International Evidence on the Nexus between Corporate Social Responsibility and Firm Risk: Do Board Diversity and CSR Committee Matter?

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Abstract

The key objectives of this paper are twofold: first, the study examines the nexus between Corporate Social Responsibility (CSR) and firm risk management in international settings. Second, the study tests the moderating impact of board diversity and CSR committee on the association between CSR and firm risk. Based on the panel sample of 4034 firms from 39 countries, the study's results show that high CSR engagement is associated with a decrease in firm risk: systematic risk and total risk. Moreover, the negative effect of CSR on firm risk is moderated by board diversity proxied by the Blau index of female and male directors. However, the findings do not display the moderating role of the CSR committee in the CSR and firm risk relationship. The main results are re-examined through the endogeneity test using the 2SLS specification, and the results remain stable. This study contributes to the current literature by confirming that CSR can be employed as a risk mitigation tool worldwide, while board diversity is a key governance channel that can further enhance the CSR's risk mitigation ability.

Keywords: corporate social responsibility, firm risk, board diversity, CSR committee, corporate governance

Introduction

Considering the growing demands of stakeholders and societies, organizations have significantly increased their corporate social responsibility (hereafter CSR) engagement over the past couple of years. El Ghoul et al. (2011) reported that more than half of the Fortune 1000 firms in the US issue CSR scores. Firms that adopt effective CSR practices are more concerned about environmental issues, give attention to the stakeholders' demands, and follow good corporate governance principles (Limkriangrai, Koh and Durand, 2016).

A recent stream of research focuses on the role of CSR in influencing the firm's risk behavior. However, the existing evidence on the association between CSR and firm risk (CSR-Risk) is inconclusive. On

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one end, the "CSR-as-insurance" or risk management theory (e.g., Godfrey 2005) posits that corporate social performance creates a reservoir of goodwill among a firm's stakeholders, and this goodwill acts as insurance against negative events. Hence, the risk management theory predicts a negative relationship between CSR and firm risk (CSR-Risk). This theory is supported by recent empirical studies such as Koh et al. (2014) and Hassan et al. (2021). On the other end, some studies have also reported a positive and non-linear relationship between CSR and firm risk (Nguyen and Nguyen, 2015; Farah, Li, Li and Shamsuddin, 2021). Some authors suggest that the potential reason for the inconsistency in existing evidence can be the underlying moderating channels that drive the CSR-Risk relationship. Recent studies indicate that the presence of CEO duality (Rezaee et al., 2020) and gender diversity (Shakil, 2021) can probably drive this relationship.

From the above discussion, we identify three main research gaps addressed by this study. First, the existing literature on the CSR-Risk relationship is still not conclusive, and most of these studies are conducted in a single country setting. Second, recent studies use various moderating channels to explain the CSR-firm relationship (e.g., Rezaee et al., 2020; Shakil, 2021), but research on the moderating impact of board diversity and CSR committee, particularly in the international context, is scant. Based on the aforementioned research gaps, we developed two main research questions: (1) Does CSR engagement impact firm risk in companies across the world? (2) if so, is the relationship between CSR and firm risk moderated by the board diversity and CSR committee? Our study addresses these questions by first examining the direct nexus between CSR and firm risk in a wider context which consists of firms across 39 countries. Second, it examines the moderating impact of board diversity and CSR committees on the association between CSR and firm risk.

Board diversity is defined as the heterogeneity among board members with respect to broad dimensions (Van Knippenberg, 2004). The motivation behind using board diversity as a moderating channel in the CSR-Risk relationship is that it is considered an effective governance mechanism that can influence corporate CSR performance. Moreover, it enhances the board's decision-making and handles the stock price volatility risk (Bernile, Bhagwat and Yonker, 2018), reputational risk, and financial risk (Chen Gramlich and Houser, 2019). Likewise, the role of a CSR committee is to seek out CSR-related issues and ensures the effective implementation of CSR activities. Moreover, the CSR committee also

manages corporate risk by limiting the impact of negative CSR performance. It also works as a control mechanism to protect firm value via managing risk. It also helps firms adopt CSR strategies, trends, and policies and monitor firm relationships with stakeholders (Fuente García-Sanchez and Lozano, 2017). Considering the important role of board diversity and CSR committees in enhancing CSR performance and mitigating firm risk, we expect these two corporate governance components to moderate the CSR-Risk relationship.

