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Corporate social responsibility versus corporate shareholder responsibility: A family firm perspective☆

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ABSTRACT

Recent literature suggests that some socially responsible corporate actions benefit shareholders while others do not. We study differences in policy toward corporate social responsibility (CSR) between family and non-family firms, using environmental performance as the proxy for CSR. We show that family firms are more responsible to shareholders than non-family firms in making environmental investments. When shareholder interests and societal interests coincide, i.e., when it comes to alleviating environmental concerns that have potential to harm society and elevate the firm's risk exposure, family firms do at least as well as non-family firms in protecting shareholder interests. However, when shareholder and societal interests diverge, i.e., when it comes to making environmental investments that might benefit society but do not benefit shareholders, family firms protect shareholder interests by undertaking a significantly lower level of such investments than non-family firms. Our findings suggest that lack of diversification by controlling families creates strong incentives for them to act in the financial interest of all shareholders, which more than overcomes any noneconomic benefits families may derive from engaging in social causes that do not benefit non-controlling shareholders.

1. Introduction

We study the differences in policy toward corporate social responsibility (CSR) between family and non-family firms to shed new light on both corporate posture toward CSR and the tension between type I and type II agency problems in family firms.[1] Bowen (1953) states that businessmen should "pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of the objectives and values of our society." On the other hand, in a well-known *New York Times Magazine* article, Friedman (1970) states that "The social responsibility of a business is to increase its profits." These two statements reflect a widely debated topic among both academics and practitioners for the past several decades, i.e. is CSR a legitimate part of a firm's business or none of its business?

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[1] In the family firm literature the type I agency problem refers to the conflict of interest between owners and managers while the type II agency problem refers to the conflict of interest between controlling (family) shareholders and non-controlling shareholders (Villalonga and Amit, 2006; Villalonga et al., 2015).

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Several studies, including Hamilton et al. (1993), Bauer et al. (2005), Schröder (2007), Benabou and Tirole (2010), Borghesi et al. (2014), Masulis and Reza (2015), Cheng et al. (2016), Adhikari (2016) and Ghoul et al. (2016) suggest that CSR is orthogonal to corporate shareholder responsibility. However, numerous other studies, such as Guenster et al. (2011), Derwall et al. (2005), Luo and Bhattacharya (2006), Kempf and Osthoff (2007), Sharfman and Fernando (2008), Deng et al. (2013), Servaes and Tamayo (2013), Chava (2014), Eccles et al. (2014), Crifo et al. (2015), Flammer (2015), Lins et al. (2017) and Albuquerque et al. (2018) show that CSR is positively related to shareholder value. A third set of studies shows that some CSR actions are beneficial to shareholders while other CSR actions are not (Oikonomou et al., 2012; Kruger, 2015; Fernando et al., 2017).

Friedman (1970) goes on to argue that individuals are free to do what they wish with their private money, including spending it on social causes; hence, an individual proprietor is free to spend money from his business as he wishes. However, if a manager is running a firm on behalf of shareholders, his fiduciary duty is to spend the firm's money on investments that maximize shareholder value. In the case of firms run by managers, a question arises then as to whether CSR activities are value enhancing or not. Fernando et al. (2017) document that some corporate investments in social causes (spending to reduce negative environmental outcomes and thereby reduce the firm's risk exposure) creates value for shareholders. In contrast, they show that spending on increasing positive environmental outcomes (investments that go beyond both legal requirements and any conceivable risk mitigation rationale), while good *socially*, is not viewed by shareholders as value-enhancing.

While the findings of Fernando et al. (2017) are based on a cross-sectional analysis of a sample of firms, there is currently no evidence on whether individual firms can differentiate between CSR actions that benefit shareholders and CSR actions that create no value for shareholders. Family firms provide an ideal experimental setting to examine this question. If family firms operate more like sole-proprietorships than widely held non-family firms, one would expect to see more spending by family firms on social causes that bring noneconomic benefits to the controlling family but no financial benefits to non-controlling shareholders (type II agency problem). On the other hand, if family firms are more concerned about their financial profits than non-family firms due to large undiversified stakes in the firm that mitigate the type I agency problem, one would expect them to spend less on social activities that do not enhance shareholder value.

Following Fernando et al. (2017), we focus on the KLD environmental ratings to capture CSR investments.[2] The financial consequences of environmental policies of firms are likely to be considerably larger than other socially relevant corporate policies.[3] As a result, corporate environmental performance is the area that is most likely to provide evidence of socially responsible investing (see Fernando et al. (2017) for a more detailed discussion). KLD provides a set of binary indicator variables, which reflects either environmental strengths or environmental concerns. For each firm, KLD provides five sub-indicators for environmental strengths and seven sub-indicators for environmental concerns. The sub-indicators for environmental strengths capture aspects of a firm's environmental policy that is intended to enhance its environmental friendliness (“greenness”) whereas the environmental concerns capture aspects that are related to various environmental risk exposures (“toxicity”). KLD assigns a value of one if a firm meets or exceeds a predetermined threshold for each sub-indicator and zero otherwise. Our analysis focuses on separately aggregating a firm's environmental strengths and concerns to measure its “greenness” and “toxicity,” respectively.

The main finding by Fernando et al. (2017) is that institutional investors, who they use as their proxy for the “smart money,” avoid “toxic” stocks (firms with negative net environmental scores). This finding is consistent with the notion that corporate policies that mitigate risk exposure are value enhancing.[4] Interestingly, they also find that institutional investors also avoid “green” stocks (firms with positive net environmental scores). This finding is consistent with the view that any corporate environmental policy that requires action beyond what is legally mandated or cannot be justified by a risk rationale does not create value for shareholders.[5] To summarize, Fernando et al. (2017) find that the interests of shareholders and society coincide when it comes to reducing a firm's environmental concerns but they diverge sharply when it comes to increasing environmental strengths. In other words, shareholders reward firms that reduce their “toxicity” but punish firms that increase their “greenness.”[6]

Kruger (2015) finds results that are consistent with Fernando et al. (2017); he uses the KLD Socrates database, which contains the underlying events used to generate the more common KLD indicators. He finds that investors react strongly negatively to negative events (that would lead to higher environmental concerns) and weakly negatively to positive events (that would lead to higher environmental strengths). This implies that reducing environmental concerns, as classified by KLD, is value enhancing but increasing environmental strengths does not create value for shareholders.

We show a clear negative association between family firms and environmental strengths. This result is economically significant indicating an environmental strength score 21% lower compared to the mean environmental score of the sample. This finding suggests that, on average, family firms are more responsible to shareholders than non-family firms when it comes to incurring expenditure that makes their firms green. Our findings for environmental concerns provide somewhat weaker evidence that family

[2] Kinder, Lydenberg and Domini Research and Analytics (KLD) is now a part of MSCI, a leading provider of investment decision support tools. Many other studies related to corporate environment policy has used this dataset; see for example Galema et al. (2008) and Chava (2014).

[3] To provide anecdotal evidence, consider the British Petroleum gulf oil spill in 2010; it is estimated that this has cost British Petroleum over $60 billion to date in losses, damages and fines. In addition, Karpoff et al. (2005) document that firms pay substantial legal penalties and suffer corresponding market value losses following violations of environmental regulations.

[4] Examples of environmental concerns as classified by KLD include issues related to the disposal of hazardous waste and violation of environmental regulations. See Appendix A for details.

[5] Examples of environmental strengths as classified by KLD include extensive recycling and the use of clean energy. See Appendix A for details.

[6] The terms “strengths” and “concerns” are applied by KLD from a social standpoint, not from a shareholder standpoint. The findings of Fernando et al. (2017) suggest that institutional shareholders prefer to invest in firms that have no environmental strengths and no environmental concerns.

firms are also more responsible to shareholders in alleviating environmental concerns. In the univariate analysis, we find that family firms have significantly lower environmental strengths and environmental concerns. Given that higher levels of both environmental concerns and strengths are value eroding, this finding implies that when looking at the unconditional means, family firms appear to be more consistent with shareholder wealth maximization in terms of both environmental strengths and concerns. However, in the multivariate analysis we do not find a statistically significant difference between family firms and non-family firms regarding environmental concerns. Nonetheless, taken together, our findings show that, on average, the corporate environmental policies of family firms are significantly more consistent with shareholder wealth maximization than non-family firms since family firms invest significantly less in environmental actions that benefit society but do not benefit shareholders while investing at least as much as non-family firms in environmental actions that benefit both society and shareholders.

We also investigate whether the nature of the family's involvement has any impact on the reported relationships between environmental strengths/concerns and family firms. We find that regardless of whether a family firm has a founder CEO or a descendent CEO, it has lower environmental strengths compared to non-family firms. If the firm is a family controlled firm (i.e., where neither the founder nor a descendant is the CEO), the reduction in the environmental strengths compared to non-family firms is even more pronounced. As with the previous analysis, regardless of who the CEO is, there is no difference between family firms and non-family firms when it comes to environmental concerns. Furthermore, instead of the family dummy (which is the primary focus of this paper) we look at how environmental strengths relate to the degree of family control. Consistent with our prior analysis we find a negative relationship between the degree of family control and environmental strengths and no relationship between the degree of family control and environmental concerns.

