# Does Corporate Social Responsibility Facilitate Public Debt Financing?

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## Abstract

We find that firms with stronger CSR performance have a larger share of public debt in their total debt, particularly when they are subject to higher information asymmetry or greater financial constraints. Moreover, the CSR effect on public debt is weaker for firms in sin industries or low-trust regions where CSR is less likely to be viewed as a genuine commitment. Utilizing the BP oil spill event as a shock to investors' CSR awareness, we document that the positive effect of CSR on public debt is more evident after the shock, particularly for firms outside the oil and gas industries.



**Keywords:** public debt, bank debt, debt structure, corporate social responsibility

## 1 INTRODUCTION

Prior studies establish that public debt investors are more sensitive to and concerned about agency problems and asymmetric information than private debt investors such as banks (Denis and Mihov, 2003; Krishnaswami et al., 1999; Myers, 1977). Compared with banks, public debt investors are less effective in monitoring borrowing firms and have information disadvantages in assessing firms' creditworthiness (Diamond, 1991; Besanko and Kanatas, 1993; Nakamura, 1993). Thus, hefty agency and information costs often limit firms' access to the public debt market, making firms rely more on bank debt financing (Johnson, 1997). Building on recent studies documenting that better corporate social responsibility (CSR) performance mitigates agency costs and information asymmetry (e.g., Bénabou and Tirole, 2010; Cheng et al., 2014; Cui et al., 2016), we hypothesize that CSR facilitates a firm's public debt financing because potential public debt investors are more willing to invest in more socially responsible firms. By examining the relation between CSR and corporate uses of public debt, our analysis aims to shed light on the financial implications of CSR and the determinants of corporate debt ownership structure.[1]

We measure firms' CSR performance using CSR scores compiled by MSCI ESG Stat, which covers six essential CSR dimensions. The debt structure data from Capital IQ allows us to separate public debt (e.g., senior and subordinate bonds and notes; commercial papers) from bank debt (e.g., term loans and credit lines). Our baseline regression result shows that CSR performance is significantly and positively associated with the share of public debt in total debt. More specifically, firms with higher CSR performance use more senior and subordinate bonds and notes and rely less on term loans. Our finding substantiates the hypothesis that firms facing more severe agency problems and information asymmetry find it more difficult or costly to raise public debt than bank debt, while CSR mitigates both frictions, thereby facilitating public

[1] Colla et al. (2020) comprehensively review the literature on debt structure and highlight the importance of understanding the temporal variations in debt ownership structure.

debt financing (or reducing reliance on bank debt financing). The baseline result is robust to the inclusion of a wide range of firm and industry characteristics and firm fixed effects, alternative measures of CSR, and alternative estimation methods.

We perform a battery of tests to alleviate various endogeneity concerns. First, we address selection bias using propensity score matching (PSM) and bias-adjusted matching (Abadie and Imbens, 2006) approaches. Second, we conduct a two-stage least squares (2SLS) analysis using the political preference of a firm's headquarters state as an instrumental variable of CSR (Deng et al., 2013). We also use the proportion of votes received by the Democratic presidential candidate in a state as an alternative instrument for CSR (Albuquerque et al., 2019). The 2SLS results align with our baseline findings and are robust to controlling for selection bias using the Heckman (1979) treatment effect model. Third, we conduct a difference-in-differences (DiD) test using firms' initial inclusion into the Dow Jones Sustainability Index (DJSI), which sends a strong signal to the debt market about the superior CSR performance of indexed firms. We find that indexed firms' share of public debt in total debt increases substantially after being included in the DJSI relative to non-DJSI firms. Lastly, we exploit the BP oil spill as a quasi-experiment that generates a plausibly exogenous shock that makes investors more socially and environmentally conscious. We compare the CSR effects on public debt before and after the oil spill in a DiD framework. The results indicate that as investors value CSR more after the BP oil spill, stronger effects of CSR on debt structure appear in firms outside the oil and gas industries. This finding highlights that CSR performance becomes a more important driver of public debt financing as investors' awareness of the importance of CSR heightens. Overall, our endogeneity tests support a causal effect of CSR performance on corporate uses of public debt, although we cannot completely rule out endogeneity as a potential confounding factor.

Next, we explore the channels through which CSR shapes debt structure. We find that the positive relation between CSR and the share of public debt in total debt is more pronounced for firms with more severe agency problems, measured by takeover susceptibility, board independence, and a combination of high free cash flow and low growth opportunities. Furthermore, the positive effect of CSR on public debt financing is also more pronounced for firms with higher information asymmetry, measured by analyst coverage, the number of business segments, and stock return volatility. These findings imply that CSR performance affects corporate debt structure by mitigating agency and information costs, which are the major concerns of public debt investors. Additionally, we document that CSR is more pronounced in facilitating public debt financing for firms facing more financial constraints, as measured by the WW (Whited and Wu, 2006) index, the SA (Hadlock and Pierce, 2010) index, and credit ratings.

Finally, we conjecture that the strength of the positive relation between CSR and debt structure depends on investors' perception of CSR. Some firms' CSR activities may be considered as mock social stewardship or window dressing (e.g., Palazzo and Richter, 2005; Cai et al., 2012; Lins et al., 2017). Therefore, their CSR performance can be less valued by public debt investors. To test this, we employ two moderators: whether a firm belongs to sin industries and the level of regional trust. Our analysis reveals that CSR performance has a significantly positive effect on the share of public debt financing for firms in non-sin industries but not for those in sin industries. We also discover that firms headquartered in high-trust regions experience a more pronounced effect of CSR on public debt usage compared to those in low-trust areas. These results indicate that the CSR activities performed by firms in non-sin industries or high-trust regions are perceived as more credible by public debt investors. Moreover, we find that the effect of CSR on public debt usage is more pronounced when the stock valuation premium that investors place on CSR performance is high, confirming that

investors' CSR sentiment (Naughton et al., 2019) affects the association between CSR and debt structure.

The contributions of our study are twofold. First, we contribute to the literature on the economic benefits of CSR to firms. Complementing prior studies' findings that CSR increases firm value (e.g., Edmans, 2011; Flammer, 2015; Harjoto and Jo, 2015), decreases the cost of capital (Dhaliwal et al., 2012; El Ghoul et al., 2011), and reduces firm risk (Albuquerque et al., 2019; Luo and Bhattacharya, 2009), our results indicate a significant financial advantage of CSR in improving firms' access to public debt markets. The cross-sectional heterogeneity in our results substantiates that CSR influences firms' choice between public and bank debt through mitigating agency problems and information asymmetry. Moreover, our analysis highlights that the positive effect of CSR on public debt usage is sensitive to investors' perceptions and sentiments toward CSR activities.

Second, our findings enrich the literature on the determinants of corporate debt structure.[2] We investigate debt structure from a corporate philanthropy perspective and illustrate that CSR performance has a significant incremental explanatory power over a wide range of well-established determinants of corporate debt structure. Consistent with the substitutional relation between costly bank monitoring and alternative governance mechanisms (Bharath and Hertzel, 2019), our results imply that CSR serves as an effective governance mechanism, enabling firms to switch away from banks to public debt financing.

Our study is related to the literature focusing on the effect of CSR on the cost of debt. Goss and Roberts (2011) show that US firms' CSR concerns significantly increase the cost of bank loans. Menz (2010) documents that CSR performance does not have a significant impact on the cost of Euro corporate bonds, while Oikonomou et al. (2014) and Ge and Liu (2015) find that CSR strengths (concerns) significantly reduce (increase) the cost of public debt issued by

[2] See, among others, Bharath and Hertzel (2019), Boubaker et al. (2018), Denis and Mihov (2003), Houston and James (1996), Lemmon et al. (2008), Li et al. (2019), Lin et al. (2013), and Rauh and Sufi (2010).

US firms. By examining the corporate debt ownership structure, we essentially assess the impact of CSR on the cost of public debt relative to the cost of bank debt, rather than evaluating the absolute cost of debt. Therefore, demonstrating that CSR performance has a first-order effect on firms' choice between public and bank debt extends the literature on the relationship between CSR and debt financing.

## 2 RELATED LITERATURE AND THE MAIN HYPOTHESIS

### 2.1 The relation between CSR and corporate financing

A vast body of research explores the effects of CSR on corporate performance and policies, with a significant focus on how CSR influences corporate financing.[3] Several studies document that strong CSR performance can alleviate firms' financial constraints (Cheng et al., 2014) and facilitate external financing, especially in countries with less developed capital markets (El Ghoul et al., 2017). Investigating the implications of CSR for capital structure, Lins et al. (2017) document that firms with higher CSR performance raise more debt during the 2008-09 financial crisis. In contrast, Verwijmeren and Derwall (2010) and Bae et al. (2011) reveal that firms with better employee well-being and treatment maintain lower debt levels. Unlike these studies focusing on the CSR effect on the overall level of debt (i.e. capital structure), our analysis examines how CSR affects firms' choice among various sources of debt (i.e. debt ownership structure).

Another related strand of research studies the effect of corporate social capital on debt financing. [4] Using firms' CSR performance as a proxy for social capital, Amiraslani et al. (2023) find that firms with better CSR performance raise more debt at lower spreads, especially during the 2008-09 financial crisis and for firms with higher expected agency problems. Their evidence

[3] For example, prior studies have shown that superior CSR performance is associated with lower costs of equity (Dhaliwal et al., 2011), less earnings management (Kim et al., 2012; Chih et al., 2008), less tax avoidance (Hoi et al., 2013), lower insider trading profits (Gao et al., 2014), but lower investment efficiency (Bhandari and Javakhadze, 2017).

[4] See Servaes and Tamayo (2017) for a review of the literature on the role of social capital in corporations.

implies that CSR is viewed favorably by debt investors.[5] Using the US county-level cooperative norms and social networks as proxies for social capital, Hasan et al. (2017a) show that firms headquartered in counties with higher social capital prefer public bonds over bank loans.[6] The reason is that debt holders believe social capital provides a social environment that limits firms' opportunistic behaviors in debt contracting, thereby mitigating agency problems. Complementing Hasan et al. (2017a), who measure social capital at the county level, our research explores the effect of firm-level social capital, which is measured using CSR performance (Lins et al., 2017; Amiraslani et al., 2023), on debt structure.

The effect of CSR on debt structure critically hinges upon the link between CSR and two market frictions: agency problems and information asymmetry, which are often studied as the channels through which CSR affects corporate policies. For instance, Cheng et al. (2014) postulate that firm CSR performance reduces agency problems through more effective stakeholder engagement and mitigates information asymmetry via more extended and credible CSR disclosure practices. Jones (1995) argues that "ethical solutions to commitment problems are more efficient than mechanisms designed to curb opportunism" and that "firms that contract with their stakeholders on the basis of mutual trust and cooperation" should experience reduced agency problems. Better stakeholder engagement associated with stronger CSR performance can reduce managers' short-term opportunistic behavior (Bénabou and Tirole, 2010; Eccles et al., 2014), thereby decreasing agency problems.

Several studies indicate that superior CSR performance reduces information asymmetry by enhancing firms' information quality and providing investors with more reliable financial information. In a cross-country study, Chih et al. (2008) find that CSR significantly reduces the extent of earnings smoothing and earnings loss avoidance. Kim et al. (2012) also document that

[5] Consistent with this view, prior studies show that CSR performance is negatively associated with the cost of corporate debt (Goss and Roberts, 2011; Oikonomou et al., 2014; Ge and Liu, 2015).
[6] In addition, Hasan et al. (2017b) document that the US regional social capital affects corporate tax avoidance.

more socially responsible firms in the US are less likely to engage in earnings management. Strong CSR performance also increases the initiation of non-financial information disclosure. Dhaliwal et al. (2011) show that CSR performance is positively correlated with firms' decision to initiate the disclosure of CSR activities. Using the issuance of CSR reports as an indicator for disclosure of non-financial information, Dhaliwal et al. (2012) reveal that CSR disclosure reduces analyst forecast errors, consistent with CSR alleviating information asymmetry.

**2.2 Hypothesis development**

We develop our main hypothesis based on theories of corporate debt ownership structure, particularly firms' choice between public and bank debt. Several information-based models articulate the key differences between public and bank debt and explain why firms rely more on bank debt than public debt in the presence of agency problems and information asymmetry. From the agency cost perspective, the moral hazard models of debt ownership structure focus on banks' information advantage in mitigating debt investors' concerns about agency problems. Jensen and Meckling (1976) illustrate the asset substitution problem: shareholders are incentivized to take highly risky projects because of the upside potential while hurting debtholders' wealth due to heightened downside risks. Myers (1977) proposes another agency problem between shareholders and debtholders, which is referred to as the underinvestment problem or debt overhang. Specifically, a leveraged firm may forego valuable investment opportunities because debtholders would capture a large portion of the cash flows, leaving insufficient returns to shareholders. The debt ownership structure literature suggests that bank monitoring can help curb these agency conflicts. For example, Diamond (1991) and Besanko and Kanatas (1993) argue that banks are more effective than public debt holders in resolving moral hazard issues, primarily due to the dispersed nature of public debt investors and their weak monitoring incentives caused by the free-rider problem. In contrast, banks have stronger motivations to monitor borrowers, thereby curbing agency problems.

From the asymmetric information perspective, information-based debt ownership structure models emphasize bank debt's informational advantage. Banks have the advantage of gathering information required to assess the creditworthiness of a prospective borrower at a lower cost than public debt investors (Nakamura, 1993). The reason is that banks can access firms' transactional information, which is often unavailable to the public. The fact that banks can produce information less costly makes bank debt superior to public debt for firms with high information asymmetry. Hadlock and James (2002) also show that banks can more accurately estimate the firm value, reducing adverse selection costs, especially for undervalued firms.

