Corporate Responsibility Reporting in the UK and Japan

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1. Introduction

There is an increasing concern for the environment and society in today's world. Stakeholders call for corporations to take responsibility for the impact that their organisational activities have on the environment and society by publicly disclosing such impacts and how they are being managed (Brammer & Pavelin, 2006). Thus, the practice of corporate responsibility reporting (hereafter CRR) has been established. As concerns for the environment and society have been rising, so has CRR. A survey by KPMG (2008) found that nearly eighty percent of the world's largest 250 companies provide such disclosures. CRR provides mainly non-financial information about environmental, social, and governance aspects of an organisation. CRR has been provided in stand-alone reports or alongside the traditional financial information of the annual report (KPMG, 2008). However, unlike the provision of financial information in an annual report, CRR tends to be a voluntary reporting practice (Kolk, 2008). As firms have the choice to provide CRR, logical economic thinking says that they will only do so if they derive some benefit from it. By providing additional disclosures via CRR, firms can reduce the information asymmetries between the company and its external shareholders (Myers & Majluf, 1984). This benefits firms because it can lead to a reduced risk of adverse selection by investors and higher market valuations of firms' shares (Healy & Palepu, 2001). If investors consider CRR with the financial information they use in their investment decision-making process, then the two types of information together should better explain market valuations. Therefore, the objective of this study is to investigate whether CRR is associated with firms' market values in order to assess whether CRR provides incremental value relevant information to investors. To carry out this research objective I employ the price specification Ohlson (1995) model. The Ohlson (1995) model is a widely accepted equity valuation model in accounting research. Prior studies have implemented variations of the Ohlson (1995) model in value relevance studies. Through

Hassel, Nilsson, and Nyquist's (2005) use of a modified Ohlson (1995) model, it is found that environmental performance disclosures are value relevant but that investors reduce market values as they follow the cost concerned school of thought. Moneva and Cuellar (2009) also use the Ohlson (1995) model to investigate the value relevance of environmental information. The authors find that financial environmental information is value relevant, but non-financial environmental information is not. Schadewitz and Niskala (2010) also employ the Ohlson (1995) model and find that CRR prepared using the GRI reporting framework has incremental value to investors in Finnish companies.

KPMG (2008) reports that the majority of the top 100 companies in the 22 countries examined in their survey use the GRI reporting framework when preparing CRR. Japan and the United Kingdom (UK) are identified as the leading countries where firms have implemented CRR. Ninety-three percent of the top 100 Japanese companies and ninety-one percent of the top 100 UK companies provided CRR in 2008. Reporting on environmental, social, and governance aspects is becoming an established practice for the companies in these countries. Thus, the UK and Japan offer an interesting context to study the value relevance of CRR. The level of CRR has been relatively high in these countries for some time (KPMG, 2008). Agency theory arguments suggest that these companies must derive some benefit from CRR to justify the continued high level of voluntary reporting. Non-financial CRR information can lessen the information asymmetries that exist between these firms and their investors. With more information, investors' uncertainty about the future economic benefits and risks of the company can be reduced (Healy & Palepu, 2001). Investors can use the information to make better estimates of the company's value and the price they are willing to pay for the company's shares. Thus, in my investigation it is expected that there will be an association between the level of CRR and the market values of the top companies in both the UK and Japan, where CRR is an established practice. Prior studies have also considered the

effect that a company's industry has on its reporting incentives. Companies operating in environmentally sensitive industries face greater public policy concern and pressure. This induces more extensive disclosure practices in order to appease the public's concern about the environmental and social impacts of the organisation's activities (Cho & Patten, 2007; Cormier & Magnan, 2007). Therefore, the association between market values and CRR by companies operating in environmentally sensitive industries is also tested. Two samples are used in this study. The first consists of 91 of the UK's largest companies. The second consists of 85 of Japan's largest companies. The top 100 largest companies from each country (from the KPMG (2008) survey) provided the base for the two samples, however some companies were eliminated because their corresponding financial information could not be identified. The two samples were tested separately, with the results of the UK sample discussed first (see Tables 2 to 4), followed by the results of the Japan sample (see Tables 4 to 7). Two measures of CRR are used to represent the other value relevant information in the Ohlson (1995) model. The first is a composite score measuring several aspects of CRR and the second is an indicator of whether or not the GRI reporting framework was used in preparing CRR. Both measures are taken from the KPMG database for CRR (KPMG, 2008). I use the price specification Ohlson (1995) model to test if CRR increases financial information's explanatory power of share prices and to test whether CRR is significantly related to share prices. *P*-values and adjusted R^2 values are used to assess the significance of the variables' coefficients and the explanatory power of the models, respectively. Some quite surprising results are obtained. It seems that only investors in the UK consider CRR information in their total information set used for their investment decision-making. Whereas, investors in Japanese firms do not appear to find that CRR provides incremental value to their valuations of the firms.

The remainder of the study proceeds as follows. Section 2 presents prior literature on CRR and value relevance studies in accounting research, outlines the theoretical framework, and develops the hypotheses. Section 3 provides details of the data and empirical models employed in the study. The results for the UK sample, the Japan sample, and for the robustness tests are considered in Section 4. Section 5 provides an overall discussion and Section 6 presents concluding remarks, limitations, and implications of the study.

2. Literature Review and Hypotheses Development

2.1. Corporate Responsibility Reporting

There has been an increasing call for businesses to take accountability for their impact on society and the environment (Brammer & Pavelin, 2006; Dhaliwal, Li, Tsang, & Yang, 2011). As a result, many companies make voluntary disclosures about the effect that organisational activities have on society and the environment and how they are being managed. It seems logical that companies derive some benefit from undertaking voluntary CRR practices. Preparing voluntary CRR disclosures consumes organisational time and money, so one would expect that firms gain from the decision to release such disclosures otherwise they would not choose to do it. Researchers have investigated how firms gain from voluntary CRR in a number of ways, with many focusing on the information's value relevance to investors. Deegan and Rankin (1997) undertook a survey to assess the materiality of environmental information. Others have looked at the relationship between CRR and the cost of equity capital (Dhaliwal *et al.*, 2011). Analyses of the market's reaction to CRR have tested changes in returns, stock prices and market valuations (Anderson & Frankle, 1980; Banghoj & Plenborg, 2008; Cormier & Magnan, 2007; Hassel *et al.*, 2005; Moneva & Cuellar, 2009; Schadewitz & Niskala, 2010). An analysis of the relationship between CRR and market value is undertaken in this study. Shareholders do consider the voluntary disclosure of social and environmental information important and seek the

information from annual reports and other sources (de Villiers & van Staden, 2010; Deegan & Rankin, 1997; Epstein & Freedman, 1994). Nonetheless, prior studies reveal mixed evidence as to the value relevance of CRR.

Studies that look at the impact of CRR on firms' returns and found that the information is value relevant include Anderson and Frankle (1980), Godfrey, Merrill, and Hansen (2009), Al-Tuwaijri, Christensen, & Hughes' II (2004), and Holm and Rikhardsson (2008). Anderson and Frankle (1980) investigated the impact of existing voluntary social disclosures on capital markets. The returns of portfolios consisting of securities of companies that made social disclosures were compared to the returns of risk-matched portfolios of non-disclosing companies. The portfolios with disclosing companies had higher returns indicating that investors positively valued the social information, regardless of whether it was financial or non-financial information. An event study which looked at abnormal returns around a negative event was undertaken by Godfrey *et al.* (2009). The authors were interested to see whether corporate responsibility engagement protected shareholder value when the company experienced a negative event. A company carrying out corporate responsibility activities is found to protect shareholder value when the firm faces a negative event. In other words, investors interpret companies' corporate responsibility actions positively and consider such actions when valuing companies' securities. More specifically, corporate responsibility actions around community involvement and diversity of the firm were deemed important to investors. Al-Tuwaijri *et al.*'s (2004) simultaneous equations study of the relationships between environmental disclosure, environmental performance, and economic performance provides further evidence of the value relevance of CRR. Their results indicate that investors consider environmental information material as firms' annual returns were positively associated with firms' environmental performance (Al-Tuwaijri et al., 2004). Holm and Rikhardsson (2008) provide strong evidence that environmental information has value

relevance to investors by employing an experimental study to investigate whether environmental information affects the investment allocation decision of investors. The results indicate that positive environmental information is positively valued by investors. This finding is consistent across different investment scenarios (Holm & Rikhardsson, 2008). It signals that investors interpret environmental information as reducing risk associated with the company rather than being concerned with the cost of such environmental actions. Thus, many studies have found evidence that suggests information disclosed about firms' environmental performance is included in investors' information set (Holm & Rikhardsson, 2008).