We undertake additional analysis to strengthen identification and establish robustness of our findings. First, we repeat our analysis on a propensity score matched sample. We match family firms with non-family firms using a propensity score calculated on size, book-to-market and the two-digit SIC code, and using the nearest neighbor matching (with replacement) approach. When we repeat our analysis on this propensity score matched sample, we find results that are consistent with our prior findings; family firms have lower environmental strengths compared to non-family firms but there is no significant difference between the firms regarding environmental concerns. Second, we use state level regulatory stringency of corporate environmental performance to control for the possibility that the environmental regulatory stringency of each state affects the environmental CSR activities of firms and their location decisions. We control for regulatory stringency using a proxy that has previously been used in the literature (King and Lenox, 2002; Kassinis and Vafeas, 2002; Berrone et al., 2010). Controlling for the state-level regulatory stringency and interacting with the family firm variable does not substantively change our results. For environmental strengths, we find that even when the state regulation is high, family firms have significantly fewer strengths than non-family firms. For environmental concerns we find that that family firms have significantly lower concerns when state regulation is high. Therefore, our overall conclusions remain unchanged.

Since family reputation is an important source of noneconomic utility for family firms, we also investigate what family reputation might mean for environmental performance in family firms. As a proxy for how important preserving the reputation of the family could be, we look at the interaction between the family firm dummy and a dummy indicating whether the founder's name or a portion of it is included in the firm name. We find that reputation does not seem to have an impact on the results for environmental strengths. However, we find that this interaction term is positive for environmental concerns, which implies that family firms with the founder's name have a higher amount of concerns. This could either imply that family reputation effects do not truly exist for large public companies or that our firm name proxy is capturing another unknown effect. However, this test also provides some evidence of family firms having less environmental concerns than non-family firms, among the firms that do not have the founder's name as part of the firm name.

We also find that our results persist across different time periods. Specifically, we investigate whether the recent financial crisis had an impact on environmental performance. We find that both during the crisis and prior to the crisis family firms have consistently lower environmental strengths. Interestingly we find that during the crisis, family firms have lower environmental concerns compared to non-family firms.

As an additional robustness test, we look at an alternative database, the Thomson Reuters' ASSET4 database. The ASSET4 database reports many indicator variables related to the environmental policy of a firm. Using the KLD definitions we categorize these variables as strengths and concerns. We repeat our analysis using these variables and find results consistent with our previous analysis. We also find that our results are robust to different methods of computing standard errors and when we control for environmental concerns (strengths) in the strengths (concerns) regressions or exclude firms that have both strengths and concerns greater than zero.

This paper contributes to a recent literature that is divided on the CSR performance of family firms. Ghoul et al. (2016) look at the CSR performance in nine East Asian countries using the Thomson Reuters' ASSET4 database and find that family firms are associated with a lower CSR score in terms of both environmental CSR and social CSR. In contrast, Berrone et al. (2010) show for a sample of U.S. firms that family firms have lower levels of toxic emissions, indicating superior environmental performance, while Dyer and Whetten (2006) show that family firms have fewer social (including environmental) concerns than non-family firms. Additionally, Block and Wagner (2014) show that family firms do better than non-family firms in some CSR dimensions and worse in others. Ghoul et al. (2016) view CSR activities as "…firm actions that go above and beyond the interests of the firm to further the social good" (Ghoul et al., 2016, pg.1). Their perspective contrasts sharply with the insight provided by Fernando et al. (2017) that some CSR activities (specifically those that mitigate the risk exposure of companies) are strongly consistent with shareholder interests, while other CSR activities are antithetical to shareholder interests.

Our findings contrast with the aforementioned studies and contribute to the literature by showing that when it comes to CSR,

family firms are more responsible to shareholders than non-family firms. When shareholder interests and societal interests coincide, i.e., when it comes to alleviating environmental concerns that have potential to harm society and elevate the firm's risk exposure, family firms do at least as well as non-family firms in protecting shareholder interests. However, when shareholder and societal interests diverge, i.e., when it comes to making environmental investments that benefit society but do not benefit shareholders, family firms are significantly more on the side of shareholders by undertaking fewer such investments than non-family firms. These findings contrast sharply with studies of corporate governance in family firms that show family firms being less responsible to their non-family shareholders.[7] When it comes to CSR, our findings suggest that the actions of the family are more consistent with the interests of shareholders (including non-family shareholders) than the managers of non-family firms, which supports the argument that the type I agency problem is alleviated in family firms, thereby causing family firms to align their CSR activities with shareholder wealth maximization.

The rest of the paper is organized as follows. Section 2 provides a brief review of the relevant literature. Section 3 presents an overview of the data and the methodology used in the study. Section 4 contains the empirical analysis and discussion of the results while Section 5 concludes.

2. Family firms and CSR

The literature on the role and functioning of the modern firm is largely based on the assumption of widely dispersed ownership, a notion that is derived from Berle and Means (1932). However, this assumption is often violated in the case of family firms, which have been documented to be a pervasive organizational form around the globe.

Anderson and Reeb (2003) document that a third of the U.S. S&P 500 firms are family firms. Claessens et al. (2000) document that more than half of East Asian corporations are family controlled. Similarly, Faccio and Lang (2002) observe that family controlled firms account for 44% of the firms in Western Europe. Given the prevalence of this organizational form, researchers over the past two decades have been interested in investigating whether family firms are effective and valuable as a form of organization.

Family firms have certain unique characteristics when compared to non-family firms. First, family owners tend to hold poorly diversified portfolios due to their concentrated ownership in the firm (Anderson and Reeb, 2003; Cheng, 2014). Due to this high ownership stake and low diversification, the performance of the firm is of critical importance for family owners as their wealth is closely tied to the performance of the firm. Secondly, family firm owners are thought to have longer investment horizons than other blockholders (James, 1999; Le Breton-Miller and Miller, 2006; Zellweger et al., 2012). In fact, family owners typically regard their ownership as an asset to be passed on to future generations (Casson, 1999; Chami, 1999).

These aforementioned characteristics give rise to a third characteristic of family firms, i.e., given the under-diversification of their portfolios and the emphasis on the survival of the firm, family owners tend to be actively involved in the management of the firm. Given these characteristics, the agency problem between managers and shareholders (known as "type I agency problem" in the family firm literature (e.g., Villalonga and Amit, 2006) is likely to be less severe compared to non-family firms.[8]

At the same time, family owners are known to derive utility from a variety of noneconomic benefits associated with their firms. These include viewing the firm as an extension of themselves as well as deriving a sense of identity from the firm (Kepner, 1983; Schein, 1995), creating a positive family image and reputation (Zellweger et al., 2012; Deephouse and Jaskiewicz, 2013), enjoying family influence over the business (Gomez-Mejia et al., 2007) and building social capital (Arregle et al., 2007). These noneconomic benefits of family owners are collectively known as "Socioemotional Wealth" in the management literature (Gomez-Mejia et al., 2007). While non-family owners and managers too might experience some of these noneconomic benefits, it is likely that the value of socioemotional wealth to the family is more intrinsic and is a more deeply rooted psychological phenomenon among family owners whose identity is tied to the firm (Berrone et al., 2010). When the socioemotional wealth of family owners is threatened it is possible that family owners will make strategic decisions that are aimed at protecting their socioemotional wealth even though it might be at the expense of other shareholders. In the finance literature on family firms this phenomenon is known as the "type II agency problem," (Villalonga and Amit, 2006); i.e. given the substantial ownership of cash flow rights and their extensive involvement in management, founding families have the incentive to take actions that benefit themselves at the expense of the other shareholders.

The literature related to CSR in family firms is nascent. Dyer and Whetten (2006), show in a preliminary study done using the S&P 500 firms that family firms behave similarly to non-family firms in terms of positive social initiatives but are associated with lower social concerns compared to non-family firms. The authors use the KLD dataset for this study. Berrone et al. (2010) look whether

[7] For example, Anderson and Reeb (2004), show that firms with concentrated founding-family ownership and relatively few independent directors perform significantly worse than non-family firms. Their study also suggests that families seek to minimize the presence of independent directors, while outside shareholders seek independent director representation. Anderson et al. (2012) find that informed trading via short sales is pursued more aggressively in family firms than in non-family firms. Chen et al. (2013) observe that both founder and descendent CEO family firms are less likely to fire a CEO after the firm performs poorly compared to non-family firms, leading to management entrenchment.

[8] Anderson and Reeb (2003) find that based on profitability measures (return on assets) as well as market measures (Tobin's Q), family firms on the S&P 500 outperform their non-family counterparts. Furthermore, they show that when a family member serves as the CEO, the firm performance is better than with an outside CEO. Maury (2006) finds similar results with respect to 13 Western European countries. In particular he finds that firms with active family control are more profitable than non-family firms, while firms with passive family control are associated with levels of profitability comparable to non-family firms. Fahlenbrach (2009) documents that 11% of the largest U.S. public firms are headed by founder CEOs and that these firms invest more in R&D, have higher capital expenditure, and make more focused mergers and acquisitions. Overall, these results are consistent with the idea that family firms reduce the type I agency problem and hence, that they are an effective organizational structure.

family firms pollute less than non-family firms using a between group approach. Their firms are limited to firms that operate in industries that are required to report their toxic emissions in the Toxic Release Inventory (TRI) program of the Environmental Protection Agency (EPA). They find that family firms have a better environmental performance,[9] especially when the firm has a strong geographical concentration. They argue that CEOs with significant stock ownership might not want to voluntarily adopt environmental policies that go beyond what is legally required nor be more stringent than their peers, as this would cause them to assume a risk that might not be justified by a sufficient return. However, while they find that this is not the case with family firms, in non-family firms they find that CEO stock ownership is associated with lower environmental performance. Furthermore, they document that the positive association between family firms and environmental performance is independent of whether the CEO is a family member or if both the CEO and Chairman are the same person.