To summarize, firms facing higher agency or information costs may have less access to public debt financing and rely more on bank debt financing. Banks have the informational advantage and can monitor borrowing firms more effectively. Thus, they are less concerned about information and agency problems than public debt investors. To the extent that CSR mitigates agency problems and information asymmetry, we expect public debt investors are more willing to invest in firms with better CSR performance. Thus, we hypothesize that firms' CSR performance facilitates public debt financing and reduces their reliance on bank debt financing:

***H1: Firms with better CSR performance have a higher proportion of public debt in their debt structure***

## 3 SAMPLE, VARIABLES, AND DESCRIPTIVE STATISTICS

### 3.1 Sample

Our sample consists of firms jointly covered by Capital IQ, MSCI ESG KLD Stats (formerly the KLD database), and Compustat. Specifically, we obtain the debt structure data of the US firms from Capital IQ, which provides the amounts of seven types of debt: term loans, revolving credit, senior bonds and notes, subordinated bonds and notes, commercial paper,

capital leases, and other debt. We start the sample in 2001 because the debt structure data from Capital IQ is available since 2001, and our sample ends in 2015.

We obtain CSR rating data from KLD Stats, which has been widely used in the literature to measure CSR performance.[7] KLD Stats uses a proprietary system to evaluate firms' social, environmental, and governance performance using multiple data sources, including firms' financial statements, annual and quarterly reports, sustainability reports, questionnaires sent to firms' investor relations offices, government surveys, general press releases, and various stakeholders' sources (Flammer, 2015). Finally, we obtain firms' annual financial information from Compustat and collect stock prices and returns from the Center for Research in Security Prices (CRSP).

We exclude financial firms (SIC codes 6000–6999) (Rauh and Sufi, 2010) and firm-year observations with missing values for the variables used in the baseline regression. To avoid using inconsistent or misrecorded data, we exclude observations with the sum of seven types of debt in Capital IQ exceeding 110% of the total debt reported in Compustat. These screens result in the final sample that includes 18,456 firm-year observations (3,101 unique firms) over the period of 2001-2015.

### 3.2 Variables

We follow prior literature on corporate debt structure (e.g., Lin et al., 2013) to construct two measures of debt structure as our dependent variables. *Public Debt* is the ratio of public debt to total debt. *Bank Debt* is the ratio of bank debt to total debt. Specifically, public debt is defined as the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper, while bank debt is the sum of term loans and revolving credit. Note that bank and public debt do not add up to total debt because total debt also includes capital leases and other debt.

[7] See Servaes and Tamayo (2013). Deng et al. (2013), Flammer (2015), Cronqvist and Yu (2017), and Bansal et al. (2022), among others.

We focus on KLD Stats's six primary CSR dimensions: product quality and safety, diversity, human rights, employee relations, environment, and community.[8] For each dimension, KLD Stats uses a binary system to capture various strengths and concerns corresponding to positive and negative aspects of CSR, respectively. Namely, for each CSR strength or concern of a firm, KLD uses one (zero) to indicate its presence (absence).[9] We construct our CSR measures by following the method used by Deng et al. (2013) and Albuquerque et al. (2019). We define our CSR measure (*CSR*) as the difference between the CSR strength score and the CSR concern score. As the number of CSR strength or concern indicators for a CSR dimension varies over time in KLD Stats, we compute a firm's CSR strength (concern) score as the number of its CSR strengths (concerns) across all six CSR dimensions divided by the maximum possible number of strength (concern) indicators in KLD Stats in a given year. As a result, *CSR* is an adjusted CSR net score that can be used to compare CSR performance across firms and over time. A higher value of *CSR* indicates better CSR performance.

To isolate the effect of CSR on corporate debt structure, we control for an extensive list of firm-specific and industry-specific characteristics that might influence debt structure according to prior literature (e.g., Houston and James, 1996; Denis and Mihov, 2003; Lin et al., 2013). Our firm-level control variables include *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, and *Rating_D*.[10] Our industry-level control variables include *HHI* and *Industry Sigma*. The Hirschman-Herfindahl index (*HHI*) proxies for product market competitiveness. *Industry Sigma* measures industry

[8] KLD also rates firms along the corporate governance dimension. We do not include corporate governance ratings in our primary CSR measure since the effect of corporate governance on corporate debt structure has been separately examined by prior studies (e.g., Bharath and Hertzel, 2019). In untabulated results, we use an alternative measure of CSR, which sums up all strengths of seven dimensions (including the corporate governance dimension) and obtain similar results.

[9] For example, the diversity dimension includes six strength indicators (promotion, work/life benefits, women and minority contracting, employment of the disabled, gay and lesbian policies, and other strengths) and two concern indicators (controversies and other concerns).

[10] Firm-years with missing R&D information are assigned a zero R&D value (Hirshleifer et al., 2012). Similarly, we set missing values of advertising expenses to zero (Grullon et al., 2004).

cash flow volatility. Appendix A1 details the definitions and data sources of the variables used in our empirical analyses.

### 3.3 Descriptive statistics

Table 1 reports the summary statistics and correlations of the variables used in our baseline regression analysis. To mitigate the influence of observations with extreme values, we winsorize all variables at the 1% level in both tails of the distributions. Panel A shows that the average values of *Public Debt* and *Bank Debt* are 0.492 and 0.418, respectively, suggesting that public and bank debt collectively account for more than 90% of total debt for an average firm in our sample. The sum of *Public Debt* and *Bank Debt* is close to but less than one because there are other types of debt (i.e., capital leases and other debt). The average value of *CSR* is -0.011, indicating that, on average, firms have more CSR concerns than CSR strengths. The standard deviation of *CSR* is 0.099, indicating substantial variation in CSR performance across firms.

In the Online Appendix (Table OA.1), we report the correlation matrix of the variables used in the baseline regression analysis. The correlation between *Public Debt* and *Bank Debt* is -0.86. The high negative correlation is consistent with the practice that firms tend to borrow predominantly with one type of debt (Colla et al., 2013). We find that *CSR* is significantly and positively correlated with *Firm Size* and *Profitability*, consistent with previous studies showing that larger and more profitable firms have better CSR performance (e.g., Liang and Renneboog, 2017). The fraction of public (bank) debt in total debt is positively (negatively) correlated with *Firm Size*, *Profitability*, *Tangibility*, *Leverage*, and *Rating_D*, but negatively (positively) correlated with the book-to-market ratio, *Cash*, and *R&D*. More importantly, the correlation between *Public Debt* and *CSR* is positive (0.141) and statistically significant ($p < 0.01$). At the same time, *Bank Debt* and *CSR* are negatively and significantly correlated. While these

unconditional relations are consistent with our predictions, they can be refined by multivariate analysis which we present in the following section.

## 4 BASELINE RESULTS

### 4.1 CSR and the choice between bank and public debt

We use the following empirical model to test the effect of CSR on debt structure.

$$DebtStructure_{it} = \alpha + \beta_1 CSR_{it-1} + X'_{it-1}\Phi + Y_t + F_i + \varepsilon_{it}, \quad (1)$$

where the dependent variable ($DebtStructure_{it}$) captures the proportion of public debt relative to total debt in firm *i* and fiscal year *t*. $CSR_{it-1}$ measures a firm's CSR performance in year *t*-1. Our main hypothesis predicts that the coefficient on *CSR* ($\beta_1$) is positive. $X'_{it-1}$ is a vector of firm-specific and industry-specific control variables introduced in Section 3.2. We control for both year ($Y_t$) and firm ($F_i$) fixed effects. The standard errors are clustered at the firm level and corrected for heteroskedasticity and autocorrelation. In what follows, we discuss most empirical results in terms of *Public Debt*. Nonetheless, an analogous yet contrary conclusion applies to *Bank Debt*.

We examine the effects of CSR performance on two measures of corporate debt structure and present the baseline results in Panel A of Table 2. The dependent variables are *Public Debt* in columns (1)-(2) and *Bank Debt* in columns (3)-(4). We control for year and industry fixed effects in columns (1) and (3) and control for year and firm fixed effects in columns (2) and (4). In columns (1)-(2), *CSR* significantly increases the public debt as a percentage of total debt. Not surprisingly, we find in columns (3)-(4) that *CSR* reduces bank debt as a percentage of total debt. These effects are not only statistically significant but also economically sizable. For example, the coefficients on *CSR* are 0.253 and 0.116 in columns (1) and (2), respectively, indicating that a one standard deviation increase in *CSR* is associated with a 2.50 and 1.15 percentage points increase in the share of public debt in total debt. These

baseline results are consistent with our hypothesis that better CSR performance facilitates public debt financing and reduces the reliance on bank debt.

The effects of control variables on debt structure are generally consistent with those documented in previous studies (Denis and Mihov, 2003; Hasan et al., 2017a; Johnson, 1997). Specifically, firm size, asset tangibility (*Tangibility*), *Leverage*, cash holdings (*Cash*), and credit ratings (*Rating_D*) are significantly and positively associated with firms' share of public debt in total debt and negatively related to the fraction of bank debt in total debt.[11] The signs of control variables in columns where *Bank Debt* is the dependent variable are largely the opposite of those in columns with *Public Debt* as the dependent variable.[12] We compute the variance inflation factors (VIFs) for all explanatory variables in the Online Appendix (Table OA.2) and find that the largest VIF is below 5, suggesting that multicollinearity is unlikely to pose a serious threat to our regression setting (O'brien, 2007).

**4.2 Robustness checks**

To address the concern that unobserved firm heterogeneity or industry- and state-level shocks may drive both CSR performance and corporate debt structure, we augment our baseline regression with high-dimensional fixed effects (Gormley and Matsa, 2014; Gormley and Matsa, 2016). Specifically, in addition to firm fixed effects, we account for time-varying heterogeneity across industries or states using interacted industry-year or interacted state-year fixed effects. The results in Panel B of Table 2 show that the positive relation between CSR and the share of public debt in total debt remains significant.[13]

[11] Krishnaswani et al. (1999) document a significantly positive relation between the market-to-book ratio and public debt financing. Nevertheless, Johnson (1997) and Denis and Mihov (2003) show that the market-to-book ratio is not significantly associated with public debt financing, consistent with our results.
[12] We tabulate the VIFs of explanatory variables in the Online Appendix (Table OA.2).
[13] Another potential concern is that corporate policies can be driven by manager fixed effects (e.g., behavioral bias). Indeed, Davidson et al. (2016) document that CEO fixed effects explain over half of the variations in CSR scores across firms. In untabulated results, we control for CEO fixed effects apart from year fixed effects. The CEO fixed effects account for unobserved heterogeneity across managers and are constructed using the CEO identifiers from the ExecuComp database. Our baseline results remain after controlling for CEO fixed effects.

In Table 3, we perform additional tests to confirm that our baseline results are robust to alternative model specifications. For brevity, we tabulate only the coefficients of CSR-related variables. Panel A examines the effects of CSR strengths (*STR*) and CSR concerns (*CON*), respectively, on debt structure. We find that CSR strengths positively and significantly affect the share of public debt in both columns (1) and (2). In contrast, CSR concerns are negatively related to the share of public debt in columns (3) and (4). Panel B examines the effects of CSR performance on debt structure using six individual CSR dimensions. Columns (1)-(6) show that all individual CSR performance dimensions positively and significantly affect public debt financing.

Panel C examines alternative measures of debt structure and CSR. Columns (1) and (2) use the ratio of public debt to bank debt (*Public Debt-to-Bank Debt*) and the ratio of public debt to total assets (*Public Debt-to-Assets*) as dependent variables. The dependent variable in column (3) is *Zero Public Debt*, which takes the value of one if a firm has no public debt and zero otherwise. Column (4) includes a quadratic term of CSR to account for the potential non-linear relation between CSR and debt structure. Column (5) uses the number of CSR items as weights (instead of using CSR dimensions) to construct the CSR performance measure (Albuquerque et al., 2019). Column (6) adopts a CSR performance measure based on the Item Response Theory (IRT) by Carroll et al. (2016). Unlike additive CSR measures that add up equally weighted CSR-related traits, the IRT-based CSR measure assigns different weights to various CSR traits so that more substantive CSR indicators are weighted more.[14] We find consistent results across all specifications in Panel C.

Panel D uses alternative estimators and subsamples. Column (1) adopts the random-effect Tobit model, given that the dependent variable is censored at zero. Column (2) uses

[14] Carroll et al. (2016) adopt the Bayesian IRT approach to develop a CSR performance measure based on the KLD data and show that it can better predict new CSR-related activities than additive CSR measures. The IRT-based CSR measure is available at www.socialscores.org.

Fama-MacBeth (1973) regression, where the coefficient estimates are the time-series averages of cross-sectional OLS regressions. Column (3) implements two-way clustered standard errors, which account for within-cluster correlations in two dimensions (firm and year). Column (4) includes firms only from 2003 onward after KLD Stat expands its sample.[15] Columns (5) and (6) examine the manufacturing (two-digit SIC code = 20-39) and non-manufacturing firms, respectively. The effect of CSR on public debt usage is robust to these alternative estimation methods and subsamples.

Panel E employs an incremental approach that examines the effect of CSR on the probability of public debt issuance using a logistic model. The advantage of the incremental approach is that it is well suited to testing the effect of time-varying firm characteristics on debt structure (Denis and Mihov, 2003). In column (1), the dependent variable is *Public_D*, which is a dummy variable that takes the value of one if a firm issues public debt in a given year and zero otherwise. We find that CSR performance significantly increases the likelihood of public debt issues, consistent with the idea that firms with stronger CSR performance can better obtain public debt financing. In addition, we follow Bharath et al. (2008) and focus on a firm's choice between public debt and bank debt issues. Specifically, we reestimate the logistic model in column (1) using a subsample of firms that issue either public debt or bank debt in a given year. For this analysis, we remove firm-year observations where firms do not issue any debt or issue both public debt and bank debt in a given year. The regression results in column (2) reveal that CSR performance significantly increases firms' likelihood of raising public debt as opposed to issuing bank debt.

In Table 4, we examine and compare the effects of CSR performance on five individual debt types. The dependent variables are three types of public debt (senior bonds/notes (*SrBondNotes*), subordinated bonds/notes (*SubBondNotes*), and commercial papers

[15] In 2003, KLD expanded its coverage to the largest 3000 US companies by market capitalization.