Literature Review and Hypotheses

CSR is a very broad concept, which scholars define in several ways. Traditionally, CSR covers all the corporate activities to enhance society's standard, quality, and economic condition (Cochran and Wood, 1984). However, the CSR's concept has been continuously evolving over the past two decades, and in recent literature, it is generally described as the aggregate of social and environmental engagement of the firms (Farah et al., 2021), which is a more holistic concept. The role of CSR as risk mitigation has recently received increasing attention from scholars. One stream of research has examined the CSR-Risk relationship under the risk management framework. This theory proposes that companies develop goodwill in the form of intangible assets through CSR, which mitigates the adverse impact of negative reputation events on the firm (Godfrey, 2005; Godfrey et al., 2009). Several empirical studies have complemented the risk management theory. For example, Kolbel et al. (2017) test the impact of CSR and corporate social irresponsibility (CSI) under the risk management paradigm. Their study finds that while CSR reduces risk through the reputation for CSR, CSI significantly increases firm risk. Sassen et al. (2016) used a sample of European firms and found that firms with greater involvement in socially responsible activities have low total and idiosyncratic risk. Similarly, recent studies (e.g., Kim, Lee and Kang, 2021) also report the negative impact of CSR on firm future risk. In contrast to the negative effects of CSR, Nguyen and Nguyen (2015) report that some CSR dimensions, such as employee-related and diversity, are positively linked to firm risk. Boubaker, Cellier, Manita, and Saeed (2020) also found that firms' risk is significantly reduced when they are engaged in CSR activities compared to firms that do not take CSR seriously. Some studies show that CSR's influence on firm risk is non-linear (Farah et al., 2021) and heterogeneous across industries (Shakil, 2021). However, based on the above findings, most of the earlier studies provided evidence in

support of the negative CSR-Risk relationship. Hence, we expect the following relationship.

H1: CSR significantly reduces firm risk.

The Moderating Role of Board Diversity and CSR Committee

The role of corporate governance, particularly the significance of board diversity, can be viewed through resource dependency theory. From the perspective of the resource dependency view (Barney, 1991), a diverse board provides various resources, such as a diverse knowledge base, skills, legitimacy, and approach to key connections (Talavera et al., 2018). According to Carter et al. (2007), corporate boards with heterogeneous characteristics have resources like different skills, thinking, and perspectives which are more effective in solving problems, implementing strategies, and making decisions. In recent year, board diversity, one of the key governance components, has been gaining significant attention due to the demands of regulatory authority to increase diversity in the board (Murphy et al., 2021). Indeed, board diversity is now considered inevitable for stakeholders and CSR disclosure. For instance, female directors' presence on the board can emphasize ignorant or less powerful stakeholders (Brieger, Francoeur, Welzel, & Ben-Amar, 2019).

With respect to CSR, several empirical studies have found that diverse boards increase the firm's CSR performance. Orazalin and Baydauletov (2020) study the link of board diversity (proxied by the percentage of female independent directors) with CSR's environmental and social performance and find that board diversity enhances firm performance in social and environmental components of the CSR. Similarly, Skała and Weill (2018) reveal that companies with gender-diverse boards (higher female to male members) have lower volatility and risk. In a fresh study, Li, Jia and Chapple (2022) analyze the nexus between board gender diversity and firm risk globally and report a significantly negative relationship between board gender diversity and firm risk. Overall, the literature suggests that board diversity can be an important determinant of effective CSR implementation and mitigates firm-specific risk. Considering the fact that board diversity has a strong role in both CSR and firm risk, it is argued that board diversity potentially strengthens the negative CSR's impact on corporate risk.

