Environmental and Social Disclosures and Firm Financial Risk: Evidence from UK

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Abstract

In this paper we examine the link between a firm's environmental (E) and social (S) disclosures and measures of its financial risk including total, systematic and idiosyncratic risk. While we do not find any link between a firm's E and S disclosures and its systematic risk, we find a negative and significant association between these disclosures and a firm's total and idiosyncratic risk. These are novel findings and consistent with the predictions of the resource based view of the firm, suggest that firms which make extensive and objective E and S disclosures build unique competitive advantages such as a positive environmental and social reputation and unique relational capital with its key stakeholders which in turn help reduce the firm's idiosyncratic risk. These findings are important for all corporate stakeholders particularly those who have a significant economic interest in the survival and success of the firm including its managers, employees, key suppliers, customers, government, and major investors, as well as other stakeholders like the wider society who have an interest in the continued survival and success of the firm.

1. Introduction

'True economic performance of a firm manifests itself .... in both high financial return and low financial risk' (Orlitzky and Benjamin, 2001; p. 369). In other words, Orlitzky and Benjamin (2001) suggest that if corporate actions that lead to better financial performance also heighten financial variability then this tends to negate the positive effects on performance. Consistent with this reasoning, Fombrun and Shanley (1990, p. 238) state that '*ceteris paribus investors prefer high market returns and low market risk…*'. Moreover, managers also benefit from the knowledge that their business fortunes are subject to reduced variability if they engage in environmentally and socially responsible activities (Oikonomou, Brooks and Pavelin, 2012). In a recent paper, Qiu, Shaukat and Tharyan, (2014) show that controlling for other relevant firm and industry specific characteristics, UK listed firms which make more extensive and objective social disclosures enjoy superior economic performance as measured by higher share prices. Moreover, they find this relation to be driven by the higher expected growth rates of the cash flows of such firms. If this is indeed the case, then such firms should not concomitantly suffer from higher market as well as possibly unique risk. In this paper we directly test these hypotheses by examining the relationship between UK firm's environmental (E) and social (S) disclosures and various measures of corporate financial risk. In doing so, we also address the need highlighted in prior literature (Toms, 2002) for gauging the impact of social disclosures on financial risk. As Toms (2002; p.277) in his study on the determinants of corporate environmental reputation, as measured by the firm's environmental disclosures, conjectures about the link between environmental reputation and environmental risk: '*Environmental risk might as easily be specific rather than systematic, although this hypothesis was not directly tested.*' In this paper we directly test the link between a firm's environmental and social reputation as measured by the extent and

objectiveness of its E and S disclosures, and the firm's total, systematic (market) as well as unsystematic or idiosyncratic risk.

In line with the rising interest among various corporate stakeholders as to how corporations address their environmental and social responsibilities (ESR), there has also been a growing interest in this area within the academic community. One aspect of enduring interest has been to understand and unravel the financial implications of the various efforts made by firms to address their ESR. Consequently, the link between ESR related performance and corporate financial performance has been widely studied (for good reviews see Orlitzky, Schmidt and Rynes, 2003; Beurden and Gossling, 2008). Less is known however, about the link between aspects of ESR particularly its corporate disclosures and firm financial risk. This investigation consistent with Orlitzky and Benjamin's (2001) previously cited statement becomes even more pertinent post financial crisis when the issues of corporate transparency and of firm risk and risk management have gained even greater prominence. Investors, corporate managers, as well as regulators are now quite keen to know how the various types of ESR activities and its disclosures affect the firm's total risk, including the systematic or market risk as well as unsystematic or unique risk. Following the financial crisis, corporate stakeholders including investors are acutely aware that it is not just the firm's systematic or market risk that matters – collapse of one risky and big industrial player can have significant repercussions for other market participants, parallel, upstream and downstream, ultimately having the potential to disrupt the whole market.

Accordingly in this paper, employing a large panel data set of UK listed firms covering the years 2005-2013, we examine the link between a firm's E and S disclosures and it's total, systematic as well as unsystematic or idiosyncratic risk. While we do not find any link between a firm's E and S disclosures and its systematic risk, we find a negative and significant association between these disclosures and a firm's total and idiosyncratic risk. This finding suggests that firms which make extensive and objective E and S disclosures enjoy competitive advantages unique to a firm such as a strong reputation and unique relational capital with its stakeholders, that in turn help reduce the firm's unique risk. These findings are of relevance for all corporate stakeholders particularly those who have their tangible and intangible assets tied to the fortunes of the firm, such as its managers, employees, and key suppliers.

The rest of the paper is organized as follows: section 2 discusses the prior literature and develops the testable hypotheses; section 3 discusses the sample, variables and regression models; section 4 presents the results; and section 5 concludes the paper.

2. Literature review and hypotheses development

In recent years there has been a growing body of research which suggests a positive link between various measures of corporate social performance (CSP) and measures of corporate financial performance (CFP) including stock market performance (e.g. Brammer, Brooks and Pavelin, 2006; Dowell, Hart and Yeung, 2000; Qiu et al., 2014). In line with these findings, scholars have also been interested in investigating the driver of this link, with a particular focus on the link between CSP and the cost of capital and/ or expected variability of the cash flows of such firms (e.g. Sharfman and Fernando, 2008; Salama, Anderson and Toms, 2011; Oikonomou, Brooks and Pavelin, 2012; Jo and Na, 2012). Drawing upon the risk management literature, Sharfman and Fernando (2008) argue that better environmental performance changes the perception of the environmental risk management by the firm among its capital providers. They argue that this perception of reduced riskiness should make investors accept a lower risk premium on both, the firm's cost of equity as well as its cost of debt. They indeed find a negative link between better environmental performance and the firm's overall cost of capital for a sample of US firms. In a later study by Salama et al. (2011), drawing upon the stakeholder theory (Donaldson and Preston, 1995; Jones, 1995) argue that if firms do not behave in an environmentally responsible manner, investors may perceive the firm as a risky investment, due to the increased probability of the implicit claims of various corporate stakeholders becoming explicit (e.g. due to regulatory intervention, threat of lawsuits due to irresponsible ESR behavior etc.). Hence such firms they argue are likely to experience greater variability of their cash flows vis. a vis. the market due to their higher fixed costs resulting from explicit and implicit stakeholder claims. Some studies have also drawn on the argument that 'good deeds earn chits' Godfrey (2005, p. 777), i.e. better handling of the firm's environmental and social responsibilities can generate moral capital or goodwill for the firm that can provide an 'insurance-like' protection for the firm's cash flows, thus reducing its variability in the case of a negative event. Consistent with this argument, Oikonomou et al. (2012) and Jo and Na (2012) both find some evidence of a negative link between better environmental performance and firm systematic risk. While all of these studies draw on different theoretical arguments to explain their findings, a common underlying theme explaining the negative link between ESR performance and firm risk is the enhanced environmental (and/or social) reputation that a firm gains, whether it is due to positive perception of its risk management or its enhanced goodwill (relational capital, Godfrey, 2005) among the firm's key stakeholders.

While the link between E (and possibly S) performance and risk has been studied to some extent, to date there are hardly any studies that directly examine the link between a firm's E and S disclosures and its financial risk (a notable exception being the study by Toms, 2002)[1]. One possible reason for this could be that there is still an ongoing debate within the disclosure literature as to whether extensive E and S disclosures do reflect superior E and S performance? While some scholars theorize and find empirical support for the notion that

[1]Toms (2002) however treats a firm's systematic risk as a determinant of its ESR disclosure.

extensive E (and possibly S) disclosures are mainly a corporate social 'legitimating tool', (Gray, Kouhy and Lavers, 1995; Cho and Patten, 2007); others, consistent with the resource based view (RBV) theory (Hart, 1995; Russo and Fouts, 1997) and voluntary disclosure theory (VDT, Verrechia, 1983, 2001) argue and find some empirical support that extensive and objective E disclosures reflect superior E performance (e.g., Al-Tuwaijri, Christensen and Hughes 2004; Cormier and Magnan, 2007, 2013; Clarkson, Li, Richardson and Vasvari, 2011). In this context, Hart (1995) and Russo and Fouts (1997) argue that superior performance in the environmental arena accompanied by its effective communication can confer competitive advantages to the firm, including a strong positive reputation. Noting the importance of communicating the responsible environmental strategies of the firm to its external stakeholders, Hart (1995, p.999) states that such effective communication could *'reinforce and differentiate a firm's position through the positive effects of a good reputation.'* Consistent with Hart's (1995) theoretical arguments, Toms (2002) finds that firms with superior environmental reputation (as measured by their environmental disclosures) also have lower systematic risk. It is important to note though that Toms (2002) assumes the association to run from risk to environmental reputation. However, one can argue that if extensive and objective E (and S) disclosures enhance a firm's environmental (and social) reputation, as proposed by Hart, (1995), and empirically supported by Toms, (2002), then such disclosures should help build relational capital with the firm's various key stakeholders and thus help reduce the variability or uncertainty of the firm's cash flows vis. a vis. the market (Godfrey's 2005). Accordingly such disclosures should reduce the firm's total and systematic risk. There is in fact some related evidence to suggest that extensive and objective E (and S) disclosures help reduce the information asymmetry between the firm and its investors (Cormier, Ledoux and Magnan, 2011), and by enriching the information environment, help security analysts make better earnings forecast (Cormier and Magnan, 2013). Hence, based on the preceding discussion, we hypothesize that (stated in alternative form):

H1: Extensive and objective E (and S) disclosures should be negatively related to a firm's total and systematic risk.