(*CommPapers*)) in columns (1)-(3) and two types of bank debt (term loans (*TermLoan*) and credit lines (*CreditLines*)) in columns (4)-(5). In all columns, we include the same control variables as those in Table 2 and year and firm fixed effects. We find that better CSR performance significantly increases corporate uses of two types of public debt: senior bonds/notes and subordinated bonds/notes. In addition, CSR performance substantially reduces the use of term loans. In contrast, the CSR effects on commercial papers and credit lines are statistically insignificant. These findings indicate that CSR performance affects medium- and long-term debt (e.g., bonds and term loans) more than short-term debt (e.g., commercial papers).

Furthermore, we conduct several additional robustness checks and report the results in the Online Appendix (Table OA.3 and OA.4). First, our baseline analysis includes an indicator variable (*Rating_D*) of the S&P domestic long-term issuer credit rating. To ensure our findings are robust to alternative measures of credit ratings, we add several alternative credit rating proxies to Equation (1) and report the regression results in the Online Appendix (Table OA.3). We first include the numerical value of credit rating (*Rating_Num*), which ranges from one for D-rated firms to 22 for AAA-rated firms. The coefficient on *Rating_Num* is positive and significant, suggesting that firms with higher credit ratings issue more public debt. Considering that some institutional investors (e.g., insurance companies) are not allowed to invest in corporate bonds rated below the investment grade, we define an investment-grade rating (*Rating_Investment*) indicator and a junk rating (*Rating_Junk*) indicator. *Rating_Investment* takes the value of one if a firm's credit rating is between 13 and 22 (i.e. BBB- or better) and zero otherwise. *Rating_Junk* takes the value of one if a firm's credit rating is between one and 12 (i.e. BB+ or lower) and zero otherwise. The regression results show that the coefficient on *Rating_Investment* is higher than that on *Rating_Junk*, confirming that firms with investment-grade ratings have a higher proportion of public debt in total debt than those with junk ratings.

Moreover, we examine the moderating effects of credit ratings by including the interaction terms between credit rating proxies (*Rating_Investment* and *Rating_Junk*) and *CSR*. The interaction terms are statistically insignificant, indicating that the CSR effect on public debt does not differ significantly between firms with above- or below-investment-grade ratings. More importantly, these additional analyses confirm that the coefficients of *CSR* remain positive and statistically significant after we account for the effect of credit ratings on debt structure in different ways.

In addition, we examine how the effect of CSR on debt structure changes over time by dividing our sample into seven sub-periods: 2001-02, 2003-04, 2005-06, 2007-08, 2009-10, 2011-12, and 2013-15. The regression results obtained using seven sub-periods in the Online Appendix (Table OA.4) show that the effect of CSR on public debt financing is significantly positive in all sub-periods, suggesting that the CSR effect on debt structure is persistent. In addition, the coefficient on CSR in the during- and post-crisis periods (2009-10) is greater than the coefficients in the pre-crisis periods (i.e. 2007-08 and 2005-06). This finding implies that CSR can play an important role when the credit supply is tight, supporting Lins et al. (2017), who document that firms with stronger CSR performance can raise more debt during the financial crisis.[16]

## 5 TESTS ON ENDOGENEITY

[16] We present the results of some further robustness tests in the Online Appendix (Table OA.5). In Panel A, to mitigate the concern that equity financing may drive both debt structure and CSR performance, we include two additional control variables related to equity financing: the text-based measure of equity financing constraints (*Equity Constraints*) (Hoberg and Maksimovic, 2015) in columns (1) and (2), and an equity issuance indicator (*Equity Issuance*) in columns (3) and (4). In Panel B, following Rauh and Sufi (2010), we remove financial firms from our sample. Yet, prior studies on corporate finance (e.g., Frank and Goyal, 2003) often exclude utility firms, given that their capital structure choices are regulated. To ensure our results are not sensitive to the inclusion of utilities, we re-estimate Equation (1) after removing all utility firms. In Panel C, we use the annual change in the ratio of public debt to total debt (Δ*Public Debt*) and the annual change in the ratio of bank debt to total debt (Δ*Bank Debt*) as dependent variables in Equation (1). In Panel D, we use the two-stage Heckman selection model to correct for sample selection bias. In the first-stage regressions in columns (1) and (3), we obtain the inverse Mills ratios (IMR) by estimating the likelihood of having non-zero *Public Debt* and *Bank Debt*, respectively, using the full sample. In the second-stage regressions, we control for the IMR and examine the effect of CSR on *Public Debt* and *Bank Debt*, respectively, based on the subsample with non-zero public debt in column (2) and the subsample with non-zero bank debt in column (4). Our baseline findings survive all these additional robustness tests.

Although we have documented a robust and positive relation between CSR performance and corporate uses of public debt, the causal interpretation remains hypothetical. Specifically, our results are subject to several endogeneity concerns, including omitted variable bias, selection bias, and reverse causality. For example, despite we have included an extensive list of controls and various fixed effects in regressions, any omitted or unobserved variable (e.g., corporate culture) which correlates with both corporate debt structure and CSR performance may lead to the positive relation between CSR and public debt usage. Moreover, the causal relation may go from debt structure to CSR performance (reverse causality) rather than the other way around (forward causality). For instance, self-interested managers may overinvest in CSR to enhance their reputation at the expense of investors (Krüger, 2015). In other words, CSR activities can be the embodiment of managerial agency problems (Bénabou and Tirole, 2010). Given bank debt's effective monitoring role in curbing agency problems, firms with more bank debt (less public debt) may reduce CSR investment, resulting in a positive relation between corporate uses of public debt and CSR performance. We conduct a few analyses to alleviate these endogeneity concerns.

**5.1 Tests for selection bias**

Firms do not choose certain levels of CSR randomly. Instead, various underlying factors (e.g., firm size and profitability) can drive their CSR performance. To the extent that these underlying factors are related to corporate debt structure, our baseline results are subject to selection bias.[17] To tackle this issue, we first conduct propensity score matching (PSM) to estimate the average treatment effect on the treated population as follows:

$$\Delta DebtStructure|_{CSR=1} \equiv E(DebtStructure_1 - DebtStructure_0|CSR = 1), \qquad (2)$$

[17] Our propensity score matching approach relaxes the OLS assumption that the effect of CSR on debt structure is homogeneous across firms, thereby avoiding potential functional form misspecifications (Dehejia and Wahba, 2002; Shipman et al., 2016).

where $\Delta Debt|_{CSR=1}$ is the difference in debt structure between firms with high (top quartile) CSR scores and firms with low (bottom three quartile) CSR scores. To estimate the treatment effects of CSR, we first estimate the probability of being a treated (i.e. high-CSR) firm, which is known as the propensity score. We then identify the untreated (i.e., low-CSR) observations with similar propensity scores as control firms. We match, with replacement, a pair of observations only if the absolute difference in the propensity score is less than 0.01. Our matching procedure adequately balances the firm characteristics between the treatment and control groups.[18] Lastly, we compare the mean difference in the share of public debt between high-CSR and matched low-CSR firms. Column (1) of Panel A in Table 5 shows that the average public debt ratio of the treatment (high-CSR) group is around five percentage points higher than that of the control (low-CSR) group. The corresponding *t*-test indicates that the difference is statistically significant at the 1% level.

Furthermore, we estimate the difference in debt structure between the treatment and control groups by running regressions on the matched sample. The key independent variable (*CSR_D*) is an indicator variable that equals one if a firm's CSR performance is in the top quartile and zero otherwise. The results in columns (3)-(4) of Panel A suggest that high-CSR firms use more public debt and rely less on bank debt, confirming our baseline findings.

Abadie and Imbens (2006) point out that the PSM procedure can encounter asymptotic bias if there are incomplete overlaps in the distributions of control variables between the treated and control groups. Thus, they propose a bias-corrected matching estimator, which adjusts the difference within the matches for the differences in their covariate values (Çolak and Whited, 2007). We employ Abadie and Imbens' (2006) matching estimator to reestimate the average treatment effect. The results in Panel B of Table 5 indicate that firms with high CSR scores use

[18] We validate the PSM procedure and report the results in Table OA.6 of the Online Appendix. Panel A shows that almost all control variables in the post-match logit regression become statistically insignificant after matching. The balancing test in Panel B shows that almost all the differences in control variables between the treatment and control groups become statistically insignificant after matching.

more public debt and less bank debt than their low CSR counterparts. This finding mitigates the concern that our matching results reflect the bias arising from the control and treatment groups being insufficiently comparable.

**5.2 Instrumental variable approaches**

Next, we use a 2SLS estimator to mitigate endogeneity concerns with two instrumental variables suggested in the CSR literature. Di Giuli and Kostovetsky (2014) document that firms headquartered in Democratic-leaning states invest significantly more in CSR activities than those in Republican-leaning states. Therefore, we follow Deng et al. (2013) and use *Blue State* as an instrumental variable. *Blue State* equals one if a firm is headquartered in a state where residents vote predominantly for the Democratic party in the presidential election and zero otherwise. Furthermore, we follow Albuquerque et al. (2019) and use the proportion of votes received by the Democratic presidential candidate in a state (*Vote_DEM*) as an alternative instrument for CSR performance. Panel C of Table 5 reports the 2SLS regression results. In the first stage, with *CSR* as the dependent variable, the coefficients on *Blue State* and *Vote_DEM* are significantly positive, implying that firms in Democratic-leaning states have better CSR performance.[19] The second stage regressions show that the coefficients on instrumented *CSR* are positive and statistically significant, consistent with our baseline findings.

We note that the coefficients on instrumented CSR are substantially larger than those of *CSR* in Table 2, possibly because of measurement errors or undetected weakness in our instrumental variables. To lessen these concerns, we employ the two instrumental variables in the Heckman treatment effect model (Heckman, 1979; Lennox et al., 2012) implemented in two stages. In the first stage (column (1)), we estimate a binary choice model with *CSR_D* (i.e. an indicator of top-quartile CSR performance) as the dependent variable and with *Blue State* and

[19] We assess the strength and validity of the instruments using the Cragg-Donald Wald *F*-statistics (Cragg and Donald, 1993; Stock and Yogo, 2005), which are around 55 and thus reject the hypothesis that our instruments are weak.

*Vote_DEM* as the main independent variables. We impose exclusion restrictions on *Blue State* and *Vote_DEM*, assuming that both variables do not directly affect debt financing. In the second stage (column (2)), we regress *Public Debt* on *CSR_D*, the Inverse Mills ratio calculated from the first stage, and all control variables in Equation (1). The result in Panel D of Table 5 shows that the effect of high CSR performance on public debt financing remains positive and significant.

**5.3 DiD analysis: the inclusion in the Dow Jones Sustainability Index**

Next, we examine how the proportion of public debt financing changes after a CSR-related event – a firm's initial inclusion in the DJSI, which consists of firms with leading CSR performance in their industries. Cheung (2011) shows that investors value CSR and react positively to a firm's inclusion in the DJSI. If the inclusion in the DJSI can serve as a strong signal to the debt market about the superior CSR performance of the constituent firms, we expect the indexed firms to raise more public debt after joining the DJSI. To test this, we conduct a DiD estimation with the following model:

$$Public\ Debt_{it} = \alpha + \beta_1 DJSIAdopt_{it} \times POST_{it} + \beta_2 DJSIAdopt_{it} + \beta_3 POST_{it} + X'_{it-1}\Phi + Y_t + F_i + \varepsilon_{it}\,, \quad (3)$$

where *Public Debt* is the ratio of public debt to total debt. *DJSIAdopt* is a dummy variable that equals one if a firm is newly added into the DJSI (treatment group) and zero for firms in the matched control group. *POST* is a dummy variable equal to one for the post-inclusion period and zero before the inclusion period. *DJSIAdopt*×*POST* is the interaction between these two dummy variables. We identify control firms from the non-DJSI sample using propensity score matching two years before the event year. The DiD sample consists of treatment and control firms with five years before and five years after the DJSI inclusion.

Figure 1 presents graphical evidence by plotting the difference in the proportion of public debt financing (*Public Debt*) between treatment and control firms around treatment

firms' initial inclusion in the DJSI. *t* denotes the event year in which a firm is included in the DJSI. As expected, the figure indicates that the average public debt ratio of the treatment firms increases substantially in the post-treatment period relative to that of the control firms. Table 6 reports the regression estimates of Equation (3). Column (1) shows that the coefficient on *DJSIAdopt*×*POST* is positive and statistically significant. The change in treatment firms' average public debt ratio around the DJSI inclusion is 9.7 percentage points higher than that of control firms.

To explore the timing of the changes in public debt ratio around a firm's initial inclusion in the DJSI, we test the parallel trend assumption underlying our DiD estimation and examine the persistence of the treatment effect. If the parallel trend assumption holds, treatment and control firms should exhibit parallel movements in their public debt ratios without the treatment. Following the literature (e.g., Roberts and Whited, 2013; Kraft et al., 2018), we test the parallel trend assumption using pre-treatment time period indicator variables. Specifically, we construct nine variables that capture the timing of DJSI inclusion and their interaction with *DJSIAdopt*. For example, *BEFORE*(*-1*) takes the value of one in year *t*-1 and zero otherwise. We then augment Equation (3) with the newly constructed timing variables and the interaction terms. The results in column (2) show that the coefficients on the interaction terms between *DJSIAdopt* and four pre-treatment time indicators are statistically insignificant, alleviating the concern that preexisting differences in corporate debt structure drive our baseline results. The coefficient on *DJSIAdopt*×*POST*(*2*) is positive and statistically significant, suggesting that the treatment effect of the DJSI inclusion on firms' public debt financing is particularly strong in the second year after the treatment. In short, our analysis reveals that treatment and control firms follow parallel trends in public debt financing in years before the treatment year, and their debt structure trends diverge only after the treatment shock.

