The London School of Economics and Political Science

Essays on Debt Contracting

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Declaration

I certify that the thesis I have presented for examination for the PhD degree of the London School of Economics and Political Science is solely own my work other than where I have clearly indicated that it is the work of others (in which case, the extent of any work carried out jointly by me and any other person is clearly identified in it).

I confirm that Chapter 2 is jointly co-authored with Peter Pope and Ane Tamayo (both at LSE) and Chapter 3 is jointly co-authored with Karl Lins (Utah), Henri Servaes (LBS), and Ane Tamayo (LSE).

I declare that my thesis consists of 50,073 words.

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Abstract

This thesis consists of three studies that investigate the channels through which corporate governance reforms, accounting choice, and social capital influence contracting in the corporate bond market.

In Chapter 1 (solo authored), I examine the public debt contracting consequences of shocks to managerial entrenchment. For identification, I exploit the mandatory adoption of board independence rules under the NYSE and NASD listing requirements as a regulatory reform that enhanced the intensity of CEO monitoring by independent directors. Using a large sample of corporate bond issues, I find that the rules induced economically significant contracting effects in noncompliant firms, namely in the form of lower payout, financing, and event-related covenants as well as higher credit ratings. In further tests, I show that while these effects are not mitigated by shareholder control, they ultimately depend on directors' private incentives and their ability and willingness to engage in costly monitoring. My findings speak to the debate on how equity-centric governance interacts with bondholders' interests and their incentives to impose long-term restrictions on firms' economic activities.

Chapter 2 (co-authored with Peter Pope and Ane Tamayo) examines the contracting relevance of the balance sheet in the corporate bond market. Using "accounting bloat" in net asset values as a proxy for balance sheet quality, we predict and find that aggregate covenant intensity in bond indentures is negatively associated with the quality of issuers' balance sheet numbers. The magnitude of this effect is more pronounced for accounting and event-related covenants and is lower in the case of covenants that restrict payouts, refinancing, and investment activities. Our results are robust to controlling for corporate governance quality and the stringency of monitoring by lenders in syndicated loan deals. Turning to market outcomes, we find that offering yields, credit spreads, and credit ratings are decreasing in balance sheet quality, while the likelihood of agreement among credit rating agencies about new bond issues' credit risk increases with balance sheet quality. To establish a causal link between balance sheet quality and covenant structures, we exploit an exogenous

court ruling in Delaware that substantially limits the fiduciary duties of directors to creditors. We show how this legal event affected bond issuers' reporting incentives and altered the debt contracting relevance of their balance sheet numbers.

Finally, in Chapter 3 (co-authored with Karl Lins, Henri Servaes, and Ane Tamayo), we investigate whether a firm's social capital, and the trust that it engenders, are viewed favorably by bondholders. Using firms' corporate social responsibility (CSR) activities to proxy for social capital, we find no relation between CSR and bond spreads over the 2005-2013 period. However, during the 2008-2009 financial crisis, which represents a shock to trust and default risk, high-CSR firms benefited from lower bond spreads. These effects are more pronounced for firms that, when in distress, have a greater opportunity to engage in asset substitution or divert cash to shareholders. High-CSR firms were also able to raise more debt capital on the primary market during this period, and those high-CSR firms that raised more debt were able to do so at lower at-issue bond spreads, better initial credit ratings, and for longer maturities. Our results suggest that bond investors believe that high-CSR firms are less likely to engage in asset substitution and diversion that would be detrimental to stakeholders, including debtholders. These findings also indicate that the benefits of CSR that accrued to shareholders during the financial crisis carry across to another important asset class, debt capital.

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Chapter 1

Managerial entrenchment, board monitoring, and public debt contracting

1.1 Introduction

Beginning with Jensen and Meckling (1976), a growing literature identifies managerial entrenchment as an endogenous element of the governance environment. These studies show that the lack of monitoring accumulates power in the hands of entrenched managers (Hermalin and Weisbach 1998) and affords them with opportunities to extract rents, thereby increasing managerial agency risk (Shleifer and Vishny 1989; Edlin and Stiglitz 1995).[1] While the implications of entrenchment for capital structure (Berger et al. 1997), stockholder returns (Gompers et al. 2003; Core et al. 2006), and firm value (Bebchuk et al. 2009) are well-documented, its impact on the agency risk borne by bondholders remains largely unclear. This is partly because entrenched managers' decisions with respect to dividends, investments, and the issuance of debt can have conflicting effects on bondholder risk (Chava et al. 2010). The central challenge, however, is that convincing empirical strategies that can effectively address the endogeneity of entrenchment and covenant choices in bond contracts (Begley and Feltham 1999) are often not available.

The objective of my paper is to examine the causal link between entrenched managers' economic decisions and bondholder agency risk. In doing so, I develop tests that are motivated by the theoretical literature on the economic and contracting consequences of entrenchment. My empirical method follows Berger et al. (1997) and is based on exploiting an equity-centric shock to managerial security and examining its effects on covenant choices in bond contracts. To that end, I build on the literature that establishes a key role for independent directors as monitoring agents on corporate boards (e.g., Fama 1980; Fama and Jensen 1983; Weisbach 1988; Hermalin and Weisbach 1998; Adams et al. 2010)

[1] While the literature has predominantly emphasized the adverse effects of managerial entrenchment, Almazan and Suarez (2003), Adams and Ferreira (2007), and Fisman et al. (2014), among others, argue that entrenchment can be viewed as a "commitment device" that improves the quality of information flow and decision making.

and use the mandatory adoption of board independence rules instituted by the New York Stock Exchange (NYSE) and the National Association of Securities Dealers (NASD) as the basis for my identification strategy.