It is interesting to note that while the link between E (and sometimes S) performance and financial risk has been investigated as the preceding discussion indicates, there are no studies to the best of our knowledge that investigate the link between E and S disclosures and a firm's financial risk . In this regard, Sharfman and Fernando (2008, p. 570) argue that the increase in the market value of a firm due to effective ESR could be due to either or both of the following effects: that is due to a lowering in the firm's cost of capital due to reduction in the perceived riskiness of the firm's cash flows among its investors; and/or, due to an increase in the firm's cash flows due to increased revenues (partly due to good reputation) and/ or lowered costs due to improved resource use efficiency. The implications for the measures of firm financial risk of the two outcomes are different: in the case of the former effective ESR should reduce only the firm's systematic risk; while in the case of the latter, i.e. higher expected firm cash flows should also lower the firm's unsystematic or unique financial risk.

Consistent with the (RBV) theory (Hart, 1995, Russo and Fouts, 1997), and the instrumental stakeholder theory (Donaldson and Preston, 1995); if extensive and objective E and S disclosures create reputational and relational capital for a firm by enhancing a firm's reputation among its various stakeholders, including employees (affective commitment), communities and regulators (legitimacy), suppliers and partners (trust) and customers (brand loyalty), (as articulated by Godfrey, 2005; p. 786), then such disclosures should not only reduce the variability vis. a vis the market but also enhance the firm's expected cash flows vis. a vis. its competitors, thus also reducing the firm's unique risk. In today's world of asset specificity, where a large portion of the tangible and intangible assets of key corporate stakeholders like managers and key employees (having developed skills specific for a firm or holding large amounts of undiversified wealth in the form of corporate equity); and key suppliers having developed tangible and intangible assets specifically for the firm; unique risk of the firm greatly matters. Hence enhanced disclosures should help build reputational (Hart, 1995) and relational capital (Godfrey, 2005) and help enhance the firm's expected cash flows, thus reducing its idiosyncratic risk. Recent evidence by Qiu et al. (2014) is consistent with such arguments. Accordingly we hypothesize that (stated in alternative form):

H2: Extensive and objective E (and S) disclosures should be negatively related to a firm's unsystematic or idiosyncratic risk.

Before we present the results, we discuss below the sample, variables and models used for testing these hypotheses.

3. Sample, variables and models

3.1 Sample

The sample for this study consists of the constituents of the FTSE350 index covering the years 2005-2013. Based on the availability of the E and S disclosure scores for the companies, we have a sample of 1620 firm-year observations.

3.2 Variables

3.2.1 E and S disclosure scores

To investigate the link between E and S disclosures and firm financial risk, our study uses Bloomberg E and S disclosure scores as main explanatory variables of interest. Data used to calculate stock volatility, systematic and specific risks, the three dependent variables, are collected from Datastream. We also control for a number of financial variables used in related prior analyses, data for which are obtained from Datastream. Appendix 1 describes in detail the variable names, their measurements and data sources.

The primary explanatory variables of interest in this study are the E and S disclosure scores of companies developed by Bloomberg. Bloomberg assigns E and S disclosure scores to companies based on data points collected via multiple sources including annual reports, standalone sustainability reports and company websites etc. The data points used for calculating E and S disclosure scores are based on the GRI framework and capture standardized cross-sector and industry- specific metrics. The weighted score is normalized to range from zero, for companies that do not disclose any E and S data, to 100 for those who disclose every data point collected. Moreover, within each E and S category, the individual company score is expressed as a percentage, so as to make the score comparable across companies. The score is also tailored to be industry relevant, so that each company is evaluated only in terms of the data that is relevant to its industry sector. The data points are also weighted (based on a proprietary weighting scheme) in terms of importance within each category, so that Green House Gas emissions for example would be weighted more heavily than other data points within the environment category. Hence, the scores not only capture the quantity but the quality of E and S disclosures. A number of prior studies have used Bloomberg disclosure scores (e.g. Qiu et al. 2014; Ioannou and Serafeim, 2014; Utz and Wimmer, 2014). A short description of data points covered in each score is discussed below.

The 'E' score covers various types of environmental information that could broadly be classified as 'hard' items and 'soft' items. 'Hard' items include quantifiable data like Carbon/GHG emissions, energy/water consumption, waste recycled, investments in sustainability, and ISO certification, among others. 'Soft' items include firms' environmental policies and initiatives such as waste reduction policy, energy efficiency policy and green building policy, among others. Approximately 80% of environmental disclosure items covered are ‘hard’ objective data items, while only 20% are ‘soft’ data points. Thus, these environmental scores largely capture a firm’s ‘hard’ environmental disclosure. This is important, as poor environmental performers would find these difficult to mimic (Clarkson et al. 2008). Also, Cormier, Ledoux and Magnan (2009) find these ‘hard’ disclosures to be more strongly associated with reducing the information asymmetry between the firm and its investors.

The ‘S’ score developed by Bloomberg mostly covers reporting of issues related to employee relations, such as employee health and welfare, as well as their training and development including training in CSR. The ‘S’ score also covers disclosure of issues of equality and diversity in employment, community spending and human rights. Based on the type of information covered, about 70% of social score is based on ‘hard’ items while ‘soft’ information makes up about 30% of the score.

Bloomberg also reports a ‘G’ score that covers some key board recommendations that the UK code of corporate governance suggests including independent director representation and separation of CEO and chair position. It also covers aspects that reflect a board’s own stakeholder orientation. These include commitment to: board diversity, as measured by the presence of women on board; promoting transparency and trust, via disclosing details of political donations; and demonstrating overall stakeholder sensitivity, via disclosing ethics policy and importantly adherence to GRI criteria. Although, we show results regarding the association between this ‘G’ score and a firm’s financial risk, we think that this score is less relevant for our purpose. Indeed, governance disclosure is mandatory in UK, while E and S are voluntary, so conceptually different in terms of disclosure theory. Moreover, as discussed in Servaes and Tamayo (2014), governance practices are not part of CSR related practices and our focus in this article is on CSR related disclosures.

3.2.2 Measures of financial risk

Following extant accounting and finance literature, we measure firm's risk by total risk. In financial theory, it is argued that total risk is composed of the firm-specific unique risk and the market or systematic risk. The total risk of an investment is measured by the standard deviation of its stock's return (cf: Ross, Westerfield and Jordan, 2011). We thus follow prior studies (e.g., Bouslah Kryzanowski, and Mzali, 2013) and estimate stock volatility as the standard deviation of daily stock returns in current year. Additionally, we use the CAPM beta as our measure of firm's systematic risk. Indeed, Sharpe (1964), Lintner (1965), and Mossin (1966) argue that systematic risk should matter in pricing because it reflects firm's risk relative to the stock market in general (Jo and Na, 2012). Systematic risk is then captured by market beta (CAPM model) of individual stocks in current year, based on daily stock returns. More precisely, we estimate firm's beta factor from regressing the daily stock return on the daily market return of the FTSE-350 over the year:

$$R_{it} = \alpha_i + \beta_i R_{mt} + e_i$$

where R_{it} is the return on security i for day t, α_i is the intercept term, β_i is the systematic risk of security i (BETA), R_{mt} is the return on the market m for day t and e_i is an error term.

Finally, Benett and Sias (2008) argue that the formation of well-diversified portfolios in practice is virtually impossible. Firm-specific, unique or idiosyncratic risk is the single largest impediment to market efficiency (Pontiff, 2006). Moreover, prior studies on the relationship between CSR and financial risk argue that it is relevant to use firm's specific risk because it is likely to capture the specific effects related to CSR strategies (Benlemlih and Girerd-Potin, 2014; Boutin-Dufresne and Savaria, 2004). We thus measure idiosyncratic (unique) risk as the standard deviation of residuals from CAPM, based on daily stock returns.

3.2.3 Control variables

Following prior literature, we control for a number of underlying firm characteristics that can affect individual firms' risk and that need to be controlled for in the estimations. In particular, we control for: *size* (SIZE) as measured by the natural logarithm of total assets. A negative relationship is expected between size and firm's financial risk. Prior studies suggest that large firms are less exposed to financial risk, as they are more capable to manage risk especially in times of high volatility (e.g., Jo and Na, 2012). Investment opportunity as measured by *market to book ratio* (MTB). It is equal to the market value of assets divided by the book value of assets. It is argued that firms with low growth perspectives are characterized by low share prices and low market to book values (e.g., Lewellen, 1999). It is shown that analysts consider firms with poor perspectives of growth (low MTB Ratio) as more exposed to stock volatility. Hence, a negative relationship between financial risk and MTB Ratio is expected. Leverage (LEV) as measured by total debt to total assets ratio. Consistent with prior evidence, high levered firms are exposed to higher risk (Abdelghani, 2005). A positive association is then expected between firm's leverage and financial risk. Profitability (ROA) is measured as return on assets. It is found that more profitable firms tend to be less risky (e.g., Jo and Na, 2012). Thus a negative relationship is then expected between the return on assets and firm's financial risk measures. We also control for capital expenditure (CAPEX), dividends per share (DIV), assets growth (ASS_GROW) as measured by total assets in year t – total assets in year t-1 to total assets in year t-1. Finally, we include industry fixed effect based on the two-digit of the Standard Industrial Classification (SIC) and year fixed effects.

3.3 Model specification

We use both univariate and multivariate approaches. In the univariate analysis, we test for difference in the mean and median values of financial risk measures (stock volatility, systematic and idiosyncratic risk respectively), between high and low E and S disclosure firms. In the multivariate analysis, we use the following model to test our hypotheses:

$$\begin{aligned}\text{Financial Risk}_{\text{it}} &= \alpha + \beta_1 \times Disclosure\ score_{it} + \beta_2 \times Size_{it} + \beta_3 \times Market\ to\ book_{it} \\ &+ \beta_4 \times leverage_{it} + \beta_5 \times ROA_{it} + \beta_6 \times Dividend\ per\ share_{it} + \beta_7 \\ &\times CAPEX_{it} + \beta_8 \times Asset\ growth_{it} + \sum_j \beta_j \\ &\times INDUSTRY\ FIXED\ EFFECTS_j + \sum_L \beta_L \times YEAR\ FIXED\ EFFECTS_L + \varepsilon_{it}\end{aligned} \tag{1}$$

FR_{it} is financial risk measure, namely stock volatility, beta risk, or unique risk. Disclosure $score_{it}$ represents E and, S, disclosure score respectively, α is time invariant intercept; b_i is slope coefficient of each respective factor. All regressions are run using pooled OLS with robust standard errors based on Newey-West approach to correct for heteroscedasticity and serial correlation.