Additionally, we conduct a placebo test where a pseudo-treatment group is created by randomly drawing half of the sample firms used in Table 6. We then use the other half as control firms and reestimate Equation (3). We repeat the simulation 5,000 times and present the distribution of the coefficients and *t*-statistics in the Online Appendix (Table OA.7). The mean and median values of the coefficients of *DJSIAdopt*×*POST* from 5,000 simulations are zero and statistically insignificant. Only about 10% of the simulations produce statistically significant coefficients, aligning with the expected Type 1 error rate (i.e., the false positive rate). This test adds to the robustness of our findings by showing that when no treatment effect exists, the results do not indicate statistical significance, alleviating the concern that our findings are due to confounding variables or statistical artifacts.

**5.4 Evidence from a quasi-experiment: the BP oil spill**

Lastly, we exploit the BP oil spill as a quasi-experiment, which engenders a plausibly exogenous increase in the investors' awareness of the importance of firms' CSR performance. The BP oil spill happened in the Gulf of Mexico on April 20, 2010. As the most significant environmental disaster in the US, an estimated five million barrels of oil flowed from the damaged well over 87 days.[20] In 2012, BP formally pled guilty to the charges of environmental crimes and agreed to pay $4 billion to settle its criminal case with the US government.[21] We compare the effect of CSR on public debt financing around the BP oil spill event in a DiD framework as follows.

$$Public\ Debt_{it} = \alpha + \beta_1 OilGas_{it} \times POST_{it} \times CSR_{it} + \beta_2 POST_{it} \times CSR_{it} + \beta_3 POST_{it} \times OilGas_{it} + \beta_4 OilGas_{it} \times CSR_{it} + \beta_5 CSR_{it} + X'_{it-1}\Phi + Y_t + F_i + \varepsilon_{it}, \quad (4)$$

where *Public Debt* is the ratio of public debt to total debt. Obviously, the BP oil spill shock primarily affects the oil and gas industry, to which BP belongs. The event should also prompt investors on the trustfulness and importance of the CSR activities of these firms. Therefore, we

[20] https://www.govinfo.gov/content/pkg/gpo-oilcommission/pdf/gpo-oilcommission.pdf
[21] https://www.justice.gov/criminal/criminal-vns/case/united-states-v-bp-exploration-and-production-inc

focus on oil and gas firms (SIC 131, 132, 138) as our treatment group. *OilGas* is a dummy variable that takes the value of one for firms in the oil and gas industry and zero for firms in the benchmark group, which consists of firms outside the oil and gas industries. *POST* is a dummy variable equal to one for the post-spill period (i.e. years 2011-2014) and zero for the pre-spill period (i.e. years 2006-2009).

The DiD results in column (1) of Table 7 reveal that the coefficient on *POST*×*CSR* is positive and statistically significant, indicating that CSR ratings have a more significant effect on debt choice after the BP oil spill, which makes investors value CSR more. However, the negative and significant coefficient on *CSR*×*OilGas*×*POST* suggests that the positive effect of CSR on public debt financing after the BP oil spill is dampened in the oil and gas industry. Column (2) investigates the detailed timing of the BP oil spill' effect on debt structure in the oil and gas industry. The coefficients on *CSR*×*OilGas*×*POST*(*i*) are all negative, and the coefficients two and three years after the oil spill are statistically significant. These results further confirm the CSR effect on debt structure choices became weaker after the BP oil spill for firms in the oil and gas industry.

Critics often regard high CSR scores in oil and gas firms as cosmetic, doubting their commitment to real social stewardship. Barrage et al. (2020) document that firms have incentives to engage in green advertising without investments in environmental stewardship. Heflin and Wallace (2017) argue that firms with poorer past environmental performance are more likely to increase disaster readiness plan disclosures after the BP oil spill partly due to window dressing incentives. Our analysis reveals that investors valued CSR more after the BP oil spill; thus, CSR's positive effect on public debt financing became stronger. On the other hand, the scandal of BP, as an oil and gas firm, represents a negative shock to investors' trust in the CSR activities of other firms in the same industry, resulting in a weakened effect of CSR on public debt financing in the industry.

Taken together, while the endogeneity of CSR performance is a perennial issue that cannot be ruled out completely, we conduct a battery of tests to alleviate endogeneity concerns. Although each test is subject to criticism, the totality of the evidence is consistent with a causal relation running from CSR performance to corporate debt structure.

## 6 CHANNELS THROUGH WHICH CSR AFFECTS CORPORATE DEBT STRUCTURE

### 6.1 Agency problems and information asymmetry

We conduct a few analyses to substantiate the channels through which CSR shapes debt structure. If the agency problems (information asymmetry) channel is at work, one would observe that the effect of CSR on debt structure is stronger for firms facing more severe agency problems (information asymmetry). The two channels are not mutually exclusive because CSR may affect debt structure by mitigating agency problems and information asymmetry. Therefore, we employ a broad array of measures adopted by prior studies (e.g., Leary and Roberts, 2010; Ferrell et al., 2016) to capture agency problems and information asymmetry in the analyses.

We employ three measures of agency problems: an index of takeover susceptibility (*Takeover Index*) constructed by Cain et al. (2017),[22] the fraction of independent directors on the board (*Board Independence*), and a dummy variable (*High FCF & Low MB*) that equals one if a firm has high (i.e. above the sample median value) free cash flow and low (i.e. below the sample median value) growth opportunities and zero otherwise (Leary and Roberts, 2010).

We partition the sample into two groups according to *High FCF & Low MB* and the median values of *Takeover Index* and *Board Independence*. The samples with low *Takeover Index*, low *Board Independence*, or *High FCF & Low MB* =1 are considered as having more severe agency problems. We regress the public debt proportion on *CSR* for each subsample and compare their coefficients on *CSR* between the two subsamples. The result in Table 8 Panel A

[22] Cain et al. (2017) show that their takeover susceptibility is relatively more exogenous and available for more firms than Gompers et al.'s (2003) G-index based on anti-takeover provisions.

shows that CSR has a stronger effect on debt structure in the subsamples with more serious agency problems (or when governance mechanisms are weak). In particular, the coefficients on *CSR* in subsamples with more agency problems are positive and significant. In contrast, those in the low agency problems subsamples are either statistically insignificant or having lower values. These results are consistent with agency problems as an essential channel through which CSR influences firms' debt choices.

We follow previous studies (e.g., Chang et al., 2006; Leary and Roberts, 2010) and use three measures of information asymmetry: the number of analysts following a firm (*Analyst Coverage*), the number of business segments (*Segments*), and stock return volatility in the past 12 months (*Return Volatility*). After partitioning the sample into two groups according to the median value of an information asymmetry measure, we regress the share of public debt in total debt on *CSR* for each subsample and compare the coefficients on *CSR* between the two subsamples. Panel B of Table 8 shows the coefficients on *CSR* in subsamples with greater information asymmetry are positive and statistically significant. However, those coefficients on *CSR* estimated using firms less subject to information asymmetry are either insignificant or have lower coefficient values. In line with our main hypothesis, the subsample analysis demonstrates that information asymmetry is another conduit for CSR's impact on corporate debt structure.

**6.2 The hedging channel as an alternative explanation**

Good CSR performance can be associated with hedging benefits during adverse market conditions (e.g., Shiu and Yang, 2017; Albuquerque et al., 2019). Godfrey et al. (2009) document that CSR commitments serve as insurance because firms with good CSR performance are criticized less during adverse events (e.g., litigation). Similarly, socially responsible firms are less adversely affected by financial crises, political risk, and economic policy uncertainty (Lins et al., 2017; Chatjuthamard et al., 2021; Peng et al., 2023). If CSR

provides insurance-like advantages, firms with better CSR performance may access the public debt market more easily. We validate this alternative explanation by partitioning the sample into two groups based on the median value of firm-level political risk (*Firm Political Risk*) (Hassan et al., 2019), the median level of national economic policy uncertainty (*Economic Policy Uncertainty_National*), and the median level of state economic policy uncertainty (*Economic Policy Uncertainty_State*). If CSR affects debt structure by lowering firm risk or enhancing hedging benefits, one should observe a stronger CSR effect on public debt for more risky firms.

We perform the subsample analysis and tabulate the results in the Online Appendix (Table OA.8). The coefficients on *CSR* are less positive for firms facing higher firm-level political risk or national and state-level economic policy uncertainty, implying that our baseline results are not attributable to the hedging channel. This finding also indicates that the risk-reducing function of CSR may affect both bank and public debt usage. In addition, banks may value CSR's hedging benefits more than public debt investors.

## 7 CROSS-SECTIONAL HETEROGENEITY

This section examines the cross-sectional heterogeneity in our baseline findings, focusing on the moderating effects of financial constraints and investors' CSR perceptions and sentiments.

### 7.1 Financial constraints

First, we examine the role of CSR in facilitating public debt financing when firms face costly external finance or have limited access to external finance. Financially constrained firms may rely more on bank debt because of banks' information advantages. To the extent that CSR alleviates information asymmetry, one would expect that the positive effect of CSR on public debt financing is more pronounced for more financially constrained firms.

To validate this hypothesis, we partition the sample based on the median values of three financial constraint measures: the WW index (Whited and Wu, 2006), the SA index (Hadlock and Pierce, 2010), and credit ratings (Farre-Mensa and Ljungqvist, 2016). Firms are classified as more financially constrained if they have higher WW and SA indices or have below-investment-grade credit ratings or no ratings. We then estimate Equation (1) using subsamples and report the results in Panel A of Table 9. The results show that the coefficients of *CSR* are larger and more significant in subsamples consisting of more financially constrained firms (columns (1), (3), and (5)).

**7.2 Investor perception**

Next, we examine the moderating effect of investors' perceptions and sentiments about CSR on the relation between CSR and public debt financing. We expect the CSR effect on corporate debt structure to be more pronounced when investors value CSR more.[23] Particularly, a firm's CSR performance may be considered as mock social stewardship rather than genuine dedication to social responsibility if a firm is in a sin industry (Hong and Kacperczyk, 2009) or in a low-trust region where people have a low propensity to trust the firm's CSR activities (Putnam, 2000; Lins et al., 2017). In addition, the effect of CSR on debt structure should also depend on investors' time-varying CSR sentiment – the valuation premium that investors place on CSR performance (Naughton et al., 2019).

Firms in controversial industries may "make a distrustful attempt of window dressing through CSR activities to legitimize questionable business" (Jo and Na, 2012; Cai et al., 2012). Additionally, Palazzo and Richter (2005) find that the firms in the tobacco industry are perceived to be socially irresponsible, and the main driver for them to engage in CSR is to allay its negative reputation. In other words, the CSR activities conducted by controversial or sin firms are more likely to be due to window dressing. Following Hong and Kacperczyk (2009),

[23] Prior studies (e.g., Flammer, 2013) show that the factors driving investors valuation and reactions to CSR can be industry-specific, region-specific, and time-varying.

we identify a group of firms in sin and controversial industries.[24] We then use the non-sin peer firms in the same two-digit SIC industry as the comparison group. We expect that the CSR activities of firms in the sin industries are less trustworthy, and consequently, the relation between CSR and debt structure is weaker for such firms. In column (1) of Table 9 Panel B, we find that the coefficient on *CSR* is insignificant for the subsample of sin firms, consistent with the argument that the CSR efforts of sin firms are often perceived as mere window dressing because of their negative reputation. On the other hand, the coefficient on *CSR* is positive and significant for the subsample of non-sin peer firms in column (2).

We then compare the effects of CSR on debt structure for firms headquartered in high-trust regions with those in low-trust ones. Lins et al. (2017) posit that in regions where people have a lower propensity to trust, CSR activities are likely to be perceived as "window dressing and less genuine activities" and consequently are "less likely to pay off". Similarly, Putnam (2000) argues that corporate goodness is more valuable in a society with higher overall social trust or social capital. We partition the sample into two groups based on the median level of social trust in the firms' headquarters regions. In column (4) of Panel B in Table 9, the coefficient of *CSR* for the high-trust subsample is 0.185, which is higher than the coefficient of for the low-trust sample (0.091) in column (3). This finding confirms that the positive relation between CSR and public debt usage is stronger for firms headquartered in high-trust regions.

Furthermore, we compare the CSR effect on debt structure between high and low CSR sentiment periods. Following Naughton et al. (2019), we measure the market-level CSR sentiment as the difference between the market-to-book ratio of the top and bottom quintile of firms based on the abnormal component of the overall CSR score. To the extent that investors' perceived importance of CSR performance is high during high CSR sentiment periods, we

[24] We use the following industry codes to identify firms in the sin and controversial industries: alcohol (SIC 2100-2199), tobacco (SIC 2080-2085), gambling (NAICS 7132, 71312, 713120, 71329, 713290, 72112, 721120), weapon (SIC 3760-3769, 3795, 3480-3489), oil (SIC 300, 1310-1339, 1370-1382, 1389, 2900-2912, 2990-2999), biotech (SIC 2833-2836), and cement (SIC 3240-3241).

expect that CSR performance can better facilitate public debt financing when investors' CSR sentiment is higher. Consistent with this expectation, column (5) of Panel B in Table 9 shows that the coefficient of *CSR* for the high CSR sentiment periods is 0.301, which is higher than the coefficient of 0.17 for the low CSR sentiment periods in column (6). Collectively, our analyses in this section indicate that superior CSR performance facilitates public debt financing when investors value CSR performance more.

## 8 CONCLUSIONS AND PRACTICAL IMPLICATIONS

This paper analyzes the impact of CSR performance on the debt ownership structure of US public firms, with a particular emphasis on public debt financing. We find that more socially responsible firms use more public debt and rely less on bank debt. Our analysis further suggests that CSR shapes corporate debt structure by mitigating agency and information costs because the two frictions are the major concerns of public debt investors. The effect of CSR is weaker for firms in sin industries or firms in low-trust regions, whose CSR is less likely to be viewed as a genuine commitment to social responsibility. In addition, CSR is more instrumental in facilitating public debt financing when firms are financially constrained or when investors value CSR more. Our findings survive a battery of endogeneity checks and contribute to our understanding of the determinants of corporate debt structure. In summary, our results emphasize a key financial benefit of being socially responsible: better CSR performance eases firms' access to public debt markets.

