

DOES CORPORATE SOCIAL RESPONSIBILITY REDUCE DIRECTORS' AND OFFICERS' LIABILITY RISK?

EVIDENCE FROM CANADA

ABSTRACT

Theoretical arguments regarding the effect of corporate social responsibility (CSR) on firm liability risk are abundant; however, empirical evidence about this relationship is scarce. We investigate this relationship from a unique perspective: the premium for directors' and officers' (D&O) liability insurance. We discuss how better CSR performance reduces liability risk against a firm's directors and officers, and therefore should be reflected in lower D&O insurance premiums. We find evidence that firms with better CSR purchase less D&O insurance coverage and pay less D&O insurance premium. Moreover, the reduction in premium is more than the reduction in coverage so that the rate-on-line (RoL) is significantly reduced, reflecting lower D&O liability risk. In addition, we find that the impact of social and corporate governance dimensions on D&O liability risk is negative and significant, whereas the impact of environmental CSR on D&O liability risk is insignificant.

Keywords: Corporate Social Responsibility, Directors' and Officers' Liability Risk, Risk Reduction

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INTRODUCTION

Corporate social responsibility (CSR) is one of the most interesting yet paradoxical phenomena in the management field. For over half a century, researchers have attempted to answer the fundamental question regarding whether a profit-seeking corporation obtains value by being socially responsible. Conflicting results suggest that the relationship between CSR and firm performance is complex. This argument traces back to the shareholder versus stakeholder debate (Danielson, Heck, & Shaffer, 2008; Donaldson & Preston, 1995). One line of thought aligns with Friedman's (1970, 2009) view of shareholder theory, arguing that because CSR activities require resource consumption (McWilliams & Siegel, 2001) they lead to rent dissipation (Coff, 1999; Coff & Blyler, 2003). Because CSR requires a firm to sacrifice shareholders' short-term rent appropriation in return for social gain (Friedman, 1970), CSR may be detrimental to a firm's financial performance and shareholder wealth.

Recent contributions to the CSR literature try to reconcile the shareholder versus stakeholder debate with an instrumental view (e.g., Barnett, 2007; Clarkson, 1995; Hillman & Keim, 2001). Scholars following this line of thought agree that a firm's CSR activities need to be financially justified, and that rent from CSR may be generated in the long-run (Wang & Bansal, 2012). Substantial research has been done seeking to show whether CSR serves as a risk reduction mechanism (e.g., Albuquerque, Koskinen, & Zhang, 2018; Boutin-Dufresne & Savaria, 2004; Godfrey, Merrill, & Hansen, 2009; Jo & Na, 2012). Two general hypotheses were developed to explain how engaging in CSR activities can reduce risk and therefore impact a firm's financial performance. First, as Mackey et al. (2007) argued, CSR engagement is a "product" a firm tries to sell to investors. High CSR performance may signal good risk management

practices that reduce a firm's risks *ex ante* (e.g., Boutin-Dufresne & Savaria, 2004; Orlitzky & Benjamin, 2001). Second, conducting business in a socially responsible way may signal to stakeholders a firm's good reputation, and may increase the firm's moral capital, providing *ex post* reduction of severity when there is a negative event (Godfrey et al., 2009). The potential negative stakeholder assessments are mitigated by the firm's accumulated moral capital (Godfrey, 2005; Godfrey et al., 2009; Shiu & Yang, 2017).

Empirically, various research studies investigate the relationship between CSR and different types of risks at the aggregate level. For example, Jo and Na (2012) found that CSR reduces total risk, which is measured as the volatility of stock returns. Albuquerque et al. (2018) confirm that better CSR performance reduces systematic risk by increasing customer loyalty and thereby reducing price elasticity. Using the volatility of residual variance from a six-factor CAPM model, Lee and Faff (2009) discovered that firms with better CSR performance have significantly lower idiosyncratic risk than firms with poorer CSR performance. Mishra and Modi (2013) extended this discussion by showing that positive CSR performance reduces idiosyncratic risk, whereas negative CSR performance increases idiosyncratic risk. Scholars also argue that firms with better CSR performance have a lower cost of equity financing (e.g., El Ghouli, Guedhami, Kwok, & Mishra, 2011), whereas socially irresponsible firms have a higher cost of debt financing (Goss & Roberts, 2011).

Previous research mainly focuses on the relationship between CSR and risk at the aggregate level, and generally ignores how CSR impacts specific types of risk. However, understanding this research question has both theoretical and practical importance. Theoretically, understanding the relationship between CSR and different types of specific risks provides more direct evidence regarding how CSR influences the firm's risk context and impacts value, thus contributing to the legitimization of

CSR. Practically, managers regularly encounter skepticism from investors regarding plans to spend resources on CSR activities (Hemingway & Maclagan, 2004). Providing direct proof that CSR can reduce specific risks helps managers justify their CSR strategies to investors. Understanding the impact of CSR on specific risks also provides guidance to managers to develop a more robust CSR strategy.

We help to fill this research gap by investigating how CSR impacts directors' and officers' (D&O) liability risk from a unique angle. We argue that companies with better CSR performance represent a better underwriting risk for D&O insurance. Given that insurance companies have superior information about the D&O liability risk—compared to the market--their premiums should be a better reflection of the expected frequency and severity of D&O liability risk than market expectation (Boyer & Stern, 2014). This justifies the use of D&O insurance as a proxy for D&O liability risk. Therefore, if CSR reduces D&O liability risk, we should expect that D&O insurance premium rates will be negatively related to CSR performance. To our knowledge, no previous research has systematically studied the effect of CSR on D&O liability risk or insurance premium costs. In this study we first investigate whether companies with better CSR performance have lower D&O premiums and then examine which CSR dimensions (environmental, social and governance) are relevant.

The Canadian context provides a unique setting to conduct this research because, unlike the U.S., Canada requires all publicly-traded firms to disclose whether they have purchased D&O liability insurance coverage (Lin, Officer, Wang, & Zou, 2013). Using a sample of Canadian publicly-traded firms, we test the relationship between CSR performance and D&O insurance rate-on-line (RoL), measured as the average premium charge per \$1000 of insurance coverage. The results support our hypotheses that firms with better CSR performance have lower D&O insurance RoL, reflecting lower D&O liability risk. We find that better performance in both social and governance dimensions reduces the D&O insurance

RoL, whereas environmental performance does not significantly impact the D&O insurance RoL.

The remainder of this paper is structured as follow. In the next section, we survey relevant literature and provide arguments to develop testable hypotheses. In the Empirical Method section, we discuss variables used in the analysis and research methods. The results are presented and analyzed in the following section and we conclude with a discussion of the results and suggestions for future research.

THEORY AND HYPOTHESES DEVELOPMENT

CSR and D&O Liability Risk

Although not specified, a number of previous studies have indirectly investigated how CSR interacts with firm liability risk. For example, Koh et al. (2014) found that CSR's effect as a value enhancing mechanism is stronger when a firm faces a higher level of litigation risk. They argue that this is because investors are more likely to reward CSR as a risk mitigation tool when a firm is in an industry with high liability risk. Blacconiere and Patten (1994) found that after chemical leak events, firms with a proactive CSR reporting strategy face less reaction from stakeholders than other firms. Scholars have also found that firms with a reputation for good CSR experience less negative stock reactions (Godfrey et al., 2009) after a disastrous event, whereas firms with a reputation for being socially irresponsible experience a greater negative impact, requiring an increase in charitable donation to recover (Muller & Kräussl, 2011). More straight forward evidence comes from a study done by Kordonsky (2018), who empirically confirmed that firms with a higher possibility of being sued in class action lawsuits strategically invest more in CSR activities, and that CSR investment significantly reduces both the probability of a class action lawsuit and negative market reaction if a lawsuit is filed.