Cormier and Magnan (2007) provide mixed evidence that environmental information is decision useful to investors. They investigate the impact of voluntary environmental reporting on the relationship between a firm's earnings and its market valuation. The authors assess country-specific factors that may affect the impact of environmental reporting. Canada, France, and Germany are looked at specifically due to their differing reporting and governance regimes. Canadian firms represent the North American context, whereas French and German firms represent differing continental European contexts. Canada is seen as having more extensive financial reporting disclosure regulations. Also, the common-law legal origin of Canada tends to indicate that the reporting environment is more shareholder-orientated. The European countries are viewed as having less comprehensive reporting requirements and a reporting environment that is more stakeholder-orientated. Thus, the authors expected firms' environmental reporting to affect the market valuation more so in Europe than in Canada. The results for German firms suggest that environmental disclosures have a moderating impact on market valuation of firms' earnings. However, investors in French and Canadian firms do not use environmental reporting to value earnings. In comparing the results from Canadian firms with the European firms, it is found that

environmental reporting has a greater impact on the market value of German firms than it does on Canadian firms. Yet there was no difference found between French firms and Canadian firms with regard to the impact of environmental reporting on market value (Cormier & Magnan, 2007). Banghoj and Plenborg (2008) studied the value relevance of voluntary disclosures made in annual reports of Danish firms. They argued that investors and analysts may find additional information that is voluntarily disclosed by management useful in valuing firms' future earnings. The reasoning behind their argument is driven by economic theory, which suggests that additional disclosures provide information about the amount, timing and uncertainty of future earnings. Consequently, investors and analysts should be able to make more accurate estimates of firms' future earnings, thus enhancing the association between market valuations and future earnings. However, the results do not support this conjecture. The authors do not find an association between current returns and future earnings. The authors speculate that investors may not be capable of incorporating voluntary information in their firm value estimates, rather than the disclosures lacking value relevance.

A common form of analysis is to test the relationship between CRR and the level of market value of equity. The Ohlson (1995) Equity Valuation Model has been the prevalent model to test such a relationship. In testing the value relevance of environmental performance information to investors in Swedish firms, Hassel *et al.* (2005) employ the Ohlson (1995) Model. The authors consider the relationship between environmental performance disclosures and firms' market values in terms of the cost-concerned school of thought and the value creation school of thought. Under the cost-concerned perspective, environmental disclosures are expected to cause the market value to decline. It is perceived that investments in environmental projects only represent increased costs, which decreases the firm's earnings. Alternatively, the value creation school of thought suggests that environmental investments

are a way to enhance a firm's competitive advantage, and thus improve the prospects of future earnings, which in turn improves market value. The results show that in relation to environmental performance disclosures, the market value of the firm decreases. Thus, the results indicate that environmental disclosures are value relevant and that investors follow the cost-concerned school of thought. Moneva and Cuellar (2009) examined the value relevance of financial and non-financial environmental disclosures made in the annual reports of a sample of listed Spanish companies. Both compulsory and voluntary environmental disclosures were analysed. In order to assess the value relevance of such disclosures, the authors performed a regression based on Ohlson's (1995) Model. This allowed the authors to investigate the impacts of environmental activities on Income Statement accounts and the valuation of future profitability and growth through environmental investment projects. The results support the importance of financial environmental information to investors when valuing companies. However, non-financial environmental disclosures were not found to have relevance to investors. The insignificant results may be explained by firms using non-financial environmental disclosures in self-promotion, whereby they overstate positive environmental contributions and understate negative impacts. Alternatively, the non-financial disclosures could be more associated with long-term strategic decisions while Spanish market investors focus more on the short-term strategies of firms (Moneva & Cuellar, 2009). Similarly, the link between firm value and CRR for Finnish firms was tested by Schadewitz and Niskala (2010). The Ohlson (1995) Model was employed using an indicator variable of whether or not a firm followed the GRI guidelines to represent CRR. They found that CRR which followed the GRI guidelines aided investors in making a more precise market valuation of the firm. This indicates that information from CRR reduces information asymmetry and has incremental value to investors (Schadewitz & Niskala, 2010).

2.2. Theoretical Framework and Hypotheses Development

The objective of this study is to investigate whether investors consider CRR to be decision-useful information and thus use it in their market valuations of firms. It is important to note again that CRR is voluntary so one would expect firms to derive some benefit from the practice otherwise they would not choose to do it. Management must weigh the benefit of investors having more information about the environmental and social impacts of the firm and therefore a better understanding of the firm, against the potential costs of other stakeholders reacting negatively to the disclosed information (e.g. pressure for environmental regulation) (Cormier & Magnan, 2007). Agency theory is drawn on to explain the reasoning behind why firms would undertake voluntary CRR.

The typical structure of a company is to have a management team (the agents) in charge of the operational activities and running the business on behalf of the external shareholders (the principals). This structure results in a separation of control and ownership. As a consequence, information asymmetry arises as managers have a greater knowledge of the organisational activities and how the shareholders' funds are being used (Myers & Majluf, 1984). This information asymmetry generates uncertainty in investors' assessments of the potential future earnings and cash flows of the company. Investors face the risk of adverse selection as they may overvalue an investment and put their money in a company that does not generate their required rate of return. This risk generated from information asymmetry impacts on how much investors are willing to pay for companies' shares. Given the lack of information, investors are likely to assume the worst and as a result they will decrease the share price of the company to compensate for the associated risk (Myers & Majluf, 1984).

Reporting is a key tool managers use to communicate firm-performance and operational activities with external investors, hence reducing information asymmetry (Healy & Palepu, 2001). Communication between these parties is essential in the functioning of efficient

markets. External investors require relevant corporate information when determining the current value of a firm (Healy & Palepu, 2001). Discretionary disclosures are made in an attempt to reduce the information asymmetry apparent between a firm's managers and its external investors (Brammer & Pavelin, 2006). Reports and disclosures make the actions of managers more transparent to investors. Transparency reduces investors' uncertainty, allowing them to make more accurate estimates of future earnings and cash flows. Enhanced transparency and more accurate estimates of future earnings mean investors can determine a more accurate share price for the company (Cormier & Magnan, 2007). Additionally, CRR provides qualitative information regarding a firm's corporate responsibility. The benefit of non-financial information is that managers often disclose more information about their activities than is required by law (Cormier & Magnan, 2007). Thus, using agency theory one can argue that CRR is carried out because it reduces information asymmetry, allowing investors to make more accurate market valuations. The information disclosed through CRR will be value relevant if it fulfils this function and will provide incremental value to investors as they include the CRR in the total set of information (i.e. financial reports and other company disclosures) they use in assessing a firm's value (Power, 1991). Drawing on the literature reviewed earlier and the information asymmetry arguments of agency theory, the following hypothesis is derived.

H1: *Higher levels of CRR are expected to be associated with higher market values of equity.*

In addition, firms that operate in environmentally sensitive industries tend to have different CRR disclosure practices than companies that do not operate in environmentally sensitive industries (Cho & Patten, 2007; Cormier & Magnan, 2007; de Villiers, Naiker, & van Staden, 2011). Industries that are considered to be environmentally sensitive are defined by de Villiers *et al.* (2011) as forestry; metal mining; coal mining and oil and gas exploration; paper and pulp mills; chemicals, pharmaceuticals and plastics manufacturing; iron and steel

manufacturing; and electricity, gas and waste water. Given the sensitive nature of these industries, firms operating within them are exposed to higher levels of environmental publicity and public concern. This can induce public policy pressure, which acts as an incentive for these firms to provide greater levels of CRR disclosures than firms which do not operate in environmentally sensitive industries (Cho & Patten, 2007; Cormier & Magnan, 2007). More extensive disclosures can further reduce information asymmetry and the risk of adverse selection for investors in companies operating in environmentally sensitive industries. Thus, it is expected that firms' market values will be incrementally higher when a higher level of CRR is disclosed by firms that operate in environmentally sensitive industries. The following hypothesis is derived for testing in the context of this study.