Given the increasing pressure on corporations to shift from their long-standing purpose of shareholder value maximization to stakeholder primary, our study has several practical implications. First, given that firms with better CSR performance can have greater access to public debt, which can be a less costly and more flexible financing option compared to bank loans or private debt, CSR can be viewed as a strategic asset in optimizing a firm's debt structure. Second, because CSR performance helps reduce agency and information costs, which are

significant barriers to accessing public debt, CSR activities can also be regarded as mechanisms that lower transaction costs and risk, making firms more attractive to lenders and investors. Third, the variation in the impact of CSR on public debt across different industries and regions suggests that firms need to tailor their CSR strategies based on their specific circumstances. In particular, financially constrained firms and those in low-trust regions or sin industries may need to adopt more transparent and impactful CSR strategies to build and maintain investor trust. Lastly, policymakers could consider incentivizing CSR activities through subsidies, tax breaks, or enhanced regulatory frameworks that recognize and support the financial benefits of CSR. Such policies would promote socially responsible business practices and stabilize financial markets by encouraging firms to adopt strategies that mitigate risks associated with agency problems and information asymmetry.

Overall, our findings illustrate that CSR is not just a tool for enhancing corporate image or complying with ethical standards, but a strategic component that significantly impacts financial structuring and market access. By effectively leveraging CSR, firms can improve their financial flexibility, reduce financing costs, and build stronger relationships with stakeholders, ultimately contributing to sustainable business growth and resilience against financial pressures.

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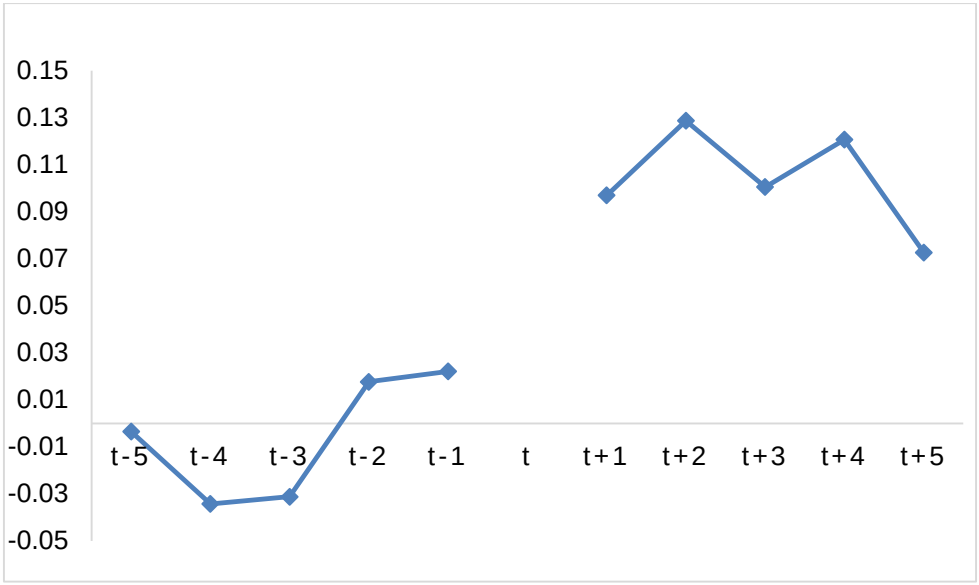


**Figure 1. The difference in public debt before and after the initial inclusion in the DJSI**

This figure shows the difference in the average public debt ratios (*Public Debt*) of treatment firms that have been included in the Dow Jones Sustainability Index (DJSI) and that of the matched control firms. *t* denotes the first time (the event year) when a firm is included in the DJSI. We plot the difference in average public debt ratios from five years before the event year (*t*-5) to five years after the event year (*t*+5).

## Appendix A1. Variable definitions

This appendix provides the definitions and data sources of the variables used in our empirical analyses.

| Variables | Definitions | Source |
|---|---|---|
| **Debt structure measures** | | |
| *Bank Debt* | The ratio of bank debt to total debt, where bank debt is the sum of term loans and revolving credit | Capital IQ |
| *Public Debt* | The ratio of public debt to total debt, where public debt is the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper | Capital IQ |
| *Public_D* | Equals 1 if a firm issues public debt in a specific year and 0 otherwise | SDC |
| *Public_Bank_D* | Equals 1 if a firm issues public debt in a specific year and 0 if the firm issues bank debt in the year. | SDC; Dealscan |
| **CSR Measures** | | |
| *CSR* | The difference between scaled CSR strengths and scaled CSR concerns scores. The scaled CSR strengths (concerns) is obtained by dividing the number of strengths (concerns) for each firm-year across all six CSR dimensions by the maximum possible number of strengths (concerns) in each of the six dimensions for each firm-year. | MSCI ESG Stats |
| **Instrumental Variables** | | |
| *Blue State* | Dummy=1 if a firm's headquarters is in a blue state, 0 otherwise. Blue states are defined as the states where the residents vote predominantly for the presidential candidate of the Democratic party. | 270towin.com |
| *Vote_DEM* | The percentage of votes received by the Democratic candidate for president in the last election in the state where the firm is headquartered. | https://uselectionatlas.org/ |
| **Controls and Other Variables** | | |
| *Firm Size* | The logarithm of total assets in millions | Compustat |
| *Profitability* | Income before extraordinary items scaled by total assets | Compustat |
| *Book-to-Market* | The book value of equity scaled by the market value of equity | Compustat |
| *Tangibility* | The net plant, property and equipment scaled by total assets | Compustat |
| *Leverage* | Total debt scaled by total assets | Compustat |
| *Cash* | Cash and cash equivalents scaled by total assets | Compustat |
| *R&D* | R&D expenses scaled by sales (missing R&D is treated as zero) | Compustat |
| *Advertisement* | Advertising expenses scaled by sales (missing advertisement is treated as zero) | Compustat |
| *Capex* | Capital expenditures scaled by total assets | Compustat |
| *Dividend Yield* | Dividend per share scaled by share price at the fiscal year end | Compustat |

| | | |
|---|---|---|
| *Rating_D* | Dummy=1 if a firm has an S&P domestic long-term issuer credit rating, 0 otherwise | Compustat |
| *Rating_Num* | Credit ratings converted into a numeric scale (i.e. AAA=22, AA+=21, ... C=2, D=1). It is set equal to zero for firm-years without a credit rating | Compustat |
| *Rating_Investment* | Dummy=1 if a firm's credit rating is between 13 and 22 (i.e. BBB- or better), 0 otherwise | Compustat |
| *Rating_Junk* | Dummy=1 if a firm's credit rating is between 1 and 12 (i.e. BB+ or worse), 0 otherwise | Compustat |
| *Industry Sigma* | The industry average of the standard deviation of the cash flow from operating activities in the past five years | Compustat |
| *HHI* | The Hirschman-Herfindahl Index (HHI) is the sum of squares of sales market share of firms in each 3-digit SIC industry. | Compustat |
| *Takeover Index* | A firm-level index of takeover susceptibility constructed by Cain et al. (2017) | Stephen McKeon's website |
| *Board Independence* | The fraction of independent directors on the board | ISS Directors |
| *High FCF & Low MB* | Dummy=1 if a firm with high (i.e. above-median) free cash flow and low (i.e. below-median) growth opportunities, and 0 otherwise. Growth opportunity is measured by market-to-book ratio | Compustat |
| *Analyst Coverage* | Number of financial analysts following a firm | IBES |
| *No. of Segments* | Number of industry segments reported under Compustat segment file | Compustat |
| *Return Volatility* | The standard deviation of monthly stock returns over the preceding twelve months | CRSP |
| *Regional Trust* | The proportion of respondents who believe that most people can be trusted in their own region. There are nine regions: New England, Middle Atlantic, East North Central, West North Central, South Atlantic, East South Central, West South Central, Mountain, and Pacific. | General Social Survey |
| *Equity Constraints* | A text-based measure of equity financing constraints | Hoberg and Maksimovic (2015) |
| *Equity Issuance* | Dummy=1 if a firm issues equity in a year, 0 otherwise | SDC |
| *Firm Political Risk* | A text-based measure of firm-level political risk (Hassan et al., 2019) | https://www.firmlevelrisk.com |
| *Economic Policy Uncertainty_National* | The level of uncertainty in a state that stems from national policy-related sources (e.g., elections, federal agencies, and regulators) | https://www.policyuncertainty.com/state_epu.html |
| *Economic Policy Uncertainty_State* | The level of uncertainty in a state that stems from state and local policy issues | https://www.policyuncertainty.com/state_epu.html |

**Table 1. Summary statistics**

This table reports the summary statistics (mean, standard deviation, quartiles, and median) of the variables. *Bank Debt* is the ratio of bank debt to total debt. *Public Debt* is the ratio of public debt to total debt. *CSR* is the firm-level CSR score. All the variables are defined in Appendix A1. The sample period is 2001-2015.

| Variables | Observations | Mean | SD | P25 | Median | P75 |
|---|---|---|---|---|---|---|
| *Public Debt* | 18,456 | 0.492 | 0.406 | 0.000 | 0.553 | 0.908 |
| *Bank Debt* | 18,456 | 0.418 | 0.394 | 0.022 | 0.298 | 0.855 |
| *CSR* | 18,456 | -0.011 | 0.099 | -0.062 | -0.015 | 0.021 |
| *Firm Size* | 18,456 | 7.613 | 1.615 | 6.473 | 7.507 | 8.644 |
| *Profitability* | 18,456 | 0.029 | 0.099 | 0.010 | 0.039 | 0.074 |
| *Book-to-Market* | 18,456 | 0.525 | 0.386 | 0.276 | 0.461 | 0.704 |
| *Tangibility* | 18,456 | 0.272 | 0.249 | 0.068 | 0.189 | 0.427 |
| *Leverage* | 18,456 | 0.265 | 0.196 | 0.116 | 0.237 | 0.369 |
| *Cash* | 18,456 | 0.119 | 0.143 | 0.024 | 0.067 | 0.160 |
| *R&D* | 18,456 | 0.037 | 0.133 | 0.000 | 0.000 | 0.017 |
| *Advertisement* | 18,456 | 0.010 | 0.023 | 0.000 | 0.000 | 0.009 |
| *Capex* | 18,456 | 0.050 | 0.059 | 0.014 | 0.033 | 0.063 |
| *Dividend Yield* | 18,456 | 0.014 | 0.021 | 0.000 | 0.004 | 0.021 |
| *Rating_D* | 18,456 | 0.528 | 0.499 | 0.000 | 1.000 | 1.000 |
| *Industry Sigma* | 18,456 | 0.041 | 0.036 | 0.021 | 0.032 | 0.049 |
| *HHI* | 18,456 | 0.232 | 0.198 | 0.089 | 0.172 | 0.303 |

## Table 2. CSR performance and the choice between bank debt and public debt

This table examines the effects of CSR performance on debt structure. The dependent variable is *Public Debt* in columns (1)-(2) and *Bank Debt* in columns (3)-(4). *Public Debt* is the ratio of public debt to total debt. *Bank Debt* is the ratio of bank debt to total debt. *CSR* is the firm-level CSR score. All other control variables are defined in Appendix A1. In Panel A, we control for firm and year fixed effects in columns (2) and (4) and industry and year fixed effects in columns (1) and (3). Panel B reports the result with high-dimensional fixed effect. Industry-year interaction fixed effects are in columns (1) and (3) and state-year interaction fixed effects are in columns (2) and (4). *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. Baseline results**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | *Public Debt* | *Public Debt* | *Bank Debt* | *Bank Debt* |
| *CSR* | 0.253*** | 0.116*** | -0.198*** | -0.109*** |
| | (6.54) | (4.20) | (-5.32) | (-3.93) |
| *Firm Size* | 0.077*** | 0.045*** | -0.089*** | -0.054*** |
| | (16.33) | (4.06) | (-20.27) | (-4.98) |
| *Profitability* | 0.069 | 0.009 | -0.025 | 0.047 |
| | (1.51) | (0.23) | (-0.50) | (1.12) |
| *Book-to-Market* | 0.011 | 0.012 | -0.011 | -0.011 |
| | (0.95) | (1.23) | (-0.91) | (-1.06) |
| *Tangibility* | 0.137*** | 0.087 | -0.193*** | -0.129** |
| | (3.43) | (1.53) | (-4.92) | (-2.21) |
| *Leverage* | 0.225*** | 0.277*** | -0.104*** | -0.150*** |
| | (6.84) | (7.97) | (-3.28) | (-4.28) |
| *Cash* | 0.176*** | 0.233*** | -0.351*** | -0.301*** |
| | (3.98) | (5.05) | (-7.95) | (-6.12) |
| *R&D* | 0.025 | 0.062 | -0.012 | -0.007 |
| | (0.54) | (0.95) | (-0.23) | (-0.10) |
| *Advertisement* | 0.372 | 0.379 | -0.043 | -0.282 |
| | (1.30) | (0.83) | (-0.16) | (-0.64) |
| *Capex* | 0.050 | -0.018 | -0.007 | 0.132 |
| | (0.52) | (-0.20) | (-0.07) | (1.47) |
| *Dividend Yield* | 0.253 | -0.121 | -0.343 | 0.231 |
| | (1.16) | (-0.90) | (-1.59) | (1.51) |
| *Rating_D* | 0.195*** | 0.106*** | -0.155*** | -0.074*** |
| | (13.48) | (6.10) | (-11.15) | (-4.15) |
| *Industry Sigma* | -0.156 | -0.004 | 0.233* | -0.035 |
| | (-1.13) | (-0.03) | (1.65) | (-0.28) |
| *HHI* | 0.019 | -0.040 | -0.017 | 0.037 |
| | (0.40) | (-0.96) | (-0.33) | (0.91) |
| Fixed Effect | Industry, Year | Firm, Year | Industry, Year | Firm, Year |
| Observations | 18,456 | 18,456 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.462 | 0.051 | 0.372 | 0.037 |