Moreover, we consider the CSR committee as another corporate governance component that is expected to influence the CSR's impact on risk. The CSR Committee is a sub-committee of the corporate board and functions as a specialized committee inside the board of directors that

gives recommendations on social and environmental to assist the corporate boards in their CSR-related engagements (Eberhardt-Toth, 2017). There are two opposing arguments on the CSR committee's role in firms. In the view of Rodrigue et al. (2013), the CSR committee is a symbolic body rather than operational and has nothing to do with CSR implementation. Instead, it only functions as a recommendation on CSR-related policies. Conversely, Liao et al., 2015 argue that the key functions of a CSR committee are to oversee the CSR activities and plan and execute the CSR strategy. Recent studies have shown the key role of the CSR committee in mitigating corporate risk. For instance, Burke et al. (2019) documented that the CSR committee works as a monitoring mechanism by reducing risk and protecting firm value. Dunbar et al. (2021) report that CSR engagement can lead to higher risk reduction in firms with CSR committees. In addition, a CSR committee is an important governance mechanism that helps firms in managing CSR-related risks, opportunities, and policies (Gennari and Salvioni, 2019). Thus, the whole theoretical and empirical discussion generates the following hypotheses.

H2: Board diversity negatively moderates the relationship between CSR and firm risk.

H3: CSR committee negatively moderates the relationship between CSR and firm risk.
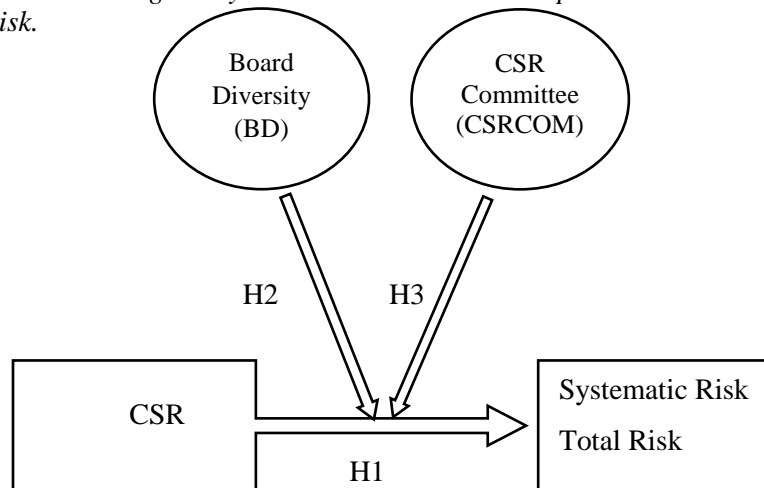

Figure 1: This figure presents the conceptual model and the proposed hypotheses of the study.

Research Methodology

Sample and Data

To empirically test the hypotheses, the current study initially considered an international sample comprising 6,363 firms from around 39 countries from 2002 to 2020. CSR data for the selected firms is obtained from the ESG data of Refinitive Eikon.[§] Financial data of the firms is extracted from the World scope database. In addition, all firm years in which the CSR information is not provided are also excluded. Firms related to utility and financial sectors are excluded following earlier studies because such firms are highly influenced by regulatory bodies. This entire selection process yields 4,034 firms with 39,993 cross-sectional time-series observations. The descriptive analysis of the data shows that financial variables have a high standard deviation, which indicates outliers. Therefore, all the financial data are winsorized at the top and bottom 1% threshold to alleviate any potential effect of the outliers.

Variables and Measures

The main dependent variable is firm risk, which is measured by using two proxies: systematic risk (market risk) and total risk (price volatility). The proxy for systematic risk is the firm's market beta, computed as the relative movement of firm stock price divided by change in market price. A beta value of 1 shows that relative stock price movement and market price movement are the same. A beta coefficient of greater (lower) than 1 indicates high (low) systematic risk. Total risk is computed as the volatility in the stock prices during the last 12 months. It is calculated as the difference between the current month's stock price and the previous month's stock price divided by the previous month's stock price multiplied by 100 and taking its annual mean.

The main explanatory variable is CSR, which is computed by following Farah et al. 2021 as the overall sum of weighted environmental (ENV) and social (SOC) components scores.[**] Both ENV and SOC are relative percentile scores that measure a firm performance in the environment and social-related activities. The moderator variable (Board Diversity (BD)) is computed using the Blau index based on the percentage of female to male directors on the corporate board following (Martín-

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[§] Specifically, we obtained data for CSR's environmental and social pillars' scores from the ESG database.