To our knowledge, no research has directly investigated whether CSR reduces D&O liability risk.

We propose at least three reasons why a firm's CSR performance will impact D&O liability risk. First, previous literature has shown that good CSR performance is linked to low financial risk (Boutin-Dufresne & Savaria, 2004) and low cost of capital (Sharfman & Fernando, 2008). Therefore, better CSR performance may signal lower risk of financial distress and thus lower possibility of litigation against directors and officers. Second, event studies have found that firms with better CSR performance experience smaller losses of shareholder value after negative events (Godfrey et al., 2009; Shiu & Yang, 2017). This results from the accumulation of stakeholder moral capital (Godfrey, 2005) or stakeholder influence capacity (Barnett, 2007). For this reason firms with better CSR performance are less likely to face D&O liability claims because negative events will have smaller financial impact. Third, some researchers argue that social norms and institutional pressures have been shifting CSR activities from "explicit activities", i.e., volunteer CSR engagement at the choice of the firms, to "implicit activities", i.e., formal and informal institutional requirements that shape a firm's actions (e.g., Flammer, 2013; Matten & Moon, 2008). That is, as CSR has become institutionalized, society exerts institutional pressures to force firms to engage in CSR activities (Bice, 2017; Bondy, Moon, & Matten, 2012; Jamali, Lund-Thomsen, & Khara, 2017). Therefore, lack of sufficient investment in CSR activities may signal illegitimacy of a firm and increase the likelihood of being the target of a shareholder action, implying higher D&O liability risk.

The purpose of D&O insurance is to cover the litigation costs and indemnification that are incurred if a firm's directors or officers are sued for negligence related to their services to the firm, provided that they acted honestly and in good faith (Core, 1997). According to Core (1997), the demand for D&O insurance can be generated from three sources: (1) a request from independent board members to protect themselves; (2) corporate risk management assessments; and (3) management

entrenchment. Previous literature has investigated the determinants of D&O insurance premiums and coverage from many angles. For example, Boyer and Stern (2012) found that common equity firms pay, on average, less than income trusts to purchase D&O insurance, probably due to the complex governance structure of the trusts. Egger et al. (2015) found that the demand for D&O insurance is related to firm size, returns on assets (ROA), and board characteristics such as the percentage of independent board members and the age of board members.

However, these studies focus mainly on firm characteristics while ignoring other strategies of a firm. We contend that if CSR performance signals lower reputation risk (Heal, 2005) and lower litigation risk, it should reduce D&O liability risk, hence reduce the D&O insurance rate. With their experience in underwriting D&O insurance, insurers are in a good position to assess D&O liability risk. They may also possess superior information compared to the market in terms of a firm's internal structure and loss characteristics (Boyer & Stern, 2014). Since a profit-seeking insurer has the ability and the financial incentive to properly assess a firm's risk, it is likely to reward companies with lower D&O liability risk by offering a lower insurance RoL. The D&O insurance RoL is therefore a strong *ex ante* indicator of D&O liability risk (Boyer, 2016). Hence, if firms with better CSR performance have a lower cost of D&O insurance, this is consistent with firms having lower D&O liability risk. We thus develop our first hypothesis as follow:

Hypothesis 1: Firms with better CSR performance have lower D&O liability risk, reflected by a lower D&O insurance RoL.

CSR Components and the D&O Liability Risk

The concept of CSR took shape in the 1950s, with an emphasis on the social issues in the 1950s to 1960s (Carroll, 2008). The Valdez Principles were introduced in 1977, which provided a guide for

companies' environmental responsibilities, in addition to their human rights responsibilities (Soderstrom, 2013). In the 1990s, researchers gradually built an integrated picture of CSR to include economic, legal, ethical and philanthropic responsibilities (e.g., Carroll, 1991). Over time CSR shifted to a multi-component construct, measured through standardized metrics by specific third-party organizations such as MSCI, Sustainalytics and Thomson Reuter's ASSET4. The most common measurement of CSR separates it into three primary components: environment, social and governance (e.g., MSCI ESG Research, 2015; Sustainalytics, 2016). Each component is measured through a series of rating criteria, targeting different stakeholders and measuring different aspects of business operations.

We argue that a firm's D&O liability risk is impacted by all three dimensions. First, shareholder class actions can arise from environmental accidents. For example, after the 2010 BP Gulf of Mexico oil spill, the largest oil spill in U.S. history, BP's shareholders brought a class action lawsuit against the company for not disclosing key information and misleading the shareholders regarding the severity of the incident. As a result, in 2016, after over two years of lawsuits, BP agreed to pay \$175 million to shareholders (Reuters, 2016). Environmental violations not only lead to regulatory penalties (Karpoff, Lott, & Wehrly, 2005), but also reputational losses (Gatzert, Schmit, & Kolb, 2016). In contrast, firms that behave responsibly in terms of environmental concerns experience reputational gain and financial reward (Flammer, 2013). Therefore, a lower (higher) environmental score, signaling a higher number of environmental concerns (strengths) of a firm is expected to signal higher D&O liability risk.

Second, D&O liability risk is expected to be affected by a firm's social performance, i.e., its relationship with various stakeholders, such as the community and its employees. A low stakeholder management score may indicate that the top management team has a myopic view: emphasizing short-term gain while ignoring the long-term repercussions of exploiting stakeholders in the short run (Letza,

Sun, & Kirkbride, 2004). This short-term orientation may lead to higher risk of D&O liability in the long run. Moreover, the trust built between a firm and its stakeholders through CSR activities reduces the chance of stakeholder sanctions and improves stakeholder engagement (Godfrey et al., 2009; Hillman & Keim, 2001), thus reducing litigation risk. For example, Flammer and Luo (2017) argue that CSR activities can be used as governance tools to reduce possible adverse behaviour of employees. This suggests that a firm's performance in social issues influences legitimacy and stakeholder trust, thereby influencing D&O liability risk.

Third, previous literature has shown that a firm's governance characteristics are correlated with the choice of D&O insurance and insurance premium (e.g., Boyer & Tennyson, 2015; Chen & Chang, 2011; Core, 2000). Farber (2005) shows that after a corporate fraud event, firms that improve corporate governance are rewarded by investors, whereas firms that don't improve corporate governance experience slow recovery. This is consistent with the notion that investors reward improvements in corporate governance. Kesner and Johnson (1990) provide more direct evidence. They found that firms with more inside directors are more likely to be sued by shareholders than those with more outside directors. Therefore, a firm's governance quality also influences D&O liability risk.

The previous discussion leads to the development of the following hypotheses regarding the impact of CSR components on D&O liability risk.

Hypothesis 2: Firms with better environmental performance have lower D&O liability risk, reflected by a lower D&O insurance RoL.

Hypothesis 3: Firms with better social performance have lower D&O liability risk, reflected by a lower D&O insurance RoL.

Hypothesis 4: Firms with better corporate governance performance have lower D&O

liability risk, reflected by a lower D&O insurance RoL.