**Panel B. Controlling for additional fixed effects**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | *Public Debt* | *Public Debt* | *Bank Debt* | *Bank Debt* |
| *CSR* | 0.116*** | 0.082*** | -0.102*** | -0.109*** |
| | (5.01) | (3.09) | (-3.58) | (-4.27) |
| Controls | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Industry×Year | Firm, State×Year | Firm, Industry×Year | Firm, State×Year |
| Observations | 18,456 | 18,456 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.747 | 0.768 | 0.714 | 0.694 |

## Table 3. Robustness checks

This table examines the robustness of the effects of CSR performance on debt structure. Panel A presents the effects of CSR strengths and CSR concerns on debt structure. Panel B examines the effects of CSR performance on debt structure using six individual CSR dimensions: community, employee, environment, diversity, human rights, and product characteristics. Panel C examines alternative measures of debt structure and CSR. Columns (1)-(2) use the ratio of public debt over bank debt and the ratio of public debt over total assets as dependent variables. Column (3) uses a dependent variable that takes the value of one if a firm has no public debt and zero otherwise. Column (4) includes a quadratic term of CSR. Column (5) uses the number of items weighted CSR. Column (6) adopts a CSR measure constructed using the Item Response Theory. Panel D examines alternative estimators and subsamples. Column (1) adopts the random-effect Tobit model. Column (2) uses Fama-MacBeth (1973) regression. Column (3) implements two-way clustered standard errors by firm and year. Column (4) includes firms only from 2003 onward. Columns (5)-(6) separately examine the manufacturing and non-manufacturing firms. Panel E studies the probability of new public debt issuance. Column (1) includes the full sample and uses the dependent variable (*Public_D*), which equals one if there is new public debt issuance and zero otherwise. In column (2), the dependent variable (*Public_Bank_D*) takes the value of one if there is a new public debt issuance and zero if there is a new bank debt issuance in a given year. The dependent variable is *Public Debt* or its alternative measures in all columns except for the Tobit regression. *Public Debt* is the ratio of public debt to total debt. *CSR* is the firm-level corporate social responsibility score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*, which are defined in Appendix A1. We control for industry and year fixed effects or firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. CSR strengths and concerns**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* |
| *STR* | 0.205*** | 0.148*** | | |
| | (4.45) | (4.24) | | |
| *CON* | | | -0.283*** | -0.058 |
| | | | (-4.17) | (-1.17) |
| Controls | Yes | Yes | Yes | Yes |
| Fixed Effect | Industry, Year | Firm, Year | Industry, Year | Firm, Year |
| Observations | 18,456 | 18,456 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.460 | 0.052 | 0.460 | 0.050 |

**Panel B. CSR dimensions**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* |
| *CSR (Community)* | 0.019* | | | | | |
| | (1.86) | | | | | |
| *CSR (Employee)* | | 0.019* | | | | |
| | | (1.73) | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| *CSR(Environment)* | | | 0.026* | | | |
| | | | (1.67) | | | |
| *CSR (Diversity)* | | | | 0.067*** | | |
| | | | | (3.63) | | |
| *CSR (Human Rights)* | | | | | 0.103*** | |
| | | | | | (3.13) | |
| *CSR (Product)* | | | | | | 0.033*** |
| | | | | | | (2.94) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 16,294 | 16,876 | 18,366 | 18,449 | 14,757 | 16,668 |
| Adj. $R^2$ | 0.051 | 0.050 | 0.051 | 0.051 | 0.050 | 0.048 |

**Panel C. Alternative measures of debt structure and CSR**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | *Public Debt-to-Bank Debt* | *Public Debt-to-Total Assets* | *Zero Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* |
| *CSR* | 13.526*** | 0.032*** | -0.089*** | 0.104*** | | |
| | (3.61) | (3.57) | (-2.91) | (3.09) | | |
| $CSR^2$ | | | | 0.089 | | |
| | | | | (0.70) | | |
| *CSR-Items Weighted* | | | | | 0.113*** | |
| | | | | | (4.24) | |
| *CSR-IRT* | | | | | | 0.010** |
| | | | | | | (2.57) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 15,111 | 18,456 | 18,456 | 18,456 | 18,456 | 14,113 |
| Adj. $R^2$ | 0.015 | 0.375 | 0.044 | 0.051 | 0.052 | 0.048 |

**Panel D. Alternative estimators and subsamples**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Tobit | Fama-MacBeth | Two-way Cluster | Post-2003 | Manufacturing | Non-manufacturing |
| *CSR* | 0.188*** | 0.287*** | 0.253*** | 0.112*** | 0.182*** | 0.064** |
| | (5.96) | (8.83) | (6.58) | (4.11) | (3.74) | (1.99) |

| | | | | | | |
|---|---|---|---|---|---|---|
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Year | | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 18,456 | 18,456 | 18,456 | 17,212 | 7,373 | 11,083 |
| Adj. $R^2$ | | 0.554 | 0.462 | 0.051 | 0.060 | 0.051 |

**Panel E. Incremental approach: Probability of new public debt issue**

| | (1) | (2) |
|---|---|---|
| | *Public_D* | *Public_Bank_D* |
| *CSR* | 0.626*** | 0.718*** |
| | (3.80) | (3.10) |
| Controls | Yes | Yes |
| Fixed Effect | Industry, Year | Industry, Year |
| Observations | 16,980 | 6,356 |
| Pseudo $R^2$ | 0.316 | 0.295 |

## Table 4. CSR performance and the choice of debt types

This table examines the effects of CSR performance on five different types of corporate debt. The dependent variables are senior bonds/notes (*SrBondNotes*), subordinated bonds/notes (*SubBondNotes*), and commercial papers (*CommPapers*) in columns (1)-(3) and term loans (*TermLoan*) and credit lines (*CreditLines*) in columns (4)-(5). *SrBondNotes* is the amount of senior bonds and notes divided by total debt. *SubBondNotes* is the amount of subordinated bonds and notes divided by total debt. *CommPapers* represents commercial papers divided by total debt. *TermLoan* is the amount of term loans divided by total debt. *CreditLines* is revolving credit divided by total debt. *CSR* is the firm-level corporate social responsibility score. All other control variables are defined in Appendix A1. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | *SrBondNotes* | *SubBondNotes* | *CommPapers* | *TermLoan* | *CreditLines* |
| *CSR* | 9.557*** | 2.703* | -0.583 | -7.680*** | -3.184 |
| | (3.43) | (1.85) | (-0.77) | (-2.94) | (-1.35) |
| *Firm Size* | 4.218*** | 0.200 | 0.099 | -2.582** | -2.861*** |
| | (3.74) | (0.35) | (0.72) | (-2.51) | (-3.39) |
| *Profitability* | 3.351 | -2.961 | 0.683* | 6.093 | -1.367 |
| | (0.90) | (-1.42) | (1.77) | (1.49) | (-0.39) |
| *Book-to-Market* | 0.553 | 0.847* | -0.197 | 0.482 | -1.542* |
| | (0.56) | (1.81) | (-1.46) | (0.51) | (-1.89) |
| *Tangibility* | 11.381** | -3.003 | 0.252 | -5.007 | -7.940* |
| | (2.01) | (-1.12) | (0.31) | (-0.85) | (-1.69) |
| *Leverage* | 20.610*** | 7.931*** | -0.720* | 10.044*** | -24.969*** |
| | (5.91) | (3.94) | (-1.73) | (2.97) | (-9.12) |
| *Cash* | 19.324*** | 4.969** | -0.821 | -0.050 | -30.088*** |
| | (4.16) | (2.17) | (-1.42) | (-0.01) | (-7.49) |
| *R&D* | -2.042 | 7.833* | 0.005 | -0.945 | 0.447 |
| | (-0.25) | (1.68) | (0.01) | (-0.12) | (0.10) |
| *Advertisement* | -1.049 | 34.960* | 4.284 | -25.065 | -2.787 |
| | (-0.02) | (1.93) | (0.92) | (-0.56) | (-0.08) |
| *Capex* | -3.657 | 0.421 | 1.357 | -11.083 | 24.298*** |
| | (-0.40) | (0.12) | (1.33) | (-1.34) | (2.93) |
| *Dividend Yield* | 8.346 | -15.625** | -4.841** | -12.422 | 35.515*** |
| | (0.61) | (-2.19) | (-2.16) | (-0.88) | (2.70) |
| *Rating_D* | 7.102*** | 3.216*** | 0.183 | 1.309 | -8.715*** |
| | (3.98) | (3.02) | (0.91) | (0.85) | (-5.93) |
| *Industry Sigma* | -1.710 | -1.627 | 2.588 | 14.339 | -17.913* |
| | (-0.14) | (-0.24) | (1.29) | (1.10) | (-1.85) |
| *HHI* | -3.814 | -0.271 | 0.012 | 5.842 | -2.137 |
| | (-0.91) | (-0.15) | (0.01) | (1.55) | (-0.57) |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 18,456 | 18,456 | 18,456 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.055 | 0.047 | 0.009 | 0.007 | 0.042 |

## Table 5. Tests on endogeneity

This table addresses endogeneity concerns regarding the effects of CSR performance on debt structure using an instrumental variable approach. Panel A examines the average treatment effect of high CSR performance on debt structure using a propensity score matching approach. For each observation with top-quartile CSR performance, we match an observation with lower CSR performance. Columns (1)-(2) compare the average debt structure between the treatment and control groups. In columns (3)-(4), we run regression based on the matched sample. *CSR_D* is a dummy variable that takes the value of one if a firm's CSR performance is in the top quartile and zero otherwise. Panel B examines the average treatment effect of high (i.e. top-quartile) CSR performance on debt structure using the bias-adjusted matching estimator (Abadie and Imbens, 2006). Panel C examines the effects using an instrumental variable approach. The dependent variable in the second stage is *Public Debt*. The instrumental variables are *Blue State* and *Vote_DEM*. *Blue State* is a dummy variable that equals one if a firm is headquartered in a state where the residents vote predominantly for the Democratic presidential candidate. *Vote_DEM* is the percentage of votes received by the Democratic presidential candidate in the last election in the state where the firm is headquartered. Panel D examines the effects using the Heckman treatment effect model in two stages. In the first stage (column (1)), we estimate a binary choice model with *CSR_D* as the dependent variable and *Blue State, Vote_DEM* and other controls as the independent variables. In the second stage (column (2)), we regress *Public Debt* on *CSR_D*, the Inverse Mills Ratio calculated from the first stage, and the control variables. *Public Debt* is the ratio of public debt to total debt. *Bank Debt* is the ratio of bank debt to total debt. *CSR* is the firm-level CSR score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, and *HHI*. The *F*-Stat is the Cragg-Donald statistics detecting the weak instrument problem. The critical values are taken from Stock and Yogo (2005). *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. Propensity score matching**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | | | Matched sample regression | |
| | *Public Debt* | *Bank Debt* | *Public Debt* | *Bank Debt* |
| Treatment group | 0.602 | 0.309 | | |
| Control group | 0.552 | 0.343 | | |
| Difference | 0.050*** | -0.034*** | | |
| | (4.94) | (-3.56) | | |
| *CSR_D* | | | 0.035*** | -0.024*** |
| | | | (5.27) | (-3.54) |
| Controls | | | Yes | Yes |

**Panel B. Abadie-Imbens Bias-adjusted matching**

| | (1) | (2) |
|---|---|---|
| | *Public Debt* | *Bank Debt* |
| Treatment effect | 0.016*** | -0.016** |
| | (2.58) | (-2.19) |

**Panel C. 2SLS**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | First Stage | Second Stage | First Stage | Second Stage |
| *INSTR. CSR* | | 2.488** | | 2.094** |
| | | (2.47) | | (1.99) |
| *Blue State* | 0.011*** | | | |
| | (4.43) | | | |
| *Vote_DEM* | | | 0.069*** | |
| | | | (4.17) | |
| Controls | Yes | Yes | Yes | Yes |
| Observations | 18,343 | 18,343 | 18,343 | 18,343 |
| Adj. $R^2$ | | 0.24 | | 0.311 |

| | | | |
|---|---|---|---|
| *F*-Stat | | 54.8 | 55.8 |
| (critical value) | | (16.38) | (16.38) |

**Panel D. Heckman treatment effect model**

| | (1) First Stage | (2) Second Stage |
|---|---|---|
| *CSR_D* | | 0.203*** |
| | | (5.25) |
| *Blue State* | 0.200*** | |
| | (5.27) | |
| *Vote_DEM* | 1.033*** | |
| | (4.62) | |
| *Inverse Mills Ratio* | | -0.092*** |
| | | (-4.09) |
| Controls | Yes | Yes |
| Observations | 18,343 | 18,343 |