Cruz et al. (2014) examine whether family firms are socially responsible toward both external and internal stakeholders. The authors utilize the CSRhub database and focus on European firms. Their interpretation of their finding is that family firms are as socially responsible as non-family firms when it concerns external stakeholders but they are socially irresponsible when it concerns internal stakeholders. They consider both these findings to be consistent with the socioemotional wealth maximization objective of family firms. In another recent study, Block and Wagner (2014) revert to the KLD dataset and use Bayesian regressions. They document that family ownership is negatively associated with community-related CSR performance but positively related to other dimensions of CSR.[10] They find that the largest positive relationship is between family ownership and product-related CSR. As an explanation for the only negative association they document, they argue that family owners might find it more efficient to pursue community related CSR activities in a more direct manner (example: through a family foundation) than through the firm.

In the finance literature, although CSR has been a topic of much debate, there is a dearth of research on CSR in family firms. Ghoul et al. (2016) examine differences in CSR performance between family and non-family firms of nine East Asian countries using the ASSET4 database from Thomson Reuters. Their measure of CSR performance is taken as the average of the firm's environmental and social performance scores. Interestingly, they find that family-controlled firms exhibit lower CSR performance. They argue that this is consistent with what they term as the “expropriation hypothesis,” i.e., family owners using their dominant voting rights to divert resources from CSR activities to other activities.

In summary, it can be said that the literature has been largely inconclusive regarding the relationship between CSR and family ownership. On one hand, due to the reduction in type I agency problem in family firms, one could expect family firms to align their CSR activities with shareholder wealth maximization. On the other hand, due to the presence of the type II agency problem, socioemotional wealth maximization can take precedence over shareholder wealth maximization in family firms, leading to CSR investments that are not value enhancing.

3. Data and methodology

In this section, we describe the data and methodology used in this study.

3.1. The sample

We use the family ownership data provided by Ronald Anderson[11] as a starting point for this study. This data is a combined and augmented sample from Anderson et al. (2009) and Anderson et al. (2012). The dataset excludes regulated public utilities, financial firms, foreign firms, firms listed as master limited partnerships and firms with share price less than $0.25. The data include an indicator variable that equals one when the family owns (or votes) a 5% or larger stake.[12] In designating family firms they do not include shares held by charitable foundations as part of the family holdings. Their final sample consists of 2000 largest firms for 2001, and spans from 2001 to 2010 with 16,200 firm-year observations. We merge this dataset with the KLD data. We drop firms for which we do not have KLD data for the full sample period. This results in a sample of 232 unique firms, out of which 59 firms, on average each year, are deemed to be family firms. However, for many companies, the selected KLD indicators are not available in 2010.[13] As a result our sample period extends from 2001 to 2009. We consider five sub-indicators of environmental strengths and seven sub-indicators of environmental concerns[14]; these indicators were picked solely based on the availability of sub-indicators for the full sample period. As Fernando et al. (2017) show, the environmental strengths reflect activities of the firm that go beyond legal

[9] Their measure of environmental performance is the average of the weighted on-site emissions (weighted using the Human Toxicity Potential Factor) in terms of benzene equivalence (for carcinogens) and for toluene equivalence (for non-carcinogens).

[10] The CSR dimensions they consider community related are diversity related, employee related, environment related and product related aspects of CSR.

[11] See http://www.ronandersonprofessionalpage.net/data-sets.html.

[12] The authors have collected family ownership data (founder and/or heir ownership) from corporate proxy statements and 10-K's for the years 2001 through 2010. To control for survivorship bias, they allow firms to exit and re-enter the sample. They state that they look at corporate histories from ReferenceforBusiness.com, FundingUniverse.com, and individual company websites.

[13] KLD at times reclassifies its indicators. Sometimes the reclassification could simply involve renaming of indicators but in other instances it could involve combining existing indicators or splitting existing indicators in to sub-indicators.

[14] The sub-indicators of environmental strength are: Beneficial Products and Services, Pollution Prevention, Recycling, Clean Energy and Other Strengths. The sub-indicators of environmental concerns are: Hazardous Waste, Regulatory Compliance, Ozone Depleting Chemicals, Substantial Emissions, Agricultural Chemicals, Climate Change, and Other Concerns. See Appendix A for detailed definitions.

requirements or cannot be justified by any risk rationale; in contrast, the environmental concerns are directly related to the firm's risk profile and financial costs. If a firm meets the KLD analyst criteria in each area, it is assigned a value of one, and zero otherwise.

3.2. Control variables

We use several control variables in our analysis and data for these variables are obtained from multiple sources. Accounting measures are obtained from COMPUSTAT, stock prices from CRSP, analyst coverage from I/B/E/S, governance variables from IRRC and institutional holdings data from the CDA/Spectrum 13F Holdings database. We also hand-collect certain data (data related to family ownership and any missing data) from the proxy statements and company websites.

We include the natural log of the book value of total assets to control for the effect of firm size. Older firms might be inclined to use older technologies that are not environmentally friendly; on the other hand, older firms might be more concerned about their image and hence, be more environmentally friendly. Therefore, we control for firm age by taking the natural log of the number of years since the firm's inception.[15] Growth opportunities are measured as the ratio of research and development expenses to total sales. We control for market leverage by including the ratio between long-term debt to total assets (adjusted for the market value of equity). Profitability is controlled by a measure of ROA (EBITD over total assets). In order to control for any effect stemming from the influence of S&P 500 membership, we include a S&P 500 dummy. We include a NASDAQ dummy to control for differences across stock exchanges. We also use several market based measures: Tobin's Q, the average monthly trading volume divided by shares outstanding (turnover) and the standard deviation of the daily stock return over each year. We also use the fraction of institutional ownership as a control variable. As analysts' following could have an effect on environmental performance, we control for the average analyst coverage of a firm during the year.

Ferrell et al. (2016) show that well governed firms suffer from less agency concerns and hence, engage in more CSR. We include numerous corporate governance controls. These variables include a dummy variable indicating whether the firm has dual class shares or not, the fraction of independent board directors, a CEO duality dummy which equals one if the CEO and Chairman are the same person and a measure of CEO equity compensation. See Appendix B for a detailed description of the variables.

Table 1 summarizes the sample by industry and year. It is apparent that family firms operate in a broad array of industries. However, family firms appear to be more prevalent in some industries than others. To control for these industry affiliations, we include fixed effects for two-digit SIC codes in addition to year fixed effects. The percentage of family firms show a declining trend over the sample period. Overall, one fourth of the observations are from family firms. This proportion is similar to the proportion of family firm observations found in the study by Ghoul et al. (2016).

3.3. Summary statistics

Table 2 presents three panels of descriptive information of our sample. Panel A provides the mean, standard deviation and minimum and maximum values for the key variables. Panel B reports the results for the differences in means between family firms and non-family firms for selected key variables. These statistics are calculated using firm-year observations. Panel C shows the correlation among some key variables used in the analysis.

Looking at the full sample (Panel A), 25.4% of the firm-year observations are family-firm observations. The average firm in the sample is nearly 67 years old. In terms of ROA, the average firm has a return of 15.6%. The average Tobin's Q is 2.159, with a maximum and minimum value of 8.473 and 0.533, respectively. Average institutional ownership for our sample is 75.6%.

The univariate analysis (Panel B) shows that family firms have both lower environmental strengths and environmental concerns compared to non-family firms. Hence, the univariate analysis suggests that family firms are more responsible to their shareholders than non-family firms when it comes to environmental CSR investments. Family firms have lower analyst coverage, leverage, institutional ownership, CEO equity-based pay (option pay as a fraction of salary, bonus and options), and fraction of independent directors. However, family firms have higher likelihood of having the same person as the CEO and chairman and having dual class shares. They also have a higher percentage of insider ownership (excluding family ownership). Interestingly, there is no difference in the firm size in terms of the book value of total assets and firm performance based on both ROA and Tobin's Q. Family firms have a significant negative correlation with both strengths and concerns as shown in Panel C. Furthermore, consistent with the findings of Kruger (2015) and Fernando et al. (2017), Tobin's Q shows a significant negative correlation with both strengths and concerns.[16]

4. Empirical analysis

In this section, we present the results of our empirical analysis.

[15] We obtain the date of inception from “Google search” and the company websites.

[16] In unreported results, we test for the conditional correlation between Tobin's Q and strengths/concerns using Tobin's Q regressions. Consistent with the findings of Kruger (2015) and Fernando et al. (2017), we find that strengths do not have a statistically significant relationship with Tobin's Q, while concerns have a significant negative relationship with Tobin's Q. We find similar results when we run the Tobin's Q regressions separately for family firms and non-family firms.

Table 1
Sample composition.
This table presents the sample distribution by two-digit SIC codes (Panel A) and by year (Panel B).