EMPIRICAL METHODS

Data and Sample

We measure the CSR performance of Canadian firms using the Sustainalytics database (formerly Canadian Social Investment Database). Sustainalytics is a leading research firm in environmental social and governance (ESG) ratings and social-based stock indices. It assesses the environmental, social, and corporate governance performance of over 4500 companies across 42 industries worldwide based on over 70 core indicators (Wharton Research Data Services, 2017). Compared with other major third party CSR databases, such as MSCI ESG and Thomas Reuters' ASSET4, Sustainalytics has an advantage in rating Canadian companies. Since its first release of the ESG report, Sustainalytics' ESG database has been widely used in CSR studies, especially those that involve Canadian firms (e.g., Graafland & Smid, 2016; Surroca & Tribó, 2013; Thorne, Mahoney, Gregory, & Convery, 2017). Our sample includes all Canadian publicly traded companies rated by Sustainalytics between 2009 and 2017.¹

The D&O insurance premium and the limit of insurance were hand collected from each Canadian firm's annual report (available at <http://www.sedar.com>). Toronto Stock Exchange (TSX) regulations stipulate that this information be disclosed in the annual management information circular of Canadian publicly-listed companies. We also collected information on the board of directors from the same management information circular. We combine the Sustainalytics ESG database with Compustat and Standard and Poor's (S&P) Capital IQ for key financial variables. Our final data set contains 1655 firm-year observations, out of which 816 observations have data for both D&O insurance coverage and

¹ Based on our conversation with the company's staff, Sustainalytics went through a major change in rating methodology in 2009. Therefore, data prior to 2009 is no longer available.

premium, and 839 observations do not. Out of the 839 observations without full D&O insurance information, 454 observations have no information about whether the firms purchased D&O insurance during the year, and 385 observations have only partial information about the D&O insurance (69 observations have information on coverage only, 18 observations have information on premium only, and 298 observations only have information that D&O insurance was purchased). We consider firms that did not disclose any information about D&O insurance as non-purchasers, and firms that only disclose partial information about D&O insurance as non-disclosers. Therefore the D&O penetration rate is approximately 72.6 percent, which is consistent with previous research (e.g., Boyer & Tennyson, 2015; Lin et al., 2013).

Measurements of Key Variables

Dependent variable. Our dependent variable is the assessment of D&O liability risk as reflected by the RoL. Following previous literature, we measure *RoL* as the premium rate per 1000 units of coverage (e.g., Boyer & Stern, 2012; Egger et al., 2015; Lin et al., 2013). The *RoL* indicates the underwriter's perception of risk borne by the insurance policy. A higher per unit price of insurance reflects that underwriters perceive higher risk of D&O litigation during the policy period. For a robustness check, we also use the *maximum coverage* (in 100 millions) and *total premium* (in 100 thousands) as dependent variables.

We acknowledge that the price of insurance is partially determined by the bargaining power of the insured firm, making the premium an imperfect measure of a firm's D&O liability risk. Although this concern may hold true in general, we argue that it is unlikely to impact our results for at least three reasons. First, our sample consists of only publicly traded companies. Therefore, the bargaining power of the companies in our sample is likely to be comparable and not vary a great deal across firms. Second,

although larger firms are more likely to have greater bargaining power, research has shown that this may not lead to higher CSR performance (Baumann-Pauly, Wickert, Spence, & Scherer, 2013). Since the main goal of this paper is to identify the relationship between a firm's CSR performance and the cost of insurance, we argue that this is unaffected by the variation of policyholders' bargaining power. Third, we control for firm size in all of our regression specifications. Such variation in D&O insurance premium caused by differences in bargaining power, if any, should be absorbed by the size variable.

Explanatory variable. We use the Sustainalytics ESG historical weighted total score as the measurement of a firm's CSR performance. Sustainalytics measures total CSR based on a variety of key indicators that address different stakeholders, including customers, contractors, suppliers, employees, regulators, and society (Sustainalytics, 2016). The multi-stakeholder orientated measurement avoids stakeholder mismatch between the dependent variable and independent variable (Hillman & Keim, 2001) and is suitable for our research question.

To test hypotheses two, three and four, we use the three second-level scores in Sustainalytics: environmental, social and governance scores. Each rating score is evaluated based on preparedness (a company's design to manage material ESG risks), disclosure (the quality of a company's report on ESG issues), and performance (a company's qualitative and quantitative performance on key ESG indicators such as carbon intensity) (Sustainalytics, 2016). Sustainalytics tracks the total CSR score and the ESG scores of its target companies on a monthly basis. The annual average scores were used as the explanatory variables for all regression analysis.

Control variables. Following previous literature, we control for firm-specific characteristics that may be related to both CSR performance and D&O premium and insurance coverage. We include common control variables in CSR literature that may interact with CSR and influence other business

processes (e.g., Hillman & Keim, 2001; Hull & Rothenberg, 2008; Jayachandran, Kalaigannam, & Eilert, 2013). These variables include research and development intensity (*R&D intensity*), measured as the R&D expenditure divided by total sales, *cost of capital*, measured as total interest payment divided by total assets, and *systematic risk*, measured as the one year beta from S&P Capital IQ.

We also include variables that are commonly controlled for in both the CSR and D&O insurance literature. We measure *firm size* as the natural log of total assets and firm *leverage* as total debt divided by total assets (Hull & Rothenberg, 2008; Lin et al., 2013; Lin, Officer, & Zou, 2011). In both the D&O literature (Boyer & Tennyson, 2015; Core, 1997; Egger et al., 2015) and the CSR literature (Hillman & Keim, 2001; Jayachandran et al., 2013) it is also common to control for the *market-to-book ratio (MB ratio)* and *performance*. Hence, we include the *MB ratio*, operationalized as the market value of common stock divided by the book value of common stocks, and *return on assets (ROA)*. We also included *board independence*, operationalized as the number of independent board members divided by board size, in all regressions (Boyer & Tennyson, 2015; Chang, Oh, Park, & Jang, 2017; Rao & Tilt, 2016). Lastly, we include year-fixed effects to further eliminate possible omitted variable bias caused by time trends.

Identification Strategy

Our main goal is to estimate whether a firm's CSR performance impacts the cost of D&O insurance. We use firm fixed-effect regression as our primary regression method. However, it's possible that a firm's CSR performance is endogenously determined, leading to an unreliable estimation of the coefficient. For example, a low D&O insurance premium may indicate that a firm has a low probability of financial distress due to extra liquidity on hand. Having excess liquidity may also provide a firm with the resources to carry out activities that influence its CSR scores (such as Research & Developments on

green technologies). Therefore, an identification strategy is required to control for endogeneity. We use multiple methods to minimize endogeneity. First, following literature in CSR and strategic management (e.g., Arora & Dharwadkar, 2011; Li, Zhou, & Zajac, 2009) we use Hausman-Taylor (HT) regression to eliminate possible endogeneity caused by omitted variables (Hausman & Taylor, 1981). HT regression estimation uses time-variant and time-invariant exogenous variables from within the model as instrumental variables to purge out possible confounding effects caused by omitted variable bias (Baltagi, Bresson, & Pirotte, 2003).