3.4 Descriptive statistics

Table 1 provides the descriptive statistics for the variables used in this study. It can be seen from Panel A that the sample is well balanced over the study's period except for 2005 and 2006 when we do not have much data about the ESG disclosure scores. Panel B classifies industries based on Standard Industrial Classification (SIC) code and reveals a good representation of all sectors. Finally Panel C shows that the mean value of stock volatility is 0.35, and the average systematic risk is 0.979 (which is approximately equal to one, the value of the market beta), and the average firm specific risk is 0.019. With respect to E and S disclosure scores, it is shown that the S has a mean score of 33% and E disclosure of 22%.

This suggests that on average our sample of firms make more extensive S than E disclosure. The average G score is also about 33%. The average MTB ratio is 2.375. Average size measured as natural log of total assets is 14.928. The average leverage (i.e. total debt to total assets ratio) and ROA are 21.2% and 9.7% respectively. The mean values of dividend per share, capital expenditure (i.e. capital expenditures to total assets ratio) and asset growth (i.e. total assets in year t – total assets in year t-1 to total assets in year t-1) are 21.15 pence, 4.5% and 15% respectively.

[Insert Table 1about here]

As can be seen in Table 2, there is a high correlation between volatility and idiosyncratic risk (0.95) as expected. According to the Table, it can be seen that the relationship between volatility and each E and S individual disclosure score is negative and significant. The same relationship holds with respect to idiosyncratic risk measure, while the link between systematic risk and individual E and S disclosure score tends to be positive and significant. Finally, the weak correlation between the control variables indicates that our model is unlikely to suffer from any multicollinearity problems.

[Insert Table 2 about here]

4. Empirical results

4.1. Univariate tests

In Table 3, we compare the mean and the median financial risk measures for high and low E and S disclosure firms. High disclosure firms are defined as those with disclosure scores above the median, while low disclosure firms are those with disclosures scores below the median. Table 3 shows the results of testing the difference in financial risk between firms with high and low environmental disclosures (Panel A), and social disclosure (Panel

B).Overall, it is clear that stock volatility and idiosyncratic risk are significantly lower for firms with high E and S disclosure scores These results hold for both tests, i.e. the significance of the difference using t tests (for the mean) and Wilcoxon tests (for the median).

Following this preliminary analysis, in the next section, we report the results of multivariate analyses wherein we control for other financial variables that may affect the relation between financial risk and E and S disclosures.

[Insert Table 3 about here]

4.2. Multivariate analyses

Table 4 reports results from estimating equation (1) using ordinary least squares (OLS), with robust standard errors based on Newey-West approach to correct for heteroscedasticity and serial correlation. Models 1-3 show results from regressing stock volatility on E and S disclosures after controlling for other firm characteristics as well as time and industry fixed effects. We find that the coefficients on E and S disclosures are negative and statistically significant at the 1% level. This is consistent with our expectation and suggests that additional information contained in E and S criteria is helpful for the market. Extensive and objective E and S disclosures appear to reduce the information asymmetry regarding the firm in the market and subsequently reduce its stock volatility. The results also show a significant economic effect: one standard deviation increase in the environment, social, and governance disclosures scores reduce stock volatility by 0.017, 0.017, and 0.020, respectively.

As explained in financial theory, firm’s stock volatility can be divided into systematic and idiosyncratic risks. These two components of stock volatility reflect two different aspects of financial risk. While the first measures the market risk, the second is more representative to the risk related to some specific strategies adopted by the firm. We estimate systematic and specific risks using a Capital Asset Pricing Model (CAPM) based on daily stock returns in current year.

We then run the same regression by replacing stock volatility with our systematic risk (Models 4-6) and idiosyncratic risk measures (Models 7-9). In terms of systematic risk, we find that the coefficient estimates on E and S disclosures scores are negative but statistically insignificant. It appears that E and S disclosures do not affect significantly the firm's systematic risk. On the other hand, in Models 7 to 9, when the dependent variable is the idiosyncratic risk, it is clear that the coefficients on E and S disclosures are negative and statistically significant at the 1% level. It appears that the component of stock volatility that is negatively related to disclosures is a firm's idiosyncratic risk.

It is relevant to highlight that results from governance score (G) analyzed in models (3, 6, and 9, respectively) show that governance disclosure significantly reduces stock volatility and unique (specific) risk, while there is no significant effect of g disclosure on systematic risk.

Furthermore, we document several significant relationships between our measures of financial risk and the control variables used in the study. First, profitability variable as measured by return on assets (ROA) is negative and statistically significant in all the models in Tables 4. This result suggests that more profitable firms are less exposed to financial risk. Second, dividends per share coefficients is negative and statistically significant providing evidence that firms that payout more signal their high quality to the market, and, consequently, are considered as less risky. Third, companies with high growth opportunities face high stock market volatility. Fourth, firms with high leverage are more exposed to financial risk, more precisely because high leverage is associated with high default risk. This explains the positive association between leverage and systematic risk (Models 4-6). Finally, other control variables are less likely to affect firm's financial risk (market to book ratio, and capital expenditures). Taken together, results from the control variables are in line with previous studies in similar context such as Salama et al. (2011).

[Insert Table 4 about here]

4.3. Robustness checks[2]

In this section, we investigate the robustness of our main findings using alternative measures of disclosures, alternative econometric specifications, instrumental variables approach to address the endogeneity issue, and Heckman selection model to address the self-selection bias. We also study the relation between ESG disclosures and financial risk in time of financial distress.

4.3.1. Alternative measures of disclosure

In Table 5, we examine whether our main findings are sensitive to alternative measures of E and S disclosures. As alternative measures, we use E and S performances as provided by Asset4, a Thomson Reuters data base. We first analyze in Models 1 to 3 the effect of ESG performances on stock volatility using similar model as in the main analysis. We find that E and S performance significantly reduces the firm's stock volatility. The coefficients on E and S performance are statistically significant at the 5% level or better. Next we explore the relation between E and S performance and idiosyncratic risk. Models 4 to 6 present the results and show that the coefficients on E and S are negative and statistically significant at the 1% level. All the models include industry and time fixed effects and are estimated with robust

[2]We focus our robustness checks on stock volatility and specific risk to ensure the validity of our main results suggesting a negative relation between ESG disclosures and firm's financial risk measured by stock volatility and idiosyncratic risk. We exclude the systematic risk from the rest of the analysis because the impact of E and S disclosures on such measure of risk is statistically insignificant.

standard errors based on Newey-West approach to correct for heteroscedasticity and serial correlation. Results from Table 5 reinforce our earlier findings of a negative association between E and S disclosures and firm's financial risk (as measured by stock volatility and idiosyncratic risk).

[Insert Table 5 about here]

4.3.2. Alternative econometric specifications

Table 6 reports results from using alternative econometric specifications and estimating alternative standards errors. In Models 1 to 6, we use robust standard errors adjusted for heteroscedasticity and clustered at the firm level (Peterson, 2009). In Models 7-12, we use Prais-Winsten standard errors that extend the Newey-West correction by integrating the panel structure of the data. The results in Models 1 to 12 of Table 6 confirm our earlier evidence: the coefficients on ESG disclosures are negative and statistically significant at the 5% level or better in all cases.

[Insert Table 6 about here]

In Table 7, in order to account for cross-sectional dependence, we make inferences based on the standard errors of the time series of coefficients. More precisely, we use a Fama and MacBeth (1973) approach that corrects for cross-sectional dependence. The Fama and MacBeth procedure consists of running several cross sectional regressions at each time priod, and then use the estimated coefficients to perform a time-serial t-test for statistical significance. Models 1 to 6 in Table 7 also shows a negative and significant relationship between E and S disclosures and firm's financial risk. The coefficients on ESG disclosures are significant at the 1% in all Models.

[Insert Table 7 about here]

4.3.3. Instrumental variables approach to address endogeneity

Our OLS results have provided support for a negative relation between E and S disclosures and firm's financial risk. Without correcting the endogeneity problem and extracting the exogenous component of E and S disclosures in assessing the influence of E and S disclosures on risk, our results could be biased. An instrumental variable approach could be a good remedy for this problem. The instrumental estimation method consists of two step regression. In the first one, we regress the E and S disclosures scores on instruments and controls. In the second stage, the predicted value of E and S disclosures substitutes the E and S disclosures scores. Good instruments for E and S disclosures should satisfy the requirements of relevance and be correlated with E and S disclosures, but not directly with firm's financial risk. As instruments, we use the industry-year average of each disclosure score and the firm-level initial score of disclosure (Attig, El Ghoul, Guedhami, and Suh., 2013; El Ghoul, Guedhami, Kwok, and Mishra., 2011).

The results of the second stage regression from the Instrumental Variable regressions are reported in Table 8. Models 1 to 6 show the results when using a simple 2SLS regressions, while models 7 to 12 show the results when using GMM regressions. In all the models of Table 8, it is clear that high level of E and S disclosures is associated with low level of financial risk as measured by stock volatility and idiosyncratic risk. All the coefficients on E and S disclosures are significant at the 1% level (except for Model 8 where the significance level is 5%).