Panel A: By industry

SIC code	Industry description	Non-family firm-years	Family firm-years	Percent family firm-years in industry
10	Metal mining	18	0	0.00%
13	Oil and gas extraction	57	15	20.80%
14	Mining and quarrying of nonmetallic minerals, except fuels	9	0	0.00%
15	Construction - general contractors & operative builders	9	18	66.70%
16	Heavy construction, except building construction, contractor	24	3	11.10%
20	Food and kindred products	72	36	33.30%
22	Textile mill products	0	9	100.00%
23	Apparel, finished products from fabrics & similar materials	0	9	100.00%
24	Lumber and wood products, except furniture	18	0	0.00%
25	Furniture and fixtures	18	9	33.30%
26	Paper and allied products	45	0	0.00%
27	Printing, publishing and allied industries	9	27	75.00%
28	Chemicals and allied products	188	28	13.00%
29	Petroleum refining and related industries	36	0	0.00%
30	Rubber and miscellaneous plastic products	18	9	33.30%
31	Leather and leather products	0	9	100.00%
33	Primary metal industries	10	17	63.00%
34	Fabricated metal products	36	9	20.00%
35	Industrial and commercial machinery and computer equipment	132	21	13.70%
36	Electronic & other electrical equipment & components	164	70	29.90%
37	Transportation equipment	72	27	27.30%
38	Measuring, photographic, medical, & optical goods, & clocks	81	27	25.00%
39	Miscellaneous manufacturing industries	27	9	25.00%
40	Railroad transportation	27	0	0.00%
44	Water transportation	9	0	0.00%
45	Transportation by air	0	18	100.00%
47	Transportation services	18	0	0.00%
48	Communications	9	0	0.00%
50	Wholesale trade - durable goods	25	11	30.60%
51	Wholesale trade - nondurable goods	36	0	0.00%
52	Building materials, hardware, garden supplies & mobile homes	18	9	33.30%
53	General merchandise stores	36	18	33.30%
54	Food stores	36	0	0.00%
55	Automotive dealers and gasoline service stations	6	3	33.30%
56	Apparel and accessory stores	18	18	50.00%
57	Home furniture, furnishings and equipment stores	9	0	0.00%
58	Eating and drinking places	36	0	0.00%
59	Miscellaneous retail	27	0	0.00%
70	Hotels, rooming houses, camps, and other lodging places	0	9	100.00%
73	Business services	141	66	31.90%
75	Automotive repair, services and parking	9	0	0.00%
79	Amusement and recreation services	9	0	0.00%
80	Health services	27	0	0.00%
82	Educational services	0	9	100.00%
87	Engineering, accounting, research, and management services	0	18	100.00%
99	Non-classifiable establishments	18	0	0.00%
	Total observations	1557	531	

Panel B: Year

Year	Non-family firms	Family firms	Percentage of family firms
2001	168	64	27.6%
2002	168	64	27.6%
2003	169	63	27.2%
2004	174	58	25.0%
2005	174	58	25.0%
2006	174	58	25.0%
2007	175	57	24.6%
2008	177	55	23.7%
2009	178	54	23.3%
Total observations	1557	531	25.4%

Table 2
Descriptive data.

This table reports descriptive data of the sample. Panel A reports the summary statistics for the whole sample. Panel B reports a comparison of means between family firms and non-family firms for key variables. Panel C reports the correlation matrix for key variables. Variable definitions are in Appendix B.

Panel A: Summary statistics for the full sample

Variables	(1)	(2)	(3)	(4)	(5)
	N	Mean	Standard deviation	Min	Max
Family firm dummy	2088	0.254	0.436	0	1
Age	2088	66.51	43.63	2	203
Strengths	2088	0.314	0.659	0	4
Concerns	2088	0.489	0.979	0	5
S&P dummy	2088	0.653	0.476	0	1
Analyst coverage	2088	13.75	6.727	1	42.08
Total assets	2088	15,666	52,812	246	797,769
Leverage	2088	0.114	0.105	0	0.624
R&D/total assets	2088	0.0333	0.0547	0	0.68
ROA	2088	0.156	0.0849	−0.641	0.574
Tobin's Q	2088	2.159	1.165	0.533	8.473
Turnover	2088	2.095	1.686	0.157	28.25
Institutional ownership	2088	0.756	0.141	0.245	1
NASDAQ dummy	2088	0.263	0.44	0	1
Return volatility	2088	0.0251	0.0124	0.00682	0.0958
Dual class dummy	2088	0.0666	0.249	0	1
CEO equity-based pay	2088	0.226	0.312	−0.265	1
Board size	2088	10.05	2.334	4	19
Fraction of independent directors	2088	0.74	0.141	0.182	1
CEO duality dummy	2088	0.88	0.325	0	1
Officer/director ownership (less family)	2088	0.0367	0.0436	0	0.509

Panel B: Difference of means tests

Variables	(1)	(2)	(3)
	Family firms	Non-family firms	Difference
Number of firm-years	531	1557	
Age	60.49	68.56	−8.07***
Strengths	0.143	0.372	−0.23***
Concerns	0.279	0.556	−0.277***
S&P dummy	0.556	0.686	−0.13***
Analyst coverage	12.48	14.18	−1.70***
Total assets	12,455	16,760	−4305
Leverage	0.0989	0.119	−0.02***
R&D/total assets	0.0316	0.0339	0.00
ROA	0.155	0.156	0.00
Tobin's Q	2.194	2.147	0.05
Institutional ownership	0.701	0.774	−0.07***
NASDAQ dummy	0.352	0.232	0.12***
Return volatility	0.0262	0.0247	0.00**
Dual class dummy	0.243	0.00642	0.24***
CEO equity-based pay	0.184	0.24	−0.06***
Board size	9.589	10.21	−0.62***
Fraction of independent directors	0.655	0.769	−0.11***
CEO duality dummy	0.923	0.866	0.06***
Officer/director ownership (less family)	0.0486	0.0326	0.02***

Panel C: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Family firm	1										
(2) Strengths	−0.15***	1									
(3) Concerns	−0.12***	0.29***	1								
(4) Total assets	−0.04	0.25***	0.43***	1							
(5) Leverage	−0.09***	0.07***	0.18***	0.13***	1						
(6) ROA	−0.01	0	−0.05	−0.07***	−0.37***	1					

(continued on next page)

Table 2 (*continued*)

Panel C: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(7) Tobin's Q	0.02	−0.06**	−0.19***	−0.08***	−0.54***	0.49***	1				
(8) Institutional ownership	−0.23***	−0.12***	−0.19***	−0.25***	0.11***	−0.11***	−0.14***	1			
(9) Dual class shares	0.41***	−0.03	−0.01	0.03	0.06**	−0.08***	−0.07***	−0.02	1		
(10) Independent directors	−0.35***	0.15***	0.17***	0	0.09***	−0.02	−0.12	0.16***	−0.25***	1	
(11) CEO duality	0.08***	0	0.01	0	0.06***	−0.04*	−0.04*	0	−0.01	−0.07***	1

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

4.1. Multivariate analysis

The empirical analysis of this paper uses a two-way fixed effects model with industry and year fixed effects. Table 3 reports the main OLS regressions. Column 1 shows the results from regressing the sum of the environmental strengths on the family firm dummy and the other control variables, whereas results from regressing the sum of the environmental concerns are shown in column 2.

The coefficient on the family firm dummy is negative and highly statistically significant in model (1). However, the family dummy is negative but insignificant in model (2). These results indicate that even after controlling for other explanatory variables, and using industry and time fixed effects, family firms have a negative association with environmental strengths. Given the findings of Fernando et al. (2017), this could imply that family firms do not spend on environmental CSR activities that are not valued by shareholders. Interestingly, when other confounding factors are controlled for, there is no difference between family firms and non-family firms regarding environmental concerns. This could be interpreted as family firms and non-family firms expending similar amounts of resources to mitigate their environmental concerns.

The analysis in this paper primarily focuses on the family firm dummy. In columns (3) and (4), we replace the family firm dummy with the control rights held by the family and repeat the analysis in columns (1) and (2). For strengths, consistent with column (1), a highly significant negative association is reported with the degree of family control. For concerns, while positive in sign, the coefficient on family control is insignificant, consistent with column (2).

In columns (5) and (6), we examine how a family's relationship to the management of the firm might affect the results reported in columns (1) and (2). We split family firms into three categories: family firms with the founder as the CEO, family firms with a descendant as the CEO and firms that are family controlled (with a hired CEO). Columns (5) and (6) include a dummy for each of these three categories; these dummies simply replace the family firm dummy used in columns (1) and (2). The results are consistent with the results of columns (1) and (2); regardless of the nature of the family involvement in firms' management, family firms are associated with lower environmental strengths and there is no significant difference in their environmental concerns compared to non-family firms.

One plausible explanation for our findings is the reduced presence of the type I agency problem in family firms.[17] When there is ownership concentration, owners have the ability to influence and/or monitor mangers to ensure that the deviation from owners' objectives is minimal. Family ownership is one scenario of ownership concentration. However, given that their own wealth is at stake, unlike other controlling shareholders family shareholders are likely to be more dedicated principals and more effective monitors. As Villalonga et al. (2015) explain, other types of concentrated owners (such as institutions, banks or the state) are only agents for their respective “super-principals”; this dilutes their incentives to monitor the manager as closely as family shareholders would. Claessens et al. (2002) provide some evidence that is consistent with this argument. They document that the positive effect of concentrated shareholder ownership on firm value is driven by family ownership and not by other controlling shareholders such as institutions and the state. Therefore, family shareholders have the potential to create value by mitigating the type I agency problem.

4.2. Matched sample analysis

In the previous section, we show that family firms are associated with a lower score of environmental strengths and that there is no significant difference between family firms and non-family firms regarding their association with the score of environmental concerns.

[17] An alternative explanation is that family firms face weaker monitoring and are less transparent. As a result, it could be that fewer concerns are detected in family firms and they do not have to establish many strengths to “cover their sins.” The evidence is mixed on whether family firms practice a less transparent disclosure policy. Anderson et al. (2009) find that founder and heir-controlled firms are more opaque than diffuse shareholder firms. However, several other studies document that family firms have a more transparent disclosure policy (Wang, 2006 and Ali et al., 2007); this would contradict the premise on which this alternative explanation is based. Furthermore, our regressions control for potential differences in monitoring in family firms, through several control variables such as institutional ownership, managerial stock ownership and the fraction of independent directors.

Table 3
Multivariate regression analysis.

