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The Effect of Corporate Social Responsibility Performance on Financial Risk

企業社會責任績效對財務風險的影響

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Abstract

Since the UN Global Compact was proposed in 1999, entrepreneurs and institutions around the world have placed a steadily increasing emphasis on corporate social responsibility (CSR). Accompanying the increased levels of CSR reporting and activities, researchers raise questions regarding whether the aim of a firm's operations is always to maximize shareholder value regardless of other potential motivating factors, an assumption frequently stated in past literature. The present study infers that a firm with superior CSR performance experiences lower market risk and liquidity risk, from empirically assessing the effect of CSR performance on financial risk. The robustness test also finds that superior CSR performance reduces the cost of capital. Furthermore, the study documents that the performance of corporate governance activities increases the cost of capital. Although there is a positive association between corporate governance performance and the cost of capital, prior research suggests that the corporate governance dimension is distinct from other social and environmental dimensions of CSR. Therefore, if the study excludes the corporate governance dimension from CSR activities, the result supports the hypothesis that CSR performance, in sum, is negatively related to the cost of capital.

【Keywords】corporate social responsibility, market risk, liquidity risk, cost of capital

摘 要

自從 1999 年提出聯合國全球盟約（The UN Global Compact）後，企業家與機構團體逐漸重視企業社會責任。由於逐漸增加的企業社會責任報告與活動，許多學者已開始對於公司的營運目標是否如過去文獻所述為極大化股東價值產生疑問。藉由實證探討企業社會責任績效對企業財務風險的影響，本文推論，當公司具有優越的企業社會責任績效，公司會面臨較低的市場與流動性風險。在敏感性測試中，我們也發現公司具有優越的企業社會責任績效，亦會面臨較低的資金成本。然而，與公司治理有關的社會責任績效卻使公司面臨較高的資金成本。雖然公司治理績效與資金成本存在正向關係，過去已有研究指出公司治理面向有別於其他企業社會責任相關的社會與環境面向。因此，如果企業社會責任活動排除公司治理面向，整體而言，企業社會責任績效與資金成本存在負向關係。

【關鍵字】企業社會責任、市場風險、流動性風險、資金成本

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1. Introduction

Since 1999, when United Nations Secretary General Kofi Annan first proposed the UN Global Compact, many multinational companies have participated in the compact and approved of the compact's stated goal of upholding ten corporate social responsibility (CSR) related principles. Entrepreneurs and institutions around the world are placing a steadily increasing emphasis on CSR or Socially Responsible Investments (SRI). In 2004, more than 80% of corporations whose stocks are included in the FTSE 100 index, reported CSR within their annual reports (Idowu and Towler, 2004). According to the World Business Council for Sustainability and Development (WBCSD), "CSR is the continuing commitment by businesses to contribute to economic development while improving the quality of life of the workforce and their families as well as of the community and society at large." Furthermore, SRI assumes, in effect, that corporate responsibility and societal concerns are valid parts of an investment process and take into account both the given investor's financial needs and a given investment's impact on society. As a result, SRI investors can affect corporate behavior and encourage corporations to improve their practices with regard to environmental, social, and governance issues. The increased levels of CSR reporting and activities in recent years have raised a question among some researchers: Are the reports of CSR activities and the CSR activities themselves beneficial to firms? This is especially important to ask when a firm effectively lowers its own profits in order to conform to its social and environmental goals. Is a firm's goal to maximize shareholder value (the shareholder approach) or stakeholder value (the stakeholder approach)?

Under the shareholder approach, a firm's goal is to maximize shareholder value or profit. However, due to the existence of externalities, this profit-maximizing behavior does not necessarily imply the maximization of social welfare (Renneboog, Ter Horst, and Zhang, 2007). Under the stakeholder approach, managers must consider the interests of all stakeholders (including employees, customers, the community, the environment, and so forth) and attempt to maximize their aggregate welfare. Using this approach, a firm may not maximize its own profit since there is a conflict between maximizing profit and maximizing social welfare. Nevertheless, at the same time, as Jensen (2001) notes, "We cannot maximize the long-term market value of an organization if we ignore or mistreat any important constituency (stakeholder)."

Prior studies examining the issues that affect companies engaging in CSR activities or CSR disclosures can be categorized by having one or more of seven main themes:

testing the influence of corporate governance, recognizing the determinants of CSR, investigating the impacts of CSR on accounting quality/information contents, investigating the impacts of CSR on CEO compensation/reputation, investigating the impacts of CSR on tax behavior, investigating the impacts of CSR on performance, and investigating the impacts of CSR on cost of capital and risk (Malik, 2015). Among those studies relating to risk, the measure of risk used most frequently is market risk (or beta) derived from Capital Asset Pricing Model (CAPM). However, as mentioned by Acharya and Pedersen (2005), liquidity risk may affect asset prices, suggesting that the expected return of a stock is affected by market risk, liquidity risk, and commonality in liquidity. In addition, Lang and Maffett (2011), Ng (2011), and Sadka (2011) suggest that higher information quality can lower liquidity risk and, hence, lower the cost of capital. Many studies also suggest that socially responsible firms provide quality financial reports either through increased disclosure or mitigated earnings management (Gelb and Strawser, 2001; Chin, Shen, and Kang, 2008; Kim, Park, and Wier, 2012). Thus, the present study expects that socially responsible firms enjoy lower market and liquidity risk.

In terms of the measures of liquidity risk, Pástor and Stambaugh (2003) establish the measure known as the market liquidity factor. In addition, they extend Fama and French's (1993) three-factor model by including the market liquidity factor and the estimated coefficient of the market liquidity factor as the measure of liquidity risk. Acharya and Pedersen (2005) further consider the illiquidity cost in order to extend the standard CAPM in a manner that separates systematic risk into market risk and liquidity risk.

This study explores the effects of CSR on financial risk by using US data. Based on a sample of 1,496 individual firms and 8,519 firm-year observations during the period of 1995 to 2011, it finds that superior CSR performance is associated with lower market risk and lower liquidity risk. As a robustness test, the study also finds that superior CSR performance reduces the cost of capital. Furthermore, the performance of corporate governance activities increases the cost of capital, even though the test controls for industry effects. Although there is a positive association between corporate governance performance and the cost of capital, the corporate governance dimension is distinct from other social and environmental dimensions of CSR (Kim et al., 2012; Kim, Li, and Li, 2014). Therefore, if the study excludes the corporate governance dimension from CSR activities, CSR performance is negatively related to the cost of capital. In order to distinguish between good and bad performers on each CSR dimension, Bouslah, Kryzanowski, and M'Zali (2013) consider strengths and concerns separately and find that both corporate governance concerns and strengths positively affect a firm's risk. They attribute this inconsistent impact to the fact that market participants do not agree on the value of the strengths and their impacts on the moments of cash flows. In addition, appropriate cost of equity capital estimates are difficult to obtain, so prior research adopts indirect estimates of cost of equity capital (Botosan, 1997). Several studies suggest that there are measurement errors in estimating the cost of capital, which can lead to spurious inferences, including studies by Goolsbee (2000) and Wang (2012). These measurement errors are also possible reasons for the observed contradiction of the positive relationship between corporate governance performance and the cost of capital.

The findings of this study contribute to the existing line of research regarding CSR performance in several ways. First, the paper is motivated by Lang and Maffett (2011), Ng (2011), and Sadka (2011), who suggest that higher information quality can lower liquidity risk. While previous studies also suggest that socially responsible firms provide quality financial reports (Gelb and Strawser, 2001; Chin et al., 2008; Kim et al., 2012), our findings extend these studies by addressing the unexplored link between CSR performance and liquidity risk. The results indicate that superior CSR performance leads to a higher return on an asset in times of market illiquidity, an increase in the ability to sell easily in states of poor market return, and an increase in the ability to sell easily when the market in general becomes illiquid.

Second, the results indicate that a firm benefits from superior CSR performance due to the benefit of the decreased market risk and liquidity risk. As a result, superior CSR performance reduces the cost of capital. Our study complements Luo and Bhattacharya (2009), Bouslah et al. (2013), and Kim et al. (2014), who also analyze the association between CSR performance and firm risk We extend upon these studies by separating systematic risk into market risk and liquidity risk. This study also complements El Ghoul, Guedhami, Kwok, and Mishra (2011) and Feng, Wang, and Huang (2015), who analyze the cost of capital implications of CSR. We extend El Ghoul et al. (2011) by using five proxies for the cost of capital based on the CAPM, the Fama-French three-factor model, and earnings-to-price ratio and showing that firms with better CSR performance exhibit a lower cost of capital for a longer sample period (1995-2011 compared to 1992-2007 in their analysis), based on CSR performance data from the KLD STATS database. Unlike Feng et al. (2015), who obtain CSR performance data from the Thomson Reuters ASSET4 database, our CSR data is obtained from the KLD STATS database. The ASSET4 database covers four dimensions (environment, social, corporate governance, and economics) which contain 18 categories, including approximately 250 indicators. The rating of each category is weighted equally by sub-indicators, and the overall environmental, social, and governance (ESG) performance is weighted equally by four dimensions. The KLD STATS database tracks the community, corporate governance, diversity, employee relations, environment, human rights, and product performance of companies, which include approximately 80 qualitative indicators. The database provides each dimension's indicators, including both strengths and concerns, to provide comprehensive measures for overall CSR performance. As mentioned by Bendell (2010), who identifies nine key weaknesses of ESG analysis, different ESG rating providers have different understandings of the concept of CSR. Consistent with the findings of prior US studies, our study supports the robustness of the negative association between CSR performance and the cost of capital.

Third, our results have implications for firms which are going to participate in corporate responsibility activities, as they indicate that the benefit of superior CSR performance outweighs the increased costs of CSR. Although shareholders may not agree with a high CSR cost (Barnea and Rubin, 2010), if a firm acts in a socially irresponsible manner, for example mismanaging stakeholders, such behavior can result in lost markets and revenues, and even a decrease in shareholders' wealth (Downing, 1997; Frooman, 1997).

2. Related Research and Hypothesis Development

2.1 The Effect of CSR on Corporate Behavior

So far, there are no theoretical models which directly link CSR performance to market risk (systematic risk), liquidity risk, or the cost of capital. Heinkel, Kraus, and Zechner (2001) analytically explore the effect of green investment on a firm's cost of capital. In their model, there are three categories of firms: acceptable firms which satisfy the investment criteria of green investors; unacceptable firms which do not satisfy the investment criteria of green investors; and reformed firms which previously do not satisfy the investment criteria of green investors but are now accepted by green investors after having incurred the reform cost required to satisfy those criteria. According to their comparative statics, a reformed firm's cost of capital decreases (i.e., its stock price increases) as the reform cost increases. In addition, under the assumption of a fixed number of investors, more green investors mean fewer neutral investors; since unacceptable firms have a lower price. Because the price of reformed firms equals the price of unacceptable firms plus the reform cost, a lower unacceptable firm price means a lower reformed firm price. Therefore, reformed firms have a higher cost of capital. If the decreased cost of capital is higher than the reform cost, the unacceptable firms will become socially responsible due to green investment.

In terms of the effect of accounting information on cost of capital, Lambert, Leuz, and Verrecchia (2007) build a model consistent with CAPM where accounting information can influence the cost of capital and demonstrate that the quality of accounting information can directly affect a firm’s assessed covariances with other firms’ cash flows and indirectly affect a firm’s real decisions to influence the cost of capital. In addition, accounting information is valued by the market. Given an effective system of internal controls to ensure the reliability of financial statements, the results of Kuo and Liao (2020) suggest that although investors may consider Internal Control Weakness (ICW) disclosures having some deficiencies in operations. This also reveals that the effort of firms in assessing their internal control effectiveness. Therefore, they find that ICW disclosures are positively valued by the market. Due to the importance of the book value of equity in debt contracting, market evaluation, and managerial bonus determination, managers have an incentive to adjust upward the estimates of Other Comprehensive Income (OCI) components of equity book value. By using changes in a firm’s market value of equity as variations in business conditions, the results of Yeh and Wang (2020) suggest that OCI adjustments are asymmetric and biased upwards, and these asymmetric adjustments are more significant for firms with more serious agency problems as they use the corporate social responsibility score from KLD STATS database to proxy for managerial ethics. Consequently, any aspect of corporate social responsibility will affect the cost of capital and market evaluation, in turns to affect corporate behavior.

For those seeking to understand the possible relationship between Corporate Social Performance (CSP) and firm risk, there is ample empirical evidence on the linkages between CSR activities (of different types) and different types of risk. For example, Luo and Bhattacharya (2009) directly look at the effects of CSR on idiosyncratic risk, and find that higher CSP lowers firm-idiosyncratic risk. Bouslah et al. (2013) also look at several aspects of CSR and firm risk.