[Insert Table 8 about here]

4.3.4. Heckman selection model

Heckman's two stage self-selection model (1979) controls for self-selection bias due to companies choosing to disclose their E and S information. The first stage estimates a probit model that regresses a dummy variable that takes the value of 1 if the E and S disclosures scores are above the median and 0 otherwise, on all the control variables from our main specification as well as two instruments. As instruments, we employ the industry-year average of each disclosure score and the firm-level initial score of disclosure (Attig et al., 2013; El Ghoul et al., 2011). In the second stage, we use similar models as those in the main specification and we include the self-selection parameter (measured as the inverse Mills' ratio) estimated from the first stage.

Table 9 presents the results from the outcome equations (the second stage regression). Even when controlling for the potential self-selection bias, the findings from the outcome equations continue to hold.

[Insert Table 9 about here]

4.3.5. E and S disclosures and financial risk in financial crisis period

Finally, we examine the effect of E and S disclosures on financial risk during financial crisis period. To define the financial crisis period, we refer to the definition of Berger and Bouwman (2013). The periods of financial distress in our sample include mainly the subprime crisis period (2007-2009). After defining this financial crisis period, we include a dummy variable that takes the value of 1 for years between 2007 and 2009 and 0 otherwise. We also include an interaction term ***Crisis* Disclosure_Score*** to explore whether there is an additional effect related to E and S disclosures during the time of financial crisis.

Table 10 presents the results for this analysis. In Models 1 to 6, we continue to find the same negative effects of E and S disclosures on firm's financial risk as measured by stock volatility and idiosyncratic risk. Furthermore, the coefficients on ***Crisis*** variable are positive and statistically significant, suggesting a high level of financial risk during the subprime crisis. Finally and more interesting for our purpose, we find that the coefficients on the interaction terms (between E and S disclosures and crisis period) are statistically not significant. There is no additional effect of E and S disclosures on firm's financial risk in time of financial distress. Indeed, in these periods, the market only considers financial information and care more about the financial stability of the firm reflected by the financial information. Thus, E and S disclosures do not have any added value in reducing firm's financial risk during the subprime crisis.

[Insert Table 10 about here]

5. Conclusions and implications

In this paper we examine the link between E and S disclosures of UK listed firms and various measures of their financial risk, including total risk, systematic and idiosyncratic risk. Specifically, we hypothesize that objective and more extensive E and S disclosures should reduce both a firm's systematic as well as its unique risk. We argue that the negative effect of E and S disclosures on a firm's total and systematic risk would be manifested if such disclosures enhance the firm's reputation and improve the perception of the E and S related risk management among the firm's investors. If such is the case then these disclosures should reduce the firm's total risk as well as the variability of the firm's cash flows vis. a vis. the market i.e. its systematic risk.

Alternatively or in addition to the above, if the effect of the enhanced firm reputation is related to the creation of relational capital with the firm's relevant stakeholders, factors unique to the firm, then the effect of such disclosures would manifest in terms of reducing the firm's unique or idiosyncratic risk. We find evidence in support of the latter hypothesis. Specifically we find a negative link between a firm's E and S disclosures and its total and unique risk but not its systematic risk. This evidence is also consistent with and supports the findings of Qiu et al. (2014). These findings thus reinforce the RBV based assertion (Hart, 1995) that objective and extensive corporate E and S related communication can enhance a firm's reputation and create unique relational capital that can enhance the firm's cash flows and reduce its unique risk. These findings are relevant for all key corporate stakeholders having tangible and intangible assets tied to the fortunes of the firm, such as its managers (holding undiversified corporate equity), employees (having developed firm specific skills and competence especially in today's knowledge based businesses) and key suppliers (having invested in intangible and tangible resources specifically for the firm) care deeply about its continued economic success.

References

Abdelghani, K.E., 'Informational content of the cost of equity capital: Empirical evidence', *Managerial Auditing Journal,* Vol. 20, 2005, pp. 928-935.

Al-Tuwaijri, S. A., Christensen, T. E. and Hughes, K. E., 'The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach', *Accounting, Organizations and Society,* Vol. 29, 2004, pp. 447-471.

Attig, N., El Ghoul, S., Guedhami, O., Suh, J., 'Corporate Social Responsibility and Credit Rating. ' *Journal of Business Ethics,* 2013, DOI 10.1007/s10551-013-1714-2.

Benlemlih, M., Girerd-Potin, I., ‘Does Corporate Social Responsibility Affect Firm Financial Risk ? Evidence from International Data. ’ *Financial Management Association European Conference (FMA), Maastricht (The Netherlands*), 2014.

Bennett, J., and Sias, R., ‘Portfolio diversification’. Working paper, 2008.

Berger, A.N. and Bouwman, C.H.S., ‘How does capital affect bank performance during financial crises?’, *Journal of Financial Economics*, Vol. 109, 2013, pp. 146–176.

Beurden, P., & Gossling, T., The worth of values—A literature review on the relation between corporate social and financial performance. *Journal of Business Ethics*, 2008, 82, 407–424.

Bouslah, K., Kryzanowski, L. and M’Zali, B., ‘The impact of the dimensions of social performance on firm risk’,*Journal of Banking and Finance*, Vol. 37, 2013, pp. 1258-1273.

Boutin-Dufresne, F., Savaria, P., ‘Corporate Social Responsibility and Financial Risk’, *Journal of Investing*, 13(1), 2004, 57-67.

Brammer, S., Brooks, C. and Pavelin, S., ‘Corporate social performance and stock returns: UK evidence from disaggregate measures’, *Financial Management,* Autumn, 2006, pp. 97-116.

Cho, C. H. and Patten, D. M., ‘The role of environmental disclosures as tools of legitimacy: a research note’, Accounting, *Organizations and Society*, Vol. 32, 2007, pp. 639-647.

Clarkson, P. M., Li, Y., Richardson, G. D. and Vasvari, F. P., ‘Revisiting the relation between environmental performance and environmental disclosure: an empirical analysis’, *Accounting, Organizations and Society*, Vol. 33, 2008, pp. 303-27.

Clarkson, P. M., Li, Y., Richardson, G. D. and Vasvari, F. P., ‘Does it really pay to be green? Determinants and consequences of proactive environmental strategies’, *Journal of Accounting and Public Policy*, Vol. 30, 2011, pp. 122-144.

Cormier, D., Ledoux, M. J. and Magnan, M., ‘The informational contribution of social and environmental disclosures for investors’, *Management Decision*, Vol. 49, 2011, pp. 1276-1304.

Cormier, D. and Magnan, M., ‘The economic relevance of environmental disclosure and its impact on environmental legitimacy’, *Business Strategy and the Environment,* 2013, http://dx.doi.org/10.1002/bse.1829.

Cormier, D., Aerts,W., Ledoux, M. J. and Magnan, M., ‘Attributes of social and human capital disclosure and information asymmetry between managers and investors’, *Canadian Journal of Administrative Sciences,* Vol. 26, 2009, pp. 71-88.

Donaldson, T. and Preston, L.E., ‘The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications’, *The Academy of Management Review,* Vol. 20, 1995, pp. 65-91.

Dowell, G., Hart, S. and Yeung, B., ‘Do Corporate Global Environmental Standards Create or Destroy Market Value?’, *Management Science*, Vol. 46, 2000, pp. 1059-74.

El Ghoul, S., Guedhami, O., Kwok, C., Mishra, D., ‘Does corporate social responsibility affect the cost of capital? ’, *Journal of Banking and Finance* 35, 2011, 2388-2406.

Fama, E. F. and MacBeth, J.D., ‘Risk, return, and equilibrium: Empirical tests’, *Journal of Political Economy,* Vol. 81, 1973, pp. 607-36.

Fombrun, C. and Shanley, M., ‘What's in a Name? Reputation Building and Corporate Strategy’, *The Academy of Management Journal,* Vol. 33, pp. 233-258.

Godfrey, P. C., 'The relationship between corporate philanthropy and shareholder wealth: A risk management perspective', *Academy of Management Review,* Vol. 30, 2005, pp. 777-798.

Gray, R., Kouhy, R. and Lavers, S., 'Corporate social and environmental reporting: a review of the literature and a longitudinal study of UK disclosure', *Accounting, Auditing and Accountability Journal*, Vol. 8, 1995, pp. 47-77.

Hart, S. L.,'A natural resource based view of the firm', *Academy of Management Review*, Vol. 20, 1995, pp. 986-1014.

Heckman, J.J., 'Sample Selection Bias as a Specification Error', *Econometrica,* Vol. 47, pp. 153-61.

Ioannou, I. and Serafeim, G., 'The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics', *Strategic Management Journal*, 2014, DOI: 10.1002/smj.2268

Jo, H. and Na, H., 'Does CSR reduce firm risk? Evidence from controversial industry sectors', *Journal of Business Ethics,* Vol. 110, 2012, pp. 441-57.

Jones, T., 'Instrumental stakeholder theory: A synthesis of ethics and economics', *Academy of Management Review*, Vol. 20, 1995, 404-37.

Lewellen, J., 'The time-series relations among expected return, risk, and book-to-market', *Journal of Financial Economics,* Vol. 54, 1999, pp. 5-43.

Lintner, J., 'The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets'. *Review of Economics and Statistics*, 47(1), 1965, 13–37.

Margolis, J.D. and Walsh, J.P., ‘People and Profits: The Search for a Link Between a Company’s Social and Financial Performance’, 2001, *Lawrence Erlbaum Associates, Mahwah, NJ.*

Mossin, J. , ‘Equilibrium in a capital asset market’. *Econometrica*, 34(4), 1966, 768–783.

Oikonomou, I., Brooks, C. and Pavelin, S., ‘The impact of corporate social performance on financial risk and utility: A longitudinal analysis’, *Financial Management*, Vol. 41, 2012, pp. 483-515.