We use the instrumental variable approach as the second method to treat endogeneity. The total CSR score is instrumented using the industry average CSR score (e.g., Cheng, Ioannou, & Serafeim, 2014; Harjoto & Jo, 2015; Jiraporn, Jiraporn, Boeprasert, & Chang, 2014). The industry average CSR score is calculated based on the SIC three digit industry classification. In the first stage of the IV regression, we regress CSR total score on the industry average CSR score and all of the control variables. The predicted value of CSR total score is then used as the explanatory variable in the second stage. Using the two stage IV regression ensures an unbiased estimation of the coefficient between CSR and D&O insurance RoL without having to adjust standard errors between the two stages (Angrist & Pischke, 2008).

Selection bias: One concern about the empirical design is the selection bias that arises from including only firms that choose to purchase D&O insurance. Since the dependent variable is the premium per unit of insurance as a representation of the underwriters' assessment of D&O liability risk, our sample only contains firms that actually purchased D&O insurance. Hence, one may argue that firms that purchase D&O insurance are systematically different from firms that do not purchase D&O insurance or from firms that do not disclose full information about D&O insurance, and these

differences are determinant factors that may change the relationship between CSR and D&O risk. We address this issue using the Heckman 2-stage model (e.g., Boyer & Stern, 2012; Egger et al., 2015; Gillan & Panasian, 2015). We create a *D&O disclosure* dummy that equals one if a firm in Sustainalytics purchased and disclosed D&O insurance in year t and zero if it did not. We regress the D&O dummy on all control variables using a probit model. Following Boyer and Stern (2012), we include *board size* as the instrument for the first stage estimation. *Board size* may only affect the decision to purchase D&O insurance but may not impact the premium rate charged by the insurers. Since D&O insurance covers all board members and top management team members, a larger board generally represents a higher likelihood that the board requires the purchase and disclosure of D&O insurance. However, the signal of a larger board to insurance underwriters is ambiguous as the effect of board size on firm outcomes is inconclusive.² The inverse Mills ratio is calculated from the first-stage regression and is input in the second stage estimation as a control variable.

Reverse causality: Another concern is the possibility of reverse causality. For example, a firm that is charged a high premium by an insurer may see this as a sign of high D&O liability risk and then decide to take actions to either reduce the probability or severity of liability risk. CSR has been argued to be a risk management tool that reduces the severity of risk by increasing stakeholder moral capital (Godfrey, 2005; Godfrey et al., 2009). Hence, it could be used to achieve such risk mitigation. Although this is a possible alternative explanation, we don't believe it will hold in the IV regression estimation. The instrumental variable we use is the industry average CSR performance, which is at a higher unit of analysis. Even if a firm senses a high D&O liability risk, it cannot effectively influence the average CSR

² Interested readers can refer to Dalton et al. (1999) for a summary of research supporting positive, negative and non-significant results between board size and firm outcomes.

performance of the whole industry. This means that the predicted CSR performance from the first stage of the IV regression is unbiased from reverse causality problem.

RESULTS

Table 1 shows the descriptive statistics and the Pearson's correlation coefficients for the main variables. There is no correlation between independent variables that is over 0.7. Therefore, our data do not exhibit collinearity. Although the three sub-scores (environmental, social and governance) have relative high correlations with the CSR total score, the correlations between them are acceptable (0.50, 0.47 and 0.41 respectively). Therefore, using each score as a separate dependent variable to measure the respective CSR dimensions is justified.

Insert Table 1 Here

We compare firms that purchased and disclosed D&O insurance with firms that purchased D&O insurance but did not disclose full information in Table 2. The table shows that firms that disclosed D&O coverage and premium tend to be larger, have lower risk, cost of capital and leverage ratio, and have larger but less independent board compared with firms in the other group. However, there is no significant difference between the two groups in terms of CSR scores, market-to-book ratio, innovation and performance. Table 3 compares the differences between firms that purchased and disclosed D&O insurance with firms that did not purchase D&O insurance. The t tests of mean difference show significant differences between the two groups for most variables. Specifically, compared with firms that did not purchase D&O insurance, firms that purchased and disclosed D&O insurance have higher CSR scores, are larger in size, have lower systematic risk, spend more on R&D, have larger and more independent boards and have higher ROA.

Insert Table 2 & 3 Here

The firm fixed-effect regression results are reported in Table 4. CSR is significantly negatively correlated with the maximum coverage ($\beta=-0.006$, $p=0.037$), the total premium paid ($\beta=-0.118$, $p=0.000$), and RoL ($\beta=-0.049$, $p=0.007$). The F statistics of model fit are all significant at $p<0.001$ level. The results show that firms with better CSR performance purchase less D&O insurance coverage and pay less premium. Moreover, the reduction in premium is more significant than the reduction in coverage so that the RoL is significantly lower for firms with better CSR performance. The economic relevance is also significant. Per 1 unit increase in CSR performance, the mean RoL is reduced by 0.049 (or about 1%). That is a 0.41 (or about 7.2%) mean reduction in RoL per one standard deviation (8.49) increase in CSR score. This implies that firms with better CSR performance have lower D&O liability risk, providing support for hypothesis 1. Although not reported due to space limitation, we also run the same regressions with the log transformations of coverage, premium and RoL as dependent variables. The results are similar to what we reported in Table 4.

Insert Table 4 Here

Table 5 shows firm fixed-effect regression results using CSR components as explanatory variables. We can see from Model 1 that environmental performance is not significantly correlated with D&O insurance RoL ($\beta=-0.011$, $p=0.317$). Therefore, we do not find support for hypothesis 2. Models 2 and 3 show that social and governance performance are both significantly negatively correlated with D&O insurance RoL ($\beta=-0.026$, $p=0.040$ and $\beta=-0.029$, $p=0.025$, respectively). The results show that the per unit impact of both social and governance scores on D&O insurance RoL are similar (about 0.5% of

the mean). That translates into a 0.26 (or 4.5%) reduction in mean RoL per one standard deviation (9.84) increase in social score, and a 0.29 (or 5.1%) reduction in mean RoL per one standard deviation (10.04) increase in governance score. Therefore, hypotheses 3 and 4 are supported.

Insert Table 5 Here

As discussed in the empirical method section, CSR performance is an endogenous variable and the coefficient from the firm fixed-effect regression may suffer omitted variable bias. We first use the HT regression to eliminate omitted variable biases, as shown in Model 1 of Table 6. As expected, the coefficients in the HT regression are similar to the coefficients in the firm fixed-effects regression, with a slightly lower significance ($\beta=-0.04$, $p=0.012$).

Our second identification strategy is IV regression with industry average CSR score as the instrumental variable. The results are shown for Models 2 and 3 in Table 6: the industry average CSR score significantly predicts firm CSR ($\beta=1.254$, $p<0.001$). Therefore we confirm that the industry average CSR score is a strong instrumental variable in this setting. The second stage regression shows that the exogenous CSR score significantly predicts the D&O insurance premium rate for a firm ($\beta=-0.177$, $p=0.023$). Therefore, we confirm that hypothesis 1 is further supported and the relationship between CSR and D&O insurance premium rate is causal.