In summary, as noted by Heinkel et al. (2001), “social investing can impact a firm’s environmental and other ethical behaviors.” Nowadays, the public and investors are gradually coming to value CSR more and more. Therefore, this study argues that a socially responsible firm will enjoy a lower risk and cost of capital.

2.2 Accounting Information and Firm Risk

Accounting information is related to cost of capital, as found in studies by Daske (2006), Kim and Shi (2011), etc. However, appropriate estimates of cost of equity capital are difficult to obtain, and because these estimates either provide no relevant information or have no relationship to market beta, prior research adopts indirect estimates of cost of equity capital (Botosan, 1997). One type is a firm's estimated market beta from the CAPM. Therefore, there is ample evidence on the linkages between accounting information and risk. For example, Beaver, Kettler, and Scholes (1970) examine the relationship between accounting and market determined risk measures. They use dividend payout, growth, leverage, liquidity, asset size, variability of earnings, and covariability of earnings to construct the accounting risk measure (accounting beta), and use market beta as the market risk measure. The evidence suggests that there is a contemporaneous relationship between accounting and market risk measures, which implies that accounting data do reflect some events which give rise to securities risk and are also reflected in the market price. Lambert et al. (2007) define cost of capital to be the expected return on the firm's stock and build a model consistent with the CAPM in which accounting information can influence the cost of capital. Furthermore, this demonstrates that the quality of accounting information can directly affect a firm's assessed covariances with the cash flows of other firms and, therefore, affect firm beta. Other research, such as the studies by Core, Guay, and Verdi (2008) and Francis, LaFond, Olsson, and Schipper (2005), also empirically analyze the relationship between accounting information and the beta of a firm.

2.3 Accounting Information and Stock Liquidity

According to CAPM, the required return on an asset increases with the covariance between the asset's return and the market return. The market beta (market risk) is the sensitivity of stock returns to unexpected changes in market returns. To consider the illiquidity cost, Acharya and Pedersen (2005) derive a liquidity-adjusted version of CAPM and suggest that the expected return of a stock is affected by market risk, liquidity risk, and commonality in liquidity. Therefore, three liquidity risk factors are added to extend the standard CAPM.

Given that accounting information is related to market risk, it also can affect stock liquidity because it can affect the information environment of the stock (Sadka, 2011), especially the risk of information asymmetry faced by liquidity traders.[1] Previously, quite a few studies examine the impact of information asymmetry on the bid-ask spread (the price dimension of market liquidity), including studies by Stigler (1964), Demsetz (1968), and Bagehot (1971). These models indicate that liquidity traders sustain losses from trading with informed traders, and recover these losses through the bid-ask spread, implying that greater information asymmetry has a wider bid-ask spread. Due to time predictability and price relevance, earnings announcements offer an opportunity to examine the effect of the release of accounting information on information asymmetry and, hence, bid-ask spreads (Lee, Mucklow, and Ready, 1993; Kim and Verrecchia, 1994; Krinsky and Lee, 1996; Affleck-Graves, Callahan, and Chipalkatti, 2002).

Lee et al. (1993) examine the effect of earnings announcements on the spread (price dimension of market liquidity) and the depth (quantity dimension of market liquidity). They indicate that specialists are averse to quoting extremes in either dimension because they attempt to strike a balance between the spread and the depth in managing liquidity risk. Hence, lower (higher) spreads are accompanied by higher (lower) depths. Consistent with this argument, they show that the combination of wider spreads and lower depths is sufficient to infer a decrease in quoted liquidity. Under this argument, they suggest that the quoted liquidity decreases after periods of high trading volume and in anticipation of earnings announcements and that this phenomenon is more pronounced for announcements with larger subsequent price changes. They contend that liquidity providers are sensitive to changes in information asymmetry risk and actively use both spreads and depths to manage this risk. Kim and Verrecchia (1994) analytically examine market liquidity and volume around earnings announcements. They assume that some market participants process earnings announcements into private information about a firm's performance at some cost, and that market participants capable of obtaining informed judgments from public sources are willing to bear such costs. In turn, this amplifies the information asymmetries between traders and market makers. As a result, this increases bid-ask spreads and decreases liquidity, although earnings announcements induce more trading volume. Krinsky and Lee (1996) separate the bid-ask spread into

1 The typical information asymmetry model (e.g. Copeland and Galai, 1983; Glosten and Milgrom, 1985) assumes two types of traders: informed traders and liquidity traders. Informed traders trade because they have private information not currently reflected in prices, while liquidity traders trade for reasons other than superior information (Lee et al., 1993; Krinsky and Lee, 1996).

three components: order processing costs, inventory holding costs, and adverse selection costs. They indicate that even though earnings announcements result in increased information asymmetry, increased information asymmetry may not affect the total bid-ask spread due to the decreases in inventory holding costs and order processing costs. Affleck-Graves et al. (2002) investigate the relationships among earnings predictability, information asymmetry, and market liquidity. They show that on the day of and the day prior to quarterly earnings announcements, the adverse selection component of the bid-ask spread increases for low predictability firms but not for high predictability firms. In a non-announcement period, they find that firms with relatively less predictable earnings have higher total bid-ask spreads than firms with more predictable earnings.

2.4 Information Quality and Liquidity Risk

Lambert et al. (2007) use a model that is consistent with the CAPM and document that the quality of a firm's accounting information can decrease a firm's cost of capital. Both directly affect market participants' perceptions about the distribution of future cash flows, and indirectly affect real decisions that alter the distribution of future cash flows. However, there is no theoretical models which directly link information quality to liquidity risk (Ng, 2011). Recently, there have been a limited number of studies which investigate whether information quality affects liquidity risk, such as those by Lang and Maffett (2011), Sadka (2011), and Ng (2011).

Lang and Maffett (2011) use a cross-country sample and find that firms with greater transparency (proxied by earnings management, CPA firms, firms mandatorily and voluntarily adopting International Accounting Standards, number of analysts forecasting the firm's earnings, and forecast accuracy) experience less liquidity volatility, fewer extreme illiquidity events, and lower correlations between firm-level liquidity with both market returns and market liquidity ($cov(L_i, R_m)$ and $cov(L_i, L_m)$, where i and m indicate firm i and market m, respectively). They also document that these liquidity risk factors are all negatively correlated. Tobin's Q. Ng (2011) uses the concept of liquidity risk proposed by Pástor and Stambaugh (2003), who extend Fama and French (1993) three-factor model by including a market liquidity factor. He shows that information quality is negatively related to liquidity risk and that a firm's cost of capital is lower due to the effect of higher information quality in lowering liquidity risk. Sadka (2011) compares the studies above and further confirms the important role of accounting information during liquidity events.

2.5 CSR and Firm Risk

Traditionally, information on CSR is divided into three information components: social, environmental, and economic. However, early studies focus more heavily on the environmental issues because complying with stringent environmental regulations can significantly increase production costs in polluting industries such as the pulp and paper, chemical, steel, and utility industries (Joshi, Krishnan, and Lave, 2001). In addition, the magnitude of the costs required to comply with environmental regulations and the unambiguous relationships between environmental disclosures and environmental performance have caused accounting standard setters and securities regulators to increase the level of accounting disclosures (Clarkson, Li, and Richardson, 2004; Clarkson, Li, Richardson, and Vasvari, 2008).

Prior research suggests that accounting information is related to firm risk, and the quality of accounting information can directly affect a firm's assessed covariances with other firms' cash flows and, as a result, affect firm beta (Lambert et al., 2007). Many studies suggest that socially responsible firms provide quality financial reports either through increased disclosure or mitigated earnings management (Gelb and Strawser, 2001; Chin et al., 2008; Kim et al., 2012). In turn, higher financial reporting quality (as proxied by accruals quality) results in the lowering of the cost of debt and equity beta (Francis et al., 2005).

There is ample empirical evidence regarding the linkages between different types of CSR activities and different types of risk. For example, Luo and Bhattacharya (2009) look directly at the effects of CSR on idiosyncratic risk. They derive idiosyncratic risk from the Fama-French four-factor model and denote firm-idiosyncratic risk as the variance of the residuals of the model. The results show that higher CSP lowers firm-idiosyncratic risk. As a complement to the analyses on the relationship between CSP and idiosyncratic risk, they also test the impact of CSP on systematic risk. They find, similarly, that higher CSP lowers systematic risk. Bouslah et al. (2013) also look at several aspects of CSR and firm risk (total and idiosyncratic risk). They obtain social performance data from the KLD STATS database regarding strength and concern ratings for seven aspects of CSR. They measure total risk by the annualized standard deviation from daily stock returns over the past year, and idiosyncratic risk by the standard deviation of the residuals derived from the Carhart (1997) four-factor model. The results show the positive impacts of concerns on firm risk. However, the impact of strengths on firm risk are not uniform. They attribute the different impact of strengths on firm risk to market participants who do not agree on the value of the strengths and their impacts on the moments of cash flows. Kim et al. (2014) investigate the relationship between CSR and stock price crash risk. They use social performance data from the KLD STATS database to compute an aggregate CSR score. The crash risk is measured by the conditional skewness of the return distribution derived from the CAPM. The findings support the conclusion that CSP mitigates future stock price crash risk, and that this mitigating effect is significant when firms have lower corporate governance ratings. Bae, Kang, and Wang (2011) look at whether CSR, in the form of fair employee treatment, leads to low leverage, which can be seen as capturing lower risk. El Ghoul et al. (2011) follow Hail and Leuz (2006) to compute the average cost of equity premium using four different models. The results show that US firms with higher CSR scores enjoy lower costs of equity capital. They also find that not all CSR dimensions are related to cost of equity. It is only when firms invest in improving employee relations, environmental policies, and product strategies do those investments contribute to the lowering of the cost of equity. From a global perspective, Feng et al. (2015) provide supporting evidence for the results of El Ghoul et al. (2011), finding that firms with superior CSR performance are associated with a reduced cost of equity capital in North America and Europe.

2.6 Hypothesis Development

As mentioned above, the public and investors are gradually coming to value CSR more and more. A socially responsible firm will enjoy a lower risk and cost of capital (Heinkel et al., 2001; Dhaliwal, Li, Tsang, and Yang, 2011). Therefore, investors who value CSR may affect corporate behavior and encourage corporations to improve their practices with regard to ESG issues.

Prior research suggests that accounting information is related to market risk (beta) (Beaver et al., 1970; Lambert et al., 2007; Core et al., 2008; Francis et al., 2005). Without taking into account illiquidity cost, the CAPM states that the required return on an asset increases with the covariance between the asset's return and the market return. In this case, the market beta (market risk), or systematic risk, is the sensitivity of stock returns to unexpected changes in market return. However, as mentioned by Acharya and Pedersen (2005), liquidity risk may affect asset prices. They derive a liquidity-adjusted version of the CAPM and suggest that the expected return of a stock is affected by market risk, liquidity risk, and commonality in liquidity. Therefore, three liquidity risk factors are added to extend the standard CAPM. In the past, many studies suggest that accounting information will affect stock liquidity and liquidity risk because it can affect the information environment of the stock and result in changes in information asymmetric risk (Sadka, 2011; Lee et al., 1993; Kim and Verrecchia, 1994; Krinsky and Lee, 1996; Affleck-Graves et al., 2002). Specifically, several studies, including those by Lang and Maffett (2011), Sadka (2011), and Ng (2011), examine the effect of information quality on liquidity risk, and their findings suggest that information quality is negatively related to liquidity risk. In addition, higher financial reporting quality results in the lowering of the cost of debt and equity beta (Francis et al., 2005). Therefore, firms with higher information quality enjoy lower market and liquidity risk.

Although there is not a theoretical model which directly links CSP to market risk and liquidity risk, there is ample empirical evidence regarding the linkages between CSP and market risk or idiosyncratic risk. This evidence suggests that higher CSP lowers market and firm-idiosyncratic risk (Luo and Bhattacharya, 2009; Bouslah et al., 2013; Kim et al., 2014). Given that firms with higher financial reporting quality enjoy lower market and liquidity risk, many studies also suggest that socially responsible firms provide quality financial reports either through increased disclosure or mitigated earnings management (Gelb and Strawser, 2001; Chin et al., 2008; Kim et al., 2012). Thus, we suggest that socially responsible firms enjoy lower market and liquidity risk. This suggests that CSP is negatively related to market and liquidity risk, leading to hypothesis one.

H1: Relatively superior CSR performance is negatively associated with a stock's risk.

H1-1: Relatively superior CSR performance is negatively associated with a stock's market risk, market beta.[2]

H1-2: Relatively superior CSR performance is negatively associated with a stock's liquidity risk.