Orlitzky, M., Schmidt, F. and Rynes, S. Corporate social and financial performance: A meta-analysis, Organization Studies, 2003, 24, 403-441

Orlitzky, M. and Benjamin, J. D., ‘Corporate social performance and firm risk: A meta-analytic review’, *Business & Society*, Vol. 40, 2001, pp. 369-396.

Petersen, M. A., ‘Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. *Review of Financial Studies*, 22, 2009, 435-480.

Pontiff, J., ‘Costly arbitrage and the myth of idiosyncratic risk’. *Journal of Accounting and Economics*, 42, 2006, 35–52.

Qiu, Y., Shaukat, A. and Tharyan, R., ‘Environmental and Social Disclosures: Link with Corporate Financial Performance’, *British Accounting Review*, 2014, DOI:10.1016/j.bar.2014.10.007

Ross, S., Westerfield, R., and Jordan, B., ‘Essentials of corporate finance’ (7th ed.). Boston: McGraw-Hill Irwin, 2011.

Russo, M. V. and Fouts, P. A., ‘A resource-based perspective on corporate environmental performance and profitability’, *Academy of Management Journal*, Vol. 40, 1997, pp. 534-559.

Salama, A., Anderson, K. and Toms, S., ‘Does community and environmental responsibility affect firm risk? Evidence from UK panel data 1994-2006’, *Business Ethics: A European Review*, Vol. 20, 2011, pp. 192-204.

Servaes, H., and Tamayo, A., ‘The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness’. *Management Science*, Vol. 59, 2014, 1045-1061.

Sharfman, M.P. and Fernando, C.S., ‘Environmental risk management and the cost of capital’, *Strategic Management Journal*, Vol. 29, 2008, pp. 569-592.

Sharpe, W., ‘Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, 19(3), 1964, 425–442.

Toms, J.S., ‘Firm resources, quality signals and the determinants of corporate environmental reputation: some UK evidence, *British Accounting Review*, Vol. 34, 2002, pp. 257-282.

Utz, S. and Wimmer, M., ‘Are they any good at all? A financial and ethical analysis of socially responsible mutual funds’, *Journal of Asset Management*, Vol. 15, 2014, 72-82.

Verrecchia, R., ‘Discretionary disclosure’, *Journal of Accounting and Economics*, Vol. 5, 1983, pp. 179-194.

Verrecchia, R., ‘Essays on disclosure’, *Journal of Accounting and Economics*, Vol. 32, 2001, pp. 97-180.

Table1. Descriptive statistics for the main variables of the study

Panel A. Sample breakdown by year			Panel B. Sample breakdown by industry		
Year	**N**	**%**	**Industry**	**N**	**%**
2005	32	1.74	**Construction industries**	72	3.92
2006	91	4.96	**Financial sector**	340	18.53
2007	168	9.16	**Manufacturing**	488	26.59
2008	225	12.26	**Mineral industries**	201	10.95
2009	259	14.11	**Retail trade**	200	10.90
2010	260	14.17	**Service indutries**	270	14.71
2011	261	14.22	**Transportation com.**	201	10.95
2012	268	14.61	**Wholesale trade**	63	3.43
2013	271	14.77			
	1,835	**100**		**1,835**	**100**

Panel C. Descriptive statistics for all the study's variables

Variable	N	Mean	Std.Dev.	Min	Max	Median
VOL	1,835	0.35	0.16	0.133	1.287	0.309
BETA	1,835	0.979	0.291	0.255	2.344	0.977
IDIO	1,835	0.019	0.009	0.007	0.073	0.017
ENV_DISC	1,835	22.319	15.099	1.55	69.422	19.38
SOC_DISC	1,835	33.449	12.986	3.509	84.211	29.822
GOV_DISC	1,835	32.66	11.431	9.917	69.422	30.579
MTB	1,788	2.375	17.822	-39.46	19.68	2.29
SIZE	1,834	14.928	1.858	11.069	21.596	14.551
LEV	1,835	0.212	0.189	0	1.672	0.19
ROA	1,805	0.097	0.1	-0.801	0.714	0.085
DIV	1,690	21.146	26.645	0	278.01	12.395
CAPEX	1,831	0.045	0.048	0	0.353	0.031
ASS_GROW	1,833	0.15	1.816	-0.888	76.843	0.057

This table shows descriptive statistics for the main variables of our study. Panel A presents the sample breakdown by year. Panel B presents the sample breakdown by industry. While Panel C provides the number of observations, the mean, the standard deviation, the minimum, the maximum, and the median for the dependent variables, the interest variables as well as the controls. The study sample consists of observations between 2005 and 2013. Definitions of all variables are presented in Appendix A.

Table 2. Pearson correlation coefficients between the variables

	VOL	BETA	IDIO	ENV_DISC	SOC_DISC	GOV_DISC	MTB	SIZE	LEV	ROA	DIV	CAPEX	ASS_GROW
VOL	**1.000**												
BETA	**0.439**	**1.000**											
IDIO	**0.950**	**0.271**	**1.000**										
ENV_DISC	**-0.113**	**0.149**	**-0.213**	**1.000**									
SOC_DISC	**-0.092**	**0.161**	**-0.185**	**0.668**	**1.000**								
GOV_DISC	**-0.120**	**0.168**	**-0.227**	**0.956**	**0.817**	**1.000**							
MTB	-0.055	-0.037	-0.039	0.028	0.012	0.020	**1.000**						
SIZE	**-0.057**	**0.289**	**-0.202**	**0.590**	**0.492**	**0.607**	-0.010	**1.000**					
LEV	-0.021	-0.028	-0.005	**0.065**	**0.075**	**0.065**	**-0.051**	**0.054**	**1.000**				
ROA	**-0.132**	**-0.127**	**-0.126**	**-0.088**	**-0.054**	**-0.078**	**0.052**	**-0.281**	-0.032	**1.000**			
DIV	**-0.268**	**-0.120**	**-0.305**	**0.334**	**0.225**	**0.333**	0.035	**0.293**	**0.053**	**0.137**	**1.000**		
CAPEX	**0.085**	0.076	**0.095**	-0.004	0.011	0.005	-0.013	**-0.088**	**0.091**	**0.184**	-0.027	**1.000**	
ASS_GROW	**0.074**	0.012	**0.051**	-0.042	-0.035	**-0.041**	0.004	0.023	-0.032	-0.008	-0.004	-0.011	**1.000**

This table presents Pearson par-wise correlation between all the variables of the study. Correlation coefficients in boldface are significant at the 5% level or better. Definitions of all variables are presented in Appendix A.

Table 3. Univariate tests for firms with high vs low social and environmental disclosures

Panel A. Environmentdisclosure

	Lowdisclosure			**High disclosure**			**T-test**		**W-test**	
	N	**Mean**	**Median**	**N**	**Mean**	**Median**	**Difference**	**T-stat**	**Difference**	**W-stat**
Volatility	926	0.365	0.321	909	0.334	0.289	-0.031***	4.12	-0.031***	5.79
Market Beta	926	0.945	0.956	909	1.013	0.990	0.067***	4.99	0.034***	4.95
IdiosyncraticRisk	926	0.021	0.018	909	0.018	0.015	-0.003***	7.34	-0.003***	9.77

Panel B. Social disclosure

	Lowdisclosure			High disclosure			T-test		W-test	
	N	Mean	Median	N	Mean	Median	Difference	T-stat	Difference	W-stat
Volatility	931	0.365	0.322	904	0.335	0.290	-0.030***	4.08	-0.032***	5.64
Market Beta	931	0.920	0.959	904	1.002	0.988	0.082***	6.46	0.029***	5.13
IdiosyncraticRisk	931	0.021	0.018	904	0.017	0.015	-0.003***	7.60	-0.003***	9.54

Table 3 shows univariate comparison tests for the three main measures of financial risk in our study. It compares the level of financial risk between firms with low and high environmental and social disclosures. Firms with low disclosures are defined as those with a disclosure score below the median. Firms with high disclosures are defined as those with a disclosure score above the median. The measures of financial risk are stock volatility, systematic risk and idiosyncratic risk. The total sample includes 1,620 firm-year observations between 2005 and 2013. Definitions of all variables are presented in Appendix A. ***Statistical significance at the 1% level.

Table 4. Environmental, Social and Governance disclosures and firm financial risk

Dependent variables	Stock Volatility			Systematic Risk			IdiosyncraticRisk		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ENV_DISC	-0.0011***			-0.0004			-0.0001***		
	(-4.01)			(-0.56)			(-4.57)		
SOC_DISC		-0.0013***			-0.0008			-0.0001***	
		(-4.62)			(-1.01)			(-4.91)	
GOV_DISC			-0.0017***			-0.0004			-0.0001***
			(-4.64)			(-0.38)			(-5.26)
MTB	0.0000	0.0000	0.0000	-0.0002	-0.0002	-0.0002	0.0000	0.0000	0.0000
	(0.15)	(-0.00)	(0.06)	(-1.01)	(-1.04)	(-1.03)	(0.93)	(0.76)	(0.82)
SIZE	-0.0008	-0.0019	0.0001	0.0523***	0.0531***	0.0517***	-0.0008***	-0.0009***	-0.0007***
	(-0.26)	(-0.63)	(0.04)	(6.58)	(7.06)	(6.49)	(-4.36)	(-4.98)	(-4.02)
LEV	0.0373*	0.0370*	0.0370*	0.1584***	0.1583***	0.1582***	0.0018	0.0018	0.0018
	(1.66)	(1.66)	(1.66)	(2.99)	(3.00)	(2.99)	(1.28)	(1.27)	(1.28)
ROA	-0.1295***	-0.1300***	-0.1270***	-0.1473*	-0.1448*	-0.1483*	-0.0107***	-0.0108***	-0.0105***
	(-3.88)	(-3.93)	(-3.85)	(-1.67)	(-1.65)	(-1.68)	(-4.65)	(-4.65)	(-4.61)
DIV	-0.0010***	-0.0010***	-0.0010***	-0.0020***	-0.0020***	-0.0020***	-0.0001***	-0.0001***	-0.0001***
	(-6.03)	(-6.15)	(-5.98)	(-5.44)	(-5.43)	(-5.45)	(-5.47)	(-5.63)	(-5.42)
CAPEX	0.0352	0.0259	0.0269	0.1030	0.0916	0.1044	0.0066	0.0060	0.0060
	(0.42)	(0.30)	(0.32)	(0.50)	(0.45)	(0.51)	(1.20)	(1.08)	(1.10)
ASS_GROW	0.0012***	0.0012***	0.0011***	-0.0018	-0.0018	-0.0017	0.0000	0.0000	0.0000
	(2.80)	(3.00)	(2.70)	(-1.50)	(-1.52)	(-1.46)	(0.55)	(0.76)	(0.38)
INTERC	0.4453***	0.4865***	0.4628***	0.5866***	0.5950***	0.6005***	0.0365***	0.0394***	0.0376***
	(8.15)	(9.18)	(8.76)	(3.84)	(4.06)	(4.06)	(10.86)	(11.91)	(11.54)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620
R2/Adj. R2	64.02	64.03	64.13	37.15	37.2	37.14	60.15	60.15	60.37