Insert Table 6 Here

The second possible concern regarding our results is selection bias. That is, firms that purchase and disclose D&O insurance may significantly differ from firms that do not. We use the Heckman 2-stage regression to address this issue. Panel A of Table 7 treats possible selection bias between the

disclosers and the *non-disclosers*; Panel B treats possible selection bias between the *disclosers* and the *non-purchasers*; and Panel C compares firms in the discloser group with all other firms. We included all control variables and *board size* as the independent variables in the first stage to predict the dummy variable *D&O disclosure* which equals 1 if a firm purchased and disclosed D&O insurance coverage and premium in a year, and 0 if it did not. *Board size* significantly positively predicts *D&O disclosure* in all three panels. As expected, firms with larger boards are more likely to disclose D&O insurance coverage and premium. The results for the second stage regressions are reported for Models 2 to 5 in each panel, using *total CSR* and *CSR components* as dependent variables, respectively. All three panels show similar results as Tables 4 and 5. *Total CSR* has a similar significant negative impact on D&O insurance *RoL* in all three panels ($\beta \approx -0.05$), providing further support for hypothesis 1. Model 3 shows that environment related CSR does not impact D&O insurance *RoL*, whereas Models 4 and 5 show that both social and governance related CSR significantly reduce D&O insurance *RoL*. This provides further support for hypotheses 3 and 4 but again rejects hypothesis 2. The inverse Mills ratio (λ) is marginally significant in Panels A and B in all second stage regressions and significant in Panel C, indicating that the differences between disclosers and non-disclosers, and between disclosers and non-purchasers, may marginally influence the D&O insurance *RoL*. Therefore, we confirm that the use of the Heckman two-stage method is justified.

Insert Table 7 Here

As per the control variables, most regression results show that larger firms are more likely to have higher D&O insurance premium rates. This is consistent with previous literature which argues that larger firms are more likely to be a target of litigation (Kassinis & Vafeas, 2002). Also as expected, we

found that firms with a higher cost of capital also have a higher D&O insurance premium rate, indicating that firms with lower financial risk may also have lower D&O liability risk. These findings align with results in previous research in D&O insurance (e.g., Boyer & Tennyson, 2015; Egger et al., 2015; Gillan & Panasian, 2015).

DISCUSSION AND CONCLUSION

The primary goal of this paper is to investigate how CSR impacts firm D&O liability risk. As mentioned above, extensive studies have been done to understand how CSR influences aggregate risk. However, research on how CSR influences specific types of risk is scarce. We attempt to fill this gap by using D&O insurance RoL as a proxy for D&O liability risk. Our results show that firms with good CSR performance have a lower D&O insurance RoL, reflecting lower D&O liability risk. Specifically, both social and governance performance in CSR are negatively related to the D&O insurance RoL. These results are robust even after we controlled for omitted variable bias and selection bias. Our results therefore provide concrete evidence for previous literature that argues CSR can be used as supplement to risk management and reduce overall risk of a firm (e.g., Flammer & Luo, 2017; Godfrey et al., 2009; Kytte & Ruggie, 2005).

However, contrary to our prediction, we did not find a significant relationship between environmental performance and D&O liability risk. We believe this may be explained by the fact that environmental concerns have been gradually institutionalized over the last few decades (Flammer, 2013). Firms continue to face more stringent environmental regulations and institutional guidelines (Allen & Shonnard, 2012). Therefore, conforming to environmental regulations has become a legitimacy issue rather than a choice. This means that stakeholders' reward for good environmental performance should gradually decline over time but their punishment for environmentally irresponsible behaviours

should increase (Flammer, 2013). Since the Sustainalytics ESG scores measure corporate social responsibility performance, rather than corporate social irresponsibility performance, it is reasonable that the correlation between the environmental score and the liability risk is insignificant.

This paper provides both theoretical and practical contributions. To our knowledge we are among the pioneers who explore the relationship between CSR and specific business risks. We thus contribute to the broader literature in understanding the relationship between CSR and firm risk. Also, we contribute to the D&O insurance literature by investigating CSR strategy as a determinant of D&O insurance coverage and premium. Previous literature in D&O insurance mainly focuses on firm characteristics, such as firm size, board characteristics, change in shareholders, debt, and risks (e.g., Boyer & Tennyson, 2015; Chen & Chang, 2011; Egger et al., 2015). We extend this research by showing that firm strategies can also influence the requirement for D&O insurance. This paper also provides managerial implications. Liability risks may be largely inherited in the type of business a firm conducts (Koh et al., 2014). For example, directors and officers of an oil company are more likely to be sued than directors and officers in a retail company, due to the nature of the inherent risks in operations. Therefore, companies in a litigious industry may want to consider investing more in CSR activities because of the D&O liability risk they face. Moreover, since the reduction in liability risk is not instantly reflected in accounting performance, managers who want to reduce D&O liability risk by allocating resources towards CSR activities may encounter investor skepticism. Understanding both the *ex ante* and *ex post* impacts of CSR on liability risk provides managers with more evidence to rationalize their actions. Better CSR performance not only reduces the severity of losses after negative events (Godfrey et al., 2009) but also reduces cost of insurance *ex ante*.

The limitations of this analysis provide opportunities for future research. First, we used

Canadian publicly listed firms for our empirical analysis. Although using Canadian firms may raise potential questions regarding the generalizability of the results, it was the best option available because Canada has more stringent legal requirements for disclosing information about D&O insurance. Other countries, such as the U.S., do not require companies to disclose information on insurance purchases. Future studies that investigate the CSR-D&O risk relationship in different settings will enhance the validity of our findings. Second, we used Sustainalytics as the main database for CSR scores because of the empirical setting. Sustainalytics covers more Canadian companies and longer periods for Canadian companies than other databases such as MSCI ESG and Thomson Reuter's ASSET4. Further research can be done to check the robustness of our results by using primary data or different CSR databases.

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TABLE 1
Descriptive Statistics: Bivariate Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. RoL	5.69	3.20													
2. CSR Total	56.30	8.25	0.08												
3. Environment Dimension	51.08	10.87	0.07	0.84											
4. Social Dimension	55.03	9.80	0.06	0.83	0.50										
5. Governance Dimension	66.10	9.98	0.07	0.71	0.47	0.41									
6. Firm Size	8.42	1.61	0.10	0.36	0.35	0.34	0.13								
7. Beta	1.14	0.89	0.13	0.06	0.00	0.11	-0.01	-0.13							
8. Leverage	0.24	0.17	-0.06	-0.01	-0.06	0.00	0.10	0.03	-0.12						
9. MB Ratio	2.38	7.41	0.00	0.01	0.03	-0.01	0.01	-0.01	-0.08	0.09					
10. R&D Intensity	0.01	0.03	0.21	-0.07	0.02	-0.12	-0.07	-0.19	-0.01	-0.09	0.05				
11. Cost of Capital	0.01	0.02	0.07	0.00	-0.01	-0.01	0.03	-0.11	-0.03	0.64	0.02	-0.06			
12. Board Size	9.81	2.95	0.08	0.28	0.30	0.19	0.17	0.66	-0.18	-0.04	0.03	-0.10	-0.09		
13. Board Independence	0.79	0.12	0.10	0.25	0.17	0.20	0.25	0.20	0.03	-0.03	-0.02	0.01	-0.06	0.14	
14. ROA	0.60	0.62	-0.08	-0.01	0.00	-0.10	0.13	-0.21	-0.18	0.02	0.07	-0.01	0.02	0.03	-0.10

Note: Two-tailed t test of Pearson's correlation coefficient are estimated. N=816 for D&O Premium Rate, N=1655 for all other variables. Correlations greater than |0.05| are significant at $p \leq 0.05$, those greater than |0.07| are significant at $p \leq 0.01$, and those greater than |0.9| are significant at $p \leq 0.001$.