H1a: *Higher levels of CRR by firms operating in environmentally sensitive industries are expected to be associated with higher market values of equity.*

UK and Japanese firms are at the forefront of CRR. These two countries have led the rest in making corporate responsibility disclosures over the last decade (KPMG, 2008). Of the 100 top Japanese firms ninety-three percent released CRR and of the top 100 UK firms ninety-one percent released CRR (KPMG, 2008). Such reporting is now considered the norm for the top firms of these two countries. As such, the UK and Japan provide an interesting context to assess the value relevance of CRR. In the UK CRR is a voluntary reporting practice, so one would assume that many of the country's largest companies have a valid reason for undertaking CRR for a long period of time and one that also explains why more companies have started to produce CRR. The reporting practice has become well established in Japan too. CRR is also considered a voluntary reporting practice in Japan and it is reported that the majority of Japanese companies' CRR is prepared using the GRI reporting framework (Nuzula & Kato, 2011). However, ministries for the environment and for economy, trade and industry have issued environmental reporting and accounting guidelines to aid companies

with their CRR (Kolk, 2008; Krechowicz & Fernando, 2009). Despite CRR being considered a voluntary practice in Japan, firms listed on the Japanese stock exchange must adhere to environmental performance and reporting regulations. Such regulations are also expanding to include related economic and social issues (KPMG, 2008). This is not the case in the UK. Regulation via the Companies Act seems imminent, but has not yet been enforced (KPMG, 2008). Agency theory arguments discussed earlier can be applied to provide reasoning for such practices by UK and Japanese firms. CRR provides additional information to investors, beyond what is required to be disclosed in the annual report. This practice reduces information asymmetry as shareholders are now more aware of the firm's activities, with regard to its societal and environmental behaviour (Cormier & Magnan, 2007). Investors demand this information and consider it alongside financial information when valuing companies because it helps them to assess the future economic benefits of the company and the associated idiosyncratic risk better. This works to reduce the risk of adverse selection and enhances firm value as investors consider the new information and impound it into the valuation of the share price (Healy & Palepu, 2001). However, when considering how the CRR practice and surrounding reporting environment of the two countries, it becomes evident that there are potentially different reasons driving the similar reporting practices of the two countries. Consequently, comparing the value relevance of CRR to investors in companies in the UK and Japan becomes an interesting and important research question to academics, companies, equity market participants, standard setters, and regulators as they consider the growing concerns for the environment and society, demand for accountability of corporations, and the future of CRR.

3. Methodology

3.1. Data

Two separate samples are used in conducting this research. The first sample consists of 91 UK firms and the second sample consists of 85 Japanese firms. These samples are taken from the KPMG International Survey of Corporate Responsibility Reporting (KPMG, 2008). KPMG compiled data about the disclosure practices of the top 100 companies in 22 countries, based on revenue rankings. The survey reviewed information from publicly available corporate responsibility or sustainability reports, company websites, and annual financial reports. The information evaluated was issued by companies into the public domain between 2007 and 2008 (KPMG, 2008)[1]. From this information KPMG constructed measures relating to the CRR of each company. Two of the CRR measures that KPMG construct are employed in this research. The survey provides a credible and independent source of information on firms' CRR practices. The first CRR measure is a composite measure which gives a numeric score of the disclosure trends. Ten categories are represented in this score: overall environmental strategy, stakeholder engagement, corporate management systems, reporting, governance, climate change, supply chain, responsible investment, assurance, whether or not the GRI guidelines are used when preparing reports, and the GRI Application level achieved. A number of criteria were examined to assess each company's disclosure of the above categories. A score of one was given when a criteria was achieved, with the final composite score having a possible range of 0 to 87. The second measure of CRR is an indicator variable for whether or not a company followed the GRI reporting framework when preparing its CRR disclosures. The GRI's Sustainability Reporting Framework aims to provide guidance to any organisation on how to report their sustainability performance (GRI,

[1] KPMG does not disclose the time that each firm released their corresponding corporate responsibility disclosures. It is believed that such information is released at a similar time to the annual report being published. The data employed in this study is therefore taken for companies' fiscal yearend falling in the period January 2008 to December 2008.

2011). KPMG report that the majority of the top 100 companies in the examined countries and the top 250 global companies use the GRI reporting framework when preparing corporate responsibility reports (KPMG, 2008). Thus, the GRI measures of CRR provide a reasonable indication of the type of corporate responsibility disclosures provided by companies. However, the composite measure offers a deeper indication of the level of disclosures made[2].

The remaining data is taken from the *Compustat Global* database. All financial accounting information, share prices and outstanding shares are collected from this database. For the UK sample, nine firms are eliminated from the original 100 analysed by KMPG because corresponding financial information could not be identified. This results in the final sample of 91 UK firms. A total of fifteen firms are eliminated from full sample of 100 Japanese firms due to an inability to identify corresponding financial data. This results in the final sample of 85 Japanese firms.

3.2. Empirical Model

Value relevance studies in accounting literature examine the relationship between accounting information and equity market valuations. More specifically, these studies test to see whether accounting information explains cross-sectional variation in share prices. Information used by investors is said to be impounded into the stock price of a firm, thus reflecting the present value of a firm's future economic benefits. By assessing the market value or stock price of firms producing CRR an indirect test of the future benefits of such disclosure is performed

[2] KPMG also supplied a measure of the level of the GRI reporting framework complied with by companies. The Global Reporting Initiative specifies three application levels of GRI reporting framework, levels A, B, and C. Level A is deemed the most comprehensive as companies must report on all 50 GRI core indicators. Level B is the next compliance level down where companies must report on 20 of the core indicators. Level C is the least comprehensive as companies only have to report on 10 of the indicators. Companies may also have these reports independently assured. This is indicated by a '+' sign. KPMG apply a numeric representation of the overall GRI Application level each company achieves. The GRI Application level measure ranges from zero to six, where zero indicates that the GRI reporting framework has not been used in preparing CRR, 1 = C level compliance, 2 = C+ level compliance, 3 = B level compliance, 4 = B+ level compliance, 5 = A level compliance, and 6 = A+ level compliance. However, in my review of the GRI Application level scores given to each company in the samples I identified some inconsistencies with the GRI reporting framework indicator value (refer to Table 1 for the definition of this variable). As a result the GRI Application level measure is not used in this study.

(Ahmed & Falk, 2006). Ohlson (1995) derived a valuation model that evaluates firms' equity market values as a function of capitalised current earnings, current book value, and other value-relevant information. The examination can be done with different measurements of equity market valuations. Models may be employed using either the level of firm value or share price, or share price returns (Barth, Beaver, & Landsman, 2001). The model adopted should be driven by the research question, hypotheses developed, and econometric considerations. The difference between studying the level of firm value and share price returns is that the former is concerned with determining what is reflected in firm value and the latter is interested in determining what is reflected in changes in value over a specific period of time (Barth *et al.*, 2001). As the purpose of this research is to determine whether CRR may be considered by investors when pricing a firm, the primary model employed examines the level of firm value in relation to financial and nonfinancial accounting information. Ohlson's (1995) model provides the basis for the development of the least square regression models used in this paper, with CRR representing other potentially value-relevant information. The Ohlson (1995) model is as follows:

$$\mathrm{MV_t} = \mathrm{BV_t} + \alpha_1 \mathrm{AE_t} + \alpha_2 \mathrm{v_t} \qquad (1)$$

Where MV_t is the market value of equity at time *t*, AE_t is abnormal earnings for the period ending time *t* ,and v_t is other value-relevant information at time *t*. AE_t is calculated as the difference between net income for period *t* and opening book value of equity multiplied by the required rate of return.