[**] The weighted percentage of ENV is computed as ENV/(ENV+SOC) $\times$100, and the weighted percentage of SOC is computed as SOC/(ENV+SOC).

Ugedo and Antonio, 2014). The Blau index suggested by Blau (1977) is measured as follows:

$$Board\ diversity\ (BD) = \sum_{i=2} P_i^2$$

Where P represents the percentage of female to male directors, and i is the number of categories. For instance, in this paper, two categories (e.g., male and female directors) are used to compute the index, and the symbol sigma (Σ) shows the sum of the proportions of male and female members on the board. When two categories are used, the Blau index varies from 0 (minimum) to 0.50 (maximum). For instance, a firm's board with two female and three male directors in the board has a Blau index of 0.48. The second moderator variable (CSR committee (CSRCOM)) is a binary variable that displays a value of 1 for firm years with a CSR committee and 0 otherwise.

Additionally, several variables can potentially influence firm risk, which needs to be controlled. First, following Shakil (2021), we control the impact of various financial variables such as leverage ratio (LEV), market to book value (MTBV), cash holdings (CASH), firm size (FSIZE), dividend yield (DY), liquidity (LIQ), research and development expenditures (RD) to mitigate the influence of firm-specific financial characteristics. Second, we also control for two board characteristics: board size (BSIZE) and board independence (INDEP). LEV is the ratio of total debt over total assets, MTBV is market value over book value, CASH is computed by dividing cash and cash equivalents on total assets, FSIZE is the natural log of total assets, DY is the ratio of dividend per share over the price per share, LIQ is current assets over current liabilities, and RD is computed as the ratio of RD over total assets. Moreover, the proxies for board characteristics are BSIZE, the total number of board members, and INDEP, the percentage of independent board members. Finally, in line with Farah et al. (2021), the impact of the macroeconomic variable is also controlled by employing the gross domestic product (GDP) growth rate.

Empirical Models

For the empirical analysis, we first use Equation 1 to estimate the direct impact of CSR on firm risk. After that, we use Equations 2 and 3 to estimate the moderating impact of BD and CSRCOM on the CSR-Risk relationship, respectively.

$$Firm\ Risk_{i,t} = \alpha + \beta 1 CSR_{i,t} + \beta 2\ LEV_{i,t} + \beta 3 MTBV_{i,t}$$
$$+ \beta 4 CASH_{i,t} + \beta 5 FSIZE_{i,t} + \beta 6\ DY_{i,t} + \beta 7 LIQ_{i,t}$$
$$+ \beta 8 RD_{i,t} + \beta 9 BSIZE_{i,t} + \beta 10 INDEP_{i,t} + \beta 11 GDP_{i,t}$$
$$+ Industry\ FE + Firm\ FE$$
$$+ \varepsilon_{i,t} \hspace{3cm} (1)$$

$$Firm\ Risk_{i,t}$$
$$= \alpha + \beta 1 CSR_{i,t} + \beta 2 BD \times CSR_{i,t} + \beta 3\ BD_{i,t} + \beta 4\ LEV_{i,t}$$
$$+ \beta 5 MTBV_{i,t} + \beta 6 CASH_{i,t} + \beta 7 FSIZE_{i,t} + \beta 8\ DY_{i,t} + \beta 9 LIQ_{i,t}$$
$$+ \beta 10 RD_{i,t} + \beta 11 BSIZE_{i,t} + \beta 12 INDEP_{i,t} + \beta 13 GDP_{i,t}$$
$$+ Industry\ FE + Firm\ FE$$
$$+ \varepsilon_{i,t} \hspace{3cm} (2)$$

$$Firm\ Risk_{i,t}$$
$$= \alpha + \beta 1 CSR_{i,t} + \beta 2 CSRCOM \times CSR_{i,t} + \beta 3\ CSRCOM_{i,t}$$
$$+ \beta 4\ LEV_{i,t} + \beta 5 MTBV_{i,t} + \beta 6 CASH_{i,t} + \beta 7 FSIZE_{i,t} + \beta 8\ DY_{i,t}$$
$$+ \beta 9 LIQ_{i,t} + \beta 10 RD_{i,t} + \beta 11 BSIZE_{i,t} + \beta 12 INDEP_{i,t} + \beta 13 GDP_{i,t}$$
$$+ Industry\ FE + Firm\ FE$$
$$+ \varepsilon_{i,t} \hspace{3cm} (3)$$