TABLE 2
Descriptive Statistics: Purchased & Disclosed vs Purchased But Not Disclosed

	Purchased & Disclosed (1)				Purchased but Not Disclosed (2)				Difference in Mean: (1)-(2)		
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean diff	t stat.	P value
1. RoL	5.69	3.20	0.88	21.44	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2. CSR total	57.04	8.49	38.44	81.71	57.46	7.88	37.32	80.99	-0.42	-0.82	0.207
3. Environment Dimension	52.34	11.56	29.83	84.76	51.85	9.67	32.50	80.85	0.49	0.72	0.236
4. Social Dimension	55.50	9.84	27.80	85.77	55.69	10.44	28.80	89.75	-0.18	-0.30	0.383
5. Governance Dimension	66.51	10.04	42.00	94.00	68.56	8.81	29.99	92.77	-2.05***	-3.43	0.000
6. Firm Size	8.67	1.77	4.58	14.06	8.20	1.14	5.32	13.50	0.48***	4.83	0.000
7. Beta	1.03	0.84	-1.14	8.98	1.16	0.87	-0.88	4.93	-0.13***	-2.49	0.006
8. Leverage	0.23	0.17	0.00	1.09	0.26	0.16	0.00	0.91	-0.03***	-3.32	0.001
9. MB Ratio	2.44	9.50	0.00	222.09	2.69	5.98	0.00	113.06	-0.25	-0.48	0.316
10. R&D intensity	0.01	0.04	0.00	0.44	0.01	0.03	0.00	0.32	-0.00	-0.43	0.334
11. Cost of Capital	0.01	0.01	0.00	0.19	0.02	0.02	0.00	0.42	-0.00**	-1.71	0.044
12. Board Size	10.37	2.88	5.00	20.00	9.36	2.24	5.00	17.00	1.00***	6.03	0.000
13. Board Independence	0.79	0.12	0.43	1.00	0.81	0.10	0.33	1.00	-0.14**	-1.91	0.028
14. ROA	0.62	0.63	0.02	3.29	0.66	0.67	0.00	4.91	-0.04	-1.03	0.152

Note: In this table we present the differences in descriptive statistics between the *Purchased & Disclosed Group* and the *Purchased but Not Disclosed Group*. The difference test is a t-test with H_0 : mean (Purchased & Disclosed Group) = mean (Purchased but Not Disclosed Group). N=1201. The number of observations for *Purchased & Disclosed Group* is 816, and the number of observations for *Purchased but Not Disclosed Group* is 385. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$.

TABLE 3
Descriptive Statistics: Purchased & Disclosed vs Not Purchased

	Purchased & Disclosed (1)				Not Purchased (2)				Difference in Mean: (1)-(2)		
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean diff	t stat.	P value
1. RoL	5.69	3.20	0.88	21.44	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2. CSR total	57.04	8.49	38.44	81.71	54.01	7.65	37.00	76.40	3.03***	6.31	0.000
3. Environment Dimension	52.34	11.56	29.83	84.76	48.18	9.97	23.00	86.67	4.15***	6.44	0.000
4. Social Dimension	55.50	9.84	27.80	85.77	53.64	9.01	26.00	78.00	1.87***	3.34	0.000
5. Governance Dimension	66.51	10.04	42.00	94.00	63.28	10.17	37.00	92.00	3.22***	5.46	0.000
6. Firm Size	8.67	1.77	4.58	14.06	8.15	1.58	4.31	13.01	0.53***	5.27	0.000
7. Beta	1.03	0.84	-1.14	8.98	1.34	0.96	-0.92	5.83	-0.31***	-6.03	0.000
8. Leverage	0.23	0.17	0.00	1.09	0.23	0.16	0.00	0.72	-0.01	-0.54	0.295
9. MB Ratio	2.44	9.50	0.00	222.09	2.03	2.71	0.00	46.38	0.41	0.90	0.185
10. R&D intensity	0.01	0.04	0.00	0.44	0.00	0.01	0.00	0.10	0.01***	3.47	0.000
11. Cost of Capital	0.01	0.01	0.00	0.19	0.01	0.01	0.00	0.09	-0.00	-0.96	0.170
12. Board Size	10.37	2.88	5.00	20.00	9.18	3.37	3.00	20.00	1.19***	6.61	0.000
13. Board Independence	0.79	0.12	0.43	1.00	0.76	0.12	0.46	1.00	0.03***	4.60	0.000
14. ROA	0.62	0.63	0.02	3.29	0.51	0.57	0.00	5.16	0.11**	3.07	0.001

Note: In this table we present the differences in descriptive statistics between the *Purchased & Disclosed Group* and the *Not Purchased Group*. The difference test is a t-test with H_0 : mean (Purchased & Disclosed Group) = mean (Not Purchased Group). N=1270, of which the number of observations for *Purchased & Disclosed Group* is 816, and the number of observations for *Not Purchased Group* is 454. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$.

TABLE 4
Fixed-effect Regression of D&O Insurance on CSR

	Model 1		Model 2		Model 3	
	DV=Max Coverage in \$100,000,000		DV=Total Premium in \$100,000		DV=RoL	
	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value
CSR Total	-0.006(0.003)**	0.037	-0.118(0.031)***	0.000	-0.049(0.018)***	0.007
Firm Size	0.156(0.037)***	0.000	1.136(0.383)***	0.003	0.638(0.228)***	0.005
Beta	0.034(0.014)**	0.017	0.176(0.149)	0.237	-0.042(0.088)	0.630
Leverage	0.139(0.141)	0.322	-0.293(1.591)	0.854	0.106(0.930)	0.909
MB Ratio	0.000(0.001)	0.962	-0.008(0.010)	0.437	0.000(0.006)	0.997
R&D intensity	1.707(0.757)**	0.024	17.281(7.592)**	0.023	4.276(4.552)	0.348
Cost of Capital	0.387(1.460)	0.791	22.645(15.394)	0.142	22.024(8.952)**	0.014
Board Independence	0.123(0.170)	0.472	2.960(1.797)*	0.100	1.713(1.041)*	0.100
ROA	0.071(0.063)	0.259	0.246(0.695)	0.724	0.483(0.405)	0.234
Constant	-0.418(0.384)	0.276	0.347(4.036)	0.932	2.957(2.372)	0.213
Year Fixed Effects		Yes		Yes		Yes
Firm Fixed Effects		Yes		Yes		Yes
F(df1, df2)	14.33(17,695)***		3.09(17, 656)***		13.55(17,641)***	
observations/firms		885/173		834/161		816/158

Note: In this table we report the results for firm fixed-effect regressions of D&O insurance variables on CSR. All probabilities are two-tailed tests. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$. Standard errors are reported in parenthesis. Observations vary between models because 69 observations have information only on coverage and 18 observations have information only on premium. The dependent variable for model 3 is *Rate-on-line (RoL)*, measured as the average premium rate per \$1000 of coverage. *CSR total* is the annual average of the total CSR performance score from Sustainalytics. *Firm size* is the log transformation of total assets; *beta* is S&P one year beta; *R&D intensity* is R&D expenditure divided by total sales; *board independence* is # of independent board members divided by total # of board members.