3. Research Design and Data

3.1 Research Design

We extract CSR data from the KLD STATS database maintained by KLD Research and Analytics, Inc. The KLD STATS database includes approximately 3,100 companies and tracks their community, corporate governance, diversity, employee relations,

2 Although prior studies (e.g., Fernandes and Ferreira, 2008, 2009; Kim and Shi, 2011) find that higher stock synchronicity occurs in emerging markets, in most developed countries like the United States, stocks tend to move in a relatively unsynchronized manner.

environment, human rights, and product performance, including approximately 80 qualitative indicators. The KLD STATS database provides each dimension's indicators, including both strengths and concerns, which provide comprehensive measures for overall CSR performance. In addition, iShares Exchange Traded Funds (ETFs) also use MSCI ESG Indices developed by KLD to select ETFs (e.g., iShares MSCI USA ESG Select ETF and iShares MSCI KLD 400 Social ETF) because the indices are composed of socially responsible US companies and provide access to a broad range of stocks that have positive ESG characteristics. Hence, the KLD STATS database is considered to be the best single source for social and environmental performance data (Graves and Waddock, 1994) and is been widely used by academics (Sharfman, 1996; Dhaliwal et al., 2011).

3.2 Measuring Liquidity Risk

Pástor and Stambaugh (2003) extend Fama and French (1993) three-factor model by including a market liquidity factor:

$$r_{i,t} = \beta_i^0 + \beta_i^L L_t + \beta_i^M MKT_t + \beta_i^S SMB_t + \beta_i^H HML_t + \varepsilon_{i,t},$$

where $r_{i,t}$ is asset i's excess return in month t, and *MKT*, *SMB*, and *HML* are the Fama and French (1993) risk factors. *MKT* is the excess return on the market. *SMB* stands for "small minus big", which is the average return on the three small portfolios minus the average return on the three big portfolios (market capitalization). *HML* stands for "high minus low", which is the average return on the two value portfolios minus the average return on the two growth portfolios (book-to-market ratio), while *L* is the market liquidity factor in month t. A higher β^L indicates higher liquidity risk, and a higher β^M indicates higher market beta.

Acharya and Pedersen (2005) consider the illiquidity cost to extend the standard CAPM, resulting in a liquidity-adjusted version of the CAPM. Through this extended CAPM, they define four risk factors. Three factors are liquidity risk factors, and the other is a market risk factor. In order to investigate the effect of CSR on the three liquidity risk factors ($cov(R_i, L_m)$, $cov(L_i, R_m)$, and $cov(L_i, L_m)$) and market beta ($cov(R_i, R_m)$), we define the first liquidity risk ($cov(R_i, L_m)$) as the covariation between a security's return and the market liquidity. We expect that CSR performance affects $cov(R_i, L_m)$ negatively because superior CSR performance leads to a higher return on an asset in times of market illiquidity. Empirical support for this effect is provided by Lins, Servaes, and Tamayo

(2017), who find that high-CSR firms had higher stock returns than low-CSR firms during the 2008-2009 financial crisis. The second liquidity risk (*cov*(L_i, R_m)) is the covariation between a security's illiquidity and the market return. We expect that CSR performance affects *cov*(L_i, R_m) negatively because superior CSR performance leads to an increase in the ability to sell easily in states of poor market return. The last liquidity risk (*cov*(L_i, L_m)) is the covariation between the asset's illiquidity and the market illiquidity. We expect that CSR performance affects *cov*(L_i, L_m) negatively because superior CSR performance leads to an increase in the ability to sell easily when the market in general becomes illiquid. Empirical support for these effects is provided by Cheng, Ioannis, and Serafeim (2013), who find that stakeholder engagement and superior CSR performance reduce agency costs from stakeholder engagement and that the reduction of information asymmetry from increased transparency gives a firm better access to finance. The increased transparency, in turn, lowers the correlations between firm-level liquidity and both market returns and market liquidity (Lang and Maffett, 2011). We measure the first liquidity risk factor (*cov*(R_i, L_m)) introduced by Pástor and Stambaugh (2003) and measure the other two liquidity risk factors (*cov*(L_i, R_m) and *cov*(L_i, L_m)) introduced by Lang and Maffett (2011).

Consistent with Lang and Maffett (2011), we use two measures, *cov*(L_i, R_m) and *cov*(L_i, L_m), which are R^2 from a regression of stock return on the market return as a measure of stock price co-movement within a country (Morck, Yeung, and Yu, 2000; Karolyi, Lee, and van Dijk, 2007). To measure *cov*(L_i, R_m), we use R^2 from the following regression by each firm and year:

$$\%\Delta DPI_{i,t} = \alpha_i + \beta_{i,1} MKTRET_{m,t-1} + \beta_{i,2} MKTRET_{m,t} + \beta_{i,3} MKTRET_{m,t+1} + \varepsilon_{i,t},$$

where *DPI* is $|R_{i,t}|$ divided by $P_{i,t}VO_{i,t}$. $R_{i,t}$ is the monthly percentage price change. $P_{i,t}$ is the monthly price, and $VO_{i,t}$ is the trading volume for stock *i* in month *t*. The higher value of *DPI* indicates greater illiquidity. $\%\Delta DPI_{i,t}$ is equal to the monthly percentage change in *DPI* for firm *i* in month *t*, and $MKTRET_{m,t}$ is the monthly country-level market return (the CRSP value-weighted return including distributions).

To measure *cov*(L_i, L_m), we use R^2 from the following regression by each firm and year:

$$\%\Delta DPI_{i,t} = \alpha_i + \beta_{i,1} \%\Delta DPI_{m,t-1} + \beta_{i,2} \%\Delta DPI_{m,t} + \beta_{i,3} \%\Delta DPI_{m,t+1} + \varepsilon_{i,t},$$

where $\%\Delta DPI_{i,t}$ is defined as above, and $\%\Delta DPI_{m,t}$ is equal to the monthly percentage change in *DPI* for the market in month *t*. $DPI_{m,t}$ is the monthly equal-weighted average *DPI* of the individual stocks. Consistent with Lang and Maffett (2011), we require at least 10 monthly observations to estimate R^2 and at least 10 firms to estimate the monthly market average *DPI*.

3.3 Empirical Model

Consistent with Lang and Maffett (2011), we include yearly control variables in our model: market value of equity (*SIZE*), book to market (*BTM*), return variability (*STDRET*), firm-specific returns (*FRET1*), and the firm's monthly average level of liquidity (*ILLIQ*). Finally, we include standard deviation of sales (*STD_SALES*) and frequency of accounting losses (*LOSS*) to control for differences in business risk. Consistent with the controls included in Ng (2011), we include sales growth (*SALES_GROWTH*), duration of operating cycle (*CYCLE*), capital intensity (*INTENSITY*), and cash liquidity (*CASH_RATIO*). Because our sample period includes the years of the global financial crisis, from 2007 to 2009, we use two dummy variables to distinguish among pre-, during, and post-financial crisis periods (*FC* and *Post-FC*). Moreover, because the fallout from Enron motivated companies to focus on CSR in order to manage risk (Owen, 2005), we also use a dummy variable (*Post-Enron*) to control for the Enron effect. Calculations of the controls are described in Appendix A.

Based on the specifications above, we establish the empirically testable models specified below. Because of heterogeneous issues that can have different implications depending on the industry, we annually standardize each measure of CSR performance to control year and industry effects for each model (Cho, Lee, and Pfeiffer Jr., 2013). Then, we define related CSR standardized variables which are used in Cho et al. (2013) and related CSR non-standardized variables, respectively.

In model 1, we use an average strength score and an average concern score (Sharfman and Fernando, 2008) to proxy for CSR performances.

$$\text{Model 1: } Dep = f\left(\frac{\sum_{i=1}^{7} CSRSTR_i}{7}, \frac{\sum_{i=1}^{7} CSRCON_i}{7}, controls\right).$$

In model 2, we use a total strength score and a total concern score to proxy for CSR performances.

Model 2: $Dep = f\left(\sum_{i=1}^{7} CSRSTR_i, \sum_{i=1}^{7} CSRCON_i, controls\right)$.

In model 3, we use seven composite indices (Jo and Harjoto, 2011) to proxy for seven CSR dimensions' performances.

Model 3: $Dep = f(CSR_i, controls)$, $i = 1...7$.

Finally, in model 4, we use a composite index (Jo and Harjoto, 2011) to proxy for aggregate CSR performance.

Model 4: $Dep = f\left(\frac{\sum_{i=1}^{7} CSR_i}{7}, controls\right)$.

Where *Dep* is one of the dependent variables, the three liquidity risk variables, and the one market risk variable. $CSRSTR_i$ is the CSR strength score for each CSR dimension, and $CSRCON_i$ is the CSR concern score for each CSR dimension. CSR_i is one of the seven composite indices, which is defined as in the study by Jo and Harjoto (2011), and *controls* are defined as above. Besides, the average CSR scores in Model 1 are defined as in the study by Sharfman and Fernando (2008).

Table 1 Descriptive Statistics and Sample Breakdown by Industry

Industry	*CSR _STR*	*CSR _CON*	*TOTAL _CSR_ STR*	*TOTAL _CSR_ CON*	*COMMUNITY*	*ENVIRONMENT*
Agriculture, forestry, fishing, & nonclassifiable establishments	0.127	0.603	0.889	4.222	0.315	0.588
Mining	0.161	0.436	1.130	3.053	0.327	0.558
Manufacturing	0.250	0.320	1.749	2.240	0.340	0.587
Transportation & pub. utilities	0.273	0.384	1.910	2.687	0.332	0.568
Wholesale trade	0.393	0.179	2.750	1.250	0.354	0.603
Retail trade	0.173	0.295	1.213	2.064	0.342	0.593
Finance, insurance, & real estate	0.119	0.333	0.833	2.333	0.347	0.598
Services	0.032	0.168	0.226	1.176	0.334	0.589
Total	0.178	0.286	1.247	2.002	0.337	0.585

Note: All variables are calculated as described in the Appendix A.

Note: The number in the Table is the mean of each CSR variable, and the last column presents observations for each industry.

3.4 Data

Our accounting and market data are gathered from Compustat, and the information regarding CSR is obtained from the KLD STATS database. Because some values are omitted prior to 1995, we consider 1995-2011 to be the sample period. The *MKT*, *SMB*, and *HML* factors are publicly available from Kenneth French's website, and the *L* factor is publicly available from Lubos Pástor's website.

3.5 Descriptive Statistics

Table 1 displays the sample distribution and descriptive statistics of CSR measures by industry. It reveals that, out of 8,519 total firm-year observations, 4,171 observations are firms in Manufacturing industry, constituting about 48.96% of overall sample during the period of 1995 to 2011, followed by Services industry with 2,558 (30.03%) observations. Furthermore, besides the highest CSR performance (*CSRCOMPOSIT* = 0.495) in the Wholesale Trade industry with only 4 observations, the Manufacturing and Transportation and Public Utilities industries are the second and third industry, which have higher CSR performance (*CSRCOMPOSIT* = 0.471 and 0.468) averagely. Finally, the Service industry has the fourth higher CSR performance (*CSRCOMPOSIT* = 0.467).

DIVERSITY	*EMPLOYEE*	*PRODUCT*	*GOVERNANCE*	*HUMAN*	*CSRCOMPOSIT*	*Overall Sample*
0.239	0.365	0.383	0.556	0.620	0.438	9(0.11%)
0.275	0.412	0.434	0.545	0.651	0.457	454(5.33%)
0.314	0.421	0.426	0.550	0.662	0.471	4,171(48.96%)
0.328	0.416	0.410	0.561	0.662	0.468	881(10.34%)
0.346	0.446	0.500	0.571	0.646	0.495	4(0.05%)
0.307	0.395	0.420	0.552	0.662	0.467	436(5.12%)
0.205	0.405	0.426	0.560	0.681	0.460	6(0.07%)
0.244	0.426	0.441	0.566	0.666	0.467	2,558(30.03%)
0.292	0.420	0.429	0.555	0.663	0.469	8,519(100%)

Table 2 presents the descriptive statistics of variables used in regression equations over the period of 1995 to 2011 with 8,519 firm-year observations. In terms of liquidity risk, the means of β^L, $cov(L_i, L_m)$, and $cov(L_i, R_m)$ are -0.029, 0.230, and 0.290, with the range from -15.879, 0.001, and 0.001 to 5.581, 1.000, and 1.000, respectively. However, the mean of β^M is 1.215, with the range from -11.087 to 26.428, has the highest standard error of 1.456. Finally, the results show that the means of CSR concern score are higher than the means of CSR strength score (0.286 and 2.002 are higher than 0.178 and 1.247).