In Equations 1, 2 and 3, the dependent variable is firm risk, while CSR is an independent variable. Other explanatory variables are used as controls, which include leverage ratio (LEV), market to book value (MTBV), cash holdings (CASH), firm size (FSIZE), dividends yield (DY), liquidity (LIQ), research and development expenditures (RD), corporate board size (BSIZE), corporate board independence (INDEP) and the average annual growth in GDP. The coefficient ($\beta 1$) estimates the CSR-Risk relationship. Thus, according to the first hypothesis, we expect a negative CSR-Risk relationship.

Equations 2 and 3 estimate the moderating impact of board diversity (BD) and CSR committee (CSRCOM) on the CSR-Risk relationship by incorporating the BD×CSR and CSRCOM×CSR, respectively. The coefficient ($\beta 2$) in Equations 2 and 3 portray the estimated effect of BD and CSRCOM on the CSR-Risk relationship. Consistent with our proposed hypothesis, we predict the value of $\beta 2$ to be negative for Equations 2 and 3. We estimate the above model by employing "Ordinary Least Squares" (OLS) regression and controlling for the time and industry-level heterogeneity by adding a year and industry dummies.

We also performed several diagnostic tests to ensure the quality of data and models. Data outliers are removed through winsorization of financial variables at the top and bottom 1% threshold. For multicollinearity diagnosis, we performed a variance inflation factor (VIF) test. The VIF's results range between 0 and 3 for all the variables (untabulated for brevity purposes), which is far below the normally accepted level of 10. Thus, the model does not suffer from potential multicollinearity issues. Finally, to control heteroskedasticity and serial correlation, we follow the approach of Peterson (2009) by applying firm-level clustering to mitigate the correlation between robust standard errors and explanatory variables.

Results Discussion

Descriptive Statistics

Before reporting the regression analysis results, descriptive statistics of the main variables are provided in Table 1. The mean systematic risk (beta) and standard deviation are 1.119 and 0.587, respectively. It indicates that stocks prices movement for all firms is, on average, 11.119 % higher than the market movement. The total risk (T_Risk) average is 0.293 with a standard deviation of 0.098, showing that the average stock price volatility is 29.3% for all the firms. The average CSR score is 0.388(38.8%), ranging from a minimum of 0 to a maximum of 0.973 (97.3%). The reported average score of BD is 0.20. The reported average score of the CSRCOM is 0.48, indicating that, on average, 48% of the total firms exhibit a CSR committee.

Table 1

Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max
BETA	39,993	1.119	0.587	-0.216	3.266
T_RISK	39,993	0.293	0.098	0.123	0.575
CSR	39,993	0.388	0.245	0	0.973
BD	39,993	0.207	0.163	0	0.50
CSRCOM	39,993	0.483	0.50	0	1
LEV	39,993	0.238	0.237	0	1
MTBV	39,993	3.256	3.306	0.030	16.75
CASH	39,993	0.156	0.159	0.001	0.898
SIZE	39,993	16.383	2.754	9.588	23.901

DY	39,993	1.904	2.107	0	11.75
LIQ	39,993	2.159	2.111	0.264	16.74
RD	39,993	0.003	0.012	0	0.068
BSIZE	39,993	9.870	3.297	1	39
INDEP	39,993	0.580	0.273	0	1
GDP	39,993	0.020	0.049	-0.364	0.380

Panel Regression Results

This section provides discussions on the empirical results concerning the proposed hypotheses. In Columns 1 and 2 of Table 2, the coefficients reflecting the impact of CSR on systematic risk (BETA) and total risk (T_RISK) are -0.103 and -0.044, respectively, and significant at the 1% level. Thus, consistent with *H1*, the results display that CSR significantly reduces both BETA and T_RISK. With respect to the economic impact, with an increase of CSR by 1 unit of standard deviation, the systematic risk and total risk reduce by 2.5% and 3%, respectively. The findings explain that high CSR performance can increase firms' legitimacy and strong shareholders relationship, which in turn protect the firm against uncertain and risky events. The results support the "risk management theory" as it implies that firms with high CSR engagement are more likely to build goodwill among the stakeholders, which protects the firm during the worst situation (Godfrey, 2005) and thus reduces the overall risk of the firm. The findings support the recent empirical literature on the negative CSR-Risk nexus (e.g., Farah et al., 2021; Li et al., 2022).

