information.
REFERENCES


Table 1: Description of sample companies.

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>No. of Companies</th>
<th>Percentage of Companies to Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>7</td>
<td>13.21%</td>
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<tr>
<td>Materials</td>
<td>23</td>
<td>43.40%</td>
</tr>
<tr>
<td>Industrials</td>
<td>10</td>
<td>18.87%</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
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<td>1.89%</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>7</td>
<td>13.21%</td>
</tr>
<tr>
<td>Health Care</td>
<td>4</td>
<td>7.55%</td>
</tr>
<tr>
<td>Utilities</td>
<td>1</td>
<td>1.89%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>53</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
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Table 2: Pearson Product-Moment Correlations Matrix

<table>
<thead>
<tr>
<th></th>
<th>VED</th>
<th>NPI</th>
<th>ER</th>
<th>Tobin</th>
<th>Vol</th>
<th>ROA</th>
<th>LEV</th>
<th>Size</th>
<th>Ind</th>
<th>New</th>
<th>Capin</th>
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<tbody>
<tr>
<td>NPI</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ER</td>
<td>.103</td>
<td>-.331*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Tobin</td>
<td>.315*</td>
<td>.157</td>
<td>-.173</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vol</td>
<td>.264</td>
<td>.282*</td>
<td>-.222</td>
<td>.611**</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>.252</td>
<td>.246</td>
<td>-.112</td>
<td>.487**</td>
<td>.329*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEV</td>
<td>-.069</td>
<td>-.235</td>
<td>.297*</td>
<td>-.148</td>
<td>-.146</td>
<td>-.312*</td>
<td></td>
<td></td>
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<tr>
<td>Size</td>
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<tr>
<td>Ind</td>
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<td>-.238</td>
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<td>-.064</td>
<td>.398**</td>
<td>.270</td>
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* p < 0.05 level (2-tailed).

** p < 0.01 level (2-tailed).
### Table 3: Reduced and Expanded Models

<table>
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<th>Model 1</th>
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<th>Model 4</th>
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<tr>
<td></td>
<td>Betas</td>
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<td>Betas</td>
<td>Betas</td>
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<tr>
<td>NPI</td>
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<td>.130</td>
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<tr>
<td>ER</td>
<td>.172</td>
<td>.227</td>
<td>.214</td>
<td>.196</td>
</tr>
<tr>
<td>Tobin</td>
<td>.216</td>
<td>.233</td>
<td>.121</td>
<td></td>
</tr>
<tr>
<td>Vol</td>
<td>.111</td>
<td>.155</td>
<td>.112</td>
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<tr>
<td>ROA</td>
<td>.095</td>
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<tr>
<td>LEV</td>
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<td>-.188</td>
<td>-.156</td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td>.535**</td>
<td>.463*</td>
</tr>
<tr>
<td>Ind</td>
<td></td>
<td></td>
<td>.285*</td>
<td>.262</td>
</tr>
<tr>
<td>New</td>
<td></td>
<td></td>
<td>-.174</td>
<td></td>
</tr>
<tr>
<td>Capin</td>
<td></td>
<td></td>
<td></td>
<td>.294*</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.049</td>
<td>.166</td>
<td>.510</td>
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<tr>
<td>$R^2$ change</td>
<td>.049</td>
<td>.117</td>
<td>.344</td>
<td>.057</td>
</tr>
</tbody>
</table>

* $p < .05$; ** $p < .01$;

Model 1: Environmental Performance Only

Model 2: Environmental Performance + Perceived Financial Benefits

Model 3: Environmental Performance + Perceived Financial Benefits + Perceived Costs

Model 4: Complete Model (Environmental Performance + Perceived Financial Benefits + Perceived Costs + Other Control Variables)