This table reports regression estimates of the relation between environmental, social and governance disclosures and financial risk for the 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. As measures of financial risk (our dependent variables), we employ the stock volatility (Models 1-3), systematic risk issue from the CAPM (Models 4-6), and idiosyncratic risk issue from the CAPM (Models 7-9). All the models include industry (based on the two-digit of Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. Beneath each coefficient estimate is reported t-statistic based on Newey-West standard errors adjusted for heteroscedasticity and serial correlation.

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

Table 5. Environmental, Social and Governance disclosures and firm financial risk: Alternative measures of disclosure

Dependent variables	Stock Volatility			IdiosyncraticRisk		
	(1)	(2)	(3)	(4)	(5)	(6)
ENV_PERF	-0.0006***			-0.0001***		
	(-3.26)			(-4.17)		
SOC_PERF		-0.0009***			-0.0001***	
		(-4.79)			(-5.87)	
GOV_PERF			-0.0005**			-0.0001***
			(-2.19)			(-3.39)
MTB	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.21)	(-0.14)	(0.19)	(1.01)	(0.54)	(1.03)
SIZE	-0.0019	-0.0003	-0.0053*	-0.0008***	-0.0007***	-0.0011***
	(-0.61)	(-0.10)	(-1.82)	(-4.48)	(-4.05)	(-6.15)
LEV	0.0358	0.0361*	0.0286	0.0018	0.0018	0.0012
	(1.58)	(1.64)	(1.26)	(1.24)	(1.30)	(0.82)
ROA	-0.1361***	-0.1245***	-0.1393***	-0.0107***	-0.0099***	-0.0111***
	(-3.85)	(-3.65)	(-3.88)	(-4.45)	(-4.26)	(-4.53)
DIV	-0.0010***	-0.0010***	-0.0010***	-0.0001***	-0.0001***	-0.0001***
	(-5.92)	(-6.08)	(-5.99)	(-5.41)	(-5.62)	(-5.55)
CAPEX	0.0340	-0.0090	0.0243	0.0069	0.0036	0.0058
	(0.39)	(-0.11)	(0.27)	(1.20)	(0.65)	(1.00)
ASS_GROW	0.0013***	0.0011***	0.0015***	0.0000	0.0000	0.0000*
	(3.42)	(2.91)	(4.19)	(1.09)	(0.57)	(1.84)
INTERC	0.4747***	0.4825***	0.5272***	0.0376***	0.0382***	0.0420***
	(8.60)	(8.90)	(9.41)	(11.11)	(11.54)	(12.06)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,559	1,559	1,559	1,559	1,559	1,559
R2/Adj. R2	64.93	65.53	64.64	61.72	61.72	60.36

This table reports regression estimates of the relation between alternative measures of environmental, social and governance disclosures and financial risk for the study sample representing the Ftse350 companies between 2005 and 2013. As alternative measures of environmental, social and governance disclosure, we use environmental, social and governance performances. As measures of financial risk (our dependent variables), we employ the stock volatility (Models 1-3), and idiosyncratic risk issue from the CAPM (Models 4-6). All the models include industry (based on the two-digit Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. Beneath each coefficient estimate is reported t-statistic based on Newey-West standard errors adjusted for heteroscedasticity and serial correlation.
*statistical significance at the 10% level. **statistical significance at the 5% level. ***statistical significance at the 1% level.

Table 6. Environmental, Social and Governance disclosures and firm financial risk: Alternative Econometric Specifications (1/2)

	Clustering By Firms						Prais-Winsten					
Dependent var.	**Stock Volatility**			**IdiosyncraticRisk**			**Stock Volatility**			**IdiosyncraticRisk**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
ENV_DISC	-0.0007**			-0.0001**			-0.0010***			-0.0001***		
	(-2.11)			(-2.23)			(-3.42)			-3.60		
SOC_DISC		-0.0008**			-0.0001***			-0.0011***			-0.0001***	
		(-2.42)			(-2.72)			(-3.88)			(-4.13)	
GOV_DISC			-0.0010***			-0.0001***			-0.0015***			-0.0001***
			(-2.60)			(-2.81)			(-3.94)			(-4.20)
MTB	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.36)	(0.27)	(0.31)	(0.91)	(0.80)	(0.85)	(-0.04)	(-0.15)	(-0.09)	(0.37)	(0.26)	(0.32)
SIZE	-0.0047	-0.0053	-0.0040	-0.0011***	-0.0012***	-0.0011***	-0.0017	-0.0029	-0.0011	-0.0009***	-0.0009***	-0.0008***
	(-1.21)	(-1.41)	(-1.04)	(-4.77)	(-5.12)	(-4.67)	(-0.47)	(-0.85)	(-0.30)	(-3.98)	(-4.48)	(-3.83)
LEV	0.0608**	0.0607**	0.0608**	0.0038**	0.0038**	0.0037**	0.0291	0.0286	0.0287	0.0016	0.0015	0.0015
	(2.46)	(2.48)	(2.48)	(2.23)	(2.25)	(2.25)	(1.22)	(1.19)	(1.20)	(1.01)	(0.99)	(1.00)
ROA	-0.1040***	-0.1039***	-0.1028***	-0.0089***	-0.0088***	-0.0088***	-0.1005***	-0.1013***	-0.0992**	-0.0086***	-0.0086***	-0.0085***
	(-2.69)	(-2.71)	(-2.68)	(-3.46)	(-3.47)	(-3.45)	(-2.52)	(-2.54)	(-2.49)	(-3.30)	(-3.29)	(-3.27)
DIV	-0.0009***	-0.0009***	-0.0009***	-0.0001***	-0.0001***	-0.0001***	-0.0010***	-0.0010***	-0.0010***	-0.0001***	-0.0001***	-0.0001***
	(-5.25)	(-5.24)	(-5.19)	(-4.85)	(-4.83)	(-4.78)	(-5.17)	(-5.27)	(-5.14)	(-4.87)	(-4.97)	(-4.83)
CAPEX	-0.0747	-0.0795	-0.0777	-0.0027	-0.0031	-0.0029	-0.0005	-0.0090	-0.0063	0.0014	0.0007	0.0010
	(-0.84)	(-0.89)	(-0.87)	(-0.46)	(-0.52)	(-0.49)	(-0.01)	(-0.10)	(-0.07)	(0.25)	(0.13)	(0.18)
ASS_GROW	0.0014***	0.0014***	0.0014***	0.0000	0.0000	0.0000	0.0013***	0.0013***	0.0012***	0.0000	0.0000	0.0000
	(3.76)	(3.96)	(3.71)	(0.66)	(0.86)	(0.63)	(3.60)	(3.70)	(3.52)	(0.82)	(0.96)	(0.73)
INTERC	0.5080***	0.5324***	0.5164***	0.0420***	0.0435***	0.0424***	0.4563***	0.4959***	0.4735***	0.0379***	0.0405***	0.0389***
	(7.16)	(7.75)	(7.51)	(9.31)	(9.89)	(9.71)	(7.09)	(7.99)	(7.64)	(9.29)	(10.15)	(9.90)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620
R2/Adj. R2	65.07	65.1	65.18	61.09	61.15	61.31	68.73	68.71	68.74	65.67	65.69	65.71

This table reports regression estimates of the relation between environmental, social and governance disclosures and financial risk for the 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. As measures of financial risk (our dependent variables), we employ the stock volatility (Models 1-3 and 7-9), and idiosyncratic risk issue from the CAPM (Models 4-6 and 10-12). All the models include industry (based on the two-digit of Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. We use two alternative econometric specifications. Robust standard errors adjusted for heteroscedasticity and clustered at firm level (Models 1-6) and Prais-Winsten standard errors (Models 7-12). Beneath each coefficient estimate is reported t-statistic.
*statistical significance at the 10% level. **statistical significance at the 5% level. ***statistical significance at the 1% level.