This table reports the regression of the sum of environmental strengths and concerns on different measures of family control and other covariates. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Variables	Family firm dummy		Family control		Family management	
	(1)	(2)	(3)	(4)	(5)	(6)
	Strengths	Concerns	Strengths	Concerns	Strengths	Concerns
Family firm	−0.249***	−0.0386				
	(0.0327)	(0.0385)				
Family control %			−0.653***	0.242		
			(0.120)	(0.167)		
Founder-CEO family firm					−0.211***	−0.0177
					(0.0387)	(0.0463)
Descendent -CEO family firm					−0.238***	−0.0204
					(0.0466)	(0.0590)
Hired CEO- family firm					−0.356***	−0.114
					(0.0535)	(0.0762)
Log (total assets)	0.197***	0.371***	0.205***	0.375***	0.194***	0.369***
	(0.0201)	(0.0218)	(0.0204)	(0.0218)	(0.0201)	(0.0217)
Leverage	−0.375**	−0.409**	−0.377**	−0.387*	−0.400**	−0.429**
	(0.161)	(0.201)	(0.163)	(0.201)	(0.163)	(0.202)
Log (firm age)	0.0197	0.0759***	0.0255	0.0767***	0.0202	0.0760***
	(0.0234)	(0.0289)	(0.0232)	(0.0290)	(0.0236)	(0.0292)
Institutional ownership	−0.461***	−0.483***	−0.326***	−0.413***	−0.473***	−0.487***
	(0.116)	(0.124)	(0.109)	(0.124)	(0.114)	(0.124)
Officer/director ownership (less family)	0.638**	−0.427	0.359	−0.420	0.660**	−0.415
	(0.256)	(0.273)	(0.240)	(0.265)	(0.264)	(0.276)
CEO equity-based pay	0.0194	−0.0662	0.0140	−0.0559	0.0108	−0.0732
	(0.0630)	(0.0765)	(0.0640)	(0.0765)	(0.0636)	(0.0767)
ROA	0.255	0.433*	0.208	0.445**	0.231	0.417*
	(0.165)	(0.225)	(0.164)	(0.226)	(0.165)	(0.224)
R&D/total assets	−0.0266	−0.471	−0.117	−0.484	−0.0207	−0.467
	(0.294)	(0.301)	(0.291)	(0.301)	(0.294)	(0.300)
CEO duality	0.0197	0.0965**	0.0120	0.0860*	0.0240	0.100**
	(0.0394)	(0.0457)	(0.0402)	(0.0455)	(0.0401)	(0.0461)
Dual class shares	0.162***	0.148**	0.215***	0.0361	0.189***	0.166**
	(0.0605)	(0.0724)	(0.0755)	(0.0887)	(0.0651)	(0.0757)
Fraction of independent directors	−0.120	0.146	−0.0453	0.189	−0.0804	0.171
	(0.110)	(0.130)	(0.109)	(0.129)	(0.113)	(0.134)
Tobin's Q	0.00425	−0.0305*	0.00744	−0.0288	0.00335	−0.0311*
	(0.0142)	(0.0176)	(0.0142)	(0.0175)	(0.0143)	(0.0176)
Return volatility	−0.0274	5.708***	−0.250	5.627***	−0.177	5.610***
	(1.199)	(1.863)	(1.202)	(1.850)	(1.192)	(1.858)
Turnover	−0.0195**	0.0590***	−0.0199**	0.0605***	−0.0187**	0.0595***
	(0.00968)	(0.0121)	(0.00969)	(0.0123)	(0.00954)	(0.0121)
Analyst coverage	−0.0101***	−0.0221***	−0.00926***	−0.0221***	−0.00989***	−0.0219***
	(0.00309)	(0.00322)	(0.00311)	(0.00321)	(0.00310)	(0.00324)
S&P dummy	−0.0816**	0.0159	−0.0973***	0.0184	−0.0803**	0.0159
	(0.0333)	(0.0424)	(0.0337)	(0.0424)	(0.0341)	(0.0432)
NASDAQ dummy	0.0664*	0.0423	0.0724*	0.0376	0.0654*	0.0408
	(0.0386)	(0.0342)	(0.0394)	(0.0348)	(0.0385)	(0.0349)
Intercept	−1.323***	−1.128***	−1.520***	−1.239***	−1.313***	−1.121***
	(0.226)	(0.369)	(0.221)	(0.370)	(0.225)	(0.369)
Observations	2088	2088	2088	2088	2088	2088
Adjusted R-squared	0.264	0.555	0.256	0.555	0.265	0.555
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

To address concerns of endogeneity, we examine a matched sample of family firms and non-family firms. If the matched firms are similar based on many observables, it is customary to assume they are similar based on unobservables as well although this is not assured by any means. Based on a propensity score calculated on size, book-to-market and the two-digit SIC code, we create a

matched sample for the family firms based on nearest neighbor matching (with replacement).[18] We check for the covariate balance and find that although we match on a propensity score calculated on size, book-to-market and industry, there is no statistical difference in the matched sample in terms of size, leverage, age, CEO compensation, ROA, R&D expenditure, Tobin's Q, return volatility, analyst coverage, the S&P dummy and the NASDAQ dummy (Table 4, Panel A). Next, we repeat the analysis of column (1) and (2) found in Table 3 on this matched sample (Table 4, Panel B).[19] The results confirm those presented in Table 3 for environmental strengths and environmental concerns.

4.3. Regulatory stringency

As emphasized by Berrone et al. (2010), the regulatory stringency of each state could have an impact on the environmental CSR activities of a firm. Hence, we repeat our analysis by controlling for the regulatory stringency in the state in which a firm is headquartered. Further, there might be a possibility of some endogeneity arising from (especially) family firms preferring to locate in states with lower regulatory stringency. We repeat our analysis after including an interaction term between the family firm dummy and the regulatory stringency variable.

Based on King and Lenox (2002), Kassinis and Vafeas (2002) and Berrone et al. (2010), we create a coarse proxy for state-level regulatory stringency by the log-transformed and inverted value of the total carbon dioxide (CO^2) emissions in the state where the firm is headquartered,[20] scaled by total employment of the state.[21] A higher value of this variable is indicative of higher regulatory stringency. Table 5 reports the results.

Even after controlling for regulatory stringency, we continue to find results consistent with our prior analysis, i.e. family firms have lower environmental strengths than non-family firms but there is no significant difference between the two types of firms when it comes to environmental concerns (columns (1) and (3)). The coefficient on regulatory stringency is highly statistically significant in both columns (1) and (3). The coefficient is positively related to environmental strengths while it is negatively related to environmental concerns. This is not surprising as one would expect the environmental performance of a firm to improve (from a social perspective) when regulatory stringency is higher.

In columns (2) and (4), we include the interaction term between the family firm dummy and the regulatory stringency variable. For strengths, the interaction term is negative and significant, indicating that even when the state-level regulation is high, family firms tend to have significantly fewer strengths than non-family firms. It is also negative and significant for concerns, indicating that family firms have significantly lower concerns when state regulation is high. Our overall conclusions remain unchanged when the regulatory stringency interaction term is included.

4.4. Reputation effects

It is possible that family firms derive noneconomic utilities through CSR activities. These utilities could come in the form of increased reputation for the family. To test this hypothesis, we look at the firm names and identify firms that have the founder's name or a portion of it included in the firm name. We create a dummy variable called “founder name,” which equals one if the firm name contains the founder's name or a portion of it and is zero otherwise; next, we repeat the analysis by including the founder name dummy and an interaction term of it with the family firm dummy. Results are reported in Table 6.

For the regressions of environmental strengths, the coefficient on the family firm dummy remains negative and significant (column (1)). This implies that among the firms without the founder's name, family firms have a lower amount of environmental strengths compared to non-family firms. The coefficient on the interaction term of the family firm dummy and founder name dummy is insignificant (column (1)). However, the sum of the family firm dummy and this interaction term is found to be negative and significant at the 1% level, implying that among the firms with the founder's name, family firms have a lower amount of environmental strengths compared to non-family firms. The regression with concerns (column (2)) presents a rather surprising result. The founder name dummy and the interaction term are positive and highly statistically significant. The sum of the family firm dummy and the interaction term is also positive and significant, implying that among family firms that have the founder's name have a higher amount of concerns. This is puzzling in light of the reputation hypothesis. However, it is interesting to note that among the firms that do not have the founder's name, family firms have lower amounts of environmental concerns as demonstrated by the negative significant coefficient on the family firm dummy.

[18] The regression results based on the propensity score matched sample reported in this paper use size, book-to-market and industry for matching, which are the variables most commonly used in the finance literature. However, we have verified that the results hold when the propensity score is calculated on a host of variables in addition to size, B/M and Industry, such as market leverage, institutional ownership, insider ownership, Tobin's Q and return volatility. In fact, in this alternative matched sample, we find a negative relationship between environmental concerns and the family firm dummy that is significant at the 10% level. See Table A.1 in the Online Appendix.

[19] The sample size is notably reduced because of the matching process.

[20] Source: U.S. Energy Information Administration (EIA).

[21] Source: U.S. Census Bureau.