Firms' required rates of return are needed to calculate abnormal earnings and implement the Ohlson (1995) model. However, this information is not observable in practice. An alternative would be to use analyst forecasts to calculate an implied required rate of return, but this information was also not available for the selected samples. As such, the current year's earnings are used in place of abnormal earnings (Ahmed & Falk, 2006). Following Barth and Clinch (2009), variables have been deflated by the number of the firm's outstanding shares.

This is done to mitigate any scale effects present in the samples. There has been debate regarding the appropriate method of standardisation. Different studies have employed different deflator variables, so Barth and Clinch (2009) test six versions of the Ohlson (1995) model commonly used in accounting research to see which is most effective at mitigating scale effects. The six specifications for the dependent variable include market value of equity, price, equity market-to-book ratio, price-to-lagged price, returns, and equity market value-to-market value ratio. Barth and Clinch (2009) find that standardising by the number of outstanding shares (i.e. the price specification) is the most effective at mitigating scale effects, in general. They report that the price model more consistently resulted in correct inferences regarding whether the coefficients equal zero, and result in lower bias and mean absolute error in the coefficients and regression R^2, regardless of the type of scale effect (Barth & Clinch, 2009, p. 283). The market value of equity model was also generally effective at mitigating scale effects, but to a lesser extent than the price specification. Consequently, I re-estimate the regressions using this specification as a robustness test. The remaining four variations of the Ohlson (1995) model have not been used in robustness testing due to Barth and Clinch's (2009) conclusion that they are less effective at mitigating scale effects and may lead to incorrect inferences. The price specification model employed in the primary test is as follows:

$$P_{i,t+3} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 E_{i,t} + \varepsilon_{i,t} \quad (2)$$

As the objective of this research paper is to investigate the incremental value of CRR, the association between financial accounting information and firm value must be tested first. This is done by implementing the above regression model (2). Then a measure of CRR can be incorporated to test the value relevance that such disclosures have for shareholders. This is done by implementing the following regression model:

$$P_{i,t+3} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 E_{i,t} + \beta_3 CRR_{i,t} + \varepsilon_{i,t} \quad (3)$$

An extension of model (3) is used to examine whether companies operating in environmentally sensitive industries appear to have differing relationships between firm value and CRR to those companies not in environmentally sensitive industries. Environmentally sensitive industries are categorised based on the classification used by de Villiers, Naiker, and van Staden (2011). Companies that are classified with the following SIC codes are deemed to operate in an environmentally sensitive industry: 800-899 (Forestry), 1000-1099 (Metal Mining), 1200-1399 (Coal Mining and Oil and Gas Exploration), 2600-2699 (Paper and Pulp Mills), 2800-3099 (Chemicals, Pharmaceutical and Plastics Manufacturing), 3300-3399 (Iron and Steel Manufacturing), and 4900-4999 (Electricity, Gas and Waste Water). The following model incorporates variables to assess the impact on companies in environmentally sensitive industries:

$$P_{i,t+3} = \beta_0 + \beta_1 BV_{i,t} + \beta_2 E_{i,t} + \beta_3 CRR_{i,t} + \beta_4 ES_{i,t} + \beta_5 (ES_{i,t} CRR_{i,t}) + \varepsilon_{i,t} \quad (4)$$

Two measures of CRR are used when testing equations (3) and (4). The first is the composite score off each company's CRR practices, as measured by KPMG in their 2008 survey (KPMG, 2008). The second is measure indicates whether the GRI reporting framework was employed in each company's preparation of CRR. Refer to Table 1 for detailed descriptions of all of the variables employed in the testing of equations (2) through (4).

The market value specification Ohlson (1995) model is employed as a robustness test. Barth and Clinch (2009) find evidence that this version of the Ohlson (1995) model is relatively consistent in resulting in correct inferences when data has scale effects. It was not found to be as generally effective as the price specification Ohlson (1995) model, but was more effective than the other commonly employed variations of the Ohlson (1995) model.

Table 1: Summary of variables used in equations (2) to (4)

Variable	Measure/Calculation
$P_{i,t+3}$	The dependent variable is a measurement of the market share price of company *i*. The closing share price on the last day of the month three months after the end of the financial year, *t*, for company *i* is used to allow time for the issuance of corporate reports and subsequent examination by users of the reports.
$BV_{i,t}$	$BV_{i,t}$ is the closing book value of equity per share for company *i*. It is calculated as difference between the company's total assets and total liabilities scaled by the number of outstanding shares at the end of the company's financial year, *t*.
$E_{i,t}$	$E_{i,t}$ is a measure of the earnings per share for company *i*. It is calculated as income before extraordinary items deflated by the number of outstanding shares at the fiscal yearend *t*.
$CRR_{i,t}$ **(Measure 1: *COMP*)**	*COMP* is a numerical measure for the disclosure trends of a company's corporate responsibility reporting (CRR). This measure is not deflated because it is independent of the company's size. *COMP* is the composite measure derived from the KPMG (2008) survey. A comprehensive description of the measurement is given in section 3.1.
$CRR_{i,t}$ **(Measure 2: *GRI*)**	*GRI* is an indicator variable for a company's corporate responsibility reporting (CRR). This measure is also not deflated because it too is independent of the company's size. *GRI* indicates whether or not company *i* has used the GRI reporting framework in preparing its CRR. If it has, *GRI* is equal to 1. If it has not, *GRI* is equal to 0.
$ES_{i,t}$	$ES_{i,t}$ represents companies in environmentally sensitive industries. Environmentally sensitive industries are based on the classification used in de Villiers, Naiker, and van Staden (2011). These industries include: forestry; metal mining; coal mining and oil and gas exploration; paper and pulp mills; chemicals, pharmaceutical and plastics manufacturing; iron and steel manufacturing; and electricity, gas, and waste water. For company *i*, $ES_{i,t}$ is equal to 1 if the company operates in an environmentally sensitive industry, and 0 otherwise.
$ES_{i,t}CRR_{i,t}$	This term represents the interaction between environmentally sensitive industries *ES* and corporate responsibility reporting *CRR*. It is calculated as *ES* multiplied by the *CRR* measure (for *COMP and GRI*).

Thus, I employ this specification to test the robustness of the results derived using the price specification regression model. To further test the robustness of the results obtained, the

regression models are estimated again using equity market values as at fiscal yearends. Investors may be timelier in incorporating financial and non-financial CRR information into the firms' market values than the three month lag allowed. Investors may anticipate the information before it is disclosed and impound it in the share price at the end of the company's financial year. Thus, both the primary test and the robustness test are re-estimated using closing stock prices (and the number of outstanding shares for the robustness test) as at the last day of company *i*'s financial year.

4. Results

This section provides an analysis of the results for the UK sample and for the Japanese sample, respectively. The value relevance of CRR in each of the samples is assessed by employing equation (2) and equation (3) sequentially. As CRR is a voluntary reporting practice it is expected that firms will choose to make such disclosures on the belief that the benefits of doing so will outweigh the associated costs. The additional information that CRR provides will aid in reducing uncertainty and risk faced by investors due to information asymmetry. It is therefore expected that CRR will have incremental value to investors as they can include the CRR disclosures in the full information set used to assess firm value. As such, the adjusted R^2 is expected to increase from equation (2) to equation (3) with the inclusion of the *CRR* variable in the regression. Also, the coefficient of the *CRR* variable (β_3) is expected to be positive and significant, indicating that there is a positive relationship between the level of CRR and firms' market value, as hypothesised in ***H1***. In a further analysis, the results from equation (4) are used in assessing whether higher levels of CRR provided by firms operating in environmentally sensitive industries are likely to be used differently by investors to determine the market value of a firm than with firms that do not operate in environmentally sensitive industries. The coefficient for the interaction between

the *ES* and *CRR* variables (β_5) can be used to examine this issue. Equation (4) is run twice, firstly using *COMP* as the measure of CRR and then again using *GRI* as the *CRR* variable. As hypothesis ***H1a*** states, it is expected that firms' market value will be incrementally higher when a higher level of CRR is disclosed by firms that operate in environmentally sensitive industries. Thus, the adjusted R^2 is expected to increase for equation (2) to equation (4) and the coefficient for the interaction term between *ES* and the *CRR* variable (β_5) is expected to be positive and significant.