Table 2 Descriptive Statistics

	Mean	SD	Min	Q1	Med	Q3	Max	N
Liquidity Risk								
β^L	-0.029	0.764	-15.879	-0.201	-0.187	0.274	5.581	8519
$cov(L_i, L_m)$	0.230	0.236	0.001	0.041	0.139	0.337	1.000	8519
$cov(L_i, R_m)$	0.290	0.166	0.001	0.158	0.324	0.357	1.000	8519
β^M	1.215	1.456	-11.087	0.547	1.479	1.637	26.428	8519
CSR Variables								
CSR_STR	0.178	0.329	0.000	0.000	0.000	0.286	3.143	8519
CSR_CON	0.286	0.277	0.000	0.143	0.143	0.429	2.571	8519
TOTAL_CSR_STR	1.247	2.304	0.000	0.000	0.000	2.000	22.000	8519
TOTAL_CSR_CON	2.002	1.940	0.000	1.000	1.000	3.000	18.000	8519
COMMUNITY	0.337	0.040	0.167	0.333	0.333	0.333	0.667	8519
ENVIRONMENT	0.585	0.049	0.294	0.588	0.588	0.588	0.882	8519
DIVERSITY	0.292	0.099	0.077	0.231	0.231	0.308	0.846	8519
EMPLOYEE	0.420	0.055	0.143	0.429	0.429	0.429	0.786	8519
PRODUCT	0.429	0.065	0.000	0.444	0.444	0.444	0.667	8519
GOVERNANCE	0.555	0.045	0.357	0.500	0.571	0.571	0.714	8519
HUMAN	0.663	0.022	0.417	0.667	0.667	0.667	0.750	8519
CSRCOMPOSIT	0.469	0.024	0.354	0.456	0.466	0.477	0.672	8519
Control Variables								
SIZE	7.209	1.494	2.432	6.353	6.655	8.075	13.146	8519
BTM	1.510	1.862	-5.591	0.299	0.533	1.942	14.159	8519
STDRET	0.115	0.054	0.017	0.078	0.121	0.128	1.212	8519
FRET1	0.212	0.501	-0.960	-0.047	0.257	0.351	13.425	8519
ILLIQ	0.021	0.068	-0.122	0.001	0.007	0.019	2.650	8519
STD_SALES	0.221	0.215	0.004	0.092	0.138	0.275	2.167	8519
LOSS	0.364	0.481	0.000	0.000	0.000	1.000	1.000	8519
SALES_GROWTH	2.322	1.116	-5.424	1.549	2.220	3.048	10.768	8519
CYCLE	0.337	0.336	0.007	0.229	0.291	0.373	17.114	8519

	Mean	SD	Min	Q1	Med	Q3	Max	N
INTENSITY	0.317	0.206	0.003	0.160	0.324	0.378	0.951	8519
CASH_RATIO	0.721	1.041	0.000	0.176	0.592	0.795	25.247	8519
FC	0.171	0.376	0.000	0.000	0.000	0.000	1.000	8519
Post-FC	0.418	0.493	0.000	0.000	0.000	1.000	1.000	8519
Post-Enron	0.897	0.304	0.000	1.000	1.000	1.000	1.000	8519

Note: All variables are calculated as described in the Appendix A. The negative minimum of *BTM* results from the negative book value of equity of 149 observations. We also re-run regressions without these observations and the results are qualitatively similar to main findings.

According to the multi-collinearity problem, although untabulated correlation results show that correlation coefficients for some variables are higher than 0.5, the variation inflation factors for those are lower than 10. Therefore, there is no multi-collinearity problem in our regression estimations.

4. Empirical Findings

Generally, in panel data sets, the residuals may suffer from the problem of heteroskedasticity. To control for cross-sectional and time-series correlation, all regression estimations reported in this study are adjusted for heteroskedasticity by using two-way cluster-robust standard errors (Petersen, 2009; Gow, Ormazabal, and Taylor, 2010).

4.1 Test Results from Risk Regressions

In accordance to the descriptions in section 3.3, we establish four models and define CSR standardized variables used in Cho et al. (2013) and CSR non-standardized variables, respectively. The results for the effects of CSR performance on the risk of a firm are shown from Table 3 to Table 6. In Table 3, we find that *CSR_STR* is significantly negatively correlated with $cov(L_i, L_m)$ (-0.014, t = -1.51; -0.006, t = -1.88) (non-standardized and standardized value), $cov(L_i, R_m)$ (-0.006, t = -1.84) (non-standardized value), and β^M (-0.169, t = -2.23; -0.042, t = -2.18) (non-standardized and standardized value), indicating that a firm has superior CSR performance may lower its liquidity risk and market risk. We also find that *CSR_CON* is significantly positively correlated with β^L (0.071, t = 1.67; 0.022, t = 2.55) (non-standardized and standardized value), $cov(L_i, L_m)$ (0.050, t = 2.44; 0.009, t = 1.93) (non-standardized and standardized value), and β^M (0.123, t = 2.16; 0.030, t = 1.67) (non-standardized and standardized value), indicating that a firm with inferior CSR performance may increase its liquidity risk and market risk.

Table 3 Risk Regression Analysis for Model 1

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
CSR_STR	-0.034	-0.015	-0.014*	-0.006**	-0.006**	-0.001	-0.169**	-0.042**
	(-0.69)	(-1.12)	(-1.51)	(-1.88)	(-1.84)	(-0.48)	(-2.23)	(-2.18)
CSR_CON	0.071**	0.022***	0.050***	0.009**	-0.0131	-0.001	0.123**	0.030**
	(1.67)	(2.55)	(2.44)	(1.93)	(-1.16)	(-0.38)	(2.16)	(1.67)
SIZE	-0.018	-0.017	-0.010***	-0.007***	0.000	-0.001	0.066*	0.062**
	(-0.79)	(-0.93)	(-3.38)	(-2.67)	(0.15)	(-0.48)	(1.87)	(1.95)
BTM	-0.044**	-0.045**	-0.060***	-0.061***	0.016***	0.016***	0.080**	0.083***
	(-2.51)	(-2.38)	(-14.73)	(-13.08)	(9.17)	(9.31)	(2.49)	(2.62)
STDRET	-0.314	-0.309	0.036	0.045	0.067**	0.063**	8.066***	8.077***
	(-0.71)	(-0.72)	(0.66)	(0.81)	(2.49)	(2.29)	(8.01)	(7.99)
FRET1	-0.056	-0.058*	-0.007	-0.010	0.000	0.001	-0.115	-0.114
	(-1.62)	(-1.74)	(-0.74)	(-0.90)	(0.02)	(0.25)	(-1.00)	(-0.99)
ILLIQ	0.094	0.095	0.015	0.024	-0.080***	-0.087***	-1.180**	-1.201**
	(0.26)	(0.27)	(0.57)	(1.06)	(-3.19)	(-3.13)	(-2.15)	(-2.22)
STD_SALES	0.111	0.111	0.001	-0.000	-0.007	-0.006	-0.298*	-0.293*
	(1.37)	(1.39)	(0.04)	(-0.02)	(-0.71)	(-0.62)	(-1.81)	(-1.75)
LOSS	0.034	0.034	-0.025***	-0.024***	0.010	0.010	0.118	0.116
	(0.54)	(0.54)	(-3.39)	(-3.38)	(1.27)	(1.21)	(1.04)	(1.04)
SALES_GROWTH	-0.042**	-0.042**	0.004	0.004	0.000	0.001	-0.034	-0.033
	(-2.50)	(-2.49)	(0.96)	(0.95)	(0.27)	(0.35)	(-1.25)	(-1.22)
CYCLE	0.068***	0.069***	-0.006	-0.007	0.007*	0.007*	-0.032	-0.033
	(3.19)	(3.23)	(-1.35)	(-1.39)	(1.87)	(1.92)	(-0.73)	(-0.74)
INTENSITY	-0.013	-0.007	0.027**	0.032**	0.001	-0.000	0.130	0.144
	(-0.14)	(-0.08)	(2.1)	(2.32)	(0.09)	(-0.01)	(0.76)	(0.84)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
CASH_RATIO	-0.012	-0.012	0.004	0.004	0.004	0.004	0.001	0.001
	(-0.58)	(-0.57)	(1.05)	(1.05)	(1.01)	(1.02)	(0.04)	(0.05)
FC	-0.013	-0.010	0.026	0.028*	0.006	0.005	-0.218	-0.216
	(-0.24)	(-0.18)	(1.59)	(1.73)	(1.12)	(0.96)	(-1.30)	(-1.28)
Post-FC	-0.053	-0.051	0.053**	0.055**	0.010	0.009	-0.176***	-0.175***
	(-1.16)	(-1.09)	(2.12)	(2.06)	(1.52)	(1.41)	(-2.88)	(-2.83)
Post-Enron	-0.061	-0.055	-0.021	-0.016	-0.006	-0.007	0.247*	0.267*
	(-1.12)	(-0.99)	(-1.35)	(-1.00)	(-0.62)	(-0.76)	(1.77)	(1.92)
CONS	0.326	0.325	0.361***	0.346***	0.254***	0.262***	-0.304	-0.301
	(1.49)	(1.54)	(11.96)	(11.12)	(9.48)	(8.67)	(-0.77)	(-0.78)
N	8519	8519	8519	8519	8519	8519	8519	8519
adj. R^2	0.018	0.018	0.208	0.207	0.053	0.053	0.094	0.094

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses, and others are based on two-tailed tests.

In Table 4, we find that *TOTAL_CSR_STR* is significantly negatively correlated with $cov(L_i, L_m)$ (-0.002, t = -1.51; -0.006, t = -1.88) (non-standardized and standardized value), $cov(L_i, R_m)$ (-0.001, t = -1.84) (non-standardized value), and β^M (-0.024, t = -2.23; -0.042, t = -2.18) (non-standardized and standardized value), and *TOTAL_CSR_CON* is significantly positively correlated with β^L(0.010, t = 1.67; 0.022, t = 2.55) (non-standardized and standardized value), $cov(L_i, L_m)$ (0.007, t = 2.44; 0.009, t = 1.93) (non-standardized and standardized value), and β^M (0.018, t = 2.16; 0.030, t = 1.67) (non-standardized and standardized value). When the CSR performance is separated into seven CSR dimensional performances, the results are shown in Table 5. The results present that *COMMUNITY* is significantly negatively correlated with β^M (-0.509, t = -1.48; -0.025, t = -2.36) (non-standardized value and standardized value), *ENVIRONMENT* is significantly negatively correlated with β^L (-0.390, t = -1.74; -0.019, t = -2.10) (non-standardized and standardized value), *DIVERSITY* is significantly negatively correlated with $cov(L_i, L_m)$ (-0.067, t = -2.19; -0.006, t = -2.46) (non-standardized and standardized value), $cov(L_i, R_m)$ (-0.037, t = -1.36) (non-standardized value), and β^M (-0.578, t = -2.74; -0.030, t = -1.44) (non-standardized and standardized value), *EMPLOYEE* is significantly negatively correlated with β^L (-0.008, t = -1.34) (standardized value), $cov(L_i, R_m)$ (-0.086, t = -2.07; -0.004, t = -1.80) (non-standardized value and standardized value), and β^M (-0.420, t = -1.80, -0.014, t = -1.40) (non-standardized and standardized value), *PRODUCT* is significantly negatively correlated with $cov(L_i, L_m)$ (-0.061, t = -1.48) (non-standardized value), and *GOVERNANCE* is significantly negatively correlated with β^L (-0.265, t = -1.76; -0.010, t = -1.64) (non-standardized value and standardized value) and $cov(L_i, L_m)$ (-0.153, t = -1.81) (non-standardized value), indicating that a firm participates in CSR activities regarding community, environment, diversity, employee relations, product, and governance with superior CSR performance may lower either its liquidity risk or market risk. However, we find that *COMMUNITY* is significantly positively correlated with $cov(L_i, R_m)$ (0.122, t = 2.40; 0.004, t = 2.50) (non-standardized value and standardized value), *ENVIRONMENT* is slightly positively correlated with $cov(L_i, R_m)$ (0.003, t = 1.62) (standardized value), and *PRODUCT* is slightly positively correlated with β^M (0.430, t = 1.30) (non-standardized value) at 10% significance level under one-tailed test. Although *COMMUNITY* and *ENVIRONMENT* are positively correlated with $cov(L_i, R_m)$, the aggregate CSR index in Table 6, *CSRCOMPOSIT* (non-standardized and standardized value) is significantly negatively correlated with β^L (-0.579, t = -2.29; -0.015, t = -2.10), $cov(L_i, L_m)$ (-0.390, t = -2.33; -0.007, t = -1.98), and β^M (-1.760, t = -2.80; -0.032, t = -1.79), implying that a firm with superior CSR performance may reduce its either liquidity risk or market risk.