Table 7. Environmental, Social and Governance disclosures and firm financial risk: Alternative Econometric Specifications (2/2)

	Fama-McBeth					
Dependent variables	**Stock Volatility**			**IdiosyncraticRisk**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ENV_DISC	-0.0010***			-0.0001***		
	(-6.52)			(-5.60)		
SOC_DISC		-0.0010***			-0.0001***	
		(-3.55)			(-5.77)	
GOV_DISC			-0.0015***			-0.0001***
			(-6.35)			(-6.41)
MTB	0.0002	0.0001	0.0001	0.0000	0.0000	0.0000
	(0.70)	(0.63)	(0.67)	(0.34)	(0.24)	(0.34)
SIZE	-0.0040	-0.0054	-0.0033	-0.0009***	-0.0009***	-0.0008***
	(-0.9)	(-1.19)	(-0.73)	(-4.38)	(-4.76)	(-3.91)
LEV	0.0009	0.0016	0.0008	-0.0004	-0.0004	-0.0005
	(0.03)	(0.06)	(0.03)	(-0.26)	(-0.27)	(-0.29)
ROA	-0.1105***	-0.1219	-0.1096***	-0.0088***	-0.0093***	-0.0085***
	(-3.68)	(-4.32)	(-3.62)	(-4.25)	(-4.78)	(-4.00)
DIV	-0.0009***	-0.0009***	-0.0009***	-0.0001***	-0.0001***	-0.0001***
	(-3.87)	(-3.77)	(-3.85)	(-4.07)	(-4.04)	(-4.08)
CAPEX	0.1158	0.1138	0.1121	0.0117*	0.0111	0.0111*
	(1.16)	(1.10)	(1.15)	(1.67)	(1.60)	(1.66)
ASS_GROW	-0.0011	0.0018	-0.0003	-0.0003	-0.0001	-0.0003
	(-0.11)	(0.19)	(-0.03)	(-0.61)	(-0.16)	(-0.49)
INTERC	0.3900***	0.4271***	0.4055***	0.0313***	0.0337***	0.0322***
	(7.88)	(8.57)	(8.08)	(11.05)	(11.49)	(10.93)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	No	No	No	No
Observations	1,620	1,620	1,620	1,620	1,620	1,620

This table reports regression estimates of the relation between environmental, social and governance disclosures and financial risk for the 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. As measures of financial risk (our dependent variables), we employ the stock volatility (Models 1-3 and 7-9), and idiosyncratic risk issue from the CAPM (Models 4-6 and 10-12). All the models include industry (based on the two-digit of Standard Industrial Classification). Definitions of all variables are presented in Appendix A. As alternative econometric specifications, we use Fama-MacBeth methodology. Beneath each coefficient estimate is reported t-statistic.

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

Table 8. Environmental, Social and Governance disclosures and firm financial risk: Endogeneity: Instrumental Variables approach

	2SLS						GMM					
Dependentvar.	**Stock Volatility**			**IdiosyncraticRisk**			**Stock Volatility**			**IdiosyncraticRisk**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
ENV_DISC	-0.0013***			-0.0001***			-0.0022***			-0.0001***		
	(-2.87)			(-2.98)			(-3.41)			(-2.98)		
SOC_DISC		-0.0013***			-0.0001***			-0.0015**			-0.0001***	
		(-2.98)			(-2.94)			(-2.33)			(-2.94)	
GOV_DISC			-0.0019***			-0.0001***			-0.0032***			-0.0001***
			(-3.53)			(-3.62)			(-3.54)			(-3.62)
MTB	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.17)	(0.00)	(0.07)	(0.97)	(0.78)	(0.85)	(0.39)	(0.18)	(0.23)	(0.97)	(0.78)	(0.85)
SIZE	-0.0001	-0.0018	0.0013	-0.0008***	-0.0009***	-0.0007***	0.0039	-0.0045	0.0048	-0.0008***	-0.0009***	-0.0007***
	(-0.02)	(-0.51)	(0.34)	(-3.41)	(-4.04)	(-3.00)	(0.90)	(-1.03)	(1.05)	(-3.41)	(-4.04)	(-3.00)
LEV	0.0373	0.0370	0.0370	0.0018	0.0018	0.0018	0.0400	0.0466	0.0417	0.0018	0.0018	0.0018
	(1.42)	(1.42)	(1.42)	(1.09)	(1.08)	(1.09)	(1.44)	(1.61)	(1.49)	(1.09)	(1.08)	(1.09)
ROA	-0.1280***	-0.1298***	-0.1247***	-0.0107***	-0.0108***	-0.0104***	-0.1074***	-0.1211***	-0.1049***	-0.0107***	-0.0108***	-0.0104***
	(-3.52)	(-3.57)	(-3.49)	(-4.24)	(-4.17)	(-4.18)	(-2.71)	(-2.80)	(-2.59)	(-4.24)	(-4.17)	(-4.18)
DIV	-0.0010***	-0.0010***	-0.0010***	-0.0001***	-0.0001***	-0.0001***	-0.0009***	-0.0009***	-0.0008***	-0.0001***	-0.0001***	-0.0001***
	(-5.29)	(-5.49)	(-5.21)	(-4.68)	(-4.89)	(-4.62)	(-4.46)	(-4.53)	(-4.26)	(-4.68)	(-4.89)	(-4.62)
CAPEX	0.0322	0.0252	0.0216	0.0066	0.0060	0.0058	0.2622***	0.2876***	0.2595***	0.0066	0.0060	0.0058
	(0.36)	(0.27)	(0.24)	(1.13)	(1.01)	(1.00)	(2.53)	(2.67)	(2.47)	(1.13)	(1.01)	(1.00)
ASS_GROW	0.0011**	0.0012***	0.0010**	0.0000	0.0000	0.0000	0.0011***	0.0015***	0.0010**	0.0000	0.0000	0.0000
	(2.40)	(2.82)	(2.27)	(0.48)	(0.74)	(0.25)	(2.51)	(3.73)	(2.41)	(0.48)	(0.74)	(0.25)
INTERC	0.4366***	0.4859***	0.4541***	0.0364***	0.0394***	0.0373***	0.2796***	0.4041***	0.3174***	0.0364***	0.0394***	0.0373***
	(6.61)	(8.19)	(7.49)	(9.19)	(10.59)	(10.10)	(4.06)	(6.38)	(4.91)	(9.19)	(10.59)	(10.10)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620	1,620
R2/Adj. R2	65.52	65.54	65.62	61.83	61.82	62.03	55.74	48.15	52.87	61.83	61.82	62.03

This table reports results from an instrumental variables approach that controls for the endogeneity when estimating the relation between environmental, social and governance disclosures and financial risk for the 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. In the second stage regression, we use as measures of financial risk (dependent variables), the stock volatility (Models 1-3 and 7-9), and idiosyncratic risk issue from the CAPM (Models 4-6 and 10-12). We employ two instrumental variables (IV): the industry-year average of each disclosure score, and the firm-level initial score of disclosure. We report results for 2SLS estimate (Models 1-6) and GMM estimate (Models 7-12). All the models include industry (based on the two-digit of Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. Beneath each coefficient estimate is reported t-statistic.

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

Table 9. Environmental, Social and Governance disclosures and firm financial risk: Endogeneity: Heckman Selection Model

Dependent variables	**Stock Volatility**			**IdiosyncraticRisk**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ENV_DISC	-0.0009**			-0.0001**		
	(-1.98)			(-2.38)		
SOC_DISC		-0.0012***			-0.0001***	
		(-3.08)			(-3.02)	
GOV_DISC			-0.0008			-0.0001*
			(-1.43)			(-1.91)
MTB	-0.0002	-0.0001	-0.0002	0.0000	0.0000	0.0000
	(-0.72)	(-0.50)	(-0.72)	(-0.40)	(0.09)	(-0.42)
SIZE	-0.0011	-0.0097***	-0.0039	-0.0006***	-0.0012***	-0.0008***
	(-0.33)	(-3.22)	(-1.17)	(-3.17)	(-6.65)	(-4.05)
LEV	0.0953***	0.0621**	0.0901***	0.0059***	0.0038**	0.0059***
	(3.03)	(2.28)	(2.91)	(3.22)	(2.37)	(3.27)
ROA	-0.0712*	-0.0426	-0.0702*	-0.0060***	-0.0051**	-0.0059***
	(-1.78)	(-1.11)	(-1.71)	(-2.57)	(-2.28)	(-2.45)
DIV	-0.0010***	-0.0010***	-0.0009***	-0.0001***	-0.0001***	-0.0001***
	(-6.55)	(-6.91)	(-6.08)	(-6.58)	(-7.11)	(-6.17)
CAPEX	-0.1911	-0.0436	-0.2714**	-0.0040	0.0039	-0.0097
	(-1.48)	(-0.43)	(-2.03)	(-0.52)	(0.66)	(-1.25)
ASS_GROW	-0.0216	0.0003	-0.0095	-0.0016*	-0.0002	-0.0009
	(-1.45)	(0.03)	(-0.64)	(-1.77)	(-0.29)	(-1.00)
INTERC	0.4278***	0.6006***	0.4819***	0.0316***	0.0420***	0.0352***
	(6.62)	(9.91)	(7.30)	(8.32)	(11.91)	(9.15)
MILLS	0.0042	-0.0122	0.0042	0.0004	-0.0005	0.0004
	(0.43)	(-1.27)	(0.46)	(0.71)	(-0.87)	(0.76)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,620	1,620	1,620	1,620	1,620	1,620

This table reports results of Heckman's two step treatment effect model to correct for self-selection bias in ESG disclosure. The selection (ESG disclosure scores) equations uses ESG disclosures dummies that take the value of one if the firm has a disclosure score (environment, social, and governance, respectively) higher than the median, and 0 otherwise. We employ two instrumental variables (IV): the industry-year average of each disclosure score, and the firm-level initial score of disclosure. The outcome equations control for the inverse Mills ratio (MILLS) estimated from the selection equation. The study sample includes 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. As measures of financial risk, we employ the stock volatility (Models 1-3), and idiosyncratic risk issue from the CAPM (Models 4-6). All the models include industry (based on the two-digit of Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. Beneath each coefficient estimate is reported t-statistic based on robust standard errors.