4.1. Results for the United Kingdom

The descriptive statistics for the UK sample derived from using the price specification Ohlson (1995) model are provided in Table 2. On average, the share price for the sample of UK companies is 23.454 (with a median of 5.465). The maximum share price is 340.56 and the minimum share price is 0.19. This indicates that the data may be positively skewed. The mean (and median) appear to be closer to the minimum value of the sample's price observations, suggesting that most of the sample is concentrated at the lower end of the distribution while a few observations have higher price values. The book value of equity per share and earnings per share also appear to be positively skewed. The book value of equity per share for the UK sample has an average of 6.825 and a median of 2.723. The maximum book value of equity per share is 111.898 and the minimum is -0.394. The average value of earnings per share for the UK sample is 0.741 (with a median of 0.421). Earnings per share has a maximum value of 10.927 and a minimum value of -5.426. *COMP* (the composite score) and *GRI* (an indicator for using the GRI Reporting Framework) are the two measurements capturing the sample's CRR disclosures. *COMP* has a mean score of 30.33 and a median score of 31, for the UK sample. From a possible range of 0 to 87, the UK sample has a maximum score of 64 and a minimum score of 3. *GRI* has a mean of 0.374 and a median of 0. The *GRI* mean indicates that 37.4% of the sample uses the GRI reporting

framework, translating into thirty-four out of the ninety-one companies in the sample employing the GRI reporting framework.

Table 2: Descriptive statistics for the UK sample

	$P_{i,t+3}$	$BV_{i,t}$	$E_{i,t}$	$COMP_{i,t}$	$GRI_{i,t}$
Number of observations	91	91	91	91	91
Mean	23.454	6.825	0.741	30.330	0.374
Median	5.465	2.723	0.421	31	0
Standard deviation	55.643	15.310	1.886	13.076	0.486
Maximum	340.56	111.898	10.927	64	1
Minimum	0.19	-0.394	-5.426	3	0

COMP and *GRI* are the two measures used to represent *CRR*. Refer to **Table 1** for a detailed description of the variables used in the regression analyses.

The Pearson correlation coefficients are provided in Table 3. This offers an initial indication that share prices are positively associated with the two measures of CRR disclosure, *COMP* and *GRI*. Also, most of the correlations between the independent variables are relatively low, below 0.7. The exception is the correlation coefficient between book value of equity per share (*BV*) and earnings per share (*E*), which is slightly above 0.7. However, these two variables are the major explanatory variables in the Ohlson (1995) model, so despite their correlation in explaining changes in the share price both remain included in the regression analyses.

Table 3: Pearson correlation coefficients for the UK sample

	$P_{i,t+3}$	$BV_{i,t}$	$E_{i,t}$	$COMP_{i,t}$	$GRI_{i,t}$
$P_{i,t+3}$	1.000				
$BV_{i,t}$	0.048	1.000			
$E_{i,t}$	0.260	0.727	1.000		
$COMP_{i,t}$	0.252	0.008	0.119	1.000	
$GRI_{i,t}$	0.356	0.035	0.252	0.628	1.000

COMP and GRI are the two measures used to represent CRR. Refer to **Table 1** for a detailed description of the variables used.

Table 4 tabulates the results for the UK sample from the regression models (2) through (4), with the two measures of companies' CRR disclosures, *COMP* and *GRI,* tested separately.

The coefficient for book value of equity per share is negative and significant in equation (2) and in equation (3) using the composite score of CRR. In the other variations of the equations the book value of equity coefficient is negative but not significant. The negative relation between the market share price and the book value of equity per share can be attributed to standardising the variables by the number of outstanding shares to control for scale effects. When the variables are not standardised in the robustness tests, the association between the market value of equity and the book value of equity becomes positive (see Table 8: Panel A). The coefficient for the earnings per share measure is positive and significant across equations (2) to (4) and when either *COMP* or *GRI* is used to measure CRR. The adjusted R^2 for equation (2) is 0.089. In equation (3), the adjusted R^2 measure improves with the addition of the variable which measures CRR disclosures. The adjusted R^2 is 0.12 with the composite score as the *CRR* variable and is 0.149 with the GRI reporting framework indicator as the *CRR* variable. Also, the coefficients for both the *COMP* and *GRI* variables are positive and significant at the 5% and 1% levels, respectively. These results provide support for hypothesis ***H1***. They suggest that CRR disclosures provide incremental value to investors as when CRR (both *COMP* and *GRI*) is added to the regression the adjusted R^2 increases and the measure of CRR (both *COMP* and *GRI*) is positively and significantly associated with the market share price. Equation (4) introduces a variable representing environmentally sensitive industries (*ES*) and an interaction term between this industry measure (*ES*) and the *CRR* measure to capture the incremental effect on the share price. When equation (4) is run using the composite score of CRR the adjusted R^2 increases from 0.089 (in equation (2)) to 0.13. Likewise, the adjusted R^2 increases to 0.157 when equation (4) employs the GRI measure of CRR. However, for both variations of equation (4) (using *COMP* and *GRI*) the CRR variable loses its significance that existed in equation (3) which did not account for environmentally sensitive industries and their interaction with CRR. The industry indicator variable, *ES*, is not

Table 4: Value relevance of CRR for the UK sample: regression results for the price specification Ohlson (1995) model

	Equation (2)	**Equation (3)** *(with CRR as COMP)*	**Equation (3)** *(with CRR as GRI)*	**Equation (4)** *(with CRR as COMP)*	**Equation (4)** *(with CRR as GRI)*
$P_{i,t+3}$	Dependent	Dependent	Dependent	Dependent	Dependent
Intercept	20.428 (0.001)***	-5.587 (0.694)	9.337 (0.199)	5.214 (0.749)	10.182 (0.201)
$BV_{i,t}$	-1.081 (0.045)**	-0.958 (0.072)*	-0.765 (0.151)	-0.769 (0.157)	-0.685 (0.204)
$E_{i,t}$	14.046 (0.002)***	12.609 (0.004)***	10.120 (0.025)**	10.379 (0.026)**	9.201 (0.049)**
$COMP_{i,t}$		0.865 (0.023)**		0.355 (0.251)	
$GRI_{i,t}$			31.698 (0.004)***		17.781 (0.113)
$ES_{i,t}$				-29.226 (0.391)	-5.779 (0.754)
$ES_{i,t}COMP_{i,t}$				1.302 (0.086)*	
$ES_{i,t}GRI_{i,t}$					34.920 (0.083)*
Adjusted R^2	0.089	0.120	0.149	0.130	0.157
F value	5.402 ($p < .01$)	5.100 ($p < .01$)	6.266 ($p < .01$)	3.689 ($p < .01$)	4.359 ($p < .01$)
Number of observations	91	91	91	91	91

The price specification is used for the regression models, thus the number of shares outstanding is used as the deflator. The price variable is taken three months after the fiscal year end of each company to allow a reasonable time lag between the fiscal year end and the publication of corporate disclosures. The model is also tested using closing market share prices at the fiscal year end as the dependent variable. The results are qualitatively unaffected. Refer to **Table 1** for a detailed description of the variables.

The *p*-values are reported in parentheses. The significance tests for the following variables are one-tailed: $COMP_{i,t}$,$GRI_{i,t}$, $ES_{i,t}COMP_{i,t}$and $ES_{i,t}GRI_{i,t}$. All others are two-tailed.

Statistical significance at the 0.10, 0.05, and 0.01 level is denoted by *, **, ***, respectively.

significant, but the interaction term between *ES* and *CRR* is positive and significant at the 10% level for both measures of CRR (*COMP* and *GRI*). This result provides evidence that is consistent with hypothesis ***H1a***, which states that higher levels of CRR by firms operating in environmentally sensitive industries are expected to be associated with higher market values

of equity. The model was also tested using closing market share price data as at the end of the financial year as a robustness test. Investors may have been timelier in impounding financial and non-financial information into the share price than the three month time lag used in the primary test. The results are not affected by the use fiscal yearend share prices.