Table 4 Risk Regression Analysis for Model 2

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
TOTAL_CSR_STR	-0.005	-0.015	-0.002*	-0.006**	-0.001**	-0.001	-0.024**	-0.042**
	(-0.69)	(-1.12)	(-1.51)	(-1.88)	(-1.84)	(-0.48)	(-2.23)	(-2.18)
TOTAL_CSR_CON	0.010**	0.022***	0.007***	0.009**	-0.002	-0.001	0.018**	0.030**
	(1.67)	(2.55)	(2.44)	(1.93)	(-1.16)	(-0.38)	(2.16)	(1.67)
SIZE	-0.018	-0.017	-0.010***	-0.007***	0.000	-0.001	0.066*	0.062*
	(-0.79)	(-0.93)	(-3.38)	(-2.67)	(0.15)	(-0.48)	(1.87)	(1.95)
BTM	-0.044**	-0.045**	-0.060***	-0.061***	0.016***	0.016***	0.080**	0.083***
	(-2.51)	(-2.38)	(-14.73)	(-13.08)	(9.17)	(9.31)	(2.49)	(2.62)
STDRET	-0.314	-0.309	0.036	0.045	0.067**	0.063**	8.066***	8.077***
	(-0.71)	(-0.72)	(0.66)	(0.81)	(2.49)	(2.29)	(8.01)	(7.99)
FRET1	-0.056	-0.058	-0.007	-0.010	0.000	0.001	-0.115	-0.114
	(-1.62)	(-1.74)	(-0.74)	(-0.90)	(0.02)	(0.25)	(-1.00)	(-0.99)
ILLIQ	0.094	0.095	0.015	0.024	-0.080***	-0.087***	-1.180**	-1.201**
	(0.26)	(0.27)	(0.57)	(1.06)	(-3.19)	(-3.13)	(-2.15)	(-2.22)
STD_SALES	0.111	0.111	0.001	-0.000	-0.007	-0.006	-0.298*	-0.293*
	(1.37)	(1.39)	(0.04)	(-0.02)	(-0.71)	(-0.62)	(-1.81)	(-1.75)
LOSS	0.034	0.034	-0.025***	-0.024***	0.010	0.010	0.118	0.116
	(0.54)	(0.54)	(-3.39)	(-3.38)	(1.27)	(1.21)	(1.04)	(1.04)
SALES_GROWTH	-0.042**	-0.042**	0.004	0.004	0.000	0.001	-0.034	-0.033
	(-2.50)	(-2.49)	(0.96)	(0.95)	(0.27)	(0.35)	(-1.25)	(-1.22)
CYCLE	0.068***	0.069***	-0.006	-0.007	0.007*	0.007*	-0.032	-0.033
	(3.19)	(3.23)	(-1.35)	(-1.39)	(1.87)	(1.92)	(-0.73)	(-0.74)
INTENSITY	-0.013	-0.007	0.027**	0.032**	0.001	-0.000	0.130	0.144
	(-0.14)	(-0.08)	(2.10)	(2.32)	(0.09)	(-0.01)	(0.76)	(0.84)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
CASH_RATIO	-0.012	-0.012	0.004	0.004	0.004	0.004	0.001	0.001
	(-0.58)	(-0.57)	(1.05)	(1.05)	(1.01)	(1.02)	(0.04)	(0.05)
FC	-0.013	-0.010	0.026	0.028*	0.006	0.005	-0.218	-0.216
	(-0.24)	(-0.18)	(1.59)	(1.73)	(1.12)	(0.96)	(-1.30)	(-1.28)
Post-FC	-0.053	-0.051	0.053**	0.055**	0.010	0.009	-0.176***	-0.175***
	(-1.16)	(-1.09)	(2.12)	(2.06)	(1.52)	(1.41)	(-2.88)	(-2.83)
Post-Enron	-0.061	-0.055	-0.021	-0.016	-0.006	-0.007	0.247*	0.267*
	(-1.12)	(-0.99)	(-1.35)	(-1.00)	(-0.62)	(-0.76)	(1.77)	(1.92)
CONS	0.326	0.325	0.361***	0.346***	0.254***	0.262***	-0.304	-0.301
	(1.49)	(1.54)	(11.96)	(11.12)	(9.48)	(8.67)	(-0.77)	(-0.78)
N	8519	8519	8519	8519	8519	8519	8519	8519
adj. R^2	0.018	0.018	0.208	0.207	0.053	0.053	0.094	0.094

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses, and others are based on two-tailed tests.

Table 5 Risk Regression Analysis for Model 3

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
COMMUNITY	0.059	0.006	0.013	-0.000	0.122**	0.004***	-0.509*	-0.025**
	(0.28)	(0.76)	(0.31)	(-0.16)	(2.40)	(2.50)	(-1.48)	(-2.36)
ENVIRONMENT	-0.390**	-0.019**	-0.054	-0.002	0.050	0.003*	-0.535	-0.014
	(-1.74)	(-2.10)	(-1.04)	(-0.60)	(1.02)	(1.62)	(-1.13)	(-0.61)
DIVERSITY	-0.077	-0.006	-0.067**	-0.006***	-0.037*	-0.003	-0.578***	-0.030*
	(-0.62)	(-0.58)	(-2.19)	(-2.46)	(-1.36)	(-1.07)	(-2.74)	(-1.44)
EMPLOYEE	0.041	-0.008*	-0.020	-0.001	-0.086**	-0.004**	-0.420**	-0.014*
	(0.29)	(-1.34)	(-0.52)	(-0.45)	(-2.07)	(-1.80)	(-1.80)	(-1.40)
PRODUCT	0.064	-0.005	-0.061*	-0.004	-0.011	-0.001	0.430*	0.016
	(0.29)	(-0.38)	(-1.48)	(-1.22)	(-0.38)	(-0.31)	(1.30)	(0.89)
GOVERNANCE	-0.265**	-0.010*	-0.153**	-0.003	0.044	-0.001	0.271	0.008
	(-1.76)	(-1.64)	(-1.81)	(-0.96)	(0.95)	(-0.25)	(0.50)	(0.40)
HUMAN	0.169	0.005	0.005	-0.001	0.032	-0.000	0.247	-0.004
	(0.22)	(0.38)	(0.04)	(-0.53)	(0.31)	(-0.03)	(0.19)	(-0.17)
SIZE	-0.013	-0.015	-0.006**	-0.006**	-0.000	-0.002	0.089***	0.074**
	(-0.69)	(-0.86)	(-2.27)	(-2.02)	(-0.17)	(-0.56)	(2.62)	(2.44)
BTM	-0.046**	-0.045**	-0.060***	-0.061***	0.017***	0.017***	0.077**	0.081**
	(-2.48)	(-2.42)	(-14.41)	(-13.02)	(9.19)	(9.60)	(2.42)	(2.54)
STDRET	-0.310	-0.297	0.040	0.047	0.067**	0.061**	8.081***	8.083***
	(-0.73)	(-0.70)	(0.76)	(0.86)	(2.53)	(2.24)	(8.05)	(8.03)
FRET1	-0.058**	-0.059**	-0.008	-0.010	0.001	0.001	-0.126	-0.118
	(-1.75)	(-1.77)	(-0.87)	(-0.95)	(0.14)	(0.32)	(-1.07)	(-1.02)
ILLIQ	0.119	0.113	0.033	0.031	-0.087***	-0.088***	-1.135**	-1.183**
	(-0.34)	(0.33)	(1.52)	(1.45)	(-3.31)	(-3.36)	(-2.16)	(-2.22)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
STD_SALES	0.105	0.109	-0.002	-0.002	-0.006	-0.006	-0.318*	-0.299*
	(1.27)	(1.35)	(-0.10)	(-0.09)	(-0.63)	(-0.59)	(-1.90)	(-1.80)
LOSS	0.036	0.034	-0.023***	-0.023***	0.010	0.010	0.127	0.121
	(0.57)	(0.55)	(-3.14)	(-3.14)	(1.29)	(1.20)	(1.10)	(1.07)
SALES_GROWTH	-0.043**	-0.042**	0.004	0.004	0.001	0.001	-0.039	-0.037
	(-2.51)	(-2.50)	(0.89)	(0.88)	(0.51)	(0.57)	(-1.38)	(-1.29)
CYCLE	0.069***	0.068***	-0.007	-0.007	0.006*	0.007*	-0.028	-0.031
	(3.35)	(3.31)	(-1.59)	(-1.56)	(1.88)	(1.89)	(-0.63)	(-0.68)
INTENSITY	-0.015	-0.005	0.033**	0.032**	0.002	0.002	0.091	0.126
	(-0.17)	(-0.05)	(2.20)	(2.32)	(0.15)	(0.11)	(0.51)	(0.73)
CASH_RATIO	-0.012	-0.011	0.004	0.004	0.004	0.004	-0.000	0.000
	(-0.58)	(-0.56)	(1.08)	(1.05)	(1.03)	(1.03)	(-0.01)	(0.00)
FC	-0.010	-0.010	0.027*	0.029*	0.005	0.006	-0.217	-0.215
	(-0.18)	(-0.18)	(1.66)	(1.75)	(0.94)	(0.98)	(-1.32)	(-1.29)
Post-FC	-0.050	-0.050	0.051**	0.055**	0.005	0.008	-0.193***	-0.168***
	(-0.93)	(-1.06)	(2.01)	(2.09)	(0.74)	(1.35)	(-2.68)	(-2.66)
Post-Enron	-0.048	-0.052	-0.016	-0.014	-0.008	-0.007	0.258*	0.280**
	(-0.91)	(-0.97)	(-1.05)	(-0.89)	(-0.84)	(-0.81)	(1.82)	(2.02)
CONS	0.521	0.305	0.504***	0.332***	0.192*	0.263***	-0.105	-0.387
	(1.00)	(1.54)	(4.44)	(11.15)	(1.93)	(8.55)	(-0.11)	(-1.08)
N	8519	8519	8519	8519	8519	8519	8519	8519
adj. R^2	0.018	0.018	0.207	0.206	0.055	0.054	0.095	0.094

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses, and others are based on two-tailed tests.

Table 6 Risk Regression Analysis for Model 4

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
CSRCOMPOSIT	-0.579**	-0.015**	-0.390**	-0.007**	0.024	0.000	-1.760***	-0.032**
	(-2.29)	(-2.10)	(-2.33)	(-1.98)	(0.40)	(0.06)	(-2.80)	(-1.79)
SIZE	-0.014	-0.014	-0.006**	-0.006**	-0.002	-0.002	0.059**	0.058**
	(-1.08)	(-1.07)	(-2.42)	(-2.39)	(-0.98)	(-0.97)	(2.16)	(2.18)
BTM	-0.046**	-0.045**	-0.061***	-0.061***	0.016***	0.016***	0.082**	0.083***
	(-2.38)	(-2.37)	(-13.46)	(-13.32)	(9.39)	(9.35)	(2.57)	(2.60)
STDRET	-0.304	-0.299	0.045	0.049	0.062**	0.061**	8.056***	8.075***
	(-0.71)	(-0.70)	(0.84)	(0.90)	(2.27)	(2.25)	(8.03)	(8.04)
FRET1	-0.059*	-0.059*	-0.010	-0.010	0.001	0.001	-0.112	-0.113
	(-1.78)	(-1.79)	(-0.92)	(-0.95)	(0.29)	(0.29)	(-0.97)	(-0.98)
ILLIQ	0.109	0.108	0.032	0.030	-0.090***	-0.090***	-1.208**	-1.216**
	(0.33)	(0.32)	(1.51)	(1.40)	(-3.51)	(-3.52)	(-2.23)	(-2.25)
STD_SALES	0.109	0.110	-0.002	-0.001	-0.006	-0.006	-0.291*	-0.287*
	(1.42)	(1.43)	(-0.10)	(-0.05)	(-0.57)	(-0.58)	(-1.72)	(-1.70)
LOSS	0.035	0.035	-0.024***	-0.024***	0.010	0.010	0.116	0.114
	(0.54)	(0.54)	(-3.15)	(-3.20)	(1.19)	(1.19)	(1.03)	(1.02)
SALES_GROWTH	-0.043**	-0.042**	0.004	0.004	0.001	0.001	-0.034	-0.033
	(-2.49)	(-2.48)	(0.88)	(0.90)	(0.40)	(0.39)	(-1.21)	(-1.18)
CYCLE	0.068***	0.068***	-0.007	-0.007	0.007*	0.007*	-0.033	-0.033
	(3.16)	(3.16)	(-1.49)	(-1.50)	(1.91)	(1.91)	(-0.75)	(-0.75)
INTENSITY	-0.009	-0.005	0.030**	0.032**	0.000	-0.000	0.132	0.146
	(-0.10)	(-0.06)	(2.21)	(2.33)	(0.00)	(-0.01)	(0.78)	(0.86)
CASH_RATIO	-0.012	-0.012	0.004	0.004	0.004	0.004	0.001	0.001
	(-0.58)	(-0.58)	(1.05)	(1.04)	(1.02)	(1.02)	(0.04)	(0.03)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
FC	-0.011	-0.010	0.028*	0.028*	0.005	0.005	-0.220	-0.216
	(-0.20)	(-0.18)	(1.70)	(1.74)	(0.96)	(0.96)	(-1.31)	(-1.28)
Post-FC	-0.051	-0.049	0.054**	0.055**	0.009	0.009	-0.179***	-0.175***
	(-1.06)	(-1.04)	(2.11)	(2.10)	(1.38)	(1.40)	(-2.84)	(-2.77)
Post-Enron	-0.058	-0.051	-0.018	-0.014	-0.008	-0.008	0.244*	0.263*
	(-1.16)	(-1.01)	(-1.19)	(-0.93)	(-0.86)	(-0.89)	(1.78)	(1.93)
CONS	0.578***	0.298*	0.522***	0.334***	0.257***	0.268***	0.577	-0.268
	(2.70)	(1.77)	(6.41)	(12.22)	(9.24)	(10.48)	(1.31)	(-0.79)
N	8519	8519	8519	8519	8519	8519	8519	8519
adj. R^2	0.018	0.018	0.207	0.206	0.053	0.053	0.094	0.094

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses, and others are based on two-tailed tests.