Table 4
Matched sample analysis Panel A reports the difference in means between the matched samples of family firms and non-family firms. Panel B reports the regression of environmental strengths and concerns on a family firm dummy and other covariates on the matched sample. Matching is done on size, book-to-market and on the two-digit SIC code. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Panel A: Covariate balance

	(1)	(2)	(3)
	Family firms	Non-family firms	Difference
Log (total assets)	8.45	8.27	0.18
Leverage	0.09	0.10	−0.01
Log (firm age)	3.89	3.88	0.02
Institutional ownership	0.70	0.78	−0.08***
Officer/director ownership (less family)	0.05	0.04	0.01**
CEO equity-based pay	0.19	0.20	−0.01
ROA	0.16	0.16	0.00
R&D/total assets	0.04	0.04	0.00
CEO duality	0.90	0.85	0.05*
Dual class shares	0.22	0.01	0.21***
Fraction of independent directors	0.66	0.76	−0.10***
Tobin's Q	2.16	2.33	−0.17
Return volatility	0.03	0.03	0.00
Turnover	1.86	2.22	−0.36**
Analyst coverage	13.65	13.94	−0.296
S&P dummy	0.62	0.65	−0.03
NASDAQ dummy	0.31	0.31	0.00

Panel B: Regressions on the matched sample

Variables	(1)	(2)
	Strengths	Concerns
Family firm	−0.235***	−0.0519
	(0.0542)	(0.0744)
Log (total assets)	0.110***	0.212***
	(0.0369)	(0.0463)
Leverage	−0.551	0.677
	(0.380)	(0.463)
Log (firm age)	−0.159**	0.171***
	(0.0648)	(0.0618)
Institutional ownership	−0.450**	−0.483*
	(0.215)	(0.262)
Officer/director ownership (less family)	0.252	−1.259**
	(0.338)	(0.511)
CEO equity-based pay	0.275**	0.0313
	(0.122)	(0.155)
Profitability	0.0151	0.118
	(0.405)	(0.534)
R&D/total assets	−0.198	0.121
	(0.475)	(0.597)
CEO duality	0.0302	0.0779
	(0.0633)	(0.0986)
Dual class shares	0.266**	0.277**
	(0.105)	(0.121)
Fraction of independent directors	0.137	0.194
	(0.167)	(0.237)
Tobin's Q	0.0113	−0.00669
	(0.0268)	(0.0365)
Return volatility	1.215	5.136
	(2.173)	(3.778)
Turnover	−0.0573**	0.0352
	(0.0225)	(0.0305)
Analyst coverage	−0.0121**	−0.0154***
	(0.00591)	(0.00516)
S&P dummy	0.00391	0.0386
	(0.0549)	(0.0748)
NASDAQ dummy	−0.145**	−0.0470
	(0.0664)	(0.0734)

(*continued on next page*)

Table 4 (*continued*)

Panel B: Regressions on the matched sample		
Variables	(1)	(2)
	Strengths	Concerns
Intercept	0.0340	−1.025*
	(0.461)	(0.590)
Observations	452	452
Adjusted R-Squared	0.304	0.422
Industry FE	Yes	Yes
Year FE	Yes	Yes

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

4.5. 2008 financial crisis

Next we examine whether the financial crisis has an impact on the results obtained, in light of evidence that family firms behave differently from non-family firms during periods of crisis (Lins et al., 2013).[22] We create a crisis period dummy that equals one if the observation is from 2007 to 2009 and zero otherwise; we then interact this dummy with the family firm dummy. Results are reported in Table 7.

The family firm dummy captures the difference between family firms and non-family firms during the pre-crisis period (2001–2006). The sum of the family firm dummy and the interaction term captures the difference between family firms and non-family firms during the crisis period. The results for environmental strengths and concerns remain consistent with the prior analysis for the pre-crisis period. When looking at the crisis period, the sum of the family firm dummy and the interaction term is negative and significant for environmental strengths at the 1% level. Interestingly, for environmental concerns, the summed coefficients are negative and significant at the 5% level. This implies that family firms had both lower environmental strengths and lower concerns during the crisis period.

4.6. Alternative CSR database

This study is based on environmental strengths and concerns as classified by KLD. In order to verify that the reported findings are not an artifact of the data that is being used, we look at an alternative database: Thomson Reuters' ASSET4 database. While this database does not classify CSR variables as strengths and concerns, they do report many indicator variables related to the corporate environmental policy of a firm. Following the KLD definitions we classify these individual variables as strengths and concerns, and then aggregate them as strengths and concerns for each firm (see Appendix C for a description of these variables). Next, we re-run the analysis reported in columns (1) and (2) in Table 3, replacing the KLD strengths and concerns with the Thomson Reuters' ASSET4 strengths and concerns. Unfortunately, the Thomson Reuters' ASSET4 database primarily focuses on environmental strengths; hence, regressions related to environmental concerns lack statistical power and need to be interpreted with caution. Results are reported in Table 8.[23]

We find that even with this alternative dataset, family firms have significantly lower environmental strengths compared to non-family firms, which is consistent with the results in Table 3. Likewise, the results for environmental concerns are also consistent with our prior findings.

4.7. Other robustness tests

Table 9 presents the results obtained by replicating our prior analysis using alternative methods to calculate standard errors. We consider the classical OLS standard errors (columns (1) and (2)), robust standard errors (columns (3) and (4)), standard errors clustered by industry (columns (5) and (6)), and standard errors clustered by industry and year (columns (7) and (8)).[24] As with the bootstrapped standard errors in our main analysis, the family dummy remains negative and significant at the 1% level for strengths, whereas it is negative but insignificant for concerns.

The correlation between strengths and concerns was shown to be positive and significant in Table 2, Panel C. It could be that firms with reported concerns attempt to establish strengths to "cover their sins," a potential strategic channel that might explain this positive correlation. A related question is whether environmental strengths and concerns are separately or jointly

[22] Lins et al. (2013) find that family firms reduced investments during the recent financial crisis compared to non-family firms, to ensure firm survival.

[23] We lose a significant number of observations as some firm-years are not covered by the Thomson Reuters' ASSET4 database.

[24] In unreported results, we look at standard errors clustered by firm, and standard errors clustered by firm and year. Results in terms of statistical significance remain unchanged.

Table 5
Regulatory stringency.

This table reports the results from regressing environmental strengths and concerns on a family firm dummy and other covariates while controlling for the level of regulatory stringency in the state which the firm is headquartered in. In addition, Columns (2) and (4) include an interaction term between the family firm dummy and the regulatory stringency variable. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Variables	(1)	(2)	(3)	(4)
	Strengths	Strengths	Concerns	Concerns
Family firm	−0.232***	0.450	−0.0291	1.434***
	(0.0331)	(0.275)	(0.0371)	(0.360)
Family firm × regulatory stringency		−1.025**		−2.198***
		(0.419)		(0.543)
Regulatory stringency	0.750***	1.051***	−1.131***	−0.486
	(0.251)	(0.302)	(0.246)	(0.308)
Log (total assets)	0.177***	0.177***	0.383***	0.383***
	(0.0194)	(0.0193)	(0.0253)	(0.0251)
Leverage	−0.451***	−0.421***	−0.418*	−0.354
	(0.160)	(0.163)	(0.214)	(0.216)
Log (firm age)	0.0222	0.0213	0.0882***	0.0862***
	(0.0230)	(0.0230)	(0.0282)	(0.0282)
Institutional ownership	−0.570***	−0.558***	−0.413***	−0.387***
	(0.114)	(0.114)	(0.130)	(0.130)
Officer/director ownership (less family)	0.557**	0.589**	−0.410	−0.340
	(0.253)	(0.261)	(0.287)	(0.287)
CEO equity-based pay	0.0822	0.0780	−0.0611	−0.0701
	(0.0602)	(0.0603)	(0.0757)	(0.0754)
ROA	0.254	0.274	0.295	0.338
	(0.167)	(0.167)	(0.228)	(0.228)
R&D/total assets	−0.194	−0.178	−0.301	−0.267
	(0.259)	(0.258)	(0.291)	(0.290)
CEO duality	0.0198	0.0169	0.0991**	0.0928**
	(0.0394)	(0.0391)	(0.0453)	(0.0445)
Dual class shares	0.155***	0.155***	0.122*	0.120*
	(0.0578)	(0.0581)	(0.0727)	(0.0721)
Fraction of independent directors	−0.103	−0.112	0.0987	0.0806
	(0.112)	(0.112)	(0.130)	(0.131)
Tobin's Q	−0.00342	−0.00580	−0.0222	−0.0273
	(0.0152)	(0.0151)	(0.0179)	(0.0177)
Return volatility	−0.461	−0.449	5.401***	5.427***
	(1.223)	(1.220)	(1.896)	(1.892)
Turnover	−0.0176**	−0.0169**	0.0590***	0.0606***
	(0.00804)	(0.00789)	(0.0119)	(0.0123)
Analyst coverage	−0.00810***	−0.00753***	−0.0229***	−0.0217***
	(0.00292)	(0.00289)	(0.00339)	(0.00340)
S&P dummy	−0.0992***	−0.0931***	0.0109	0.0241
	(0.0333)	(0.0335)	(0.0420)	(0.0415)
NASDAQ dummy	0.0470	0.0419	0.0626*	0.0517
	(0.0396)	(0.0392)	(0.0352)	(0.0352)
Intercept	−1.527***	−1.738***	−0.558	−1.009**
	(0.264)	(0.284)	(0.385)	(0.405)
Observations	2052	2052	2052	2052
Adjusted R-squared	0.272	0.273	0.568	0.571
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

determined. Further, managers of firms with higher reported concerns might have a higher likelihood of career termination. Therefore, they might have a higher incentive to establish strengths to increase their external values in the job market (Type I agency problem); this might be a particular concern for family firms if they are less transparent and subject to less monitoring. Therefore, we run our main tests using concerns as a control for the strengths regression and vice versa. We also included the interaction between concerns (strengths) and the family firm dummy in the strengths (concerns) regressions. The results can be found in Table A.2 of the Online Appendix. In all these regressions, the strengths (concerns) coefficient is positive and significant

Table 6
Reputation effect.