4.2. Results for Japan

Table 5 provides the descriptive statistics for the sample of 85 Japanese companies. The average market share price for the sample is 59122.859, whereas the median share price is 1216. The Japanese sample's maximum share price is 1170000 and the minimum share price is 193. This is indicative that the sample is positively skewed, as was the UK sample. The book value of equity per share has a mean of 39767.188 and a median of 1017.869. The maximum book value of equity per share is 675499.146 and the minimum value is 59.252. The earnings per share for the Japan sample is, on average, 3837.964 (with a median of 85.077). The maximum (minimum) earnings per share value is 71327.679 (-110.955). With regard to the two *CRR* variables, the composite score has a mean of 34.341 and the GRI reporting framework indicator has a mean of 0.835. The two measures have a median of 36 and 1, respectively. The maximum composite score the Japanese sample is 51 and the minimum score is 0. In comparing the *COMP* and *GRI* descriptive statistics of the Japan sample to the UK sample there is some indication that the Japan sample has relatively better CRR practices, generally. The mean (median) composite score of the Japan sample is higher at 34.341 (36) than that of the UK sample's at 30.330 (31), suggesting that the Japanese companies follow more comprehensive CRR practices. Similarly, 83.5% of the Japanese sample use GRI reporting framework in preparing their CRR (71 companies out of 85), whereas 37.4% of the UK sample use the GRI reporting framework (34 companies out of 91). The GRI reporting framework is the leading reporting framework for environmental and

social disclosures internationally (GRI, 2011)**.** Thus, its use is indicative of better CRR practices.

Table 5: Descriptive statistics for the Japan sample

	$P_{i,t+3}$	$BV_{i,t}$	$E_{i,t}$	$COMP_{i,t}$	$GRI_{i,t}$
Number of observations	85	85	85	85	85
Mean	59122.859	39767.188	3837.964	34.341	0.835
Median	1216	1017.896	85.077	36	1
Standard deviation	203557.949	131669.833	13212.436	11.336	0.373
Maximum	1170000	675499.146	71327.679	51	1
Minimum	193	59.252	-110.955	0	0

COMP and *GRI* are the two measures used to represent *CRR*. Refer to **Table 1** for a detailed description of the variables used in the regression analyses.

The Pearson correlation coefficients for the Japanese sample are presented in Table 6. The composite score and the GRI reporting framework indicator are negatively correlated with the market share price. This contrasts with the correlations between the share price and CRR in the UK sample. Correlation coefficients between the independent variables are at an acceptable level, except for the correlation between book value of equity per share and earnings per share. These two variables appear to be highly correlated, with a correlation coefficient above 0.7. This is similar to the UK sample, and again no attempt has been made to exclude either of these variables from the primary regression because they are a vital part of the value relevance model derived by Ohlson (1995).

Table 6: Pearson correlation coefficients for the Japan sample

	$P_{i,t+3}$	$BV_{i,t}$	$E_{i,t}$	$COMP_{i,t}$	$GRI_{i,t}$
$P_{i,t+3}$	1.000				
$BV_{i,t}$	0.908	1.000			
$E_{i,t}$	0.991	0.931	1.000		
$COMP_{i,t}$	-0.128	-0.034	-0.118	1.000	
$GRI_{i,t}$	-0.116	-0.043	-0.103	0.582	1.000

COMP and GRI are the two measures used to represent CRR. Refer to **Table 1** for a detailed description of the variables used.

The results from the primary regression (equations (2) to (4)) for the Japanese sample are provided in Table 7. As with the UK sample, equations (3) and (4) were tested twice; once using the composite score measure of CRR and again using the GRI reporting framework indicator as the CRR measure. The results are consistent across the two measures of CRR. The coefficient of the book value of equity per share is continually negative and significant. The negative direction of the association between book value of equity per share and the market share price can be attributed to the scalar (number of shares outstanding) because when the market value of equity model is employed the association becomes positive (see Table 8: Panel B). The coefficient of the earnings per share variable is positive and significant for all of the equations. The adjusted R^2 value is constant across all the equations and their variations, in terms of the CRR measure used, at 0.983. Furthermore, the coefficient of the *COMP* and *GRI* variables in equation (3) is insignificant. These results do not provide support for hypothesis ***H1***, as they indicate that there is no association between the market share price and CRR. Equation (4) includes a variable for environmentally sensitive industries and for the interaction between these industries and CRR. The *ES* industry variable is insignificant across both variations of the equation (*COMP* and *GRI*). The results of this equation also provide further evidence against the value relevance of CRR for the Japanese sample. The coefficient of the interaction term, for both *COMP* and *GRI,* is positive but insignificant suggesting that higher levels of CRR in companies operating in environmentally sensitive industries is not associated with higher market share prices. Thus, the results for the Japan sample do not provide support for hypothesis ***H1a***. As with the UK sample, the model was also tested using closing market share price data as at the end of the financial year of company *i,* for robustness purposes. The use of the share price data as at fiscal yearend does not impact the results of the model using share price data as at the end of the month three months after the fiscal yearend.

Table 7: Value relevance of CRR for the Japan sample: regression results for the price specification Ohlson (1995) model

	Equation (2)	**Equation (3)** *(with CRR as COMP)*	**Equation (3)** *(with CRR as GRI)*	**Equation (4)** *(with CRR as COMP)*	**Equation (4)** *(with CRR as GRI)*
$P_{i,t+3}$	Dependent	Dependent	Dependent	Dependent	Dependent
Intercept	1200.092 (0.691)	3745.578 (0.698)	5388.135 (0.463)	6017.836 (0.599)	7302.400 (0.387)
$BV_{i,t}$	-0.161 (0.009)***	-0.157 (0.013)**	-0.155 (0.013)**	-0.155 (0.016)**	-0.154 (0.015)**
$E_{i,t}$	16.760 (0.000)***	16.720 (0.000)***	16.694 (0.000)***	16.687 (0.000)***	16.668 (0.000)***
$COMP_{i,t}$		-73.727 (0.390)		-133.868 (0.334)	
$GRI_{i,t}$			-4975.461 (0.265)		-7083.677 (0.219)
$ES_{i,t}$				-8306.878 (0.704)	-8554.175 (0.629)
$ES_{i,t}COMP_{i,t}$				223.535 (0.356)	
$ES_{i,t}GRI_{i,t}$					9422.507 (0.312)
Adjusted R^2	0.983	0.983	0.983	0.983	0.983
F value	2436.29 ($p < .01$)	1605.955 ($p < .01$)	1612.365 ($p < .01$)	941.553 ($p < .01$)	946.562 ($p < .01$)
Number of observations	85	85	85	85	85

The price specification is used for the regression models, thus the number of shares outstanding is used as the deflator. The price variable is taken three months after the fiscal year end of each company to allow a reasonable time lag between the fiscal year end and the publication of corporate disclosures. The model is also tested using closing market share prices at the fiscal year end as the dependent variable. The results are qualitatively unaffected. Refer to **Table 1** for a detailed description of the variables used.

The *p*-values are reported in parentheses. The significance tests for the following variables are one-tailed: $COMP_{i,t}$,$GRI_{i,t}$, $ES_{i,t}COMP_{i,t}$and $ES_{i,t}GRI_{i,t}$. All others are two-tailed.

Statistical significance at the 0.10, 0.05, and 0.01 level is denoted by *, **, ***, respectively.

