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# Environmental Initiatives and Earnings Management

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# Environmental Initiatives and Earnings Management

## Abstract

**Purpose** - The purpose of this paper is to provide initial evidence on the association between environmental initiatives and earnings management. Prior literature documents firms participating in environmental initiatives to report relatively stronger financial performance. Moreover, firms with superior performance have been shown to engage in greater levels of earnings management. A natural question that arises is: to what extent do firms with environmental initiatives engage in earnings management to report better financial performance?

**Design/methodology/approach** - The study draws on two theoretical frameworks, external monitoring and internal corporate culture, to predict an inverse association between environmental initiatives and earnings management. We test this prediction using an earnings management regression model, estimating discretionary accruals using the modified-Jones approach.

**Findings** – The study finds that firms with environmental initiatives exhibit lower earnings management proxied by absolute and income-increasing total discretionary accruals. We further find pollution prevention and climate related initiatives to help explain this inverse association. Our results imply that firms practicing environmental responsibility report better financial performance most likely due to real economic performance rather than through earnings management techniques.

**Originality/value** - This study provides initial evidence on the association between environmental initiatives and earnings management, an area of tremendous value to all stakeholders in a market with increasing interest in corporate environmental performance and its implications.

**Keywords** - corporate social responsibility, climate, environmental performance, earnings management, earnings quality

**Paper type** – Research paper

# Environmental Initiatives and Earnings Management

## 1. Introduction

Corporate social and environmental responsibility is receiving increasing attention from regulators, market participants, the public, and the media (Social Investment Forum, 2012). Initiatives related to the environment are a component of the broader concept of corporate social responsibility (CSR) that is receiving more intense scrutiny, a trend that is certainly expected to continue given recent corporate environmental disasters such as the *British Petroleum* oil spill.<sup>1</sup> To enhance accountability and transparency, and assist capital market participants in making more informed economic decisions, the Securities and Exchange Commission (SEC) recently released its environmental disclosure transparency initiatives (SEC, 2010).<sup>2</sup> Such disclosure initiatives underscore the unprecedented growth in socially and environmentally responsible investments over the past twenty years.<sup>3</sup> To hedge risks, shareholders are also demanding

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<sup>1</sup> CSR encompasses an array of activities that can impact various aspects of our world, such as environmental activities, labor relations, diversity, employee protection, sale of toxic substances such as alcohol and tobacco, and activities involving nuclear products. These various CSR activities have been categorized according to their positive and negative impact on society and the environment. Authors in the literature use terms such as CSR and corporate social performance synonymously. We restrict our study to the environmental component of CSR and deeply analyze the environmental dimension by examining how its various components are related to earnings management.

<sup>2</sup> This SEC interpretive release entitled *Commission Guidance Regarding Disclosure Related to Climate Change* more thoroughly outlines an organization's responsibility to disclose existing and potential climate change effects on annual report items such as the description of business, risk factors, environmental capital expenditures, and legal and regulatory disclosures. Compliance with this guideline is currently not mandatory although the SEC is considering introducing some mandatory disclosure requirements.

<sup>3</sup> Investments in these funds grew from \$639 billion to \$3.74 trillion between 1995 and 2012 (Social Investment Forum, 2012). Organizations providing such mutual funds include Ariel Funds, Pax World Balanced Funds, New Alternatives Funds, and Green Century Funds; and indices include the KLD Index under the RiskMetrics Group (now a part of the MSCI ESG Database) and the Dow Jones Sustainability Index.

executives and boards to terminate their relationships with companies presenting high environmental risk (Allen et al., 2010).

Nevertheless, some investors have suffered significant economic losses following scandals at environmentally responsible firms. Bohn (2010) documents anecdotes of fraudulent reporting and intentional abuse of millions of dollars invested in firms headed by high profile executives advertising socially responsible environmental initiatives.<sup>4</sup> Such evidence counters the general notion that executives and the governance of environmentally responsible firms are of relatively higher standards (VanDyne et al., 1994; Fombrum et al., 2000).

A potential explanation for such unexpected economic consequences is that market participants believe environmentally responsible firms are an attractive investment based on the growth and performance of such firms (Social Investment Forum, 2012). Capital market research affirms such beliefs by documenting a positive association between environmental initiatives and firm performance (e.g., Bragdon and Marlin, 1972; Spicer, 1978; Douglas and Judge, 1995; Semenova and Hassel, 2008; Guenster et al., 2011; Eccles et al., 2012).

However, we know from the extant literature that firms use earnings management techniques to meet market expectations and portray financial strength that may not reflect economic reality (Burgstahler and Dichev, 1997; Payne and Robb, 2000; Dechow et al., 2000; Matsumoto, 2002; Das and Zhang, 2003; Abarbanell and Lehavy, 2003; Lin et al., 2008). Given the increasing attention and investments poured into environmentally responsible firms, it is important to empirically ascertain if these firms are engaged in relatively greater earnings

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<sup>4</sup> Bohn specifically cites one recent high-profile case involved the Mantria Corporation in which the company claimed to be developing environmentally-friendly residential communities and fuel sources, but then faced a complaint filed by the SEC in November 2009 that alleged Mantria to be a Ponzi scheme that scammed approximately 300 investors out of \$30 million through fraudulent and unregistered securities offerings (Bohn, 2010).

management. The evidence from such analyses could infer whether the relatively better financial performance of firms engaged in environmental initiatives is achieved through management's manipulations of earnings or real economic performance.<sup>5</sup> By doing so, this study contributes to the literature and practice by providing initial insight on the association between environmental initiatives and earnings management.

Recent studies have examined earnings management in the more broad context of CSR activities and have yielded conflicting results (Trebucq and Russ, 2005; Petrovits, 2006; Chih et al., 2008; Prior et al., 2008; Kim and Venkatachalam, 2011; Kim et al., 2012). For example, Petrovits (2006) and Prior et al (2008) find evidence of greater earnings management associated with CSR activities for firms reporting small earnings increases and unregulated firms, respectively. However, Trebucq and Russ (2005) and Chih et al. (2008) find inconsistent results in this area based on different CSR and earnings management specifications. And Kim et al. (2012) find that CSR is negatively related to discretionary accruals. One explanation of these conflicting results is that a broad measure of CSR comprised of several categories and sub-categories may mask specific associations between different types of CSR activities and earnings management. Thus, we extend this limited but growing literature by focusing on environmental initiatives and how their various components relate to earnings management. Prior studies have not examined how the components of environmental initiatives are related to earnings management.

We hypothesize that firms engaged in environmental initiatives are associated with less earnings management based on both an external monitoring theory and an internal corporate

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<sup>5</sup> We assume that if environmental initiatives are not significantly positively associated with earnings management, but are rather significantly negatively associated with earnings management, then it is likely that such firms derive their relatively better financial performance through real economic gains rather than earnings management practices.

culture theory. The former suggests that since environmentally responsible firms are more closely monitored and followed by regulators, investors, society, and the media, management of such firms will perceive greater scrutiny and compliance pressure. Together, these sentiments may motivate management of environmentally responsible firms not to pursue questionable financial reporting practices as the consequences of doing so may harm their reputation and heighten the risk of litigation. Extant literature supports this notion of increased monitoring driving higher reported earnings quality or lower earnings management (Defond and Jiambalvo, 1991; Dechow et al., 1996; Rajgopal and Venkatachalam, 1997; Becker et al., 1998; Mitra, 2002; Knayazvena, 2007; Yu, 2008).

The internal corporate culture theory suggests that firms with environmental initiatives foster a corporate culture exhibiting moral beliefs and values for the greater good, and happier, more productive, and more honest employees. Consequently, such corporate cultures encourage employees to act less out of self-interest, and in our context, potentially reduce the propensity for earnings manipulation. This line of reasoning is grounded in research presenting evidence of better CSR breeding stronger corporate culture (Etzioni, 1988; Tichy et al., 1997; Sherman, 1997; Turban and Greening, 1997; Leonard, 1997; Maignan et al., 1999; Maignan and Ferrell, 2001), which fosters corporate commitment and reduces employee self-interest behavior (VanDyne et al., 1994; Fombrum et al., 2000). Based on these two theoretical frameworks, we predict an inverse association between firms engaged in environmental initiatives and earnings management.

Based on a sample of 2,095 firm observations from 2004 to 2006 and after controlling for determinants of earnings management, we find support for the predicted negative association between environmental initiatives and earnings management proxied by total discretionary

accruals estimated using the performance-adjusted modified-Jones model (Kothari et al., 2005). Our results are consistent across total and income-increasing measures of discretionary accruals. We also find that discretionary accruals are most significantly negatively related to initiatives related to pollution prevention and climate protection. Our results are robust to a number of additional tests, including partitioning by firm size, environmentally sensitive industries, and financial performance, and the inclusion of potential omitted variables.

Overall, our initial results support the assertion that firms engaged in environmental initiatives exhibit lower earnings management. This finding supports the notion that the relatively superior financial performance exhibited by environmentally-responsible firms is not likely a result of earnings manipulation but more likely due to real economic gains. Moreover, our results suggest that firms engaged in pollution prevention and/or climate protection initiatives are least likely to manage earnings. The evidence presented is consistent with the external monitoring and internal corporate culture theoretical frameworks drawn upon to predicate our hypothesis. These findings add insight to the literature and suggest areas of future research to advance our understanding of the implications of environmental initiatives. Our findings also inform capital markets and regulators by documenting that environmentally responsible firms are generally less likely to misreport financial information. Such findings could also assist auditors screening for firms that are more likely to misstate their earnings.