In addition, we noticed that the relation of control variables with firm risk is mostly consistent with previous studies' findings. The negative relationship of MTBV, FSIZE, and DY with firm risk are consistent with (Shakil 2021), while the positive relationship of CASH is consistent with (Farah et al., 2021). Moreover, the negative relationship of BSIZE with firm risk is also reported by Fan et al. (2021). Altogether, the initial analysis in Table 2 confirmed earlier studies' findings concerning the negative association between CSR and firm risk. Thus, the results provide a foundation for the forthcoming analysis to investigate the moderating channels behind this relationship.

Table 2

The direct impact of CSR on firm risk

Note: t-stats are reported in the parentheses, which display statistical significance, while the symbols "*", "**", and "***" show significance levels at the 10%, 5%, and 1%, respectively.

	(1) BETA	(2) T_RISK
CSR	-0.103***	-0.044***
	(-3.636)	(-8.578)
LEV	0.368***	0.019***
	(10.529)	(3.013)
MTBV	-0.017***	-0.002***
	(-8.758)	(-6.678)
CASH	0.378***	0.126***
	(7.114)	(14.351)
FSIZE	0.001	-0.005***
	(0.324)	(-9.066)
DY	-0.039***	-0.010***
	(-14.058)	(-18.102)
LIQ	0.006	0.001
	(1.524)	(1.094)
RD	-0.754**	0.272***
	(-2.100)	(5.047)
BSIZE	-0.005***	-0.004***
	(-2.938)	(-11.085)
INDEP	0.242***	-0.037***
	(9.813)	(-7.654)
GDP	0.047	-0.033***
	(0.626)	(-3.112)
Constant	0.932***	0.468***
	(14.600)	(38.907)
Year dummies	Yes	Yes
Industry dummies	Yes	Yes
Observations	39,993	39,993
Adjusted-R^2	0.136	0.290

The Moderating Role of Gender Diversity and CSR committee

In the previous section, we present evidence on the direct impact of CSR on the firm systematic and price volatility risks. In this section, we intend to empirically examine whether the two corporate governance components (e.g., board diversity and CSR committee) drive the negative impact of CSR on overall firm risk. The estimated results on the moderating role of board diversity and CSR committees are reported in Table 3. Columns 1 and 2 display the results for the systematic risk (BETA) and total risk (T_RISK) models, respectively. The combined effect of CSR and BD on systematic risk (BETA) is negatively significant ($\beta 2$ = -0.392, t-stats = -3.194), implying that BD enhances the negative impact of CSR on firm risk. In Column 2, we notice similar results when BETA is replaced with T_RISK ($\beta 2$= -0.090, t-stats= -3.90). Consistent with the *H2*, the overall results reveal that the negative CSR-Risk relationship is moderated by the board diversity. Consistent with the resource dependency perspective (Barney, 1991), our findings imply that firms with diverse board members, with both male and female directors, provide diverse resources and expertise, thereby strengthening the CSR's impact on firm risk. Such boards utilize their diverse skills to enable the corporate board to solve various problems related to sustainability and enhance decision-making (Carter et al., 2007) which translates into improved CSR performance in terms of alleviating market and price risk.

On the other hand, we do not find significant evidence concerning the impact of CSRCOM on the CSR-Risk relationship for both measures of the firm risk (Columns 3-4), as shown by their respective t-stats in parenthesis. Thus, our third hypothesis (*H3*) is not confirmed. These findings suggest that although CSRCOM has an important role in initiating CSR strategies and implementation, they have little role in triggering the association between CSR and firm risk. It also complements the view that the role of the CSR committee is more symbolic and has less influence on initiating CSR strategies (Rodrigue et al., 2013). The results may also suggest that the CSR committee is more concerned about developing CSR strategies and their implementation rather than enhancing the CSR committee's risk mitigation function.