4.3. Robustness Tests

Barth and Clinch (2009) test six variations of the Ohlson (1995) model that are commonly used in accounting research to assess which models are the most effective at mitigating scale effects. They find that the price specification Ohlson (1995) model generally mitigates the

scale effects of their simulated data, hence this is the model I employ as the primary test. Barth and Clinch (2009) also find that the market value of equity specification is more effective at mitigating scale effects than the four other variations of the Ohlson (1995) model, but is less effective than the price specification variation. Therefore, as a robustness test, I re-estimate equations (2) to (4) using the market value of equity specification as the dependent variable. Correspondingly, the independent variables are no longer stated in the per share specification (i.e. they are not standardised), instead total book value of equity and total earnings are used. The results for both samples are provided in Table 8. The UK sample's results are tabulated in Panel A of Table 8. Equation (2), based on financial information only, has an adjusted R^2 value of 0.368. Total book value of equity and total earnings are positively and significantly associated with the market value of equity, which is consistent with the results from the primary test. The adjusted R^2 improves for equation (3) to 0.372 when the composite score is used and to 0.390 when the GRI reporting framework indicator is used. Both these measures of CRR are related to the market value of equity in the expected positive direction. However, only the coefficient of the *GRI* measure of CRR is significant. The adjusted R^2 decreases for equation (4) using the composite measure of CRR, relative to equation (2) (from 0.368 for equation (2) to 0.360 for equation (4)). Furthermore, the *COMP* variable and the interaction term are insignificant for this specification of equation (4). On the other hand, the use of the *GRI* indictor variable in equation (4) results in an increase in the adjusted R^2 to 0.383 (relative to equation (2)) and a positive and significant coefficient on the *GRI* variable. Yet, in relation to *GRI* variation of equation (3), the adjusted R^2 decreases (from 0.390 for equation (3) to 0.383 for equation (4)) and the interaction term is not significant. The coefficients for environmentally sensitive industries are insignificant across the two variations of equation (4). Overall, for the UK sample, there is moderate evidence in support of hypothesis ***H1*** but no evidence in support of hypothesis ***H1a***.

Table 8: Value relevance of CRR for the UK sample and the Japan sample: regression results for the market value specification Ohlson (1995) model

	Equation (2)^	**Equation (3)^** *(with CRR as COMP)*	**Equation (3)^** *(with CRR as GRI)*	**Equation (4)^** *(with CRR as COMP)*	**Equation (4)^** *(with CRR as GRI)*
Panel A: UK sample					
$MV_{i,t+3}$	Dependent	Dependent	Dependent	Dependent	Dependent
Intercept	8973.210 (0.465)	-22050.157 (0.433)	-4989.417 (0.719)	-15368.303 (0.642)	-3753.998 (0.806)
$TotalBV_{i,t}$	2.874 (0.000)***	2.658 (0.000)***	2.554 (0.000)***	2.662 (0.000)***	2.503 (0.000)***
$TotalE_{i,t}$	5.253 (0.028)**	5.020 (0.036)**	4.878 (0.038)**	5.195 (0.045)**	5.770 (0.023)**
$COMP_{i,t}$		1114.291 (0.111)		991.933 (0.190)	
$GRI_{i,t}$			48451.612 (0.022)**		63779.831 (0.017)**
$ES_{i,t}$				-37605.211 (0.585)	-7226.082 (0.841)
$ES_{i,t}COMP_{i,t}$				731.009 (0.354)	
$ES_{i,t}GRI_{i,t}$					-30608.692 (0.276)
Adjusted R^2	0.368	0.372	0.390	0.360	0.383
F value	27.202 ($p < .01$)	18.746 ($p < .01$)	20.186 ($p < .01$)	11.125 ($p < .01$)	12.185 ($p < .01$)
Number of observations	91	91	91	91	91
Panel B: Japan sample					
$MV_{i,t+3}$	Dependent	Dependent	Dependent	Dependent	Dependent
Intercept	272054.488 (0.001)***	262914.433 (0.214)	349227.862 (0.033)**	376830.321 (0.124)	408494.854 (0.027)**
$TotalBV_{i,t}$	0.769 (0.000)***	0.768 (0.000)***	0.775 (0.000)***	0.763 (0.000)***	0.772 (0.000)***
$TotalE_{i,t}$	4.223 (0.000)***	4.229 (0.000)***	4.183 (0.000)***	4.301 (0.000)***	4.218 (0.000)***
$COMP_{i,t}$		290.335 (0.481)		-2703.792 (0.351)	
$GRI_{i,t}$			-98682.385 (0.289)		-154121.802 (0.223)

$ES_{i,t}$				-461656.989 (0.340)	-279600.298 (0.476)
$ES_{i,t}COMP_{i,t}$				11975.269 (0.190)	
$ES_{i,t}GRI_{i,t}$					267289.402 (0.267)
Adjusted R^2	0.947	0.947	0.947	0.946	0.946
F value	757.738 ($p < .01$)	499.013 ($p < .01$)	501.022 ($p < .01$)	295.625 ($p < .01$)	295.224 ($p < .01$)
Number of observations	85	85	85	85	85

^The market value specification of the Ohlson (1995) model is used as a robustness test of the price specification model for the UK sample and Japan sample. The firm observations do not change, hence there are 91 observations in the UK test and 85 observations in the Japanese test. $MV_{i,t+3}$ represents the market value of equity of company *i* three months after its financial year end. It is calculated as the closing market share price multiplied by the number of outstanding shares on the last day of the third month after the financial year end of company *i*. The market value three months after the end of the financial year is used to allow time for the publication and analysis of corporate disclosures. $TotalBV_{i,t}$ represents the total book value of equity for company *i* as at the end of the financial year. It is calculated as Total Assets less Total Liabilities for company *i*. $TotalE_{i,t}$ is the Income Before Extraordinary Items figure for company *i's* financial year.
Refer to **Table 1** for a description of the remainder of the variables used.
The model is also tested using market value of equity at the fiscal year end of company *i* as the dependent variable for both the UK sample and the Japan sample. The results are qualitatively unaffected.
The *p*-values are reported in parentheses. The significance tests for the following variables are one-tailed: $COMP_{i,t}$, $GRI_{i,t}$, $ES_{i,t}COMP_{i,t}$, and $ES_{i,t}GRI_{i,t}$. All others are two-tailed.
Statistical significance at the 0.10, 0.05, and 0.01 level is denoted by *, **, ***, respectively..

Under the market value specification Ohlson (1995) model, the results are somewhat robust to the results from the primary test. The adjusted R2 value increases in equation (3) using both measures of CRR, indicating that CRR information along with financial information improves the explanatory power of market values of equity. Also, there is support for the expected positive association between market values of equity and levels of CRR, but only when the use of the GRI reporting framework is used to indication the level of CRR. However, in contrast to the results of the primary test, no evidence is found for the relation between higher levels of CRR by firms operating in environmentally sensitive industries and higher market values of equity. The coefficient of the interaction term, with *COMP* and *GRI*, were insignificant and the adjusted R^2 value decreased relative to equation (3). The results from the robustness tests of the Japan sample are provided in Panel B of Table 8. The

adjusted R^2 for equation (2) is 0.947, and the total book value of equity and total earnings are positively and significantly associated with the market value of equity. Similar to the results under the primary test, the adjusted R^2 remains relatively constant across the three equations (for both *COMP* and *GRI* as measures of CRR), however it does decrease to 0.946 for both CRR measures in equation (4). Also, the coefficients for total book value of equity and total earnings are positive and significant in all the equations. Under the price specification model the coefficient for earnings per share was positive and significant for all the equations too. Yet, the coefficient for book value of equity per share was consistently negative and significant in the price specification model (see Table 7). This indicates that the negative association between the book value of equity per share and market share price is due to the use of the number of outstanding shares as a scalar. In equation (3), the introduction of a *CRR* variable (either *COMP* or *GRI*) does not indicate that higher levels of CRR are associated with higher levels of market value of equity, as the coefficients for *COMP* and *GRI* are insignificant. This result is consistent with the results from the primary test of the Japan sample. Moreover, when environmentally sensitive industries are introduced into robustness test in equation (4), the coefficients on the *CRR* variable (both *COMP* and *GRI*), the *ES* variable, and the interaction between *CRR* and *ES* remain insignificant. These results are also consistent with the results obtained from the price specification Ohlson (1995) model. Overall, the results for the Japan sample are generally robust to using the market value specification Ohlson (1995) model. No support is found for higher levels of CRR being associated with higher market values of equity (hypothesis ***H1***) and no support is found for higher levels of CRR by firms operating in environmentally sensitive industries being associated with higher market values of equity (hypothesis ***H1a***). The regression models for both samples were also estimated using the market value equity (closing share price

multiplied by the number of outstanding shares) of company *i* at the end of its 2008 financial year. It does not impact the results, as was the case for the primary tests.