The remainder of this paper progresses as follows. The next section reviews extant literature. Section 3 provides a development of our hypothesis. Sections 4 and 5 discuss the sample and empirical model, respectively. Section 6 presents our primary results, and Section 7 reports the results of additional analyses. Lastly, Section 8 concludes the paper.

## **2. Prior Literature**

We review two areas of pertinent literature underpinning our primary research question. We first review studies that examine the association between firm environmental and financial performance. This review establishes the link between environmental initiatives and financial measures of firm success. The second literary area we review provides anecdotal and empirical support of the association between earnings management and firm financial performance. A review of this literature suggests that positive financial performance measures are sometimes achieved through devious earnings management means. Deductively, these two literary paradigms lead to our research question that examines the extent to which firms with environmental initiatives manage earnings.

### *2.1 Environmental Performance and Financial Performance*

Although research in the U.S. has not historically examined corporate environmental performance as rigorously as in other developed nations, the existing studies do support an association between environmental and financial performance.<sup>6</sup> As early as 1972, a positive association between environmental performance and financial performance was supported for U.S. firms in the pulp and paper industry (Bragdon and Marlin, 1972). This study along with Spicer's (1978) empirical archival results support the notion that firms with better environmental pollution-control devices tend to be more profitable. Additionally, due to lack of publicly available environmental initiative data, Douglas and Judge (1995) utilize a survey questionnaire administered to U.S. managers and find that firms with greater natural environment resource commitments exhibit superior environmental and financial performance. This research lays the

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<sup>6</sup> Refer to Balabanis et al. (1998), Cronin (2001), and Hill et al. (2007) for a review of selected studies in other countries.



foundation for the positive association between environmental performance and financial performance of U.S. firms.

In the more recent empirical archival studies, firm environmental preparedness and performance are significant and positively associated with accounting-based operational and financial performance measures, such as return on assets and Tobin's  $q$  (Semenova and Hassel, 2008; Guenster et al., 2011). Other studies have shown green capital, green marketing, and other environmental efficiencies to give firms significant competitive advantage in their operations and financial results (Orsato, 2006; Chen, 2008; Fraj-Andres et al., 2009). And most recently, Eccles et al. (2012) find that companies with a higher sustainability focus significantly outperform their counterparts in both stock market and accounting long-term performance metrics. Collectively, these studies support a positive link between environmental initiatives and financial performance, establishing the first premise underpinning our research hypothesis.

## *2.2 Earnings Management and Financial Performance*

The prevalence of corporate financial scandals in the late 1990s and early 2000s highlighted the harsh reality that strong financial performance is not always a result of true economic performance; rather they suggest that financial performance can be manipulated by management to appear better than the economic reality of the firm. High profile companies such as Enron, Tyco, WorldCom, and Xerox, who commanded financial respect by appearing to perform so well financially, were uncovered to have engaged in earnings manipulation to produce their strong financial results. For Xerox, April 2002 revealed a massive multi-year manipulation that the SEC claims kept Xerox's stock price artificially high in the late 1990s, evidence of the manner in which investors and the financial world at large were misled (Bandler and Hechinger, 2002).

Empirical research has similarly supported the association between earnings management and the appearance of strong financial performance. Given the importance the market places on meeting analyst forecasts, we review literature that has examined earnings management as a tool for achieving forecast targets, thereby presenting positive financial performance to the market. Burgstahler and Dichev (1997) provide evidence of management's use of discretionary accruals to avoid losses or earnings declines. Additionally, Dechow et al. (2000), Payne and Robb (2000), and Das and Zhang (2003) show that managers use discretionary accruals to meet or beat analysts' forecasts. Similarly, Matsumoto (2002) presents a positive association between income-increasing discretionary accruals and the likelihood of avoiding negative earnings surprise. In another interesting finding, Abarbanell and Lehavy (2003) find that abnormal accruals are the main source of asymmetry in the distribution of forecast errors, indicating the use of accruals to meet analyst expectations in current and future periods. And although recent research has brought to light other forms of financial statement manipulation, Lin et al. (2008) still find evidence of firms' heavy use of abnormal accruals to achieve analyst expectations. These empirical archival studies consistently support the notion that positive financial performance may not always be derived from real economic substance but from earnings management, thus supporting the second premise underpinning our research hypothesis.

### **3. Hypothesis Development**

#### *3.1 Environmental Initiatives and External Monitoring*

Corporate environmental responsibility has received considerably more attention in recent years. Increasing societal pressures, media attention, and capital market interest paid to environmental issues all contribute to an overall greater visibility of environmentally active firms by regulators and the market alike. For example, Congress and corporate regulators such as the Securities and

Exchange Commission (SEC) have increased their focus on corporate environmental responsibility through increased regulatory scrutiny, evidenced by such guidelines as the recent environmental disclosure rules set forth to increase corporate America's accountability to stakeholders (SEC, 2010). Such increased regulatory attention complements the rising interest in social and environmental responsibility on behalf of capital markets. The past twenty years has seen unprecedented growth in socially responsible mutual funds and market indices, with investments growing exponentially from \$639 billion to \$3.74 trillion between 1995 and 2012 (Social Investment Forum, 2012). Shareholders are even going so far as to demand companies terminate relationships with companies presenting high environmental risk (Allen et al., 2010). With public concern serving as a considerable driver of corporate environmentalism (Banerjee et al., 2003), firms are paying closer attention to the way they implement and report their environmental performance. Considering this monumental increase in societal, regulatory, and market coverage of environmentally responsible firms, we anticipate that firms will strive to provide high quality financial reporting in order to meet the increasing demand for such quality that comes along with rising levels of public scrutiny.

Extant literature supports this notion of better earnings quality with an increased level of market attention. In the most recent of these studies, Knyazeva (2007) reports a negative association between analyst coverage, a proxy for market scrutiny, and earnings management, arguing that greater market coverage of firms serves as a partial substitute to other governance mechanisms in constraining earnings manipulation. Yu (2008) also finds a significant negative association between analyst coverage and the level of firm discretionary accruals, and the likelihood to just meeting or beating earnings benchmarks. This research paradigm supports our

argument that greater market visibility of environmentally responsible firms would likely dampen the extent of earnings manipulation by such firms.

Another external source of monitoring comes from institutional owners. Because institutional owners have greater resources, ability, and incentives to monitor firms in which they invest, they may serve as a monitoring mechanism to deter earnings management (Mitra, 2002). As previously discussed, environmentally active firms have seen a massive influx of attention from mutual funds, market indices, and the market alike, undoubtedly increasing these firms' attractiveness to more sophisticated institutional investors. In fact, by 2001, the amount of money invested in professionally managed, socially screened equities passed the \$2.03 trillion mark, with one of out of every eight institutional investment dollars being part of a socially responsible portfolio (Social Investment Forum, 2001). Prior research on institutional ownership has reported similar results to the analyst coverage literature with regard to the effect of increased market attention on earnings management. DeFond and Jiambalvo (1991) and Becker et al. (1998) find less prior period income-decreasing adjustments with the presence of blockholder ownership. Dechow et al. (1996) report that firms with blockholders are less likely to commit financial statement fraud. Perhaps most relevantly, Rajgopal and Venkatachalam (1997) find institutional ownership to be negatively related to the absolute value of discretionary accruals, consistent with institutional owners' role as monitors of earnings quality. These studies complement the analyst coverage literature in establishing our theoretical conjecture that firms participating in environmental initiatives are less likely to manage earnings due to the heightened external market forces closely monitoring such firms.

### *3.2 Environmental Initiatives and Internal Corporate Culture*

Firm involvement in CSR initiatives have been shown not only to impact financial performance, but also to impact corporate culture (Tichy et al., 1997). CSR helps integrate a firm into local community social networks, strengthening bonds between the company, its employees, and the community (Etzioni, 1988). Walter Haas, Jr., Chairman of Levi-Strauss, a company highly involved in social and environmental initiatives, verbalized this notion during an interview with *Fortune Magazine* in saying, “I believe that if you can create an environment that your people identify with, that is responsive to their sense of values, justice, fairness, ethics, compassion, and appreciation, they will help you be successful” (Sherman, 1997, 104).

Extant empirical research directly supports the influence of CSR in creating and maintaining happy and productive employees. Firms involved in CSR are more attractive to potential employees (Turban and Greening, 1997), and also experience higher employee commitment thereafter (Maignan et al., 1999; Maignan and Ferrell, 2001).. Additionally, a survey of executives conducted by the Conference Board shows that employee productivity, morale, team work, and skill development improve significantly when corporate social initiatives are implemented (Leonard, 1997). More recently, Lindgreen et al. (2009) report results of a CSR survey administered to 401 U.S. firms, which echo the findings of prior research and show that CSR initiatives motivate employees and bond them to the company.

Strong corporate cultures, such as those provided by socially and environmentally responsible firms, are less likely to experience self-interest employee behavior that conflicts with firm objectives due to the close alignment between the individual employee’s self-interest and the collective good of the company and society (Fombrun et al., 2000). Additionally, firms with a greater sustainability focus tend to be more long-term oriented, disclose more non-financial information, and incentivize directors and executives more on sustainability measures (Eccles et

al., 2012). This greater transparency and lesser emphasis on financial incentive measures may contribute to a culture less conducive to earnings manipulation. CSR initiatives themselves also foster altruism and dampen individualistic thinking, thereby lessening the risk of purely self-interested behavior (Van Dyne et al., 1994). Given that environmental initiatives are a major subset of CSR initiatives, extending this line of reasoning to financial reporting practices suggests that firms engaging in environmental initiatives have a corporate culture that would likely not condone manipulation of earnings to artificially boost earnings.