Table 3
The moderating impact of BD and CSRCOM on the CSR-Risk relationship

	(1) BETA	(2) T_RISK	(3) BETA	(4) T_RISK

CSR	-0.018	-0.027***	-0.109***	-0.065***
	(-0.452)	(-3.448)	(-2.634)	(-8.276)
CSR×BD	-0.392***	-0.090***		
	(-3.194)	(-3.90)		
BD	-0.029	-0.021*		
	(-0.439)	(-1.675)		
CSR×CSRCOM			-0.012	0.014
			(-0.226)	(1.493)
CSRCOM			-0.011	-0.004
			(-0.403)	(-0.893)
LEV	0.370***	0.019***	0.367***	0.019***
	(10.607)	(3.110)	(10.504)	(2.987)
MTBV	-0.016***	-0.002***	-0.017***	-0.002***
	(-8.458)	(-6.287)	(-8.757)	(-6.691)
CASH	0.368***	0.123***	0.375***	0.125***
	(6.941)	(14.083)	(7.067)	(14.324)
FSIZE	-0.002	-0.006***	0.001	-0.005***
	(-0.721)	(-10.443)	(0.386)	(-9.125)
DY	-0.038***	-0.009***	-0.039***	-0.010***
	(-13.689)	(-17.541)	(-13.946)	(-18.057)
LIQ	0.005	0.001	0.006	0.001
	(1.352)	(0.789)	(1.536)	(1.089)
RD	-0.780**	0.267***	-0.774**	0.273***
	(-2.180)	(4.983)	(-2.155)	(5.061)
BSIZE	-0.004**	-0.004***	-0.005***	-0.004***
	(-2.204)	(-9.989)	(-2.920)	(-11.131)
INDEP	0.269***	-0.029***	0.242***	-0.037***
	(10.740)	(-5.852)	(9.789)	(-7.665)
GDP	0.053	-0.031***	0.045	-0.033***
	(0.703)	(-2.912)	(0.599)	(-3.099)
Constant	0.941***	0.473***	0.925***	0.472***
	(14.336)	(39.061)	(14.274)	(38.703)
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Observations	39,993	39,993	39,993	39,993
Adjusted-R^2	0.138	0.296	0.136	0.290

Addressing Endogeneity Concerns

In the panel data analysis literature, endogeneity between the explanatory and the dependent variables is a widely discussed issue. In the context of this study, the results may be affected by some unknown firm-level factors that could influence firm risk. Likewise, the simultaneous association between CSR and firm risk may also exist because low-risk firms are likely to have more effective CSR policies, potentially creating an endogeneity problem. To deal with such issues, we adopt the instrumental variables approach using the Two-stage Least Squares (2SLS) regression method. Similar to Awaysheh et al. (2020), we employ the average industry-level CSR for each country (*IND_CSR*) as an instrument. The instrumental variable techniques are widely used in the latest literature since they effectively handle endogeneity issues.

In this first stage, as reported in Table 4, the CSR is regressed on the *IND_CSR* and found a significant positive association between the two variables, implying that firm-level CSR is linked with their respective industry's CSR. Thus, the selection of *IND_CSR* as a CSR's instrument is justifiable. We then computed the predicted value of CSR (CSR_predicted) from the regression model in the first stage of 2SLS. The CSR_predicted is used as a proxy for CSR in the second stage of the 2SLS regression. Similar to the OLS results, the interaction impact of BD and CSR_predicted on BETA and T_RISK is negative, indicating consistent results. Similarly, the interaction impact of CSRCOM and CSR_predicted on BETA and T_RISK is insignificant, which is also consistent with the main results in Table 2. In addition to the 2SLS model, we also implement the Generalized Method of Moment (GMM) as an alternative approach to deal with endogeneity, and the untabulated results remain consistent.