This table reports whether the founder's name being included in the firm name has any effect on the environmental strengths and concerns of a firm. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Variables	(1)	(2)
	Strengths	Concerns
Family firm	−0.227***	−0.111***
	(0.0371)	(0.0392)
Family firm × founder name	−0.0763	0.242***
	(0.0566)	(0.0681)
Founder name	0.0314	0.170***
	(0.0403)	(0.0458)
Log (total assets)	0.198***	0.361***
	(0.0203)	(0.0215)
Leverage	−0.361**	−0.411**
	(0.162)	(0.202)
Log (firm age)	0.0177	0.0471
	(0.0237)	(0.0296)
Institutional ownership	−0.456***	−0.398***
	(0.116)	(0.123)
Officer/director ownership (less family)	0.667**	−0.702**
	(0.263)	(0.277)
CEO equity-based pay	0.0206	−0.0860
	(0.0631)	(0.0752)
ROA	0.249	0.312
	(0.164)	(0.230)
R&D/total assets	−0.0463	−0.661**
	(0.294)	(0.299)
CEO duality	0.0234	0.101**
	(0.0398)	(0.0452)
Dual class shares	0.174***	0.118*
	(0.0616)	(0.0673)
Fraction of independent directors	−0.115	0.143
	(0.109)	(0.126)
Tobin's Q	0.00513	−0.0291*
	(0.0142)	(0.0175)
Return volatility	−0.0263	5.616***
	(1.200)	(1.865)
Turnover	−0.0208**	0.0571***
	(0.00982)	(0.0137)
Analyst coverage	−0.00995***	−0.0205***
	(0.00311)	(0.00322)
S&P dummy	−0.0817**	0.0460
	(0.0336)	(0.0408)
NASDAQ dummy	0.0699*	0.0601*
	(0.0386)	(0.0345)
Intercept	−1.351***	−1.089***
	(0.227)	(0.375)
Observations	2088	2088
Adjusted R-squared	0.264	0.566
Industry FE	Yes	Yes
Year FE	Yes	Yes

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

but the interaction term is insignificant. More importantly, the coefficient on the family firm dummy hardly changes in absolute value, nor does its significance.

As a further check, we have re-run our main regressions by excluding firms that have both strengths and concerns from our sample (See Table A.3 in the Online Appendix.) The resulting sample only has firms that have strengths and no concerns, or concerns but no strengths. Our results remain unchanged.

Table 7
Impact of the financial crisis.

This table reports the results from regressing environmental strengths and concerns on a family firm dummy, a crisis period dummy, the interaction of these two dummies and other covariates. The crisis period dummy equals one if the observation is from 2007 to 2009 and zero otherwise. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Variables	(1)	(2)
	Strengths	Concerns
Family firm	−0.235***	0.00288
	(0.0347)	(0.0433)
Family firm × crisis	−0.0448	−0.127**
	(0.0541)	(0.0622)
Crisis	0.262***	0.0549
	(0.0680)	(0.0824)
Log (total assets)	0.197***	0.371***
	(0.0202)	(0.0218)
Leverage	−0.375**	−0.410**
	(0.161)	(0.201)
Log (firm age)	0.0197	0.0759***
	(0.0234)	(0.0289)
Institutional ownership	−0.458***	−0.472***
	(0.115)	(0.124)
Officer/director ownership (less family)	0.634**	−0.437
	(0.255)	(0.277)
CEO equity-based pay	0.0158	−0.0762
	(0.0629)	(0.0766)
ROA	0.252	0.424*
	(0.165)	(0.225)
R&D/total assets	−0.0269	−0.472
	(0.293)	(0.301)
CEO duality	0.0205	0.0988**
	(0.0393)	(0.0457)
Dual class shares	0.163***	0.150**
	(0.0605)	(0.0722)
Fraction of independent directors	−0.114	0.162
	(0.109)	(0.130)
Tobin's Q	0.00420	−0.0307*
	(0.0142)	(0.0175)
Return volatility	−0.0362	5.683***
	(1.204)	(1.862)
Turnover	−0.0197**	0.0584***
	(0.00975)	(0.0120)
Analyst coverage	−0.0100***	−0.0220***
	(0.00309)	(0.00322)
S&P dummy	−0.0810**	0.0177
	(0.0334)	(0.0422)
NASDAQ dummy	0.0671*	0.0444
	(0.0387)	(0.0342)
Intercept	−1.333***	−1.154***
	(0.226)	(0.368)
Observations	2088	2088
Adjusted R-squared	0.264	0.555
Industry FE	Yes	Yes
Year FE	Yes	Yes

* Indicates significance at the 10% level.
** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

5. Conclusions

In this paper, we study the differences in policy toward CSR between family and non-family firms in the U.S., using environmental performance as the proxy for CSR. We obtain the environmental data from KLD, a widely used database for CSR studies. We find that when it comes to CSR, family firms are more responsible to shareholders than non-family firms. When shareholder interests and societal interests coincide, i.e., when it comes to alleviating environmental concerns that have potential to harm society and elevate the firm's risk exposure, family firms do at least as well as non-family firms in protecting shareholder interests. However, when shareholder and societal interests diverge, i.e., when it comes to making environmental investments that benefit society but do not benefit shareholders, family firms are significantly more on the side of shareholders and undertake fewer such investments than non-

Table 8
Alternative CSR database.

This table reports the regression of environmental strengths and concerns, using data from the Thomson Reuters' ASSET4 database, on the family firm dummy and other covariates. Bootstrapped standard errors are reported within parenthesis. Variable definitions are in Appendix B.

Variables	(1)	(2)
	Strengths	Concerns
Family firm	−1.413***	0.00613
	(0.495)	(0.0417)
Log (total assets)	2.270***	−0.0680***
	(0.247)	(0.0155)
Leverage	−3.581	0.624***
	(2.941)	(0.178)
Log (firm age)	−0.310	−0.0429**
	(0.322)	(0.0201)
Institutional ownership	−5.525***	−0.0432
	(1.808)	(0.140)
Officer/director ownership (less family)	−3.498	−0.940***
	(4.680)	(0.325)
CEO equity-based pay	1.980***	−0.00979
	(0.747)	(0.0459)
ROA	7.330***	−0.0298
	(2.568)	(0.138)
R&D/total assets	8.671	−0.134
	(7.036)	(0.278)
CEO duality	−0.133	0.0492
	(0.484)	(0.0346)
Dual class shares	1.527	−0.0424
	(1.023)	(0.0852)
Fraction of independent directors	4.231***	−0.439***
	(1.533)	(0.118)
Tobin's Q	0.0890	0.00796
	(0.260)	(0.0137)
Return volatility	−42.68**	3.349***
	(19.21)	(1.213)
Turnover	0.186	−0.0116
	(0.137)	(0.00846)
Analyst coverage	0.0529	0.000961
	(0.0434)	(0.00276)
S&P dummy	−0.278	0.0304
	(0.578)	(0.0402)
NASDAQ dummy	−0.00502	0.0280
	(0.652)	(0.0406)
Intercept	−13.92***	2.223***
	(3.995)	(0.261)
Observations	1038	1038
Adjusted R-squared	0.591	0.291
Industry FE	Yes	Yes
Year FE	Yes	Yes

** Indicates significance at the 5% level.
*** Indicates significance at the 1% level.

family firms. This finding holds for the full sample as well for a matched sample of family and non-family firms. The results are robust to several tests including different definitions for family firms, different time periods and different levels of regulatory stringency.

The reduced presence of the type I agency problem might be a potential explanation for the results reported in this paper. Due to their undiversified investments, the financial bottom line may take precedence over noneconomic utilities for families that own large public firms. As a result, family firms may behave in a manner that is beneficial to non-family shareholders as well. We leave these avenues for future research.

Table 9
Standard errors.

This table reports the regression coefficients on the family firm dummy from the regressions of environmental strengths and concerns. Standard errors are reported in within parenthesis. Each pair of columns correspond to a different approach of calculating standard errors. The control variables are the same as those found in columns (1) and (2) of Table 3.

Variables	OLS		Robust		Clustered by industry		Clustered by industry and year	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Strengths	Concerns	Strengths	Concerns	Strengths	Concerns	Strengths	Concerns
Family firm	−0.249***	−0.0386	−0.249***	−0.0386	−0.249***	−0.0386	−0.249***	−0.0386
	(0.0403)	(0.0466)	(0.0321)	(0.0378)	(0.0540)	(0.0861)	(0.0585)	(0.0904)
Observations	2088	2088	2088	2088	2088	2088	2088	2088
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*** Indicates significance at the 1% level.

Appendix A. KLD variable definitions

I. Environmental Strengths

Strength	Definition
A Beneficial products and services	This indicator measures the positive environmental impact of a firm's products and/or services. Factors affecting this evaluation include, but are not limited to, products/services that reduce other firms' and individuals' consumption of energy, production/consumption of hazardous chemicals, and overall patterns of resource consumption.
B Pollution prevention	Company has notably strong pollution prevention programs including emissions reductions and toxic-use reduction programs.
C Recycling	This indicator measures a firm's use of recycled materials in its products/services. Factors affecting this evaluation include, but are not limited to: assessment of the volume and recycled content of products made with recycled input materials, including paper, metal, plastic; and any certification of its practices by a third party, such as the Forest Stewardship Council for timber product companies.
D Clean energy	This indicator measures a firm's policies regarding climate change. Factors affecting this evaluation include, but are not limited to, acknowledgement of direct and/or indirect impacts on operations due to climate change, formal commitments to reduce greenhouse gas emissions, initiatives to reduce energy consumption and to increase the use of renewable energy.
X Other strengths	This indicator assesses a firm's environmental management policies, programs and initiatives that are not covered by any other MSCI ESG Research environmental metrics.