In sum, our hypotheses are supported, and the results are consistent with the viewpoint from Cho et al. (2013), who suggest the importance of separately considering both positive and negative CSR performances. Generally, these results suggest that a firm with superior CSR performance would have lower liquidity risk and market risk.

4.2 Robustness Tests

4.2.1 1% Outliers Deletion Rule

To reduce the potential effects of outliers, we winsorize top and bottom 1% observations for each continuous variable and repeat risk regressions from Table 3 to Table 6. In unreported analyses, all of our primary inferences remain largely unchanged.

4.2.2 A Direct Measure of the Cost of Capital

In this section, we estimate the cost of capital directly to investigate the effect of CSR performance on the cost of capital instead of risk. To construct the cost of capital variables, we follow Fu, Kraft, and Zhang (2012), who define five proxies for the cost of capital based on the CAPM, Fama-French three-factor model, and earnings-to-price ratio to calculate five measures of the cost of capital. The first measure uses compounded twelve monthly returns. In the second measure, we regress the stock return on the market return (value-weighted CRSP returns) by each firm and past five years, and the estimated expected return is the cost of capital estimate. In the third measure, we use Fama-French three-factor model to obtain the estimated expected return as a proxy for the cost of capital. In the fourth measure, we use the earnings-to-price ratio as the measure of the cost of capital by using earnings per share including extraordinary items as the earnings. In the final measure, which is similar to the fourth measure, we use earnings per share excluding extraordinary items as the earnings to calculate the earnings-to-price ratio. The results for four models to test the effects of CSR performance on the cost of capital are shown in Table 7. In panel A, we find that *CSR_STR* is significantly negatively correlated with *FRET1* (-0.185, t = -5.44; -0.032, t = -2.84) (non-standardized and standardized value), *EP_EPSPI* (-4.251, t = -1.47; -0.875, t = -1.37) (non-standardized and standardized value), and *EP_EPSPX* (-4.243, t = -1.46; -0.893, t = -1.40) (non-standardized and standardized value), with the exception of the coefficient on *R_HAT_FF* (1.270, t = 1.36) (standardized value) which is significantly positive at 10% significance level under one-tailed test. We also find that *CSR_CON* is significantly negatively correlated with *FRET1* (-0.259, t = -4.23) (non-standardized value), *R_HAT_MARKET* (-4.716, t = -2.21) (non-standardized value), with the exception of *R_HAT_FF* (1.797, t = 2.53) (standardized value). In panel

B, the results are qualitatively similar to those in panel A. The results indicate that the information asymmetry effect is weaker than the information precision effect, so the cost of capital will be decreased as we find that the information regarding CSR decreases the cost of capital for both CSR strength score and CSR concern score. When we separate the CSR performance into seven CSR dimensional performances, the results are presented in panel C. The results show that *COMMUNITY* is significantly negatively correlated with *FRET1* (-0.167, *t* = -1.68; -0.010, *t* = -1.98) (non-standardized and standardized value), *ENVIRONMENT* is significantly negatively correlated with *FRET1* (-0.273, *t* = -1.64) (non-standardized value), *EP_EPSPI* (-10.680, *t* = -2.09) (non-standardized value), and *EP_EPSPX* (-10.510, *t* = -2.00) (non-standardized value), *DIVERSITY* is significantly negatively correlated with *FRET1* (-0.428, *t* = -3.75; -0.024, *t* = -2.18) (non-standardized and standardized value), *EP_EPSPI* (-12.300, *t* = -1.40; -0.811, *t* = -1.45) (non-standardized and standardized value), and *EP_EPSPX* (-12.190, *t* = -1.40; -0.818, *t* = -1.48) (non-standardized and standardized value), *EMPLOYEE* is significantly negatively correlated with *R_HAT_MARKET* (-37.580, *t* = -2.02; -1.316, *t* = -1.64) (non-standardized and standardized value), *EP_EPSPI* (-5.568, *t* = -1.32) (non-standardized value), and *EP_EPSPX* (-5.825, *t* = -1.39) (non-standardized value), and *PRODUCT* is significantly negatively correlated with *R_HAT_FF* (-37.720, *t* = -4.68; -2.119, *t* = -4.60) (non-standardized and standardized value), with the exception of *PRODUCT* (0.223, *t* = 1.46) (non-standardized value) and *HUMAN* (0.011, *t* = 1.65) (standardized value) which are slightly positively correlated with *FRET1*. Similarly, *GOVERNANCE* is significantly positively correlated with *FRET1* (1.461, *t* = 5.26; 0.023, *t* = 1.77) (non-standardized and standardized value), *R_HAT_MARKET* (44.810, *t* = 1.39) (non-standardized value), *R_HAT_FF* (40.550, *t* = 1.64) (non-standardized value), *EP_EPSPI* (29.470, *t* = 1.57; 1.127, *t* = 1.47) (non-standardized and standardized value), and *EP_EPSPX* (29.340, *t* = 1.56; 1.125, *t* = 1.46) (non-standardized and standardized value). However, when we aggregate seven CSR dimensions' performances into one index, *CSRCOMPOSIT*, there is a significantly negative relation between the CSR performance and EP ratio, which is at least significant at a 10% significance level under one-tailed test in panel D. Therefore, this shows that superior CSR performance reduces the cost of capital, and the hypotheses are supported. Nevertheless, we find that CSR performance regarding corporate governance may lower a firm's risk, but increase the cost of capital of a firm. Although there is a positive association between corporate governance and the cost of capital, the corporate governance dimension is distinct from other social and environmental dimensions (Kim et al., 2012; Kim et al., 2014). If we exclude the corporate governance dimension from the CSR activities, the conclusion would lead to CSR performance being negatively related to the cost of capital. In order to distinguish between good and bad performers on each CSR dimensions, Bouslah et al. (2013) consider strengths and concerns separately and find that both corporate governance concerns and strengths positively affect a firm's risk. They attribute this inconsistent impact to the fact that market participants do not agree on the value of the strengths and their impacts on the moments of cash flows. In addition, appropriate cost of equity capital estimates are difficult to obtain, so prior research adopts indirect estimates of cost of equity capital (Botosan, 1997). Several studies suggest that there are measurement errors in estimating the cost of capital, which can lead to spurious inferences, including studies by Goolsbee (2000) and Wang (2012). These measurement errors are also possible explanations for this observed contradiction on the positive relationship between corporate governance performance and the cost of capital.

4.2.3 Models Controlled for Industry Effects

In order to control for industry effects of biasing our results, we separate our sample into 9 industries and add industry dummy variables into the CSR performance models (Model 1 to Model 4) as control variables in Table 8 and Table 9. The results show that these analyses yield inferences qualitatively similar to those without industry effects controlled. In particular, the coefficients of *CSR_STR* and *TOTAL_CSR_STR* on *R_HAT_MARKET*, and the coefficients of *CSR_CON* and *TOTAL_CSR_CON* on *FRET1* turn to be significant. Especially when we re-estimate Model 3 for cost of capital regressions by industry, untabulated results show that the effects of *GOVERNANCE* on the cost of capital are still positive, with the exception of *R_HAT_MARKET* regression (-3.037, t = -2.23) (standardized value) when observations are those firms in Retail Trade industry, indicating that the positive effects of *GOVERNANCE* on the cost of capital are not driven by industry.

Table 7 Cost of Capital Regression Analysis

	FRET1 Non-standard	*FRET1* Standard	*R_HAT_MARKET* Non-standard	*R_HAT_MARKET* Standard
Panel A: Model 1				
CSR_STR	-0.185***	-0.032***	-1.562	-0.224
	(-5.44)	(-2.84)	(-1.09)	(-0.40)
CSR_CON	-0.259***	-0.020	-4.716**	0.174
	(-4.23)	(-1.25)	(-2.21)	(0.53)
Panel B: Model 2				
TOTAL_CSR_STR	-0.027***	-0.032***	-0.223	-0.224
	(-5.44)	(-2.84)	(-1.09)	(-0.40)
TOTAL_CSR_CON	-0.037***	-0.020	-0.674**	0.174
	(-4.23)	(-1.25)	(-2.21)	(0.53)
Panel C: Model 3				
COMMUNITY	-0.167**	-0.010**	2.082	-0.166
	(-1.68)	(-1.98)	(0.15)	(-0.56)
ENVIRONMENT	-0.273*	0.002	2.527	-0.195
	(-1.64)	(0.49)	(0.28)	(-0.37)
DIVERSITY	-0.428***	-0.024**	2.449	0.440
	(-3.75)	(-2.18)	(0.14)	(0.33)
EMPLOYEE	-0.087	-0.002	-37.580**	-1.316*
	(-0.75)	(-0.32)	(-2.02)	(-1.64)
PRODUCT	0.223*	0.001	7.792	0.088
	(1.46)	(0.11)	(1.23)	(0.36)
GOVERNANCE	1.461***	0.023**	44.810*	0.925
	(5.26)	(1.77)	(1.39)	(0.66)
HUMAN	0.594	0.011**	-5.139	0.098
	(1.24)	(1.65)	(-0.29)	(0.26)
Panel D: Model 4				
CSRCOMPOSIT	0.141	-0.006	16.550	-0.097
	(0.29)	(-0.65)	(0.82)	(-0.26)

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses and others are based on two-tailed tests.

R_HAT_FF Non-standard	R_HAT_FF Standard	EP_EPSPI Non-standard	EP_EPSPI Standard	EP_EPSPX Non-standard	EP_EPSPX Standard
1.685	1.270*	-4.251*	-0.875*	-4.243*	-0.893*
(0.97)	(1.36)	(-1.47)	(-1.37)	(-1.46)	(-1.40)
3.978	1.797***	-0.299	0.048	-0.305	0.0612
(1.05)	(2.53)	(-0.29)	(0.34)	(-0.29)	(0.42)
0.241	1.270*	-0.607*	-0.875*	-0.606*	-0.893*
(0.97)	(1.36)	(-1.47)	(-1.37)	(-1.46)	(-1.40)
0.568	1.797***	-0.043	0.048	-0.044	0.061
(1.05)	(2.53)	(-0.29)	(0.34)	(-0.29)	(0.42)
-0.192	0.661	-15.430	-0.540	-15.640	-0.555
(-0.01)	(0.91)	(-1.15)	(-0.87)	(-1.15)	(-0.89)
-10.370	-0.433	-10.680**	-0.209	-10.510**	-0.197
(-1.03)	(-0.96)	(-2.09)	(-1.06)	(-2.00)	(-1.00)
2.577	0.395	-12.300*	-0.811*	-12.190*	-0.818*
(0.24)	(0.45)	(-1.40)	(-1.45)	(-1.40)	(-1.48)
6.654	0.762	-5.568*	-0.116	-5.825*	-0.144
(0.37)	(1.02)	(-1.32)	(-0.68)	(-1.39)	(-0.85)
-37.720***	-2.119***	1.159	-0.118	1.409	-0.109
(-4.68)	(-4.60)	(0.49)	(-0.96)	(0.59)	(-0.87)
40.550*	0.093	29.470*	1.127*	29.340*	1.125*
(1.64)	(0.13)	(1.57)	(1.47)	(1.56)	(1.46)
-25.860	-0.440	4.550	-0.012	4.281	-0.011
(-1.12)	(-1.24)	(0.54)	(-0.09)	(0.49)	(-0.08)
-20.240	-0.483	-28.990**	-0.568*	-28.840**	-0.579*
(-0.77)	(-0.95)	(-1.65)	(-1.45)	(-1.66)	(-1.49)