In summary, the preceding discussion of the two theoretical frameworks, external monitoring and internal corporate culture, together suggest that earnings management would be lower for firms with environmental initiatives. We, therefore propose the following directional hypothesis:

H: There is an inverse association between environmental initiatives and earnings management.

#### 4. Sample

We identify firms with environmental data using the KLD Research & Analytics, Inc. database.<sup>7</sup> KLD independently rates companies trading on U.S. stock exchanges with regard to their social performance across a range of dimensions, including the environment (KLD, 2006).<sup>8</sup> The KLD database is widely used and considered highly reliable because the KLD analysts are independent of the companies being rated, the analysts use objective screening criteria to rate firms, the ratings are applied consistently across companies, and a wide range of sources is used

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<sup>7</sup> We note that since the time of our study, this database is now a part of the MSCI ESG database; however, we refer to it as KLD herein as this was the database during our period of study.

<sup>8</sup> Other dimensions of social performance data in KLD include community, diversity, employee relations, and human rights (KLD, 2006).

to obtain the data (Waddock and Graves, 1997; Hillman and Keim, 2001).<sup>9</sup> This database, containing firm data as far back as 1991, has been increasingly used in the past several years in management and accounting research (e.g., Cho et al., 2006; Bartkus and Glassman, 2008; Sharfman and Fernando, 2008; Chen et al., 2008, Cho et al., 2009).

We begin our data year in 2004 since KLD restructured some of its data in prior years thus affecting comparability. The environmental initiative data is sourced from KLD, financial data from COMPUSTAT, and governance data from the Corporate Library. Our initial sample, derived from converging these three databases and removing companies with missing data, comprises 3,697 firm observations in calendar years 2004-2006.<sup>10</sup> We then exclude financial firms based on two-digit standard industry classification (SIC = 60 to 69) and remove observations without a December 31 year-end as KLD gathers and codes environmental data on a calendar-year basis. Our final sample comprises 2,095 firm observations with all the necessary data. While our sample attrition rate may seem high, it is similar to other studies (e.g., DeVilliers et al., 2011) utilizing the three databases we do as well.

## 5. Empirical Model and Variables

We construct the following earnings management model based on the prior literature and variables described below:

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<sup>9</sup> KLD indicated through our discussions that most of the environmental data are sourced from a firm's proxy statements such as the 10-K.

<sup>10</sup> We end our sample in 2006 to avoid the impact of the period surrounding the financial crisis on our results. It is plausible that in the year prior to the crisis, firms may have indulged in greater environmental activities but during and following the crisis, reduced their investment in environmental activities. Similarly, firms may have altered their earnings management behavior during this period as regulators applied more scrutiny on corporate behavior.

$$DACC = f \{ LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, YEAR \text{ FIXED EFFECTS, INDUSTRY, ENV } \}$$

### 5.1 Dependent Variable: Discretionary Accruals (DACC)

We use total discretionary accruals for our measure of earnings management for the following reasons. First, it is widely used and has been validated as a reliable proxy for earnings management (Kothari et al., 2005). Second, it is a more appropriate measure for our study because many environmental initiatives require significant resources that result in material capital expenditures. Capital expenditures are usually reported as long term assets, particularly, property, plant and equipment (PPE), which is captured in the total discretionary accruals model. Working capital or current accruals models do not capture earnings management related to PPE. Consistent with prior research, we use the following performance-adjusted modified-Jones model as proposed by Kothari et al. (2005) to estimate total discretionary accruals:

$$TOTACC = \beta_0 / LAG\_ASSETS + \beta_1 (SALES - REC) + \beta_2 PPE + LAG\_ROA + \epsilon$$

where:

- TOTACC = Total accruals defined as net income less cash from operations scaled by lagged total assets;
- LAG\_ASSETS = Lagged total assets;
- SALES = Change in sales scaled by lagged total assets;
- REC = Change in accounts receivable, netted out prior to scaling above;
- PPE = Net property, plant and equipment scaled by lagged total assets;
- and
- LAG\_ROA = Lagged return on assets.

### 5.2 Test Variable: Environmental Initiative

Following prior research, the residuals from the model above serve as our proxy for earnings management. We use both the absolute value of discretionary accruals (AB\_DACC) and income-increasing discretionary accruals (INC\_DACC) in our tests. Because management may



manipulate earnings by using income-increasing or income-decreasing accruals, the magnitude of discretion exercised is of interest, which is captured by AB\_DACC. As our interest is also to see if environmentally responsible firms report better financial performance through earnings management, the use of INC\_DACC would test management's use of income-increasing discretionary accruals.

Our environmental test variable (ENV) is measured three ways, with our primary measure being the extent of environmental initiatives for each firm as reported by KLD. For each of the five environmental initiatives rated by KLD, a firm is designated a binary variable (1 if an initiative is reported, 0 otherwise) to indicate if the firm is involved in that specific environmental initiative. We take the sum of these five different initiatives (ENV\_IN) to represent the extent of environmental initiatives undertaken by a firm. This approach is widely used in prior research (e.g., Waddock and Graves, 1997; Hillman and Keim, 2001).<sup>11</sup>

Our second measure is a binary variable that captures whether a firm is reported to have at least one environmental initiative (coded 1, and 0 otherwise) (ENV\_YN). The purpose of this measure is to test whether a single or multiple initiative matter. Since environmental initiatives can vary in complexity and level of resources demanded, a single initiative alone may be sufficient to attract market attention and influence corporate culture. This reasoning leads to our third measure, which considers each of the five reported types of environmental initiatives to capture some extent of how each different initiative is related to earnings management.

Accordingly, we include each of the five types of environmental initiatives in our model. KLD describes the nature of each environmental initiative (KLD, 2006). The first initiative

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<sup>11</sup> Prior research equally ranks each component of the KLD environmental ratings because there is no theoretical basis for a ranking (Hillman and Keim, 2001). Accordingly, we do not attempt to rank the environmental initiatives.

relates to a company's use and/or development of environmentally beneficial products or services, such as innovative remediation products and energy efficient processes (PROD\_SERV). The second applies to a company having notably strong pollution prevention programs, such as emissions and toxic-use reductions (POLL\_PREV). The third refers to a firm which is a substantial user of recycled materials, or is a major factor of the recycling industry itself (RECYCLE). The fourth initiative indicates that a company has demonstrated a commitment to climate-friendly practices in order to reduce its impact on climate change and pollution; such measures include energy efficiency and the use of renewable energy and clean fuels (CLIMATE). Finally, the fifth environmental initiative in our data indicates a company's superior commitment to management systems, voluntary programs, and other environmentally proactive activities (OTHER). In order to provide some idea and clarification of differences between these initiatives, in the Appendix we provide examples of actual disclosures for each initiative type made in corporate annual reports..

### *5.3 Control Variables*

Based on the prior literature, we include variables determined to be significantly related to measures of earnings management. We control for firm size (LN\_MVE = natural log of the market value of firm equity) but do not predict a direction because prior research reports mixed results (Frankel et al., 2002; Ashbaugh et al., 2003; Cohen and Zarowin, 2010). We include leverage (LEV = total liabilities to total assets) as has been done in extant literature (Frankel et al., 2002; Ashbaugh et al., 2003; Bergstresser and Philippon, 2006; Cohen and Zarowin, 2010; Choi et al., 2010) but do not predict its relation with discretionary accruals as firms may have incentives to manage earnings with greater leverage in order to avoid debt covenant violations, or they may have the incentive to refrain from earnings management due to the more stringent

monitoring that accompanies greater debt financing. We include a firm's market-to-book ratio (MKTBK = market value of firm equity divided by book value of firm equity) as this growth measure has been found to be positively associated with discretionary accruals (Frankel et al., 2002; Ashbaugh et al., 2003; Bergstresser and Philippon, 2006; Cohen and Zarowin, 2010; Choi et al., 2010). We also include a loss indicator variable (LOSS = 1 if firm had an operating loss for the financial year, and 0 otherwise) and expect it to be positively related to earnings management because loss firms have incentives to report higher earnings (Frankel et al., 2002; Ashbaugh et al., 2003; Choi et al., 2010).

We include operating cash flow (OCF = operating cash flow scaled by beginning of year total assets) as firms with greater cash flows from operations have been found to be less likely to manage earnings (Frankel et al., 2002; Myers et al., 2003; Ashbaugh et al., 2003; Choi et al., 2010). We also include a measure of the prior year's total accruals (LAG\_TOTACC = last year's total accruals scaled by beginning of year total assets) as extant literature has done so in earnings management modeling to control for the variations in reversals of accruals over time (Frankel et al., 2002; Ashbaugh et al., 2003; Choi et al., 2010). We predict a negative association with discretionary accruals based on the findings in the prior literature. Additionally, we include auditor type (BIG4 = 1 if firm is audited by one of the Big 4 audit firms, and 0 otherwise) because large audit firms provide greater audit quality and thus may lessen earnings management (Frankel et al., 2002; Myers et al., 2003; Ashbaugh et al., 2003; Choi et al., 2010). Consistent with prior research, we include a merger or acquisition during the financial year (MERGER = 1 if merger or acquisition occurred, and 0 otherwise) as a control but do not predict a direction because of the mixed results in the literature (Frankel et al., 2002; Ashbaugh et al., 2003). We also include a litigation risk variable (LITIGATION = 1 if the firm is in a high

litigation risk industry identified by Francis et al. (1994) as SICs 2833-2836, 3570-3577, 3600-3674, 5200-5961, or 7370-7374, and 0 otherwise) as such risk has been associated with higher discretionary accruals (Frankel et al., 2002; Ashbaugh et al., 2003). We expect LITIGATION to be positively associated with earnings management.