5. Discussion

Overall, the samples of some of the UK's and Japan's largest companies provide quite contrasting results. The price specification Ohlson (1995) model provides evidence that is consistent with hypotheses ***H1***and ***H1a*** for the UK sample but not for the Japan sample. The findings in this context are especially interesting because the UK's and Japan's largest companies have been world leaders in undertaking CRR, for some time (KPMG, 2008). With regard to the UK sample, the adjusted R^2 increases when the CRR measure (both *COMP* and *GRI*) is added to the regression equation and both measures of CRR are positively and significantly related to the market share price (see Table 4). However, in terms of the Japan sample, the adjusted R^2 value remains constant for equations (2) to (4), regardless of the CRR measure used. Also, CRR (both measures) is not significantly associated with the market share price. The different results are potentially due to inherent differences between the UK sample and the Japan sample. CRR is a voluntary practice for companies in the UK and in Japan (Kolk, 2008). However, publicly listed companies on the Japanese Stock Exchange have to adhere to certain environmental and social disclosure regulations (KPMG, 2008). Given the regression results, it seems that only investors in the UK companies include CRR disclosures in the total information set they use when valuing a company. Investors in Japanese companies appear to include financial information in their total information set used when valuing a company, but the non-financial CRR information does not seem to provide any incremental value-relevant information to their investment decision-making process. From this, one may infer that UK companies consider their shareholders when making the decision to undergo CRR. Management of top UK companies may perceive that CRR will provide investors with the benefit of reducing information asymmetry, thus allowing them to

make better assessments of the future economic benefits and risks of the company from which they more accurately value the company. This can be reflected by increases in the market share price because the reduction in information asymmetry means that investors do not have to assume the worst about the company's corporate responsibility practices when deciding how much they are willing to pay for its shares in the market. In contrast, this inference cannot be made for top Japanese companies. The high adjusted R^2 value suggests that little value relevance is associated with variables other than book value of equity and earnings (Lo & Lys, 2000). As CRR does not seem to provide incremental value relevance to investors, over and above that of financial information, I cannot conjecture that CRR reduces information asymmetry between management and external investors of Japanese companies. An alternative suggestion for the provision of CRR by top Japanese companies is that these CRR disclosures are not provided for the benefit of the companies' shareholders, but are instead produced for other stakeholder groups which are not considered within the scope of this study. Or, non-financial CRR information may be more associated with companies' strategic operational decisions in the long-term but the investors may be more focused on Japanese companies' short-term financial performance (Moneva & Cuellar, 2009). The results remain dissimilar still when the impact of higher levels of CRR by companies operating in environmentally sensitive industries is taken into account. The UK sample demonstrates that higher levels CRR by companies operating in environmentally sensitive industries (as classified by (de Villiers *et al.*, 2011)) are associated with higher market share prices. Whereas, no association is found between CRR by firms in environmentally sensitive industries and their market share prices, for the Japan sample. This provides further support for inference that CRR reduces information asymmetry for investors in UK companies, which reduces the risk of adverse selection and enhances investors' ability to value companies that operate in environmentally sensitive industries. Again, such an inference cannot be made for

Japanese companies operating in environmentally sensitive industries. The evidence from the Japan sample does not corroborate the conclusion that higher levels of CRR disclosures, even by companies that have an incentive to provide enhanced CRR disclosures, provide incremental value relevant information to the total information set used by investors. Despite many of Japan's top companies being world leaders in CRR practices, it does not seem that these reports provide value relevant information to investors as was anticipated (KPMG, 2008).

6. Conclusion

CRR is becoming a more established reporting practice around the world. Studies have investigated the value relevance of the CRR in many different countries. I examine the value relevance of CRR disclosed by companies from the UK and Japan, two countries that are leading the world in this reporting practice (KPMG, 2008). Following prior value relevance research I employ a variation of the Ohlson (1995) model to test the association between CRR and market values (Hassel *et al.*, 2005; Moneva & Cuellar, 2009; Schadewitz & Niskala, 2010). I use the price specification Ohlson (1995) model based on Barth and Clinch's (2009) findings that this is, generally, the most effective model at mitigating scale effects. The regression models are tested using two measures of CRR. The first is a composite score of a companies' CRR and the second is an indicator variable of whether or not the GRI reporting framework was followed. The results of the UK sample support both hypotheses. Higher levels of CRR are associated with higher market values of equity. Likewise, higher levels of CRR by firms operating in environmentally sensitive industries are associated with higher market values of equity. These results suggest that CRR provides incremental value relevant information to investors in UK companies as the non-financial information is said to be included in their total information set used to value a company. Agency theory provides depth and reasoning to why investors may find this information

value relevant and why companies choose to undertake CRR. The additional information available to investors can reduce their uncertainties of companies' operational activities, future earnings, and associated risks. These uncertainties come about because the separation between ownership and control in publicly listed companies causes informational asymmetries between firms' managers and shareholders. Thus, with more disclosures information asymmetries can be reduced and shareholders can make better informed investment decisions. As a result, they are less likely to assume the worst case scenario (the adverse selection problem) and so make more accurate valuations of a company's shares (Healy & Palepu, 2001). Companies continue to provide CRR to investors as it has the benefit of enhancing the market valuations of its shares. As Japan also as a well established practice of CRR one may expect that CRR would be positively associated with the market value of equity for Japanese companies too, given this theoretical perspective. However, no association was found between CRR and market values, even for companies operating in environmentally sensitive industries. This suggests that investors in Japanese companies do not find CRR information value relevant and do not include the disclosures in the total information set they use to value companies. Inherent differences in the reporting and investment environments of these two countries may explain why such different results were obtained. Future research could extend the findings of this study and add to the research regarding why companies undertake CRR by considering other stakeholder groups which may benefit from Japanese companies providing CRR. Future research could also assess the value relevance of CRR in a longitudinal study as firms' environmental and social decisions tend to be more strategic and long-term rather than about short-term performance.

The market value specification Ohlson (1995) model is used as a robustness test. The results from this model supported the primary model's results for the Japan sample, but only partially supported the main findings for the UK sample. The GRI variable as a measure of

CRR provided support for the positive association between market values of equity and CRR, but did not support the expectation that higher levels of CRR by firms operating in environmentally sensitive industries would be associated with higher market values of equity. The composite measure provided evidence in support of hypothesis ***H1*** as the adjusted R^2 value increased when this CRR measure was added into the regression equation. However, the composited score did not generate support for hypothesis ***H1a*** when the market value specification Ohlson (1995) model was used. This may be because this model does not mitigate scale effects as effectively as the price specification variation (Barth & Clinch, 2009). The *F*-values showed that all the models (in the primary tests and robustness tests) were significant and thus aided in understanding the relationship between firms' book values of equity, earnings, and CRR disclosures and their market values. However, there is the possibility that the model used does not fully capture the relationship between the disclosures (both financial and non-financial) and market valuations. The measures of CRR (the composite score and GRI indicator) may not be completely effective in representing the information that companies disclose through CRR. However, the composite score is a very comprehensive measure of CRR as it incorporates several reporting aspects into its calculation and the GRI reporting framework is a well established guideline used around the world in the preparation of CRR (KPMG, 2008). Thus, these measures provide a reasonable indication of the level of CRR provided by a company. Also, the measures used are derived by a high-level and independent public accounting firm (KPMG) which adds a level of credibility to the data.

The findings of this study have implications for academics, companies, investors, and policy makers. The study adds to the existing debate of the value relevance of CRR by providing some contrasting, yet interesting, results. This study can be extended and provides avenues for future research, perhaps by using longitudinal data or by assessing the research question

in the context of different countries or stakeholder groups. The findings may be useful to companies in making decisions of whether or not to undertake CRR, especially for UK or Japanese companies. Similarly, the study provides investors with useful information regarding how companies' CRR practices can affect firm value. Regulators may consider the results of this study when assessing the future of CRR and whether or not to mandate some, or all, of the disclosure practices. Likewise, standard setters may also find the results important to the potential preparation of CRR standards in the future. It is important to make clear that the empirical results only show the correlation between the CRR measures and share prices, they to do not establish that higher levels of CRR cause higher share prices for UK companies and not for Japanese companies.

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