Table 8 Risk Regression Analysis Controlled for Industry Effects

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
Panel A: Model 1								
CSR_STR	-0.038	-0.013	-0.014*	-0.005**	-0.006**	-0.001	-0.170***	-0.042**
	(-0.83)	(-1.03)	(-1.53)	(-1.81)	(-1.72)	(-0.73)	(-2.51)	(-2.10)
CSR_CON	0.063*	0.024***	0.047***	0.011**	-0.012	-0.001	0.107**	0.028*
	(1.28)	(3.20)	(2.41)	(2.25)	(-1.08)	(-0.49)	(1.83)	(1.56)
Panel B: Model 2								
TOTAL_CSR_STR	-0.005	-0.013	-0.002*	-0.005**	-0.001**	-0.001	-0.024***	-0.042**
	(-0.83)	(-1.03)	(-1.53)	(-1.81)	(-1.72)	(-0.73)	(-2.51)	(-2.10)
TOTAL_CSR_CON	0.009*	0.024***	0.007***	0.011**	-0.002	-0.001	0.015**	0.028*
	(1.28)	(3.20)	(2.41)	(2.25)	(-1.08)	(-0.49)	(1.83)	(1.56)
Panel C: Model 3								
COMMUNITY	0.077	0.007	0.017	-0.000	0.120**	0.004***	-0.474*	-0.024**
	(0.36)	(0.85)	(0.38)	(-0.05)	(2.36)	(2.41)	(-1.47)	(-2.12)
ENVIRONMENT	-0.362**	-0.018**	-0.040	-0.002	0.048	0.003*	-0.507	-0.012
	(-1.75)	(-2.02)	(-0.80)	(-0.49)	(1.01)	(1.56)	(-1.14)	(-0.55)
DIVERSITY	-0.069	-0.006	-0.064**	-0.006***	-0.038*	-0.003	-0.518***	-0.031*
	(-0.63)	(-0.55)	(-2.28)	(-2.42)	(-1.35)	(-1.15)	(-2.65)	(-1.54)
EMPLOYEE	0.016	-0.008*	-0.026	-0.001	-0.088**	-0.004**	-0.519**	-0.014*
	(0.12)	(-1.33)	(-0.62)	(-0.43)	(-2.13)	(-1.79)	(-2.35)	(-1.35)
PRODUCT	0.042	-0.006	-0.069*	-0.005*	-0.014	-0.000	0.323	0.016
	(0.21)	(-0.48)	(-1.54)	(-1.45)	(-0.46)	(-0.22)	(1.17)	(0.80)
GOVERNANCE	-0.282**	-0.011**	-0.156**	-0.003	0.049	-0.000	0.332	0.007
	(-1.72)	(-1.82)	(-1.80)	(-1.19)	(1.06)	(-0.19)	(0.70)	(0.37)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard	$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
HUMAN	0.196	0.005	0.020	-0.001	0.024	-0.000	0.444	-0.003
	(0.24)	(0.37)	(0.16)	(-0.56)	(0.24)	(-0.01)	(0.38)	(-0.17)
Panel D: Model 4								
CSRCOMPOSIT	-0.574**	-0.015**	-0.378**	-0.007**	0.017	0.000	-1.703***	-0.032**
	(-2.13)	(-2.14)	(-2.36)	(-2.01)	(0.34)	(0.04)	(-2.80)	(-1.78)

Note: All variables are calculated as described in the Appendix A.

Note: t statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the p-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses and others are based on two-tailed tests.

Table 9 Cost of Capital Regression Analysis Controlled for Industry Effects

	FRET1	*FRET1*	*R_HAT_MARKET*	*R_HAT_MARKET*
	Non-standard	Standard	Non-standard	Standard
Panel A: Model 1				
CSR_STR	-0.188***	-0.036***	-1.829*	-0.366
	(-5.86)	(-3.47)	(-1.36)	(-0.65)
CSR_CON	-0.248***	-0.026**	-4.929**	-0.100
	(-4.20)	(-1.87)	(-2.22)	(-0.22)
Panel B: Model 2				
TOTAL_CSR_STR	-0.027***	-0.036***	-0.261*	-0.366
	(-5.86)	(-3.47)	(-1.36)	(-0.65)
TOTAL_CSR_CON	-0.036***	-0.026**	-0.704**	-0.100
	(-4.20)	(-1.87)	(-2.22)	(-0.22)
Panel C: Model 3				
COMMUNITY	-0.169**	-0.011**	1.561	-0.093
	(-1.75)	(-2.32)	(0.11)	(-0.30)
ENVIRONMENT	-0.327**	0.001	0.126	-0.086
	(-1.98)	(0.23)	(0.01)	(-0.18)
DIVERSITY	-0.435***	-0.025**	3.774	0.287
	(-4.28)	(-2.35)	(0.22)	(0.21)
EMPLOYEE	-0.092	-0.002	-39.160**	-1.315*
	(-0.78)	(-0.33)	(-2.10)	(-1.60)
PRODUCT	0.238**	0.004	5.339	0.151
	(1.65)	(0.51)	(0.94)	(0.73)
GOVERNANCE	1.471***	0.025**	48.290*	0.915
	(5.34)	(2.18)	(1.45)	(0.63)
HUMAN	0.536	0.012**	-1.443	0.136
	(1.14)	(1.77)	(-0.08)	(0.36)
Panel D: Model 4				
CSRCOMPOSIT	0.083	-0.006	15.590	-0.059
	(0.18)	(-0.63)	(0.83)	(-0.15)

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses and others are based on two-tailed tests.

R_HAT_FF Non-standard	*R_HAT_FF* Standard	*EP_EPSPI* Non-standard	*EP_EPSPI* Standard	*EP_EPSPX* Non-standard	*EP_EPSPX* Standard
1.959	1.308*	-4.083*	-0.965*	-4.096*	-0.983*
(1.10)	(1.43)	(-1.41)	(-1.31)	(-1.41)	(-1.33)
4.181	1.923***	-0.236	-0.076	-0.247	-0.0642
(1.09)	(2.61)	(-0.27)	(-0.37)	(-0.27)	(-0.30)
0.280	1.308*	-0.583*	-0.965*	-0.585*	-0.983*
(1.10)	(1.43)	(-1.41)	(-1.31)	(-1.41)	(-1.33)
0.597	1.923***	-0.034	-0.076	-0.035	-0.064
(1.09)	(2.61)	(-0.27)	(-0.37)	(-0.27)	(-0.30)
-1.465	0.629	-16.130	-0.551	-16.330	-0.565
(-0.07)	(0.84)	(-1.14)	(-0.91)	(-1.14)	(-0.93)
-11.310	-0.463	-12.350**	-0.217	-12.200**	-0.202
(-1.12)	(-0.94)	(-2.35)	(-1.10)	(-2.26)	(-1.01)
2.329	0.417	-11.410*	-0.871*	-11.340*	-0.879*
(0.21)	(0.46)	(-1.37)	(-1.40)	(-1.37)	(-1.43)
9.415	0.749	-5.247	-0.113	-5.526	-0.141
(0.52)	(1.01)	(-1.15)	(-0.65)	(-1.23)	(-0.81)
-36.050***	-2.132***	0.220	-0.059	0.488	-0.051
(-4.26)	(-4.66)	(0.11)	(-0.50)	(0.26)	(-0.42)
40.150*	0.106	31.450*	1.169*	31.290*	1.166*
(1.60)	(0.15)	(1.54)	(1.49)	(1.53)	(1.48)
-26.550	-0.444	7.952	0.003	7.556	0.005
(-1.10)	(-1.26)	(0.81)	(0.02)	(0.74)	(0.03)
-19.060	-0.505	-28.050*	-0.566*	-28.030*	-0.577*
(-0.78)	(-0.99)	(-1.54)	(-1.46)	(-1.55)	(-1.51)

4.2.4 Models Controlled for Reverse Causality

In order to alleviate possible reverse causality concern and potential endogeneity, we follow Jiraporn, Jiraporn, Boeprasert, and Chang (2014) to re-estimate CSR performance models (Model 1 to Model 4) by using lagged CSR performance instead of contemporaneous CSR performance in Table 10 to Table 11, and we reduce the sample size to 3,689 observations. The results remain similar to those using contemporaneous CSR performance. Although some variables of interest turn to be insignificant, many variables turn to be more significant. For example, for risk regressions, the coefficients of

Table 10 Risk Regression Analysis Controlled for Reverse Causality

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard
Panel A: Model 1			
CSR_STR	0.014	0.005	-0.032*
	(0.35)	(0.43)	(-1.64)
CSR_CON	0.043*	0.008	0.036**
	(1.42)	(1.26)	(2.11)
Panel B: Model 2			
TOTAL_CSR_STR	0.002	0.005	-0.005*
	(0.35)	(0.43)	(-1.64)
TOTAL_CSR_CON	0.006*	0.008	0.005**
	(1.42)	(1.26)	(2.11)
Panel C: Model 3			
COMMUNITY	-0.012	0.014*	0.017
	(-0.06)	(1.37)	(0.22)
ENVIRONMENT	-0.111	-0.008*	-0.121*
	(-0.54)	(-1.46)	(-1.41)
DIVERSITY	-0.006	-0.003	-0.080*
	(-0.04)	(-0.22)	(-1.35)
EMPLOYEE	0.005	-0.005	-0.016
	(0.03)	(-0.62)	(-0.35)
PRODUCT	0.000	0.000	-0.099*
	(0.00)	(0.02)	(-1.58)

CSR_CON and *TOTAL_CSR_CON* on β^L (standardized value) turn to be insignificant, but the coefficients of *CSR_STR* and *TOTAL_CSR_STR* on $cov(L_i, R_m)$ (standardized value) turn to be significant. For cost of capital regressions, the coefficients of *COMMUNITY* on *FRET1* turn to be insignificant, but the coefficients of *COMMUNITY* on *EP_EPSPI* and *EP_EPSPX* turn to be significant, etc. Furthermore, *GOVERNANCE* still has a positive relationship with the cost of capital, and the composite index of CSR performance still significantly negatively related with the cost of capital. Thus, CSR variables are not endogenous variables.

$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
-0.011**	-0.005*	-0.003**	-0.212***	-0.045**
(-1.99)	(-1.47)	(-1.71)	(-4.08)	(-2.20)
0.007***	-0.001	0.001	0.229**	0.051*
(2.72)	(-0.05)	(0.19)	(2.08)	(1.61)
-0.011**	-0.001*	-0.003**	-0.030***	-0.045**
(-1.99)	(-1.47)	(-1.71)	(-4.08)	(-2.20)
0.007***	-0.000	0.001	0.033**	0.051*
(2.72)	(-0.05)	(0.19)	(2.08)	(1.61)
-0.004	0.105*	0.000	-0.458	-0.026**
(-1.22)	(1.62)	(0.09)	(-1.11)	(-1.95)
-0.005**	0.020	0.002	-0.753*	-0.023
(-1.74)	(0.27)	(0.65)	(-1.47)	(-0.93)
-0.002	-0.033*	-0.002	-0.436**	-0.006
(-0.63)	(-1.28)	(-0.60)	(-2.37)	(-0.27)
-0.001	-0.059	-0.003	-0.574**	-0.016
(-0.48)	(-1.17)	(-1.21)	(-1.99)	(-0.84)
-0.009**	-0.066**	-0.005***	0.253	0.003
(-2.14)	(-1.85)	(-2.57)	(0.70)	(0.16)

	β^L Non-standard	β^L Standard	$cov(L_i, L_m)$ Non-standard
GOVERNANCE	0.125	0.001	-0.085
	(0.48)	(0.05)	(-0.76)
HUMAN	-0.355	-0.005	0.094
	(-0.68)	(-0.65)	(0.69)
Panel D: Model 4			
CSRCOMPOSIT	-0.129	0.003	-0.45**
	(-0.42)	(0.40)	(-1.92)

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses and others are based on two-tailed tests.