We include a governance variable (ACEXP = 1 if the audit committee contains at least one accounting expert, and 0 otherwise) because stronger governance mechanisms over financial reporting may have a negative impact on a firm's propensity to manage earnings (Bergstresser and Philippon, 2006; Naiker and Sharma, 2009; Dhaliwal et al., 2010). We restrict the governance measure to accounting experts on the audit committee because this is the primary governance mechanism found to most significantly influence earnings management in recent research (Naiker and Sharma, 2009; Dhaliwal et al., 2010). In supplementary tests, we consider additional governance variables.

Lastly, we include year and industry indicator variables to control for variances due to these factors, as other earnings management studies have done (Myers et al., 2003; Bergstresser and Philippon, 2006). For industry classification, we use the Fama and French (2010) ten industry portfolio. For efficient reference, the operational definition of our variables, their expected association with our measure of earnings management, and their data sources are summarized in Table 1.

<<< Insert Table 1 here >>>

## **6. Results**

### *6.1 Descriptive Statistics*

Table 2 presents the descriptive statistics for our full sample and by firms with high and low levels of earnings management based on the median split of the absolute value of discretionary

accruals.<sup>12</sup> With regard to our test variable, firms with greater environmental initiatives (ENV\_IN) have a lower tendency to manage earnings. The mean ENV\_IN is significantly ( $p < 0.10$ ) higher in the low DACC sub-sample relative to the high DACC sub-sample. This finding provides preliminary support for our central hypothesis, which will be tested more robustly in the multivariate analyses. Regarding our control variables, firms with higher DACC are less likely to be audited by one of the Big 4 audit firms, as anticipated. They also tend to have less operating cash flow, as expected. The descriptive data also show high DACC firms to be larger as proxied by market value of equity, and to have greater litigation risk. These differences suggest that characteristics of firms with higher levels of earnings management vary significantly from firms with lower levels, which is consistent with prior research.

<<< Insert Table 2 here >>>

Table 3 presents the descriptive statistics for our dependent and control variables for firms that have at least one environmental initiative (ENV\_YN = 1) and those that do not have any environmental initiatives (ENV\_YN = 0). We find that the average AB\_DACC is significantly lower in firms with at least one environmental initiative compared to firms without an environmental initiative, thus providing preliminary support for our hypothesis. Two control variables are significantly different; firms with at least one environmental initiative have significantly lower leverage and are audited mostly by the Big 4 compared to firms without an environmental initiative.

<<< Insert Table 3 here >>>

## 6.2 Multivariate Analyses

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<sup>12</sup> We winzorized our data at the first and 99<sup>th</sup> percentiles in order to control for outliers, and note that our unwinzorized data yields consistent results.

Table 4 reports Pearson and Spearman correlation matrices for the independent variables. Multicollinearity does not appear to be a problem. The largest Pearson correlation is between LEV and MKTBK, ( $r = -0.639$ ) (Spearman correlation of  $-0.506$ ), which is below the 0.80 multicollinearity threat threshold (Kennedy, 1992). The highest of all the reported and untabulated variance-inflation-factors (VIF) is 2.056, well below the threshold of 10 beyond which multicollinearity may be a problem (Kennedy, 1992).

<<< Insert Table 4 here >>>

Table 5 presents the results for the regression of the absolute value of performance-adjusted modified-Jones discretionary accruals on the control variables and our primary test variable, ENV\_IN. The results for the control variables indicate that OCF and LAG\_TOTACC are negative and significantly associated with AB\_DACC, as anticipated. LEV is also significantly negatively associated with AB\_DACC, suggesting that more leveraged firms are less likely to manage earnings via discretionary accruals, supporting the notion that more stringent monitoring by creditors may help lessen management's propensity to manipulate earnings. We find LITIGATION and LOSS to be significantly positively related to AB\_DACC, as anticipated, signaling that firms that face greater litigation risk or firms that have incurred an operating loss in the financial year are more likely to manage earnings through discretionary accruals.

Most importantly, the results indicate a significant negative association between our test variable, ENV\_IN and AB\_DACC. Our hypothesis is therefore supported. This finding suggests that firms with greater environmental initiatives engage in less earnings management as evidenced by lower levels of the absolute value of discretionary accruals. These results are consistent with the two theoretical frameworks supporting our hypothesis in that, whether due to

increased external monitoring by the market, innate corporate culture qualities, or both, firms with greater environmental initiatives exhibit lower levels of earnings manipulation.

<<< Insert Table 5 here >>>

We also perform the above analysis with an alternate dependent variable measure in Table 6. We isolate only those discretionary accruals that are income-increasing in order to provide more insight. Since prior literature has established that firms with greater environmental performance also appear to have greater financial performance, we perform our regression analysis on only those discretionary accruals that increase reported income. As shown in Table 6, our results for income-increasing discretionary accruals as the dependent variable are consistent with our analysis in Table 5. Our control variable results are also the same. Our hypothesis is, therefore, further supported, suggesting that firms engaged in more environmental initiatives are less likely to manage earnings through income-increasing accruals.

<<< Insert Table 6 here >>>

We also perform the above analyses using two additional measures of our test variable. Tables 7 and 8 present our absolute value and income-increasing discretionary accrual analyses employing an environmental initiative variable that captures whether a firm is reported by KLD to have engaged in at least one environmental initiative (EI\_YN). We find that EI\_YN is significant and negatively associated with both AB\_DACC (Table 7) and INC\_DACC (Table 8), consistent with our findings in Tables 5 and 6. These findings suggest that a firm engaged in at least one environmental initiative, regardless of what it may be, is negatively associated with the extent to which earnings are manipulated.

<<< Insert Tables 7 and 8 here >>>

In order to gain further insight on the specific types of initiatives as they relate to earnings management, in Tables 9 and 10 we examine how each type of environmental initiative is related to discretionary accruals. We find that two types of environmental initiatives are significantly negatively associated with earnings management measured as the absolute value of discretionary accruals: those related to a firm's implementation of notably strong pollution prevention programs, such as emissions and toxic-use reductions (POLL\_PREV), and those that indicate a firm's commitment to climate-friendly practices aimed at reducing its impact on climate change and pollution, such as energy efficiency and the use of renewable energy and clean fuels (CLIMATE). For income-increasing discretionary accruals, we find that only POLL\_PREV is negative and significant.<sup>13</sup> These findings support the notion that firms engaged in pollution prevention and/or climate-related environmental initiatives are the least likely to manage earnings. They also further support our hypothesis, adding clarity to those specific initiatives that most impact a firm's level of earnings manipulation.

<<< Insert Tables 9 and 10 here >>>

## 7. Additional Tests

### 7.1 Firm Size

We test the sensitivity of our primary results to client size, as larger firms are more visible and have potentially more resources to engage in environmental initiatives. We partition our sample into small and large firms based on median market value of equity (large firms > median). For the large firm subsample, we obtain results consistent with our primary analyses; we find a significant negative association between earnings management and environmental initiatives

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<sup>13</sup> This lack of significance for climate-related initiatives may be attributed to the small sample size of firms with income-increasing accruals *and* such initiatives (n = 35).



(ENV\_IN), with the same initiatives found to have the strongest negative association (POLL\_PREV and CLIMATE). On the contrary, the small firm subsample loses significance for these variables of interest. Upon closer investigation, we find that large firms report over five times the amount of environmental initiatives that small firms report in our sample (223 versus 44). This finding supports the aforementioned notion of greater resource availability for large firms to participate in environmental initiatives, and the non-significant finding for small firms may be due to the small number of such initiatives in the small firm sample. The disparity in association between large and small firms may also be attributed to the greater visibility, and therefore greater market and regulatory scrutiny, faced by large firms.

### *7.2 Environmentally Sensitive Industries*

In order to examine the sensitivity of our results to environmentally sensitive industries, we partition our sample into firms operating in and out of such industries, as defined by Cho et al. (2006).<sup>14</sup> As with the reasoning underlying our hypothesis, we anticipate environmentally sensitive firms to be less likely to manage earnings due to greater external monitoring from regulators and the market (DeFond and Jiambalvo, 1991; Dechow et al., 1996; Rajgopal and Venkatachalam, 1997; Becker et al., 1998; Mitra, 2002; Knyazeva, 2007; Yu, 2008) and/or due to internal corporate culture being influenced by a greater sense of social responsibility (Etzioni, 1988; Van Dyne et al., 1994; Leonard, 1997; Sherman, 1997; Tichy et al., 1997; Maignan et al., 1999; Fombrun et al., 2000; Lindgreen et al., 2009). On the other hand, a firm that participates in environmental initiatives while operating in a non-environmentally sensitive industry may be doing so on a more voluntary basis, perhaps driven by a stronger corporate culture of

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<sup>14</sup> These industries are oil exploration, paper, chemical and allied products, pharmaceuticals, petroleum refining, and metals industries.

responsibility and ethical behavior. Thus, we expect environmental initiatives to be negatively associated in both sets of firms. Our untabulated results of re-estimating our primary regression model for both sets of firms show that environmental initiative involvement (ENV\_IN) is negative and significantly ( $p < 0.10$ ) associated with discretionary accruals for both sets of firms. When we estimate our model that incorporates specific types of initiatives, we find that for firms in environmentally sensitive industries, climate-related initiatives (CLIMATE) appear to have the strongest negative association with a firm's level of earnings management ( $p < 0.10$ ); whereas for non-environmentally sensitive industry firms, pollution prevention initiatives (POLL\_PREV) have the greatest negative impact on earnings management ( $p < 0.01$ ). Overall, these results further support our primary analysis, as both industry groups appear to be less likely to manage earnings when participating more heavily in environmental initiatives.