Table 4

2SLS regression using an instrumental variable approach

	First Stage	Second Stage			
	CSR	BETA	T_RISK	BETA	T_RISK
CSR_Predicted		-0.090	-0.007	-0.163**	-0.052***
		(-1.325)	(-0.511)	(-2.349)	(-3.822)
CSR_Predicted×BD		-0.406**	-0.105***		
		(-2.404)	(-3.216)		
BD		-0.037	-0.028*		
		(-0.467)	(-1.856)		

CSR_Predicted × CSRCOM				-0.032	0.035***
				(-0.459)	(2.706)
CSRCOM				-0.016	-0.023***
				(-0.529)	(-4.181)
LEV	0.060***	0.382***	0.018***	0.376***	0.016**
	(5.547)	(10.754)	(2.770)	(10.597)	(2.537)
MTBV	0.002***	-0.016***	-0.002***	-0.017***	-0.002***
	(3.010)	(-8.383)	(-6.269)	(-8.653)	(-6.653)
CASH	-0.010	0.369***	0.124***	0.373***	0.123***
	(-0.672)	(6.962)	(14.167)	(7.053)	(13.952)
FSIZE	0.022***	-0.000	-0.007***	0.004	-0.006***
	(20.429)	(-0.083)	(-10.720)	(1.152)	(-8.660)
DY	0.010***	-0.036***	-0.009***	-0.037***	-0.010***
	(11.088)	(-12.926)	(-17.005)	(-13.145)	(-17.498)
LIQ	-0.004***	0.005	0.001	0.005	0.001
	(-3.853)	(1.238)	(0.873)	(1.434)	(1.218)
RD	0.438***	-0.698*	0.263***	-0.721**	0.258***
	(3.863)	(-1.939)	(4.823)	(-2.001)	(4.711)
BSIZE	0.009***	-0.003	-0.004***	-0.004**	-0.004***
	(12.207)	(-1.463)	(-9.817)	(-2.066)	(-10.829)
INDEP	0.176***	0.283***	-0.030***	0.256***	-0.039***
	(16.651)	(10.766)	(-5.791)	(9.741)	(-7.542)
GDP	0.045**	0.049	-0.032***	0.043	-0.034***
	(2.207)	(0.650)	(-3.006)	(0.570)	(-3.222)
IND_CSR	0.891***				
	(59.508)				
Constant	-0.717***	0.905***	0.485***	0.873***	0.478***
	(-33.713)	(12.877)	(37.022)	(12.590)	(36.274)
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	39,993	39,993	39,993	39,993	39,993
Adjusted-R^2	0.520	0.138	0.288	0.136	0.281

Conclusion

This study first examined the association between CSR activities (proxied by the aggregate of environmental and social scores) on the

relationship between CSR and firm risk in the global context. Second, we examined whether board diversity and CSR committees moderate this relationship. The study employed a panel data analysis technique in which the overall sample is examined through the OLS regression model, including controlling for the industry and year effects. The estimated results demonstrate that firms with high CSR scores reduce both systematic and total risk. Unlike the CSR committee, which has no significant impact on the CSR-Risk relationship, board diversity negatively and significantly moderates this relationship. The results remain consistent when CSR is instrumented on the average industry CSR in 2SLS regression. These results generate three key findings. First, firms with high performance are more capable of dealing with systematic and price risk. Second, board diversity further enhances the effectiveness of CSR as a risk management approach. Third, the role of the CSR committee is insignificant or symbolic in improving the risk management function of CSR.

The findings of the study provide important policy implications. First, it provides useful insights to the management that CSR initiatives can be an important strategy to safeguard firms against market risk (systematic risk) and price volatility (total risk). Moreover, a corporate board with diverse board members could be a key channel that enhances the risk-mitigating effect of CSR. Thus, corporate owners and management should maintain a balance board with diverse human resources to make their socially responsible practices more effective. The findings are equally important for the firms' stakeholders, particularly investors, to adjust their stock portfolio based on the firm's ability to manage risk through board diversity.

This study is not free of limitations. First, the study did not consider several country-level factors such as cultural values, market differences, and institutional environment across countries. Thus, for future studies, researchers should focus on whether and how these factors influence the CSR-Risk relationship. Second, board diversity may be higher in developed countries than the developing or under-developed countries. Therefore, it will be interesting to test whether the role of board diversity in influencing the CSR-Risk relationship is heterogeneous across countries. Moreover, the board diversity measure is limited to female and male members, while other board's characteristics such as age diversity, cultural diversity and skills and educational background of the board

members are not considered due to data limitation. Therefore, in future, these limitations should be addressed.

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