TABLE 5
Fixed-effect Regression of D&O Insurance on CSR Components

DV=RoL	Model 1		Model 2		Model 3	
	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value
Environment Score	-0.011(0.011)	0.317				
Social Score			-0.026(0.013)**	0.040		
Governance Score					-0.029(0.013)**	0.025
Firm Size	0.683(0.228)***	0.003	0.647(0.228)***	0.005	0.611(0.229)***	0.008
Beta	-0.036(0.088)	0.688	-0.029(0.088)	0.739	-0.039(0.088)	0.655
Leverage	0.021(0.934)	0.982	0.062(0.932)	0.947	0.076(0.931)	0.935
MB Ratio	0.000(0.006)	0.944	0.000(0.006)	0.962	0.000(0.006)	0.966
R&D intensity	3.860(4.620)	0.404	3.309(4.543)	0.467	2.462(4.546)	0.588
Cost of Capital	22.569(9.002)**	0.012	23.505(8.967)***	0.009	22.241(8.967)**	0.013
Board Independence	1.554(1.044)	0.137	1.758(1.047)*	0.093	1.557(1.041)	0.135
ROA	0.553(0.407)	0.175	0.465(0.407)	0.254	0.464(0.407)	0.255
Constant	0.691(2.208)	0.754	1.598(2.255)	0.479	2.675(2.410)	0.267
Year Fixed Effects		Yes		Yes		Yes
Firm Fixed Effects		Yes		Yes		Yes
F(df1, df2)		13.05(17, 641)***		13.31(17, 641)***		13.37(17, 641)***
observations/firms		816/158		816/158		816/158

Note: In this table we report the results for firm fixed-effect regressions of D&O insurance *rate-on-line (RoL)* on different CSR components. All probabilities are two-tailed tests. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$. Standard errors are reported in parenthesis. The dependent variable is *RoL*, measured as the average premium rate per \$1000 of coverage. *Environment (social or governance) score* is the annual average of total score in the environment (social or governance) dimension in Sustainalytics. *Firm size* is the log transformation of total assets; *beta* is S&P one year beta; *R&D intensity* is R&D expenditure divided by total sales; *board independence* is # of independent board members divided by total # of board members.

TABLE 6

Robustness Check: Endogeneity Control with Hausman-Taylor (HT) Regression and Instrumental Variable (IV) Regression

	Model 1: HT regression DV=RoL		Model 2: IV regression, 1 st stage DV=CSR Total		Model 3: IV regression, 2 nd stage DV=RoL	
	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value
Industry Mean CSR			1.254(0.223)***	0.000		
CSR Total	-0.040(0.016)**	0.012			-0.177(0.077)**	0.023
Firm Size	0.677(0.172)***	0.000	3.344(0.199)***	0.000	1.396(0.282)***	0.000
Beta	-0.037(0.080)	0.648	-0.661(0.255)***	0.010	0.139(0.114)	0.223
Leverage	-0.080(0.840)	0.924	-4.348(2.409)*	0.071	-3.891(1.194)***	0.001
MB Ratio	0.000(0.005)	0.995	-0.001(0.020)	0.976	0.005(0.009)	0.557
R&D intensity	4.257(4.206)	0.312	35.869(8.372)***	0.000	17.381(4.468)***	0.000
Cost of Capital	25.168(8.139)***	0.002	26.309(24.770)	0.289	81.383(11.239)***	0.000
Board Independence	2.262(0.936)**	0.016	18.070(2.016)***	0.000	5.250(1.548)***	0.001
ROA	0.543(0.367)	0.139	1.146(0.951)	0.228	0.024(0.394)	0.951
Constant	3.626(1.763)**	0.040	-57.733(13.033)***	0.000	2.799(1.529)*	0.068
Year Fixed Effect		Yes		Yes		Yes
Industry Fixed Effect		Yes		Yes		Yes
χ^2 (df)		378.58(57)***		N/A		N/A
Adjusted R2		N/A		0.672		0.562
observations/firms		816/158		816/158		816/158

Note: In this table we treat CSR as an endogenous variable and control for endogeneity using HT and IV regressions. All probabilities are two-tailed tests. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$. Standard errors are reported in parenthesis. The dependent variables for HT regression and the second stage of the IV regression are *Rate-on-line (RoL)*, measured as the average premium rate per \$1000 of coverage. For HT regression, *CSR total* is the annual average of the total CSR performance score from Sustainalytics. For the first stage of the IV regression, the instrumental variable is the *industry mean CSR*, measured as the annual industry mean of CSR total score. The industry is categorized based on the 3 digit Standard Industrial Classification (SIC) code. The explanatory variable in the second stage IV regression is the predicted value of *CSR total score* from the first stage IV regression. *Firm size* is the log transformation of total assets; *beta* is S&P one year beta; *R&D intensity* is R&D expenditure divided by total sales; *board independence* is # of independent board members divided by total # of board members.

TABLE 7
Robustness Check: Heckman Two-stage Regressions to Treat Selection Biases

Panel A: Purchased & Disclosed Group vs Purchased but Not Disclosed Group										
	Model 1: First Stage DV=D&O Disclose Dummy		Model 2: Second Stage DV=RoL		Model 3: Second Stage DV=RoL		Model 4: Second Stage DV=RoL		Model 5: Second Stage DV=RoL	
	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value	Coefficient (SE)	P value
Board Size	0.049(0.021)**	0.017								
CSR Total			-0.051(0.018)***	0.005						
Environment Score					-0.010(0.011)	0.349				
Social Score							-0.029(0.013)**	0.022		
Governance Score									-0.030(0.013)**	0.021
Firm Size	0.095(0.038)**	0.012	0.436(0.255)*	0.088	0.505(0.256)**	0.049	0.427(0.257)*	0.097	0.419(0.257)	0.103
Beta	-0.078(0.047)*	0.096	0.079(0.112)	0.483	0.072(0.113)	0.522	0.102(0.112)	0.366	0.076(0.112)	0.500
Leverage	-0.767(0.302)**	0.011	1.184(1.117)	0.289	0.972(1.121)	0.386	1.230(1.122)	0.273	1.097(1.118)	0.327
MB Ratio	-0.001(0.005)	0.817	0.001(0.006)	0.797	0.001(0.006)	0.876	0.001(0.006)	0.812	0.001(0.006)	0.839
R&D intensity	0.613(1.012)	0.545	2.726(4.632)	0.556	2.398(4.713)	0.611	1.613(4.625)	0.727	0.935(4.634)	0.840
Cost of Capital	2.427(2.587)	0.348	19.594(9.047)**	0.031	20.483(9.095)**	0.025	20.968(9.053)**	0.021	19.952(9.062)**	0.028
Board Independence	-0.941(0.359)***	0.009	2.865(1.233)**	0.020	2.569(1.236)**	0.038	3.022(1.246)**	0.016	2.645(1.232)**	0.032
ROA	-0.055(0.066)	0.406	0.506(0.405)	0.212	0.574(0.407)	0.158	0.483(0.407)	0.236	0.485(0.407)	0.233
Inverse Mills			-2.935(1.690)*	0.083	-2.600(1.698)	0.126	-3.174(1.705)*	0.063	-2.786(1.691)*	0.100
Constant	1.006(0.440)**	0.022	4.172(2.470)*	0.092	1.653(2.293)	0.471	2.967(2.367)	0.211	3.790(2.500)	0.130
Year Fixed Effect		Yes		Yes		Yes		Yes		Yes
Firm Fixed Effect				Yes		Yes		Yes		Yes
χ^2 (df)		116.10(17)***		-		-		-		-
F(df1, df2)			13.01(18,640)***		12.48(18,640)***		12.81(18,640)***		12.82(18,640)***	
Total Observations		1201		816		816		816		816
Panel B: Purchased & Disclosed Group vs Not Purchased Group										
	Model 1: First Stage DV=D&O Disclose Dummy		Model 2: Second Stage DV=RoL		Model 3: Second Stage DV=RoL		Model 4: Second Stage DV=RoL		Model 5: Second Stage DV=RoL	