### *7.3 Yearly Analyses*

We test the sensitivity of our primary results to the financial year examined. As previously noted, our sample covers years 2004 to 2006. We conduct our regression analysis for each year individually and find results consistent with our earlier results. In our primary tests, we excluded an additional environmental initiative variable indicating ISO 14000 certification because KLD began rating this measure in 2006. When we re-estimate our equations for the entire sample and for 2006 after including this additional environmental variable in our primary measure, ENV\_IN or ENV\_YN, we find consistent results. Furthermore, when we include this ISO 14000 initiative variable in our initiative type analyses, we find it is negatively related to firm levels of discretionary accruals, but not significantly. This non-significant result could be due to the relatively small number of firm observations with this type of initiative in our sample ( $n = 56$ ) or could signify the lack of influence ISO 14000 initiatives have on earnings management.

#### *7.4 Financial Performance*

We theorized the plausibility that some high performing firms may engage in earnings management practices to report higher earnings, but firms engaging in environmental initiatives may be achieving their higher earnings performance through real economic gains flowing from the benefits of environmental initiatives. In order to test the sensitivity of our earnings management findings to firms reporting relatively high or low financial performance measures, we partition our sample based on the medians of two highly-analyzed performance measures in the literature: return on assets and earnings per share. The idea here is that if firms with relatively higher performance show a positive association between environmental initiatives and earnings management, then it can be argued that high performing firms may be partially reporting higher earnings by engaging in earnings management related to environmental initiatives (given the discretion management may have over the accounting treatment of environmental initiatives).

For firms with high return on assets, we find results consistent with our primary analysis with regard to the negative association previously found between discretionary accruals and environmental initiatives and types of initiatives; however, one more initiative type shows significance in this partition: initiatives related to a firm's use and/or development of environmentally beneficial products or services (PROD\_SERV). This initiative type appears to be significantly positively related to earnings management for high performing firms. This finding potentially questions the true strength of financial performance for firms participating in such initiatives, as it could be inflated due to manipulation of earnings by management. With regard to firms with relatively lower return on assets, our findings are consistent with our primary analyses, except that initiatives related to climate protection (CLIMATE) become an

insignificant indicator of earnings management for these firms. Our results are also consistent when partitioning based on earnings per share, with the exception that for high earnings per share firms, recycling initiatives (RECYCLE) additionally appear to be significantly negatively related to earnings management, and as with low return on asset firms, low earnings per share firms do not appear to have an association between earnings management and climate initiatives (CLIMATE). Overall, these performance sensitivity tests support our hypothesis that firms with greater environmental initiatives tend to be associated with a lower manipulation of earnings, although there appears to be variation in the types of initiatives that drive this association.

To provide further support of our results above, we regress earnings per share (EPS) on ENV\_YN, signed discretionary accruals, interaction between ENV\_YN and signed discretionary accruals, and various control variables.<sup>15</sup> We employ signed discretionary accruals rather than the absolute measure because positive accruals are income-increasing and negative accruals are income-decreasing. Our interest is in understanding the income-increasing impact of accruals on earnings in the presence of environmental initiatives. We employ a dummy measure for environmental initiatives (ENV\_YN) for ease of interpreting the interaction term. The idea here is to ascertain whether firms that engage in (1) income-increasing earnings management and (2) environmental initiatives, report higher earnings. Further, if firms engaging in earnings management report higher earnings, then is this impact lower for firms that also engage in environmental initiatives? This latter effect can be tested through our interaction term.

Results show that ENV\_YN ( $\beta = 0.209$ ,  $p < 0.05$ ) and signed accruals ( $\beta = 0.656$ ,  $p < 0.05$ ) are positively associated with EPS. These results suggest that firms engaging in

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<sup>15</sup> Control variables include firm size, leverage, company age, merger and acquisition, foreign operations, board independence, duality, board size, board meetings, year dummy variables, and Fama-French 10 industry dummy variables.

environmental initiatives report higher EPS, and those with positive accruals also report higher EPS. However, the impact of earnings management (signed accruals) on EPS is not positive for firms engaging in environmental initiatives because the interaction term, ENV\_YN\*signed discretionary accruals, is negative and significant ( $\beta = -1.866$ ,  $p < 0.05$ ). This finding lends some credence to our argument that firms employing income-increasing earnings management techniques are not achieving higher earnings when they also engage in environmental initiatives. Our results imply that firms engaging in environmental initiatives have good governance and strong corporate culture because in such firms the opportunistic impact of earnings management on reporting higher earnings is reduced.

### *7.5 Environmental Concerns*

In addition to environmental initiative data, KLD reports and describes environmental concern data (KLD, 2006).<sup>16</sup> In order to test the sensitivity of our environmental initiative findings to the inclusion of such concerns in our earnings management models, we include an environmental concern variable that captures the sum of KLD-reported environmental concerns for each firm, similar to our derivation of our environmental initiative variable (ENV\_IN) in our primary analysis. Our test variable findings for environmental initiatives and types remain significantly negative and consistent. Additionally, we find that environmental concerns are significantly negatively related to discretionary accruals as well ( $p < 0.01$ ). This finding is consistent with our theoretical argument that firms facing greater regulatory and market scrutiny are less likely to

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<sup>16</sup> The six environmental concerns are firms: having large hazard waste liabilities or violations of waste management regulations, having violations of air, water, or other environmental regulations, being identified as one of the top manufacturers of ozone-depleting chemicals, having high legal levels of toxic chemical emissions into the air and water, being identified as a substantial producer of agricultural chemicals, having substantial direct or indirect revenues from the sale or combustion of coal or oil and its derivative fuel products, and having involvement in any other environmental controversy (KLD, 2006).

manipulate earnings, as firms with known environmental concerns would undoubtedly face greater monitoring from external sources.

### *7.6 Governance Index*

We test the impact of corporate governance on our results because stronger governance has been found to influence a firm's ability to manage earnings (Dhaliwal et al., 2010) and propensity to engage in environmental activities (Johnson and Greening, 1999; David et al., 2007). To capture the overall effect of governance and to ensure our model is parsimonious, we derive a governance index based on the independence and meeting frequency of the board of directors, the size and expert considerations of the audit committee, and the dual nature of the CEO also serving as chairman of the board. We select these governance factors because they have been found the most significantly and commonly associated with earnings management (Beasley, 1996; Dechow et al., 1996; Sharma, 2004; Dhaliwal et al., 2010). Accordingly, we calculate an indicator variable for each of these governance characteristics on a firm basis as follows: for board independence, 1 if firm board independence percentage exceeds board independence percentage median, and 0 otherwise; for board meetings, 1 if firm board meetings exceed board meeting median, and 0 otherwise; for audit committee size, 1 if firm audit committee size equals to or exceeds three, and 0 otherwise; for audit committee expert, 1 if firm has an accounting expert on the audit committee, and 0 otherwise; and lastly, for duality, 1 if a firm's CEO does *not* also serve as chairman of the board; and 0 otherwise. We then derive our governance index as the sum of each of these five indicator variables, whereby the higher the index, the stronger the governance mechanisms in place. After incorporating this measure into the model, our test variable of interest (ENV\_IN) remains negative and significantly related to earnings management ( $p < 0.01$ ), supporting our primary analyses. Furthermore, our test by types of

initiatives yields consistent results. The governance index variable is significant ( $p < 0.10$ ) and upon further analyses we find that a firm whose CEO is not the chair of the board is driving this result ( $p < 0.05$ ), while the other governance variables are not significant.

## **8. Conclusion**

The corporate world has observed an unprecedented increase in the attention paid to environmental accountability from a range of stakeholders including Congress, regulators, the market, and society at large. Recent authoritative guidelines in accounting, such as the SEC's release describing the need to increase environmental disclosure transparency (SEC, 2010), highlight the importance of environmental considerations in accounting research. This study seeks to add insight to this developing paradigm by examining the association between environmental initiatives and earnings management.

We anticipate firms with environmental initiatives will exhibit lower levels of earnings management based on two theoretical frameworks. The first is an external monitoring theory that suggests the greater attention, monitoring and scrutiny of environmentally-active firms from regulators, capital market participants and society will lessen management's motives to artificially manipulate earnings. This theory is supported by extant research that documents higher financial reporting quality for firms subject to greater external monitoring (Defond and Jiambalvo, 1991; Dechow et al., 1996; Rajgopal and Venkatachalam, 1997; Becker et al., 1998; Mitra, 2002; Knayazvena, 2007; Yu, 2008).