## Table 6. The effect of DJSI inclusion on public debt

This table presents the difference-in-differences analysis of the impact of DJSI inclusion on public debt. *DJSIAdopt* is a dummy variable equal to one if a stock is newly added in the DJSI (treatment group) and zero for firms in the control group. *POST* is a dummy variable equal to one for the post-inclusion period and zero otherwise. *DJSIAdopt*×*POST* is the interaction between these two variables. *BEFORE*(*i*) or *POST*(*i*) is a dummy variable that equals one if the year is *i* years before or after the inclusion and zero otherwise. *i* takes a value from -4 to +5, while year -5 is the benchmark year and is not included as a regressor. The treatment group includes firms that are newly included in the DJSI, and the control group includes matched firms based on propensity scores from the non-DJSI sample. The sample consists of five years before and five years after the DJSI inclusion. The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt. *BEFORE*(*i*) and *POST*(*i*) are included in the regression, but their coefficients are not tabulated. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

| | (1)<br>*Public Debt* | (2)<br>*Public Debt* |
|---|---|---|
| *DJSIAdopt* × *POST* | 0.097*** | |
| | (2.91) | |
| *POST* | -0.064** | |
| | (-2.54) | |
| *DJSIAdopt* × *BEFORE*(*-4*) | | -0.047 |
| | | (-1.13) |
| *DJSIAdopt* × *BEFORE*(*-3*) | | -0.036 |
| | | (-0.78) |
| *DJSIAdopt* × *BEFORE*(*-2*) | | 0.017 |
| | | (0.33) |
| *DJSIAdopt* × *BEFORE*(*-1*) | | 0.023 |
| | | (0.48) |
| *DJSIAdopt* × *POST*(*+1*) | | 0.084 |
| | | (1.49) |
| *DJSIAdopt* × *POST*(*+2*) | | 0.112* |
| | | (1.94) |
| *DJSIAdopt* × *POST*(*+3*) | | 0.079 |
| | | (1.34) |
| *DJSIAdopt* × *POST*(*+4*) | | 0.086 |
| | | (1.44) |
| *DJSIAdopt* × *POST*(*+5*) | | 0.089 |
| | | (1.48) |
| Controls | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year |
| Observations | 1,153 | 1,153 |
| Adj. $R^2$ | 0.582 | 0.585 |

## Table 7. The BP oil spill and the relation between CSR and public debt

This table examines the effect of the BP oil spill on the relation between CSR and public debt. *CSR* is the firm-level CSR score. *OilGas* is a dummy variable that takes the value of one for firms that belong to the oil and gas industry (treatment group) and zero for firms in other industries (control group). *POST* is a dummy variable equal to one for the post-spill period (2011-2015) and zero for the pre-spill period (2005-2009). *CSR*×*OilGas*×*POST* is the interaction among these three variables. *BEFORE*(*i*) or *POST*(*i*) is a dummy variable that equals one if the year is *i* years before or after the BP oil spill and zero otherwise. *i* can take a value from -4 to +5, while while year -5 is the benchmark year and is not included as a regressor. The treatment group includes firms in the oil and gas industry, and the control group includes matched firms based on propensity scores from non-oil and gas industries. The regression sample consists of five years before and five years after the BP oil spill. The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt. *BEFORE*(*i*), *POST*(*i*) and the two-way interaction terms are included in the regression, but their coefficients are not tabulated. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2005-2015.

| | (1)<br>*Public Debt* | (2)<br>*Public Debt* |
|---|---|---|
| *CSR* × *OilGas* × *POST* | -1.432** | |
| | (-2.29) | |
| *CSR* × *OilGas* × *BEFORE*(*-4*) | | 1.080 |
| | | (1.24) |
| *CSR* × *OilGas* × *BEFORE*(*-3*) | | 0.129 |
| | | (0.09) |
| *CSR* × *OilGas* × *BEFORE*(*-2*) | | 0.659 |
| | | (0.87) |
| *CSR* × *OilGas* × *BEFORE*(*-1*) | | 0.686 |
| | | (0.64) |
| *CSR* × *OilGas* × *POST*(*+1*) | | -0.606 |
| | | (-0.64) |
| *CSR* × *OilGas* × *POST*(*+2*) | | -1.575* |
| | | (-1.96) |
| *CSR* × *OilGas* × *POST*(*+3*) | | -1.687* |
| | | (-1.94) |
| *CSR* × *OilGas* × *POST*(*+4*) | | -1.292 |
| | | (-1.49) |
| *CSR* × *OilGas* × *POST*(*+5*) | | -0.444 |
| | | (-0.50) |
| *CSR* × *OilGas* | 0.977* | 0.711 |
| | (1.72) | (0.97) |
| *CSR* × *POST* | 1.557*** | |
| | (4.42) | |
| *OilGas* × *POST* | 0.126* | |
| | (1.87) | |
| *CSR* | -1.200*** | -0.778 |
| | (-3.45) | (-1.50) |
| Controls | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year |
| Observations | 726 | 726 |
| Adj. $R^2$ | 0.775 | 0.774 |

## Table 8. Channels

This table examines the channels through which CSR affects corporate debt structure. In Panel A, the sample is divided based on three proxies of agency problems: an index of takeover susceptibility (*Takeover Index*) constructed by Cain et al. (2017), the fraction of independent directors on the board (*Board Independence*), and a dummy variable (*High FCF & Low MB)* that equals one if a firm has high (i.e. above the sample median value) free cash flow and low (i.e. below the sample median value) growth opportunities and zero otherwise. In Panel B, we partition the sample using three proxies of information asymmetry: the number of analysts following a firm (*Analyst Coverage*), the number of business segments (*Segments*), and stock return volatility in the past 12 months (*Return Volatility*). The dependent variable is the ratio of public debt to total debt (*Public Debt*) in all columns. Public debt is the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper. *CSR* is the firm-level CSR score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. The agency problems channel**

| | Takeover Index | | Board Independence | | FCF and MB | |
|---|---|---|---|---|---|---|
| | Low | High | Low | High | High, Low | Low, High |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *CSR* | 0.202*** | 0.088** | 0.157*** | 0.016 | 0.172** | 0.036 |
| | (3.21) | (2.22) | (2.90) | (0.39) | (2.34) | (0.47) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 7,128 | 7,030 | 5,676 | 4,743 | 2,694 | 3,608 |
| Adj. $R^2$ | 0.062 | 0.050 | 0.045 | 0.042 | 0.065 | 0.078 |
| ΔCSR Coeff | 0.115** | | 0.140*** | | 0.136* | |
| (*t*-stat) | (2.21) | | (2.86) | | (1.73) | |

**Panel B. The information asymmetry channel**

| | Analyst Coverage | | No. of Segments | | Return Volatility | |
|---|---|---|---|---|---|---|
| | Low | High | Multiple | Single | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *CSR* | 0.132** | 0.025 | 0.109*** | 0.008 | 0.169*** | 0.090*** |
| | (2.14) | (0.79) | (2.74) | (0.14) | (3.17) | (2.82) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 8,911 | 8,788 | 8,891 | 6,269 | 9,091 | 8,897 |
| Adj. $R^2$ | 0.051 | 0.073 | 0.041 | 0.064 | 0.067 | 0.034 |
| ΔCSR Coeff | 0.107** | | 0.101* | | 0.079* | |
| (*t*-stat) | (2.13) | | (1.94) | | (1.71) | |

## Table 9. Cross-sectional analyses

This table examines the cross-sectional heterogeneity in the relation between CSR and debt structure. In Panel A, the sample is split based on three measures of financial constraints: the WW index, the SA index, and corporate bond ratings (i.e., below-investment-grade ratings or no ratings versus above-investment-grade ratings). In Panel B, the sample is split according to whether a firm is in a sin industry, headquartered in low or high trust regions, and in periods with high or low CSR sentiment. The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt, where public debt is the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper. *CSR* is the firm-level CSR score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. We control for firm and year fixed effects, or industry and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. Financial constraints**

| | WW | | SA | | Rating | |
|---|---|---|---|---|---|---|
| | Constrained | Unconstrained | Constrained | Unconstrained | Low or No | High |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *CSR* | 0.239*** | 0.072** | 0.224*** | 0.081** | 0.119*** | 0.004 |
| | (3.59) | (2.00) | (3.96) | (2.06) | (2.82) | (0.11) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 7,217 | 7,241 | 7,258 | 7,309 | 14,228 | 4,228 |
| Adj. $R^2$ | 0.068 | 0.048 | 0.060 | 0.053 | 0.051 | 0.065 |
| ΔCSR Coeff | 0.167*** | | 0.143*** | | 0.116*** | |
| (*t*-stat) | (2.97) | | (2.81) | | (2.93) | |

**Panel B. Investor's perception and sentiment**

| | Sin Industries | | Regional Trust | | CSR Sentiment | |
|---|---|---|---|---|---|---|
| | Sin Firms | Non-sin Peer | Low | High | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *CSR* | 0.039 | 0.205*** | 0.091** | 0.185*** | 0.301*** | 0.170*** |
| | (0.62) | (2.88) | (2.39) | (4.32) | (5.09) | (4.56) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Industry | Industry |
| Observations | 2,231 | 3,285 | 9,253 | 9,203 | 8,535 | 9,921 |
| Adj. $R^2$ | 0.163 | 0.058 | 0.053 | 0.045 | 0.462 | 0.450 |
| ΔCSR Coeff | -0.167** | | -0.094** | | 0.131*** | |
| (*t*-stat) | (-2.56) | | (-2.29) | | (2.61) | |

**Online Appendix for**

**Does Corporate Social Responsibility Facilitate Public Debt Financing?**

Table OA.1. Correlation matrix

Table OA.2. Variance inflation factors

Table OA.3. The role of credit rating

Table OA.4. The effect of CSR over time

Table OA.5. Further robustness tests

Table OA.6. The validity of propensity score matching

Table OA.7. Placebo test for the effect of DJSI inclusion on public debt

Table OA.8. Hedging channel

## Table OA.1. Correlation matrix

This table reports the Pearson correlations among the variables. The correlation coefficients significant at the 5% level are highlighted in bold. *Public Debt* is the ratio of public debt to total debt. *Bank Debt* is the ratio of bank debt to total debt. *CSR* is the firm-level CSR score. All the variables are defined in Appendix A1. The sample period is 2001-2015.

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *1. Public Debt* | 1 | | | | | | | | | | | | | | | |
| *2. Bank Debt* | **-0.857** | 1 | | | | | | | | | | | | | | |
| *3. CSR* | **0.141** | **-0.141** | 1 | | | | | | | | | | | | | |
| *4. Firm Size* | **0.447** | **-0.470** | **0.239** | 1 | | | | | | | | | | | | |
| *5. Profitability* | **0.069** | **-0.060** | **0.079** | **0.154** | 1 | | | | | | | | | | | |
| *6. Book-to-Market* | **-0.035** | 0.007 | **-0.081** | **0.068** | **-0.149** | 1 | | | | | | | | | | |
| *7. Tangibility* | **0.229** | **-0.172** | **-0.085** | **0.055** | 0.014 | **0.017** | 1 | | | | | | | | | |
| *8. Leverage* | **0.244** | **-0.158** | **-0.029** | **0.170** | **-0.138** | **-0.162** | **0.224** | 1 | | | | | | | | |
| *9. Cash* | **-0.122** | **0.081** | **0.038** | **-0.289** | **-0.211** | **-0.179** | **-0.279** | **-0.273** | 1 | | | | | | | |
| *10. R&D* | **-0.078** | **0.074** | **0.023** | **-0.226** | **-0.467** | **-0.144** | **-0.155** | **-0.095** | **0.546** | 1 | | | | | | |
| *11. Advertisement* | -0.007 | -0.004 | **0.113** | 0.008 | **0.051** | **-0.106** | **-0.100** | **0.028** | **0.068** | **-0.028** | 1 | | | | | |
| *12. Capex* | **0.089** | **-0.047** | **-0.056** | **-0.064** | **0.046** | **-0.051** | **0.695** | **0.067** | **-0.130** | **-0.076** | **-0.054** | 1 | | | | |
| *13. Dividend Yield* | **0.097** | **-0.113** | **0.068** | **0.233** | **0.050** | **0.138** | **0.017** | **0.124** | **-0.190** | **-0.135** | **-0.029** | **-0.110** | 1 | | | |
| *14. Rating_D* | **0.533** | **-0.470** | **0.128** | **0.600** | **0.075** | **-0.041** | **0.173** | **0.335** | **-0.227** | **-0.156** | 0.006 | **0.039** | **0.109** | 1 | | |
| *15. Industry Sigma* | **-0.021** | **0.056** | **-0.020** | **-0.231** | **-0.196** | **-0.120** | **0.028** | **-0.076** | **0.389** | **0.406** | **-0.021** | **0.133** | **-0.191** | **-0.087** | 1 | |
| *16. HHI* | **0.070** | **-0.044** | **-0.029** | 0.004 | **0.076** | **-0.020** | 0.013 | 0.013 | **-0.085** | **-0.134** | **0.054** | **-0.059** | **-0.044** | **0.058** | **-0.105** | 1 |

## Table OA.2. Variance inflation factors

This table presents the variance inflation factors (VIFs) of the independent variables in Table 2.

| Variable | VIF |
|---|---|
| *CSR* | 1.27 |
| *Firm Size* | 2.23 |
| *Profitability* | 1.59 |
| *Book-to-Market* | 1.41 |
| *Tangibility* | 4.39 |
| *Leverage* | 1.69 |
| *Cash* | 1.95 |
| *R&D* | 2.15 |
| *Advertisement* | 1.27 |
| *Capex* | 2.84 |
| *Dividend Yield* | 1.40 |
| *Rating_D* | 1.96 |
| *Industry Sigma* | 1.89 |
| *HHI* | 1.84 |

## Table OA.3. The role of credit rating

This table examines the role of credit rating. In column (1), in addition to the credit rating dummy (*Rating_D*), we add the numerical value of credit rating (*Rating_Num*) in the regression. *Rating_Num* is credit ratings converted into a numeric scale (i.e. AAA=22, AA+=21, ... C=2, D=1), and is equal to zero for firm-years without a credit rating. In column (2), we examine the effects of having an investment-grade rating (*Rating_Investment*) and a junk rating (*Rating_Junk*) on debt structure. *Rating_Investment* takes the value of one if a firm's credit rating is between 13 and 22 (i.e. BBB- or better), and zero otherwise. *Rating_Junk* takes the value of one if a firm's credit rating is between 1 and 12 (i.e. BB+ or worse), and zero otherwise. In column (3), we examine the moderating effects of *Rating_Investment* and *Rating_Junk* on the relation between CSR and debt structure. The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt, where public debt is defined as the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper. *CSR* is the firm level corporate social responsibility score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI* in column (1), and we exclude *Rating_D* in columns (2) and (3) to avoid perfect collinearity. All variables are defined in Appendix A1. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

| | (1)<br>*Public Debt* | (2)<br>*Public Debt* | (3)<br>*Public Debt* |
|---|---|---|---|
| *CSR* | 0.113*** | 0.112*** | 0.101* |
| | (4.11) | (4.04) | (1.70) |
| *Rating_Num* | 0.008*** | | |
| | (3.03) | | |
| *Rating_Investment* | | 0.168*** | 0.167*** |
| | | (7.78) | (7.72) |
| *Rating_Investment × CSR* | | | 0.048 |
| | | | (0.71) |
| *Rating_Junk* | | 0.084*** | 0.082*** |
| | | (4.67) | (4.58) |
| *Rating_Junk × CSR* | | | -0.077 |
| | | | (-0.97) |
| *Rating_D* | 0.025 | | |
| | (0.79) | | |
| Controls | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year |
| Observations | 18,456 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.054 | 0.058 | 0.056 |