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

Table 10. Environmental, Social and Governance disclosures and firm financial risk: Crisis period

Dependentvar.	**Stock Volatility**			**IdiosyncraticRisk**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ENV_DISC	-0.0009***			-0,0001***		
	(-3.13)			(-3.39)		
SOC_DISC		-0.0010***			-0.0001***	
		(-3.58)			(-3.55)	
GOV_DISC			-0.0012***			-0.0001***
			(-3.23)			(-3.70)
CRISIS	0.1476***	0.1567***	0.1418***	0.0088***	0.0098***	0.0091***
	(12.91)	(9.37)	(7.41)	(12.49)	(9.34)	(7.76)
Crisis*Disc_Score	0.0006	0.0001	0.0006	0.0000	0.0000	0.0000
	(1.47)	(0.25)	(1.05)	(0.40)	(-0.82)	(-0.14)
MTB	-0.0002**	-0.0002**	-0.0002**	0.0000	0.0000	0.0000
	(-2.10)	(-2.31)	(-2.17)	(-0.94)	(-1.19)	(-1.03)
SIZE	-0.0056*	-0.0053*	-0.0050	-0.0011***	-0.0011***	-0.0010***
	(-1.73)	(-1.71)	(-1.56)	(-5.66)	(-5.99)	(-5.40)
LEV	0.0318	0.0312	0.0313	0.0016	0.0015	0.0015
	(1.30)	(1.28)	(1.28)	(1.04)	(1.01)	(1.02)
ROA	-0.2059***	-0.2047***	-0.2053***	-0.0159***	-0.0158***	-0.0157***
	(-5.53)	(-5.52)	(-5.54)	(-6.55)	(-6.51)	(-6.54)
DIV	-0.0010***	-0.0010***	-0.0010***	-0.0001***	-0.0001***	-0.0001***
	(-5.76)	(-5.86)	(-5.74)	(-5.19)	(-5.33)	(-5.17)
CAPEX	0.0359	0.0270	0.0321	0.0066	0.0061	0.0062
	(0.38)	(0.29)	(0.34)	(1.11)	(1.02)	(1.05)
ASS_GROW	0.0032***	0.0030***	0.0031***	0.0001***	0.0001***	0.0001***
	(7.54)	(7.30)	(7.43)	(4.27)	(4.14)	(4.02)
INTERC	0.6207***	0.6370***	0.6339***	0.0447***	0.0462***	0.0455***
	(11.57)	(12.04)	(12.09)	(13.41)	(13.91)	(13.83)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	No	No	No	No
Observations	1,620	1,620	1,620	1,620	1,620	1,620
R2/Adj. R2	47.58	47.66	47.59	47.26	47.44	47.39

This table reports regression estimates of the relation between environmental, social and governance disclosures and financial risk during financial crisis period. The study sample includes 1,620 firm-year observations representing the Ftse350 companies between 2005 and 2013. Financial risk is measured by the stock volatility (Models 1-3), and idiosyncratic risk issue from the CAPM (Models 4-6). The models include a dummy variable that controls for crises periods. They also include an interaction term that investigates whether the relation between ESG disclosures and financial risk is more pronounced during the financial crisis period. To define financial crisis period, we follow Berger and Bouwman (2014). All the models include industry (based on the two-digit of Standard Industrial Classification) and time fixed effects. Definitions of all variables are presented in Appendix A. Beneath each coefficient estimate is reported t-statistic based on Newey-West standard errors adjusted for heteroscedasticity and serial correlation.

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

Appendix A. Variables definitions and data source

Variables	Definition	Source
VOL	Stock volatility measured as the standard deviation of daily stock returns in current year (times sq.251)	Datastream
BETA	Market beta (from CAPM) of individual stocks in current year, based on daily stock returns	Datastream
IDIO	Idiosyncratic risk measured as the standard deviation of residuals from CAPM based on daily stock returns	Datastream
ENV_DISC	Environmentaldisclosure score	Bloomberg
SOC_DISC	Social disclosure score	Bloomberg
GOV_DISC	Governance disclosure score	Bloomberg
MTB	Market value of assets over book value of assets	Datastream
SIZE	Firm size. It is the natural logarithm of total assets	Datastream
LEV	Book value of total debt divided by total assets	Datastream
ROA	Return on assets	Datastream
DIV	Dividends per share	Datastream
CAPEX	Capital expenditures expense divided by total assets	Datastream
ASS_GROW	The evolution of total assets from year t-1 to year t to total assets in year t-1	Datastream

Appendix B. E and S indicators with Bloomberg fields

Environmental	
Direct CO2 Emissions	DIRECT_CO2_EMISSIONS
Indirect CO2 Emissions	INDIRECT_CO2_EMISSIONS
Travel Emissions	TRAVEL_EMISSIONS
Total CO2 Emissions	TOTAL_CO2_EMISSIONS
CO2 Intensity (Tonnes)	CO2_INTENSITY
CO2 Intensity per Sales	CO2_INTENSITY_PER_SALES
GHG Scope 1	GHG_SCOPE_1
GHG Scope 2	GHG_SCOPE_2
GHG Scope 3	GHG_SCOPE_3
Total GHG Emissions	TOTAL_GHG_EMISSIONS
NOx Emissions	NOX_EMISSIONS
SO2 Emissions	SO2_EMISSIONS
SOx Emissions	SULPHUR_OXIDE_EMISSIONS
VOC Emissions	VOC_EMISSIONS
CO Emissions	CARBON_MONOXIDE_EMISSIONS
Methane Emissions	METHANE_EMISSIONS
ODS Emissions	ODS_EMISSIONS
Particulate Emissions	PARTICULATE_EMISSIONS
Total Energy Consumption	ENERGY_CONSUMPTION
Electricity Used (MWh)	ELECTRICITY_USED
Renewable Energy Use	RENEW_ENERGY_USE
Water Consumption	WATER_CONSUMPTION
Water/Unit of Prod (in Liters)	WATER_PER_UNIT_OF_PROD
% Water Recycled	PCT_WATER_RECYCLED
Discharges to Water	DISCHARGE_TO_WATER
Waste Water (Th Cubic Meters)	WASTE_WATER
Hazardous Waste	HAZARDOUS_WASTE
Total Waste	TOTAL_WASTE
Waste Recycled	WASTE_RECYCLED
Paper Consumption	PAPER_CONSUMPTION
Paper Recycled	PAPER_RECYCLED
Fuel Used (Th Liters)	FUEL_USED
Raw Materials Used	RAW_MAT_USED
% Recycled Materials	PCT_RECYCLED_MATERIALS
Gas Flaring	GAS_FLARING

Number of Spills	NUMBER_SPILLS
Amount of Spills (Th Tonnes)	AMOUNT_OF_SPILLS
Nuclear % Total Energy	NUCLEAR_%_ENERGY
Solar % Total Energy	SOLAR_%_ENERGY
Phones Recycled	PHONES_RECYCLED
Environmental Fines #	NUM_ENVIRON_FINES
Environmental Fines $	ENVIRON_FINES_AMT
ISO 14001 Certified Sites	ISO_14001_SITES
Number of Sites	NUMBER_OF_SITES
% Sites Certified	%_SITES_CERTIFIED
Environmental Accounting Cost	ENVIRONMENTAL_ACCTG_COST
Investments in Sustainability	INVESTMENTS_IN_SUSTAINABILITY
Energy Efficiency Policy	ENERGY_EFFIC_POLICY
Emissions Reduction Initiatives	EMISSION_REDUCTION
Environmental Supply Chain Management	ENVIRON_SUPPLY_MGT
Green Building Policy	GREEN_BUILDING
Waste Reduction Policy	WASTE_REDUCTION
Sustainable Packaging	SUSTAIN_PACKAGING
Environmental Quality Management Policy	ENVIRON_QUAL_MGT
Climate Change Policy	CLIMATE_CHG_POLICY
New Products - Climate Change	CLIMATE_CHG_PRODS
Biodiversity Policy	BIODIVERSITY_POLICY
Environmental Awards Received	ENVIRONMENTAL_AWARDS_RECEIVED
Verification Type	VERIFICATION_TYPE

Social

Number of Employees	NUMBER_EMPLOYEES_CSR
Employee Turnover %	EMPLOYEE_TURNOVER_PCT
% Employees Unionized	PCT_EMPLOYEES_UNIONIZED
Employee Average Age	EMPLOYEE_AVERAGE_AGE
% Women in Workforce	PCT_WOMEN_EMPLOYEES
% Women in Mgt	PCT_WOMEN_MGT
% Minorities in Workforce	PCT_MINORITY_EMPLOYEES
% Disabled in Workforce	PCT_DISABLED_IN_WORKFORCE
% Minorities in Mgt	PCT_MINORITY_MGT
Workforce Accidents	WORK_ACCIDENTS_EMPLOYEES
Lost Time from Accidents	LOST_TIME_ACCIDENTS

Lost Time Incident Rate	LOST_TIME_INCIDENT_RATE
Fatalities – Contractors	FATALITIES_CONTRACTORS
Fatalities – Employees	FATALITIES_EMPLOYEES
Fatalities – Total	FATALITIES_TOTAL
Community Spending	COMMUNITY_SPENDING
Employee Training Cost	EMPLOYEE_TRAINING_COST
SRI Assets Under Management	SRI_ASSETS_UNDER_MANAGEMENT
# Awards Received	AWARDS_RECEIVED
Health and Safety Policy	HEALTH_SAFETY_POLICY
Fair Remuneration Policy	FAIR_REMUNERATION_POLICY
Training Policy	TRAINING_POLICY
Employee CSR Training	EMPLOYEE_CSR_TRAINING
Equal Opportunity Policy	EQUAL_OPPORTUNITY_POLICY
Human Rights Policy	HUMAN_RIGHTS_POLICY
UN Global Compact Signatory	UN_GLOBAL_COMPACT_SIGNATORY