II. Environmental Concerns

Concern	Definition
A Hazardous waste	The company's liabilities for hazardous waste sites exceed $50 million, or the company has recently paid substantial fines or civil penalties for waste management violations. Before 1996 the threshold for liabilities was $30 million.
B Regulatory problems	Companies that averaged $40,000 or more in settlements, fines, and/or penalties during the period receive a score = 1. For each company, MSCI ESG Research calculates a three-year average of settlements, fines, and/or penalties (US$) for alleged violations of any of the following nine major U.S. federal environmental health and safety laws: i. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) ii. Toxic Substances Control Act (TSCA) iii. Endangered Species Act (ESA) iv. Clean Water Act (CWA) v. Safe Water Drinking Act (SWDA) vi. Resource Conservation and Recovery Act (RCRA) vii. Clean Air Act (CAA)

		viii. Atomic Energy Act (AEA) Source: Nuclear Regulatory Commission ix. Mine Act (MA) Source: Mine Safety and Health Administration
C	Ozone depleting chemicals	The company is among the top manufacturers of ozone depleting chemicals such as HCFCs, methyl chloroform, methylene chloride, or bromines.
D	Substantial emissions	This indicator is designed to assess the severity of controversies related to a firm's non-GHG emissions. Factors affecting this evaluation include, but are not limited to, a history of involvement in land or air emissions-related legal cases, widespread or egregious impacts due to hazardous emissions, resistance to improved practices, and criticism by NGOs and/or other third-party observers.
E	Agriculture chemicals	The company is a substantial producer of agricultural chemicals, i.e., pesticides or chemical fertilizers.
F	Climate change (from 1999)	This indicator is designed to assess the severity of controversies related to a firm's climate change and energy-related policies and initiatives. Factors affecting this evaluation include, but are not limited to, a history of involvement in GHG-related legal cases, widespread or egregious impacts due to corporate GHG emissions, resistance to improved practices, and criticism by NGOs and/or other third-party observers.
X	Other concerns	This indicator is designed to assess the severity of controversies related to a firm's environmental impact not covered by other MSCI ESG Research's environmental indicators. Factors affecting this evaluation include but are not limited to widespread or egregious environmental impacts, resistance to improved practices, and criticism by NGOs and/or other third-party observers.

Appendix B. Variable definitions

Age is the number of years between the year of estimation and the year in which the firm was incorporated.

Analyst Coverage is the monthly average of analysts following a firm each year.

Board Size is the number of members in the board including the Chairman.

CEO Duality takes a value of one if CEO and Chairman are both the same person.

CEO Equity-based Pay is the dollar amount of options paid to the CEO as a fraction of the sum of the bonus pay, salary and option pay.

Concerns is the sum of the KLD sub-indicators for environmental concerns of a firm. The sub-indicators of environmental concerns indicate whether the firm releases hazardous waste, agricultural chemicals or ozone depleting chemicals; has regulatory problems; has substantial emissions; contributes to climate change; has other environmental concerns. If the firm meets the KLD threshold in each area, it is assigned a value of one and zero otherwise.

Descendent-CEO Family Firm takes a value of one if the firm is a family firm with a descendent of the founder as its CEO.

Dual Class Dummy takes a value of one if the firm has more than one class of common shares.

Family Control % is the percentage of control the family has in a firm (accounting for the effect of dual class shares, if any).

Family Firm takes a value of one if a family owns (or votes) a 5% or larger stake of the firm.

Founder Name takes a value if the firm name includes the founder's name or a portion of it.

Founder-CEO Family Firm takes a value of one if the firm is a family firm with the founder as its CEO.

Fraction of Independent Directors is the proportion of board members that are deemed to be independent.

Hired CEO- Family Firm takes a value of one if the firm is controlled by a family but the CEO is a hired professional.

Institutional Ownership is the fraction of common shares held by institutions that file 13F reports.

Leverage is *Long-Term Book Debt* (COMPUSTAT item *DLTT*) divided by *Total Assets* minus book value of equity (COMPUSTAT item *CEQ*) plus *Market Value* of equity.

Market Value is shares outstanding (COMPUSTAT item CSHO) multiplied by stock price (COMPUSTAT item *PRCC_F*).

NASDAQ Dummy takes value one if the firm trades at the NASDAQ Stock Exchange.

Officer/Director Ownership (less Family) is measured as the equity holdings of all officers and directors less family holdings.

R&D/Total Assets is the R&D expenses (COMPUSTAT item *XRD*) divided by *Total Assets (COMPUSTAT item AT)*.

Regulatory Stringency is the total CO2 emission of a state scaled by the total employment in the state, log-transformed and inverted.

Return Volatility is the standard deviation of daily holding period stock returns (from CRSP) during the year.

ROA is operating income before depreciation (COMPUSTAT item *OIBDP*) divided by *Total Assets* (COMPUSTAT item *AT*).

S&P Dummy takes a value of one if the firm is listed in the S&P 500 Index.

Strengths is the sum of the KLD sub-indicators for environmental strengths of a firm. The sub-indicators of strength indicate whether the firm has environmentally beneficial products and services, uses clean energy, engages in extensive recycling, attempts to prevent pollution and has other environmental strengths. If the firm meets the KLD threshold in each area, it is assigned a value of one and zero otherwise.

Tobin's Q is the ratio of *Total Assets* minus book value of equity (COMPUSTAT item *CEQ*) plus *Market Value* of equity to *Total Assets*.

Total Assets is the book value of assets (COMPUSTAT item AT).

Turnover is the average monthly trading volume divided by shares outstanding.

Appendix C. Thomson Reuters' ASSET4 variables

I. Environmental Strengths

Variable	Description
Resource reduction policy	Does the company have a policy for reducing the use of natural resources or to lessen the environmental impact of its supply chain?
Policy water efficiency	Does the company have a policy to improve its energy efficiency?
Policy energy efficiency	Does the company have a policy to improve its water efficiency?
Policy sustainable packaging	Does the company have a policy to improve its use of sustainable packaging?
Policy environmental supply chain	Does the company have a policy to include it supply chain in the company's efforts to lessen its overall environmental impact?
Resource reduction targets	Does the company set specific objectives to be achieves on resource efficiency?
Environment management team	Does the company have an environmental management team?
Environment management training	Does the company train its employees on environmental issues?
Environmental materials sourcing	Does the company claim to use environmental criteria (e.g.: life cycle assessment) to source or eliminate materials?
Renewable energy use	Does the company make use of renewable energy?
Green buildings	Does the company report about environmentally friendly or green sites or offices?
Environmental supply chain management	Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?
Environmental supply chain partnership termination	Does the company use environmental criteria (ISO 14000, energy consumption, etc.) in the selection process of its suppliers or sourcing partners?
Land environmental impact reduction	Does the company report on initiatives to reduce the environmental impact on land owned, leased or managed for production activities or extractive use?
Biodiversity impact reduction	Does the company report on its impact on biodiversity or on activities to reduce its impact on the native ecosystems and species, as well as the biodiversity of protected and sensitive areas?
Emissions trading	Does the company report on its participation in any emissions trading initiative?
Climate change commercial risk opportunities	Is the company aware that climate change can represent commercial risks and/or opportunities?
Waste reduction initiatives	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total waste?
e-Waste reduction	Does the company report on initiatives to recycle, reduce, reuse, substitute, treat or phase out total e-waste?
IS0 14000 or EMS	Does the company claim to have an ISO 14000 or EMS certification?
Environmental restoration initiatives	Does the company report or provide information on company-generated initiatives to restore the environment?
Staff transportation impact reduction	Does the company report on initiatives to reduce the environmental impact of transportation used for its staff?
Environmental partnerships	Does the company report on partnerships or initiatives with specialized NGOs, industry organizations, governmental or supra-governmental organizations, which are focused on improving environmental issues?
Environmental products	Does the company report on at least one product line or service that is designed to have positive effects on the environment or which is environmentally labeled and marketed?
Eco-design products	Does the company report on specific products which are designed for reuse, recycling or the reduction of environmental impacts?
Noise reduction	Does the company develop new products that are marketed as reducing noise emissions?
Product impact minimization	Does the company reports about take-back procedures and recycling programs to reduce the potential risks of products entering the environment or does the company report about product features or services that will promote responsible and environmentally preferable use?
Take-back and recycling initiatives	Does the company reports about take-back procedures and recycling programs to reduce the potential risks of products entering the environment?
Product environmental responsible use	Does the company report about product features and applications or services that will promote responsible, efficient, cost-effective and environmentally preferable use?
Renewable/clean energy products	Does the company develop products or technologies for use in the clean, renewable energy (such as wind, solar, hydro and geo-thermal and biomass power)?

Water technologies	Does the company develop products or technologies for use water treatment, purification or that improve water use efficiency?
Sustainable building products	Does the company develop products and services that improve the energy efficiency of buildings?
Toxic chemicals reduction	Does the company report on initiatives to reduce, reuse, substitute or phase out toxic chemicals or substances?

II. Environmental Concerns

Variable	Description
Environmental controversies	Is the company under the spotlight of the media because of a controversy linked to the environmental impact of its operations on natural resources or local communities?
Environmental expenditures investments	Does the company report on its environmental expenditures or does the company report to make proactive environmental investments to reduce future risks or increase future opportunities? (Zeros transformed to ones and ones to zeros).
Environmental project financing	Does the company claim to evaluate projects on the basis of environmental or biodiversity risks as well? (Zeros transformed to ones and ones to zeros).
Agrochemical products	Does the company produce or distribute agrochemicals like pesticides, fungicides or herbicides?
Agrochemical 5% revenue	Are the revenues generated by the company from agrochemicals like pesticides, fungicides or herbicides 5% or more of company sales?

Appendix D. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcorpfin.2018.05.003.

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