## Table OA.4. The effect of CSR on debt structure over time

This table examines the effects of CSR performance on debt structure over time by dividing our sample into seven sub-periods. Specifically, the sample period is 2001-2002 in column (1), 2003-2004 in column (2), 2005-2006 in column (3), 2007-2008 in column (4), 2009-2010 in column (5), 2011-2012 in column (6), and 2013-2015 in column (7). The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt. *CSR* is the firm level corporate social responsibility score. All other control variables are defined in Appendix A1. We control for industry and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | 2001-02 | 2003-04 | 2005-06 | 2007-08 | 2009-10 | 2011-12 | 2013-15 |
| | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* | *Public Debt* |
| *CSR* | 0.310* | 0.344*** | 0.260** | 0.192* | 0.330*** | 0.185*** | 0.178*** |
| | (1.69) | (2.59) | (2.36) | (1.76) | (3.30) | (3.05) | (3.47) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Industry, Year | Industry, Year | Industry, Year | Industry, Year | Industry, Year | Industry, Year | Industry, Year |
| Observations | 680 | 1,674 | 2,605 | 2,818 | 2,982 | 3,085 | 4,612 |
| Adj. $R^2$ | 0.396 | 0.337 | 0.396 | 0.402 | 0.437 | 0.469 | 0.470 |

## Table OA.5. Additional robustness tests

This table reports the results of additional robustness tests. Panel A includes additional control variables related to equity financing. We control for text-based measure of equity financing constraints (*Equity Constraints*) in columns (1) and (2), and equity issuance (*Equity Issuance*) in columns (3) and (4). Panel B excludes utility firms from the sample. Panel C uses the annual change in the ratio of public debt to total debt (Δ*Public Debt*) and the annual change in the ratio of bank debt to total debt (Δ*Bank Debt*) as dependent variables in columns (1) and (2) respectively. Panel D use the two-stage Heckman selection model to correct for sample selection bias. In the first-stage regressions in columns (1) and (3), we obtain the inverse Mills ratios (IMR) by estimating the likelihood of having non-zero *Public Debt* and *Bank Debt*, respectively, using the full sample. In the second-stage regressions, we control for the IMR and examine the effect of CSR on *Public Debt* and *Bank Debt*, respectively, based on the subsample with non-zero public debt in column (2) and the subsample with non-zero bank debt in column (4). The dependent variable is *Public Debt* or *Bank Debt* in Panels A and B. *Public Debt* is the ratio of public debt to total debt. *Bank Debt* is the ratio of bank debt to total debt. *CSR* is the firm level corporate social responsibility score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. All other control variables are defined in Appendix A1. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

**Panel A. Controlling for equity financing**

| | (1) *Public Debt* | (2) *Bank Debt* | (3) *Public Debt* | (4) *Bank Debt* |
|---|---|---|---|---|
| *CSR* | 0.090** | -0.099*** | 0.116*** | -0.109*** |
| | (2.52) | (-2.74) | (4.20) | (-3.94) |
| *Equity Constraints* | 0.039 | -0.069 | | |
| | (0.65) | (-1.05) | | |
| *Equity Issuance* | | | -0.005 | 0.013* |
| | | | (-0.77) | (1.69) |
| Controls | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 12,336 | 12,336 | 18,456 | 18,456 |
| Adj. $R^2$ | 0.054 | 0.039 | 0.051 | 0.037 |

**Panel B. Excluding utility firms**

| | (1) *Public Debt* | (2) *Bank Debt* |
|---|---|---|
| *CSR* | 0.128*** | -0.123*** |
| | (4.14) | (-3.91) |
| Controls | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year |
| Observations | 16,215 | 16,215 |
| Adj. $R^2$ | 0.055 | 0.039 |

**Panel C. Changes in debt structure**

| | (1) Δ*Public Debt* | (2) Δ*Bank Debt* |
|---|---|---|
| *CSR* | 0.049** | -0.039* |
| | (2.48) | (-1.91) |
| Controls | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year |
| Observations | 14,491 | 14,491 |
| Adj. $R^2$ | 0.025 | 0.030 |

**Panel D. The two-stage Heckman selection model**

| | (1) First Stage Dummy=1 if *Public Debt* >0 | (2) Second Stage *Public Debt* | (3) First Stage Dummy=1 if *Bank Debt* >0 | (4) Second Stage *Bank Debt* |
|---|---|---|---|---|
| *CSR* | -0.004 | 0.203*** | -1.048*** | -0.106** |
| | (-0.03) | (7.58) | (-9.53) | (-2.20) |
| *Firm Size* | 0.312*** | 0.011*** | -0.048*** | -0.091*** |
| | (28.00) | (3.51) | (-5.21) | (-32.06) |
| *Profitability* | 0.376*** | 0.038 | -0.535*** | 0.122*** |
| | (2.74) | (1.10) | (-3.80) | (3.48) |
| *Book-to-Market* | 0.147*** | -0.042*** | -0.012 | -0.015** |
| | (4.19) | (-5.52) | (-0.37) | (-2.08) |
| *Tangibility* | 1.254*** | -0.014 | -0.585*** | -0.140*** |
| | (15.63) | (-0.68) | (-8.64) | (-5.36) |
| *Leverage* | 1.660*** | -0.217*** | 1.154*** | -0.292*** |
| | (22.45) | (-10.09) | (15.78) | (-8.21) |
| *Cash* | 0.211** | 0.390*** | -1.661*** | 0.065 |
| | (2.10) | (14.83) | (-16.82) | (1.03) |
| *R&D* | 0.177 | 0.141*** | 0.572*** | -0.128*** |
| | (1.60) | (4.34) | (4.78) | (-3.86) |
| *Advertisement* | -2.625*** | 0.759*** | -1.137** | 0.095 |
| | (-5.36) | (6.16) | (-2.44) | (0.76) |
| *Capex* | -1.055*** | 0.022 | 0.727*** | -0.045 |
| | (-3.41) | (0.31) | (2.62) | (-0.63) |
| *Dividend Yield* | -2.179*** | 0.755*** | -0.592 | -0.451*** |
| | (-3.65) | (5.38) | (-1.00) | (-3.31) |
| *Rating_D* | 0.787*** | 0.048*** | -0.368*** | -0.132*** |
| | (26.35) | (4.68) | (-11.89) | (-10.48) |
| *Industry Sigma* | 1.395*** | -0.216** | -1.056*** | 0.516*** |
| | (3.68) | (-2.27) | (-3.15) | (5.17) |
| *HHI* | 0.423*** | -0.041** | -0.164*** | 0.029* |
| | (6.81) | (-2.44) | (-2.89) | (1.72) |
| *Inverse Mills Ratio* | | -0.262*** | | -0.237*** |
| | | (-11.86) | | (-2.80) |
| Fixed Effect | Industry, Year | Industry, Year | Industry, Year | Industry, Year |
| Observations | 18,456 | 13,357 | 18,456 | 15,111 |

## Table OA.6. The validity of propensity score matching

This table examines the validity of our propensity score matching approach. In Panel A, we report results from Logit regressions used to calculate the propensity scores for the matching procedure, where the dependent variable is an indicator variable set to one if a firm's CSR performance is in the top quartile and zero otherwise. Columns (1) and (3) respectively show the coefficients for the full sample before matching and the subsample with matched observations. Columns (2) and (4) report the robust *t*-statistics. Panel B conducts balancing test by comparing the means of the covariates of the treated and control groups before matching (columns (1)-(3)) and after matching (columns (4)-(6)). ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A1. The sample period is 2001-2015.

**Panel A. Logit regression: the probability of being treated**

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | Before matching | | After matching | |
| *Firm Size* | 0.372*** | (25.08) | -0.017 | (-1.02) |
| *Profitability* | 1.894*** | (7.12) | 0.612* | (2.01) |
| *Book-to-Market* | -0.309*** | (-5.37) | 0.032 | (0.47) |
| *Tangibility* | -0.264** | (-2.28) | 0.094 | (0.67) |
| *Leverage* | -0.725*** | (-6.37) | 0.062 | (0.46) |
| *Cash* | 0.495*** | (2.86) | 0.328 | (1.60) |
| *R&D* | 1.440*** | (7.41) | 0.034 | (0.15) |
| *Advertisement* | 6.820*** | (9.40) | -0.762 | (-0.96) |
| *Capex* | -0.751 | (-1.49) | -0.572 | (-0.91) |
| *Dividend Yield* | 4.946*** | (5.49) | 0.845 | (0.77) |
| *Rating_D* | 0.147*** | (2.98) | 0.042 | (0.70) |
| *Industry Sigma* | 2.231*** | (3.90) | -0.409 | (-0.63) |
| *HHI* | -0.099 | (-1.02) | 0.004 | (0.03) |
| Observations | 18,456 | | 8,458 | |
| Pseudo $R^2$ | 0.080 | | 0.001 | |

**Panel B. Balancing test**

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Before matching | | | After matching | | |
| | Treated | Control | %Bias | Treated | Control | %Bias |
| *Firm Size* | 8.322 | 7.401 | 57.0*** | 8.303 | 8.324 | -1.3 |
| *Profitability* | 0.042 | 0.026 | 17.3*** | 0.042 | 0.038 | 3.7* |
| *Book-to-Market* | 0.489 | 0.535 | -12.0*** | 0.490 | 0.492 | -0.5 |
| *Tangibility* | 0.248 | 0.280 | -13.3*** | 0.248 | 0.249 | -0.2 |
| *Leverage* | 0.255 | 0.267 | -6.7*** | 0.255 | 0.255 | -0.2 |
| *Cash* | 0.126 | 0.117 | 6.0*** | 0.125 | 0.122 | 2.5 |
| *R&D* | 0.043 | 0.035 | 5.7*** | 0.042 | 0.043 | -0.4 |
| *Advertisement* | 0.014 | 0.009 | 18.7*** | 0.013 | 0.014 | -1.5 |
| *Capex* | 0.044 | 0.052 | -14.4*** | 0.044 | 0.045 | -1.4 |
| *Dividend Yield* | 0.016 | 0.013 | 16.4*** | 0.016 | 0.016 | 1.6 |
| *Rating_D* | 0.656 | 0.489 | 34.2*** | 0.654 | 0.652 | 0.3 |
| *Industry Sigma* | 0.042 | 0.041 | 1.7 | 0.042 | 0.042 | -0.6 |
| *HHI* | 0.228 | 0.233 | -2.4 | 0.228 | 0.228 | 0.1 |

## Table OA.7. Placebo test for the effect of DJSI inclusion on public debt

This table conducts placebo tests for the model specification in column (1) of Table 6. The placebo tests are based on the randomized samples from 5,000 simulations. For each simulation, we draw a random sample of treatment firms from half of the sample firms used in Table 6 and use the other firms as control firms. We report the distribution of the coefficient and *t*-statistics for the *DJSIAdopt* × *POST* variable from the simulations. The dependent variable is *Public Debt*, defined as the ratio of public debt to total debt. The sample period is 2001-2015.

| | Mean | P5 | P25 | Median | P75 | P95 |
|---|---|---|---|---|---|---|
| Coefficient for *DJSIAdopt* × *POST* | 0.000 | -0.058 | -0.023 | 0.000 | 0.024 | 0.058 |
| *t*-statistics for *DJSIAdopt* × *POST* | 0.009 | -1.675 | -0.668 | 0.003 | 0.692 | 1.672 |

## Table OA.8. The hedging channel

This table examines the hedging channel through which CSR affects debt structure. The sample is split based on three proxies of firm risk or uncertainty: (1) firm-level political risk, (2) national economic policy uncertainty, and (3) state-level economic policy uncertainty. The dependent variable is *Public Debt* in all columns. *Public Debt* is the ratio of public debt to total debt, where public debt is defined as the sum of senior bonds and notes, subordinated bonds and notes, and commercial paper. *CSR* is the firm level corporate social responsibility score. The control variables are *Firm Size*, *Profitability*, *Book-to-Market*, *Tangibility*, *Leverage*, *Cash*, *R&D*, *Advertisement*, *Capex*, *Dividend Yield*, *Rating_D*, *Industry Sigma*, *HHI*. All variables are defined in Appendix A1. We control for firm and year fixed effects. *t*-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. Intercept terms are included in all regressions but are not reported. The sample period is 2001-2015.

| | Firm Political Risk | | Economic Policy Uncertainty_National | | Economic Policy Uncertainty_State | |
|---|---|---|---|---|---|---|
| | High | Low | High | Low | High | Low |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| *CSR* | 0.087** | 0.106** | 0.098*** | 0.135*** | 0.070** | 0.149*** |
| | (2.54) | (2.55) | (3.08) | (2.70) | (1.97) | (3.58) |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Fixed Effect | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year | Firm, Year |
| Observations | 7,505 | 7,760 | 9,053 | 9,235 | 9,153 | 9,135 |
| Adj. $R^2$ | 0.059 | 0.046 | 0.045 | 0.058 | 0.058 | 0.064 |
| ΔCSR Coeff | -0.020 | | -0.036 | | -0.078 | |
| (*t*-stat) | (-0.14) | | (-0.24) | | (-0.61) | |