	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value
Board Size	0.036(0.017)** 0.029						
CSR Total		-0.047(0.018)*** 0.010					
Environment Score				-0.011(0.011) 0.330			
Social Score						-0.025(0.013)* 0.053	
Governance Score							-0.028(0.013)** 0.033
Firm Size	0.080(0.033)** 0.015	0.509(0.238)** 0.033	0.540(0.240)** 0.025	0.514(0.239)** 0.032	0.481(0.240)** 0.045		
Beta	-0.184(0.043)*** 0.000	0.291(0.207) 0.160	0.329(0.207) 0.113	0.314(0.207) 0.130	0.302(0.207) 0.145		
Leverage	-0.302(0.343) 0.379	0.628(0.974) 0.519	0.598(0.978) 0.541	0.603(0.976) 0.537	0.612(0.975) 0.530		
MB Ratio	0.001(0.006) 0.876	-0.001(0.006) 0.814	-0.002(0.006) 0.750	-0.002(0.006) 0.776	-0.002(0.006) 0.780		
R&D intensity	8.179(2.433)*** 0.001	-0.107(5.171) 0.984	-0.904(5.222) 0.863	-1.170(5.153) 0.820	-1.942(5.143) 0.706		
Cost of Capital	3.925(4.381) 0.370	14.745(9.831) 0.134	14.552(9.885) 0.141	15.917(9.865) 0.107	14.772(9.848) 0.134		
Board Independence	1.101(0.307)*** 0.000	-0.280(1.529) 0.855	-0.622(1.529) 0.685	-0.302(1.536) 0.844	-0.479(1.527) 0.754		
ROA	0.192(0.066)*** 0.003	0.224(0.430) 0.603	0.265(0.432) 0.539	0.199(0.432) 0.645	0.199(0.431) 0.644		
Inverse Mills		-3.311(1.863)* 0.076	-3.628(1.867)* 0.052	-3.416(1.867)* 0.068	-3.394(1.866)* 0.069		
Constant	-1.402(0.359)*** 0.000	7.098(3.323)** 0.033	5.356(3.258) 0.101	5.924(3.264)* 0.070	6.922(3.352)** 0.039		
Year Fixed Effect		Yes	Yes	Yes	Yes		Yes
Firm Fixed Effect			Yes	Yes	Yes		Yes
χ2 (df)	114.01(17)***						
F(df1, df2)		13.02(18, 640)***	12.59(18, 640)***	12.82(18, 640)***	12.86(18, 640)***		
Total Observations	1270	816	816	816	816		816

Panel C: Purchased & Disclosed Group vs All Other Firms

	Model 1: First Stage DV=D&O Disclose Dummy	Model 2: Second Stage DV=RoL	Model 3: Second Stage DV=RoL	Model 4: Second Stage DV=RoL	Model 5: Second Stage DV=RoL
	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value	Coefficient (SE) P value
Board Size	0.041(0.015)*** 0.006				
CSR Total		-0.047(0.018)*** 0.010			
Environment Score			-0.010(0.011) 0.337		
Social Score				-0.026(0.013)** 0.044	

Governance Score									-0.027(0.013)**	0.038
Firm Size	0.088(0.029)***	0.002	0.329(0.265)	0.216	0.354(0.266)	0.185	0.323(0.266)	0.225	0.308(0.266)	0.248
Beta	-0.132(0.038)***	0.000	0.366(0.201)*	0.069	0.396(0.202)**	0.050	0.397(0.201)**	0.049	0.366(0.202)*	0.070
Leverage	-0.531(0.251)**	0.035	1.714(1.169)	0.143	1.724(1.174)	0.143	1.745(1.172)	0.137	1.669(1.172)	0.155
MB Ratio	0.000(0.004)	0.948	0.000(0.006)	0.952	0.000(0.006)	1.000	0.000(0.006)	0.982	0.000(0.006)	0.984
R&D intensity	2.965(1.010)***	0.003	-3.917(5.812)	0.501	-4.771(5.864)	0.416	-5.198(5.791)	0.370	-5.553(5.787)	0.338
Cost of Capital	2.560(2.471)	0.300	14.876(9.469)	0.117	14.986(9.521)	0.116	15.975(9.491)*	0.093	15.175(9.485)	0.110
Board Independence	0.287(0.270)	0.289	0.662(1.137)	0.561	0.451(1.139)	0.693	0.663(1.142)	0.562	0.522(1.137)	0.646
ROA	0.074(0.053)	0.168	0.233(0.419)	0.578	0.285(0.421)	0.498	0.203(0.421)	0.630	0.219(0.420)	0.602
Inverse Mills			-4.824(2.138)**	0.024	-5.097(2.145)**	0.018	-5.039(2.140)**	0.019	-4.780(2.146)**	0.026
Constant	-0.900(0.316)***	0.004	8.770(3.497)**	0.012	6.947(3.431)**	0.043	7.768(3.451)**	0.025	8.368(3.508)**	0.017
Year Fixed Effect		Yes		Yes		Yes		Yes		Yes
Firm Fixed Effect				Yes		Yes		Yes		Yes
χ^2 (df)		116.34(17)***								
F(df1, df2)			13.17(18, 640)***		12.73(18, 640)***		12.97(18, 640)		12.98(18, 640)	
Total Observations		1655		816		816		816		816

Note: In this table we control for selection bias using Heckman two-stage regressions. All probabilities are two-tailed tests. * indicates $p \leq 0.1$, ** indicates $p \leq 0.05$, *** indicates $p \leq 0.01$. Standard errors are reported in parenthesis. Panel A contains firms in the *Purchased & Disclosed group* and the *Purchased but Not Disclosed Group*; Panel B contains firms in the *Purchased & Disclosed Group* and the *Not Purchased Group*; Panel C contains all firms. The first stage regressions are probit regressions to calculate the *inverse Mills ratio* (the selection bias); the second stage regressions are firm-fixed effect regressions with the *inverse Mills ratio* added as an independent variable. The dependent variable for the first stage Heckman regressions in all panels is the *D&O disclose dummy*, which equals one if a firm purchased D&O insurance and disclosed D&O insurance premium and coverage, and 0 otherwise. The dependent variable for the second stage regressions is *Rate-on-line (RoL)*, measured as the average premium rate per \$1000 of coverage. *CSR total* is the annual average of the total CSR performance score from Sustainalytics. *Environment (social or governance) score* is the annual average of total score in the environment (social or governance) dimension in Sustainalytics. *Board size* is included as the selection variable in the first stage regressions. Inverse Mills ratio is included in all second stage regressions. *Firm size* is the log transformation of total assets; *beta* is S&P one year beta; *R&D intensity* is R&D expenditure divided by total sales; *board independence* is # of independent board members divided by total # of board members.