The second framework we rely on is an internal corporate culture theory. This theory posits firms with environmental initiatives have a stronger corporate culture because commitment to environmental responsibility stems from values and belief systems that are ethical and moral and discourage pursuit of self-interest behavior. Such a culture is supported by

extant literature in non-accounting contexts (Etzioni, 1988; Tichy et al., 1997; Sherman, 1997; Turban and Greening, 1997; Leonard, 1997; Maignan et al., 1999; Maignan and Ferrell, 2001; VanDyne et al., 1994; Fombrum et al., 2000) and may be associated with lower earnings management. Together, these two theoretical frameworks support our directional hypothesis that predicts an inverse association between environmental initiatives and earnings management.

Our results support this hypothesis. We consistently find a significant negative association between environmental initiatives and earnings management measured using the performance-adjusted modified-Jones model (Kothari et al., 2005). Our results hold for both absolute value and income-increasing total discretionary accruals. We further find that this association is strongest for environmental initiatives related to pollution prevention and climate protection efforts. Future research with more specific data using both empirical archival and survey methods could provide greater interpretation of these initiative type results. Nevertheless, our results infer that firms engaged in environmental initiatives appear to be less likely to manage earnings via discretionary accruals.

Given that firms with greater environmental initiatives tend to report stronger financial results (Bragdon and Marlin, 1972; Spicer, 1978; Douglas and Judge, 1995; Semenova and Hassel, 2008; Guenster et al., 2011), and also given that managers in general have been shown to manipulate earnings via discretionary accruals in order to appear stronger financially (Burgstahler and Dichev, 1997; Payne and Robb, 2000; Dechow et al., 2000; Matsumoto, 2002; Das and Zhang, 2003; Abarbanell and Lehavy, 2003; Lin et al., 2008), our finding of lower earnings management for environmentally-responsible firms supports the notion that the strong financial performance documented for such firms may not be a result of earnings management to the extent the evidence suggests in this study. Our results imply the relatively better financial



performance of environmentally responsible firms reported in prior literature is likely due to real economic gains, as such firms seem to have developed better relationships with stakeholders, consumers, and society, which in turn, creates loyalty and generates revenues (e.g., Fry et al., 1982; Hillman and Keim, 2001; Lev et al., 2010). Accordingly, we believe that environmentally responsible firms have fewer incentives to manipulate earnings to report better performance.

Additionally, our results provide further insight to recent studies that have more broadly examined earnings management in the context of various CSR initiatives (Trebucq and Russ, 2005; Petrovitis, 2006; Chih et al., 2008; Prior et al., 2008; Kim and Venkatachalam, 2011; Kim et al., 2012). Given that these studies provide conflicting results, this insight is valuable with specific regard to environmental initiatives. We also note that our finding of lower earnings management via discretionary accruals for firms with environmental initiatives is consistent with the most recent evidence in this area which documents a negative association between CSR performance and earnings management (Kim et al., 2012).

Our results have important implications for practice. Since firms that engage in environmental initiatives also engage in less earnings management potentially due to stronger internal corporate culture, directors and managers may want to evaluate participation in such initiatives as a means of boosting employee morale and promoting more ethical business behavior. Regulators may want to consider policy development that evaluates and encourages firm participation in environmental initiatives given its association with less earnings management as well. And of course, employees and investors alike may take a greater interest in firm environmental accountability measures given their association with more conservative financial reporting, which may underscore an overall more ethical corporate tone.

Some potential limitations of our study provide opportunities for future research. First, a closer examination of the factors driving the lower discretionary accruals for environmentally-responsible firms could be examined. More specifically, is this association attributable to one or both of our two proposed theories (external monitoring and internal corporate culture), or some other theory yet to be explored? We are unable to identify the motives for firm engagement in environmental initiatives from our archival data but encourage future researchers to explore such issues using other methods such as surveys and interviews. Second, while we use discretionary accruals as a proxy for earnings management, it has limitations, and future studies could examine other proxies to test the sensitivity and generalizability of our results. Some of these proxies include the likelihood of financial restatement, fraud, the propensity to meet or beat analyst forecasts, and earnings conservatism. Third, our environmental initiative data does not provide information on the likely success of the initiative, nor does it capture the extent of the financial investment related to a particular initiative. Such information, however, would allow for more thorough examination of these initiatives in general, and as they relate to earnings management. For example, some initiatives may be more demanding of resources, more costly to implement, and more questionable in measurability of success. These types of initiatives could incentivize management to justify the investment in these initiatives as they face pressure to meet market expectations. Fourth, we do not specifically examine the incentives facing management to engage in environmental initiatives and how these affect the association between initiatives and discretionary accruals. For example, we could gain more insight into the environmental initiative behavior of firms seeking to reduce the cost of capital, or obtain new financing, or those seeking some federal or state concessions. Fifth, our period of study is prior to the economic crisis in 2008 to 2009, which may have altered in the implications of environmental

initiatives since this time. Future research may examine the change in environmental initiatives prior to, during, and following the crisis. Sixth, we focus on U.S. firms to examine our research question, but an international analysis of this association may yield interesting insight into differences amongst countries in our evermore globalized business world. Lastly, environmental initiatives can be examined from the perspectives of a variety of interested stakeholders, such as directors, managers, employees, auditors, and investors. This opens avenues for advancing our limited knowledge of the increasingly important issue of environmental accountability facing corporations and society. We hope that our initial evidence will encourage debate, discussions, and more research on this important issue.

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**TABLE 1**  
**Variable Definitions**

| Variable Name                       | Expected Sign | Variable Measurement  |
|-------------------------------------|---------------|---|
| <b>Panel A: Dependent Variables</b> |               |   |
| AB_DACC                             |               | Absolute value of firm performance-adjusted modified-Jones model discretionary accruals (Kothari et al. 2005).  |
| INC_DACC                            |               | Income-increasing firm performance-adjusted modified-Jones model discretionary accruals (Kothari et al. 2005).  |
| <b>Panel B: Test Variables</b>      |               |   |
| ENV_IN                              | -             | Sum of types of environmental initiatives for a firm in a given year as reported by KLD Analytics.  |
| ENV_YN                              | -             | 1 if a firm engages in at least one environmental initiative as reported by KLD Analytics, and 0 otherwise.   |
| <b>Panel B: Control Variables</b>   |               |   |
| LN_MVE                              | ?             | Natural log of the market value of firm equity (Compustat).   |
| LEV                                 | ?             | Total debt to total assets (Compustat).   |
| MKTBK                               | +             | Market value of equity divided by book value of equity (Compustat).   |
| LOSS                                | +             | 1 if firms reports a loss in the fiscal year, and 0 otherwise (Compustat).  |
| OCF                                 | -             | Operating cash flow scaled by beginning of year total assets (Compustat).   |
| LAG_TOTACC                          | -             | Last year's total accruals scaled by beginning of year total assets (Compustat).  |
| BIG4                                | -             | 1 if firm is audited by a Big 4, and 0 otherwise (Compustat).   |
| MERGER                              | ?             | 1 if firm was involved in a merger or acquisition in the current year, and 0 otherwise (Compustat).   |
| LITIGATION                          | +             | 1 if the firm is in a high litigation risk industry identified by Francis et al. (1994) as SIC's 2833-2836, 3570-3577, 3600-3674, 5200-5961, 7370-7374, and 0 otherwise. (Compustat). |
| ACEXP                               | -             | 1 if audit committee contains at least one accounting expert, and 0 otherwise (Corporate Library and proxy statements).   |
| YEAR FIXED EFFECTS                  |               | Year dummies.   |
| INDUSTRY                            |               | Ten portfolio industry dummy variables as defined by Fama and French (2010).  |

**Table 2**

**Descriptive Statistics for Full Sample and for Firms with High and Low Discretionary Accruals**

| <u>Variable</u> | <u>Full Sample</u><br><u>(n = 2,095)</u> |               |           | <u>High Discretionary Accrual Firms</u><br><u>(n = 1,048)</u> |               |           | <u>Low Discretionary Accruals Firms</u><br><u>(n = 1,047)</u> |               |           | <u>Test of</u><br><u>Differences<sup>b</sup></u> |
|-----------------|--|---------------|-----------|---|---------------|-----------|---|---------------|-----------|--|
|                 | <u>Mean</u>                              | <u>Median</u> | <u>SD</u> | <u>Mean</u>   | <u>Median</u> | <u>SD</u> | <u>Mean</u>   | <u>Median</u> | <u>SD</u> | <u>t-statistic</u>                               |
| LN_MVE          | 21.39                                    | 21.21         | 1.36      | 21.44   | 21.27         | 1.35      | 21.34   | 21.15         | 1.36      | 1.78*  |
| LEV             | 0.56                                     | 0.55          | 0.23      | 0.57  | 0.56          | 0.23      | 0.55  | 0.54          | 0.23      | 1.44   |
| MKTBK           | 1.33                                     | 1.04          | 1.14      | 1.31  | 1.00          | 1.16      | 1.36  | 1.09          | 1.11      | 1.04   |
| LOSS            | 0.11                                     | 0.00          | 0.32      | 0.12  | 0.00          | 0.32      | 0.11  | 0.00          | 0.31      | 0.94   |
| OCF             | 0.11                                     | 0.10          | 0.10      | 0.10  | 0.11          | 0.12      | 0.11  | 0.99          | 0.86      | 2.03**   |
| LAG_TOTACC      | 0.00                                     | 0.00          | 0.00      | 0.00  | 0.00          | 0.00      | 0.00  | 0.00          | 0.00      | 0.21   |
| BIG4            | 0.96                                     | 1.00          | 0.20      | 0.95  | 1.00          | 0.22      | 0.96  | 1.00          | 0.19      | 1.71**   |
| MERGER          | 0.06                                     | 0.00          | 0.24      | 0.07  | 0.00          | 0.25      | 0.05  | 0.00          | 0.22      | 1.55   |
| LITIGATION      | 0.21                                     | 0.00          | 0.41      | 0.25  | 0.00          | 0.43      | 0.19  | 0.00          | 0.37      | 4.63***  |
| ACEXP           | 0.71                                     | 1.00          | 0.46      | 0.71  | 1.00          | 0.46      | 0.71  | 1.00          | 0.45      | 0.20   |
| ENV_IN          | 0.13                                     | 0.00          | 0.40      | 0.11  | 0.00          | 0.38      | 0.14  | 0.00          | 0.42      | 1.39*  |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, and 0.10 levels, respectively. See Table 1 for variable definitions.