$cov(L_i, L_m)$ Standard	$cov(L_i, R_m)$ Non-standard	$cov(L_i, R_m)$ Standard	β^M Non-standard	β^M Standard
-0.001	0.044	0.000	-0.283	-0.020
(-0.15)	(0.77)	(0.10)	(-0.36)	(-0.70)
0.002	0.118	0.001	-0.875	-0.014
(0.66)	(1.23)	(0.46)	(-0.41)	(-0.49)
-0.011***	-0.054	-0.002	-2.636***	-0.042**
(-2.51)	(-0.53)	(-0.95)	(-3.74)	(-1.69)

Table 11 Cost of Capital Regression Analysis Controlled for Reverse Causality

	FRET1	*FRET1*	*R_HAT_MARKET*	*R_HAT_MARKET*
	Non-standard	Standard	Non-standard	Standard
Panel A: Model 1				
CSR_STR	-0.163***	-0.035**	1.669	0.250
	(-3.88)	(-2.37)	(0.50)	(0.36)
CSR_CON	-0.089**	-0.012	-4.182*	-0.636
	(-1.80)	(-0.99)	(-1.57)	(-1.11)
Panel B: Model 2				
TOTAL_CSR_STR	-0.023***	-0.035**	0.238	0.250
	(-3.88)	(-2.37)	(0.50)	(0.36)
TOTAL_CSR_CON	-0.013**	-0.012	-0.597*	-0.636
	(-1.80)	(-0.99)	(-1.57)	(-1.11)
Panel C: Model 3				
COMMUNITY	-0.032	0.001	0.714	-0.057
	(-0.24)	(0.14)	(0.05)	(-0.17)
ENVIRONMENT	-0.261**	-0.003	8.287	0.098
	(-1.79)	(-0.62)	(0.49)	(0.12)
DIVERSITY	-0.369***	-0.029***	11.250	1.090
	(-2.71)	(-2.57)	(0.36)	(0.50)
EMPLOYEE	-0.157**	-0.001	-49.140**	-1.692*
	(-1.70)	(-0.46)	(-1.74)	(-1.29)
PRODUCT	0.133	0.003	11.470**	0.362
	(1.08)	(0.37)	(2.09)	(1.03)
GOVERNANCE	0.428***	0.010*	67.650	2.194
	(3.71)	(1.56)	(0.96)	(0.88)
HUMAN	0.548***	0.003	-8.195	-0.212
	(2.48)	(0.54)	(-0.38)	(-0.59)
Panel D: Model 4				
CSRCOMPOSIT	-0.641**	-0.013**	38.100	0.536
	(-2.25)	(-2.14)	(1.22)	(0.85)

Note: All variables are calculated as described in the Appendix A.

Note: *t* statistics in parentheses.* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$, the *p*-values are based on standard errors clustered by firm and year. The significance of CSR variables are based on one-tailed or two-tailed tests according to our hypotheses and others are based on two-tailed tests.

	R_HAT_FF Non-standard	*R_HAT_FF* Standard	*EP_EPSPI* Non-standard	*EP_EPSPI* Standard	*EP_EPSPX* Non-standard	*EP_EPSPX* Standard
	0.642	-0.225	-2.053**	-0.334	-2.086**	-0.357
	(0.30)	(-0.31)	(-1.71)	(-1.18)	(-1.73)	(-1.27)
	5.666**	1.290*	0.564	0.023	0.456	0.025
	(1.74)	(1.44)	(0.63)	(0.15)	(0.48)	(0.15)
	0.092	-0.225	-0.293**	-0.334	-0.298**	-0.357
	(0.30)	(-0.31)	(-1.71)	(-1.18)	(-1.73)	(-1.27)
	0.809**	1.290*	0.081	0.023	0.065	0.025
	(1.74)	(1.44)	(0.63)	(0.15)	(0.48)	(0.15)
	6.221	0.456	-8.977**	-0.312*	-8.520**	-0.298*
	(0.43)	(0.72)	(-1.98)	(-1.73)	(-1.79)	(-1.60)
	-31.280*	-2.057**	-6.908	-0.084	-6.536	-0.051
	(-1.53)	(-1.97)	(-1.09)	(-0.35)	(-1.01)	(-0.21)
	15.620**	0.738	-10.960	-0.526	-11.030	-0.564
	(1.75)	(0.78)	(-1.18)	(-0.69)	(-1.19)	(-0.75)
	7.784	0.624	5.281	0.287	5.216	0.272
	(0.38)	(0.72)	(0.90)	(1.01)	(0.88)	(0.96)
	-30.940***	-1.568**	0.227	-0.157	0.140	-0.174
	(-3.46)	(-2.05)	(0.08)	(-0.88)	(0.05)	(-1.00)
	-5.869	0.066	20.620**	0.648*	20.69**	0.661*
	(-0.36)	(0.10)	(2.09)	(1.49)	(2.10)	(1.52)
	-7.396	-0.27	-0.949	-0.046	-1.763	-0.058
	(-0.30)	(-0.68)	(-0.17)	(-0.53)	(-0.31)	(-0.66)
	-33.070*	-0.814**	-17.860**	-0.244*	-17.570**	-0.256**
	(-1.33)	(-1.95)	(-2.15)	(-1.55)	(-2.10)	(-1.68)

5. Conclusions

This paper investigates the effects of CSR on financial risk. In particular, this study uses market risk and liquidity risk as measures of systematic risk. This paper is motivated by Lang and Maffett (2011), Ng (2011), and Sadka (2011), who suggest that higher information quality can lower liquidity risk and, hence, lower the cost of capital.

In the present study, by empirically assessing the effect of CSR performance on financial risk, we infer that a firm with superior CSR performance experiences lower market risk and liquidity risk. Through the robustness test, we also find that superior CSR performance reduces the cost of capital. Furthermore, we find that the performance of corporate governance activities increases the cost of capital, even though we control for industry effects. Although there is a positive association between corporate governance and the cost of capital, the corporate governance dimension is distinct from other social and environmental dimensions of CSR (Kim et al., 2012; Kim et al., 2014). Therefore, if we exclude the corporate governance dimension from CSR activities, we find that, in summary, CSR performance is negatively related to the cost of capital. In order to distinguish between good and bad performers on each CSR dimension, Bouslah et al. (2013) consider strengths and concerns separately and find that both corporate governance concerns and strengths positively affect a firm’s risk. They attribute this inconsistent impact to the fact that market participants do not agree on the value of the strengths and their impacts on the moments of cash flows. In addition, appropriate cost of equity capital estimates are difficult to obtain, so prior research adopts indirect estimates of cost of equity capital (Botosan, 1997). Several studies suggest that there are measurement errors in estimating the cost of capital, which can lead to spurious inferences, including studies by Goolsbee (2000) and Wang (2012). These measurement errors are also possible reasons for the observed contradiction of the positive relationship between corporate governance performance and the cost of capital.

Although there is a conflict between profit maximizing and social welfare maximizing, our findings are consistent with Jensen (2001) statement that “We cannot maximize the long-term market value of an organization if we ignore or mistreat any important constituency (stakeholder).” Firms will benefit from CSR activities, especially from superior CSR performance. Therefore, our results have implications for firms which are going to participate in corporate responsibility activities, as they indicate that the benefit of superior CSR performance outweighs the increased costs of CSR. Simultaneously, a firm will benefit from lower cost of capital.

The present research is subject to limitations. First, although CSR reporting can be viewed as a self-selecting process, ESG data sources are gathered from direct communications with companies, annual reports, 10-Ks, proxies, 20-Fs, sustainability/CSR reports, and so forth. As such, the current study is different from that by Dhaliwal et al. (2011), who use an indicator variable that equals 1 if a firm discloses a standalone CSR report. Hence, we hardly control for the incentives of CSR disclosure. Accordingly, this is a study of association, not causation, and it is therefore vulnerable to the possibility that unobserved factors may drive the reported findings. Second, Lubos Pástor's website only provides the monthly liquidity factor data, such that we cannot use daily data to estimate the β^L. However, when we use the prior five years' monthly data to estimate the β^L and re-run the CSR performance models, the primary results are qualitatively the same. Third, we do not exclude the possibility that risk might be a moderator variable or mediator variable in which CSR performance can reduce the cost of capital. As such, whether risk is a moderator variable or mediator variable needs to be further investigated.

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Appendix A: Variable Definitions

Variable	**Definition**
COMMUNITY	(sum of all community strength score minus the sum of all community concern score plus total maximum possible number of community concern score) divided by (total maximum possible number of community strength score plus total maximum possible number of community concern score)
ENVIRONMENT	(sum of all environment strength score minus the sum of all environment concern score plus total maximum possible number of environment concern score) divided by (total maximum possible number of environment strength score plus total maximum possible number of environment concern score)
DIVERSITY	(sum of all diversity strength score minus the sum of all diversity concern score plus total maximum possible number of diversity concern score) divided by (total maximum possible number of diversity strength score plus total maximum possible number of diversity concern score)
EMPLOYEE	(sum of all employee strength score minus the sum of all employee concern score plus total maximum possible number of employee concern score) divided by (total maximum possible number of employee strength score plus total maximum possible number of employee concern score)
PRODUCT	(sum of all product strength score minus the sum of all product concern score plus total maximum possible number of product concern score) divided by (total maximum possible number of product strength score plus total maximum possible number of product concern score)
GOVERNANCE	(sum of all governance strength score minus the sum of all governance concern score plus total maximum possible number of governance concern score) divided by (total maximum possible number of governance strength score plus total maximum possible number of governance concern score)
HUMAN	(sum of all human strength score minus the sum of all human concern score plus total maximum possible number of human concern score) divided by (total maximum possible number of human strength score plus total maximum possible number of human concern score)
CSRCOMPOSITE	corporate social combined score = (COMMUNITY + ENVIRONMENT + DIVERSITY + EMPLOYEE + PRODUCT + GOVERNANCE + HUMAN) / 7
CSR_STR	the average strength of all dimensions
CSR_CON	the average concern of all dimensions
TOTAL_CSR_STR	the total strength of all dimensions
TOTAL_CSR_CON	the total concern of all dimensions
L	the market liquidity factor
MKT	the Fama and French (1993) risk factor, is the excess return on the market
SMB	the Fama and French (1993) risk factor, is the average return on the three small portfolios minus the average return on the three big portfolios (market capitalization)

Variable	**Definition**
HML	the Fama and French (1993) risk factor, is the average return on the two value portfolios minus the average return on the two growth portfolios (book-to-market ratio)
β^L	an coefficient on liquidity factor in Pástor and Stambaugh (2003) four-factor model
β^M	an coefficient on market factor in Pástor and Stambaugh (2003) four-factor model
$cov(L_i, R_m)$	the R^2 from the following regression by firm and year: $\%\Delta DPI_{i,t} = \alpha_i + \beta_{i,1}MKTRET_{m,t-1} + \beta_{i,2}MKTRET_{m,t} + \beta_{i,3}MKTRET_{m,t+1} + \varepsilon_{i,t}$
$cov(L_i, L_m)$	the R^2 from the following regression by firm and year: $\%\Delta DPI_{i,t} = \alpha_i + \beta_{i,1}\%\Delta DPI_{m,t-1} + \beta_{i,2}\%\Delta DPI_{m,t} + \beta_{i,3}\%\Delta DPI_{m,t+1} + \varepsilon_{i,t}$
DPI	$\frac{\lvert R \rvert}{PVO}$, *R* is the monthly percentage price change, *P* is price, and *VO* is the trading volume
$\%\Delta DPI$	the monthly percentage change in *DPI*
MKTRET	the monthly country-level market return (CRSP value-weighted return including distributions)
FRET1	the measure is compounded the twelve monthly returns
R_HAT_MARKET	the estimated expected return which is estimated by regressing the stock return on the market return (value-weighted CRSP returns) for each firm-year observation in the past five years
R_HAT_FF	the estimated expected return which is estimated by regressing Fama-French three-factor model
EP_EPSPI	the earnings-to-price ratio by using earnings per share including extraordinary items as the earnings
EP_EPSPX	the earnings-to-price ratio by using earnings per share excluding extraordinary items as the earnings
SIZE	the natural log of market value of equity
BTM	annual book value of equity divided by market value of equity
STDRET	the standard deviation of monthly stock returns
ILLIQ	the average annually *DPI*, which is multiplied by 1000
STD_SALES_ME	The standard deviation of total sales deflated by mean sales, calculated over the last five fiscal years
LOSS	The proportion of years that the firm experienced a loss in the last five fiscal years
SALES_GROWTH	The logged value of the change in sales over the prior year (r.f. Fu et al., (2012) *log(GRWOTH)*)
CYCLE	The operating cycle based on inventory turnover and accounts receivable turnover as calculated by the total of the number of days in accounts receivable and inventory, divided by 365

Variable	**Definition**
INTENSITY	The ratio of net plant, property, and equipment to total assets
CASH_RATIO	The ratio of cash and cash equivalent to total current liabilities
FC	an indicator equals one if the sample period is across the year of global financial crisis from 2007 to 2009
Post-FC	an indicator equals one if the sample period is across post-financial crisis period
Post-Enron	an indicator equals one if the sample period is across the Enron period

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