<sup>b</sup>Test results are identical when we use non-parametric tests.

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**Table 3****Descriptive Statistics for Firms With and Without Environmental Initiatives (EI)**

| <u>Variable</u> | <u>Firms With EI</u><br><u>(n = 248)</u> |               |           | <u>Firms Without EI</u><br><u>(n = 1,847)</u> |               |           | <u>Test of</u>                                       |
|-----------------|--|---------------|-----------|---|---------------|-----------|--|
|                 | <u>Mean</u>                              | <u>Median</u> | <u>SD</u> | <u>Mean</u>                                   | <u>Median</u> | <u>SD</u> | <u>Differences<sup>b</sup></u><br><u>t-statistic</u> |
| AB_DACC         | 0.06                                     | 0.04          | 0.09      | 0.08  | 0.04          | 0.10      | -2.811***  |
| LN_MVE          | 21.41                                    | 21.21         | 1.35      | 21.39   | 21.21         | 1.35      | 0.256  |
| LEV             | 0.51                                     | 0.52          | 0.23      | 0.57  | 0.56          | 0.23      | -3.619***  |
| MKTBK           | 1.43                                     | 1.11          | 1.25      | 1.33  | 1.03          | 1.14      | 1.344  |
| LOSS            | 0.12                                     | 0.00          | 0.31      | 0.11  | 0.00          | 0.32      | 0.216  |
| OCF             | 0.10                                     | 0.09          | 0.08      | 0.11  | 0.11          | 0.11      | -0.825   |
| LAG_TOTACC      | 0.00                                     | 0.00          | 0.00      | 0.00  | 0.00          | 0.00      | 0.926  |
| BIG4            | 0.98                                     | 1.00          | 0.13      | 0.95  | 1.00          | 0.21      | 2.219**  |
| MERGER          | 0.05                                     | 0.00          | 0.21      | 0.06  | 0.00          | 0.24      | -0.817   |
| LITIGATION      | 0.17                                     | 0.00          | 0.38      | 0.21  | 0.00          | 0.41      | -1.381   |
| ACEXP           | 0.67                                     | 1.00          | 0.47      | 0.71  | 1.00          | 0.45      | -1.344   |
| ENV_IN          | 1.09                                     | 1.00          | 0.56      | 0.00  | 0.00          | 0.00      | 84.49***   |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, and 0.10 levels, respectively. See Table 1 for variable definitions.

<sup>b</sup>Test results are identical when we use non-parametric tests.

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Table 4

Correlations: Pearson (Spearman) Correlations are Presented in the Upper (Lower) Diagonal<sup>a</sup>

|            | <u>DACC</u>   | <u>LN_MV</u><br><u>E</u> | <u>LEV</u>        | <u>MKTBK</u>  | <u>LOSS</u>   | <u>OCF</u>    | <u>LAG_TOTACC</u> | <u>BIG4</u>  | <u>MERGER</u> | <u>LITIGATION</u> | <u>ACEXP</u> | <u>ENV_IN</u> |
|------------|---------------|--------------------------|-------------------|---------------|---------------|---------------|-------------------|--------------|---------------|-------------------|--------------|---------------|
| DACC       |               | 0.032                    | -<br>0.003        | 0.018         | 0.036         | <b>-0.145</b> | <b>-0.057</b>     | -0.007       | 0.027         | <b>0.164</b>      | 0.010        | <b>-0.058</b> |
| LN_MVE     | <b>0.051</b>  |                          | <b>0.097</b>      | <b>0.166</b>  | <b>-0.205</b> | -0.028        | 0.004             | 0.015        | 0.013         | -0.030            | 0.006        | 0.007         |
| LEV        | 0.026         | <b>0.104</b>             |                   | <b>-0.506</b> | 0.036         | -0.020        | 0.037             | 0.026        | 0.010         | -0.009            | 0.024        | <b>-0.080</b> |
| MKTBK      | -0.037        | <b>0.105</b>             | -<br><b>0.639</b> |               | 0.006         | -0.006        | -0.015            | 0.002        | -0.016        | -0.015            | -0.008       | 0.028         |
| LOSS       | 0.026         | <b>-0.212</b>            | 0.033             | -0.034        |               | <b>-0.055</b> | 0.033             | 0.008        | -0.026        | 0.027             | 0.003        | 0.007         |
| OCF        | 0.022         | -0.018                   | 0.003             | -0.020        | <b>-0.044</b> |               | <b>0.147</b>      | 0.004        | <b>0.047</b>  | <b>-0.141</b>     | 0.030        | -0.016        |
| LAG_TOTACC | 0.021         | 0.018                    | 0.038             | -0.016        | 0.021         | <b>-0.064</b> |                   | 0.024        | 0.005         | -0.014            | 0.001        | 0.018         |
| BIG4       | -0.028        | 0.011                    | 0.024             | 0.005         | 0.008         | 0.011         | <b>0.059</b>      |              | <b>0.043</b>  | -0.026            | 0.014        | 0.026         |
| MERGER     | 0.041         | 0.012                    | 0.011             | -0.042        | -0.026        | 0.041         | -0.033            | <b>0.043</b> |               | 0.021             | 0.011        | <b>-0.045</b> |
| LITIGATION | <b>0.117</b>  | -0.019                   | -<br>0.002        | -0.003        | 0.027         | <b>-0.059</b> | -0.027            | -0.026       | 0.021         |                   | -0.009       | -0.030        |
| ACEXP      | 0.002         | -0.004                   | 0.022             | -0.019        | 0.003         | 0.022         | 0.013             | 0.014        | 0.011         | -0.009            |              | -0.029        |
| ENV_IN     | <b>-0.062</b> | 0.014                    | -<br><b>0.084</b> | <b>0.048</b>  | -0.005        | -0.041        | <b>0.081</b>      | 0.039        | <b>-0.046</b> | -0.034            | -0.041       |               |

<sup>a</sup>Correlations significant at the two-tailed 0.05 level are in bold figures. See Table 1 for variable definitions.

**Table 5**  
**Regression of Absolute Value of Discretionary Accruals on Environmental Initiatives**

$$AB\_DACC = f\{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, ENV\_IN, YEAR\ FIXED\ EFFECTS, INDUSTRY\}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.047           | 1.308              |
| LN_MVE                           | ?                    | 0.002           | 1.331              |
| LEV                              | ?                    | -0.023          | -2.077**           |
| MKTBK                            | +                    | 0.002           | 0.797              |
| LOSS                             | +                    | 0.012           | 1.719**            |
| OCF                              | -                    | -0.102          | -4.792***          |
| LAG_TOTACC                       | -                    | -5.181          | -1.502*            |
| BIG4                             | -                    | 0.000           | -0.026             |
| MERGER                           | ?                    | 0.006           | 0.664              |
| LITIGATION                       | +                    | 0.021           | 3.284***           |
| ACEXP                            | -                    | 0.000           | -0.041             |
| ENV_IN                           | -                    | <b>-0.012</b>   | <b>-2.224**</b>    |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 2,095                |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.10</b>          |                 | <b>11.091***</b>   |
| VIF Range                        | 1.021 – 1.536        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions.

**Table 6**  
**Regression of Income-Increasing Discretionary Accruals on Environmental Initiatives**

$$\text{INC\_DACC} = f\{\text{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, ENV\_IN, YEAR FIXED EFFECTS, INDUSTRY}\}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.061           | 0.993              |
| LN_MVE                           | ?                    | 0.002           | 0.654              |
| LEV                              | ?                    | -0.033          | -1.719*            |
| MKTBK                            | +                    | 0.003           | 0.732              |
| LOSS                             | +                    | 0.022           | 1.861**            |
| OCF                              | -                    | -0.195          | -5.406***          |
| LAG_TOTACC                       | -                    | -20.606         | -3.822***          |
| BIG4                             | -                    | 0.004           | 0.246              |
| MERGER                           | ?                    | -0.017          | -1.041             |
| LITIGATION                       | +                    | 0.029           | 2.600***           |
| ACEXP                            | -                    | 0.003           | 0.377              |
| ENV_IN                           | -                    | <b>-0.015</b>   | <b>-1.497*</b>     |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 927                  |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.13</b>          |                 | <b>7.355***</b>    |
| VIF Range                        | 1.038 – 1.502        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions.

**Table 7**

**Regression of Absolute Value of Discretionary Accruals on Environmental Initiative Indicator**

$$AB\_DACC = f\{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, ENV\_YN, YEAR\ FIXED\ EFFECTS, INDUSTRY\}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.034           | 0.940              |
| LN_MVE                           | ?                    | 0.002           | 1.328              |
| LEV                              | ?                    | -0.023          | -2.089**           |
| MKTBK                            | +                    | 0.002           | 0.814              |
| LOSS                             | +                    | 0.012           | 1.699**            |
| OCF                              | -                    | -0.101          | -4.785***          |
| LAG_TOTACC                       | -                    | -5.153          | -1.494*            |
| BIG4                             | -                    | 0.000           | 0.039              |
| MERGER                           | ?                    | 0.006           | 0.727              |
| LITIGATION                       | +                    | 0.021           | 3.316***           |
| ACEXP                            | -                    | 0.000           | -0.067             |
| ENV_YN                           | -                    | <b>-0.016</b>   | <b>-2.332***</b>   |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 2,095                |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.10</b>          |                 | <b>11.116***</b>   |
| VIF Range                        | 1.020 – 1.537        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions.



**Table 8**

**Regression of Income-Increasing Discretionary Accruals on Environmental Initiative Indicator**

$$INC\_DACC = f\{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, ENV\_YN, YEAR\ FIXED\ EFFECTS, INDUSTRY\}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.060           | 0.976              |
| LN_MVE                           | ?                    | 0.002           | 0.658              |
| LEV                              | ?                    | -0.033          | -1.728*            |
| MKTBK                            | +                    | 0.003           | 0.762              |
| LOSS                             | +                    | 0.021           | 1.829**            |
| OCF                              | -                    | -0.194          | -5.413***          |
| LAG_TOTACC                       | -                    | -20.625         | -3.826***          |
| BIG4                             | -                    | 0.005           | 0.321              |
| MERGER                           | ?                    | -0.017          | -1.023             |
| LITIGATION                       | +                    | 0.029           | 2.666***           |
| ACEXP                            | -                    | 0.003           | 0.370              |
| ENV_YN                           | -                    | <b>-0.019</b>   | <b>-1.589*</b>     |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 927                  |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.13</b>          |                 | <b>7.370***</b>    |
| VIF Range                        | 1.038 – 1.502        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions..

**Table 9**

**Regression of Absolute Value of Discretionary Accruals on Types of Environmental Initiatives**

$$AB\_DACC = f\{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, PROD\_SERV, POLL\_PREV, RECYCLE, CLIMATE, OTHER, YEAR\ FIXED\ EFFECTS, INDUSTRY\}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.046           | 1.279              |
| LN_MVE                           | ?                    | 0.002           | 1.325              |
| LEV                              | ?                    | -0.023          | -2.082**           |
| MKTBK                            | +                    | 0.002           | 0.817              |
| LOSS                             | +                    | 0.012           | 1.741**            |
| OCF                              | -                    | -0.100          | -4.728***          |
| LAG_TOTACC                       | -                    | -4.964          | -1.438*            |
| BIG4                             | -                    | 0.000           | 0.015              |
| MERGER                           | ?                    | 0.006           | 0.694              |
| LITIGATION                       | +                    | 0.020           | 3.219***           |
| ACEXP                            | -                    | 0.000           | 0.044              |
| <b>PROD_SERV</b>                 | -                    | <b>0.010</b>    | <b>0.814</b>       |
| <b>POLL_PREV</b>                 | -                    | <b>-0.033</b>   | <b>-2.256**</b>    |
| <b>RECYCLE</b>                   | -                    | <b>-0.009</b>   | <b>-0.522</b>      |
| <b>CLIMATE</b>                   | -                    | <b>-0.019</b>   | <b>-1.635**</b>    |
| <b>OTHER</b>                     | -                    | <b>0.001</b>    | <b>0.042</b>       |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 2,095                |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.10</b>          |                 | <b>9.627***</b>    |
| VIF Range                        | 1.022 – 1.538        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions.

**Table 10**

**Regression of Income-Increasing Discretionary Accruals on Types of Environmental Initiatives**

$$\text{INC\_DACC} = f\{ \text{LN\_MVE, LEV, MKTBK, LOSS, OCF, LAG\_TOTACC, BIG4, MERGER, LITIGATION, ACEXP, PROD\_SERV, POLL\_PREV, RECYCLE, CLIMATE, OTHER, YEAR FIXED EFFECTS, INDUSTRY} \}$$

| <u>Variable</u>                  | <u>Expected Sign</u> | <u>Estimate</u> | <u>t-statistic</u> |
|----------------------------------|----------------------|-----------------|--------------------|
| Intercept                        |                      | 0.058           | 0.949              |
| LN_MVE                           | ?                    | 0.002           | 0.648              |
| LEV                              | ?                    | -0.034          | -1.775*            |
| MKTBK                            | +                    | 0.003           | 0.730              |
| LOSS                             | +                    | 0.021           | 1.817**            |
| OCF                              | -                    | -0.188          | -5.218***          |
| LAG_TOTACC                       | -                    | -20.179         | -3.740***          |
| BIG4                             | -                    | 0.006           | 0.365              |
| MERGER                           | ?                    | -0.018          | -1.062             |
| LITIGATION                       | +                    | 0.027           | 2.415***           |
| ACEXP                            | -                    | 0.004           | 0.459              |
| <b>PROD_SERV</b>                 | -                    | <b>0.022</b>    | <b>0.970</b>       |
| <b>POLL_PREV</b>                 | -                    | <b>-0.042</b>   | <b>-1.673**</b>    |
| <b>RECYCLE</b>                   | -                    | <b>-0.006</b>   | <b>-0.178</b>      |
| <b>CLIMATE</b>                   | -                    | <b>-0.025</b>   | <b>-1.146</b>      |
| <b>OTHER</b>                     | -                    | <b>0.003</b>    | <b>0.094</b>       |
| YEAR FIXED EFFECTS               |                      | yes             |                    |
| INDUSTRY                         |                      | yes             |                    |
| Observations                     | 927                  |                 |                    |
| Adjusted R <sup>2</sup> /F-value | <b>0.13</b>          |                 | <b>6.390***</b>    |
| VIF Range                        | 1.039 – 1.507        |                 |                    |

\*\*\*, \*\*, \* denote significance at the 0.01, 0.05, 0.10 levels, respectively. One-tailed tests used for a directional prediction, and two-tailed otherwise. The t-statistics are based on White's (1980) adjusted standard errors. See Table 1 for variable definitions.

**Appendix: Examples of Environmental Initiatives**

| <b>Initiative Type</b>                                     | <b>Company</b>                  | <b>Example</b>   |
|--|---------------------------------|--|
| <b>Environmental Products and Services (PROD_SERV)</b>     | <b>Waters Corporation</b>       | The Company's Waters instruments (LC and MS) are utilized in this broad range of industries to detect, identify, monitor and measure the chemical, physical and biological composition of materials as well as to purify a full range of compounds. These instruments are used in drug discovery and development, including clinical trial testing, the analysis of proteins in disease processes (known as "proteomics"), food safety analysis and environmental testing (Waters Corporation 2006).   |
| <b>Pollution Prevention (POLL_PREV)</b>                    | <b>3M Company</b>               | Capital expenditures for environmental purposes have included pollution control devices — such as wastewater treatment plant improvements, scrubbers, containment structures, solvent recovery units and thermal oxidizers — at new and existing facilities constructed or upgraded in the normal course of business. Consistent with the Company's policies stressing environmental responsibility, capital expenditures... for known projects are presently expected to be about \$20 million over the next two years for new or expanded programs to build facilities or modify manufacturing processes to minimize waste and reduce emissions (3M Company 2006).   |
| <b>Recycling Initiatives (RECYCLE)</b>                     | <b>Trex Company, Inc.</b>       | Through capital investments and process engineering, we continuously seek to lower the all-in cost to manufacture Trex products. Investments in plastic recycling capabilities will allow us to expand our ability to use a wider breadth of waste streams and as a result lower our raw material costs (Trex Company, Inc. 2006).   |
| <b>Climate Protection (CLIMATE)</b>                        | <b>FPL Group, Inc.</b>          | As a participant in President Bush's Climate Leader Program to reduce greenhouse gas intensity in the United States by 18% by 2012, FPL Group has inventoried its greenhouse gas emission rates and has committed to a 2008 reduction target of 18% below a 2001 baseline emission rate measured in pounds per megawatt-hour. FPL Group believes that the planned operation of its generating portfolio, along with its current efficiency initiatives, greenhouse gas management efforts and increased use of renewable energy, will allow it to achieve this target. In addition, FPL Group has joined the U.S. Climate Action Partnership, an alliance made up of a diverse group of U.S.-based businesses and environmental organizations, which in early 2007 issued a set of principles and recommendations to address global climate change and the reduction of greenhouse gas emissions (FPL Group, Inc. 2006). |
| <b>Other Environmentally Proactive Initiatives (OTHER)</b> | <b>The Dow Chemical Company</b> | Dow is committed to world-class environmental, health and safety ("EH&S") performance, as demonstrated by a long-standing commitment to Responsible Care®, the significant progress made by the Company over a 10-year period toward Dow's EH&S Goals for 2005, and the development of Dow's new 2015 Sustainability Goals. In 2005, Dow developed its next generation of 10-year goals that will provide continuity to the first set of goals, while also addressing a broader set of challenges. The 2015 Sustainability Goals will set the standard for sustainability in the chemical industry by focusing on improvements in Dow's local corporate citizenship and product stewardship, and by actively pursuing methods to reduce the Company's environmental impact (The Dow Chemical Company 2006).  |