In response to the corporate failures of the early 2000s, in 2002 the NYSE and the NASD proposed new rules on the structure and composition of corporate boards. The rules require all publicly-listed companies to have a majority of independent directors as well as fully independent board committees.[2] An attractive feature of this quasi-experimental setting is that a large number of firms were forced to increase the proportion of independent directors on their boards in order to comply with the new listing requirement (Chhaochharia and Grinstein 2009; Linck et al. 2009; Duchin et al. 2010; Guo and Masulis 2015).[3] This allows to me to study the effects of board monitoring on bond covenant choices in a setting that is relatively free from endogeneity concerns.

The change in board independence rules reflects an equity-centric perspective to corporate governance regulation. The Securities and Exchange Commission (SEC) believes that reinforcing the centrality of independent directors "... should increase the likelihood that boards will make decisions that are in the best interests of shareholders."[4] However, as a shock to managerial security, the rules can affect agency risks for *both* shareholders and bondholders by limiting the ability of chief executive officers (CEOs) to enjoy the quiet life and consume excess perquisites (Bertrand and Mullainathan 2003), tactically pursue inefficient projects in order to extract private benefits (Shleifer and Vishny 1989; Bebchuk and Cohen 2005), or influence their own compensation (Bebchuk and Fried 2003).[5] Extant evidence on the effects of this regulatory reform on the size and structure of CEO compensation (Chhaochharia and Grinstein 2009) and performance-based CEO turnover (Guo and Masulis 2015) corroborates this view and indicates that the rules have enhanced the intensity of CEO monitoring.

To examine the public debt contracting consequences of mandatory board independence rules, I rely on a difference-in-differences design using a sample of 2,147 bonds issued between 1996 and 2007 by 510 firms that lie at the intersection of the RiskMetrics and the Mergent FISD universes. For identification, I exploit the cross-sectional variation in listed firms' compliance with the NYSE and NASD board independence rules in the year immediately before their introduction.[6] This strategy allows me to assign bond issuers to

[2] Chhaochharia and Grinstein (2007) and Duchin et al. (2010) discuss the background and timeline of events that led to the NYSE and NASD corporate governance regulations.

[3] The NYSE and NASD rules on independence are similar. A director does not qualify as "independent" unless the board of directors affirmatively determines that the director has no direct or indirect material relationship with the company. In addition, a director is not independent if the director or an immediate family member of the director is, or has been within the last three years, an employee of the company.

[4] Securities and Exchange Commission, Exchange Act Release 34-48745, November 2003.

[5] Berger et al. (1997) examine similar shocks (e.g., increased CEO monitoring following the addition of a blockholder to the board) and conclude that these events are effectively threats to entrenched managerial security. Hermalin (2005) makes a similar observation and notes that among the decisions where boards play an important role "are those decisions pertaining to the selection, monitoring, and retention (or dismissal) of the CEO."

[6] Selection of the board independence rule as opposed to other exchange regulations is due to the observa-

noncompliant (treatment) and compliant (control) groups and facilitates empirical tests on bond contracting responses to changes in board independence.

I start by conducting univariate tests to validate my conjecture on differences in the nature of the governance environment between firms in the two groups. Consistent with expectations, I find that noncompliant firms display some of the important symptoms that are often attributed to managerial entrenchment. For example, they have smaller boards that are more likely to be co-opted (Jensen 1993; Coles et al. 2014), their CEOs have more voting power (Stulz 1988; McConnell and Servaes 1990), and are entrenched by virtue of their significantly longer tenures (Zwiebel 1996; Berger et al. 1997). However, these firms have weaker takeover defenses and as such, are less likely to be entrenched through insulation from the market for corporate control (Cremers and Nair 2005; Gillan et al. 2011).

Next, I turn to empirical tests and examine the effects of the board independence rules on bond covenant intensity. I find that relative to the average compliant firm, the rules lead to significant reductions in the use of covenants in bond contracts of noncompliant firms. This finding is robust to the inclusion of a battery of controls as well as firm and time fixed effects. The economic magnitude of the decline is large and ranges between 15% to 18% relative to the sample mean (5.55). To mitigate concerns about the endogeneity of compliance status, I apply entropy balancing to generate a more plausible counterfactual set of control firms. I use the observable firm-level and managerial determinants of board independence outlined in Boone et al. (2007) to match compliant and noncompliant firms. Using the matched sample design, I continue to find statistically significant and economically important bond contracting effects.

Building on the literature that explains how entrenchment influences payout, investment, and financing decisions, I examine the channels through which board independence rules affect the use of covenants in bond contracts. Fluck (1999) and Myers (2000), for example, identify entrenchment as an important determinant of dividend policy. Hu and Kumar (2004) corroborate this view and show that payout decisions are driven by entrenched managers' incentives to avoid shareholder intervention.[7] Therefore, contracting restrictions on dividends should increase with entrenchment. Consistent with this notion, I find that payout covenants of noncompliant firms are considerably lower in the post-adoption period.[8] This result also conforms to evidence in Maxwell and Stephens (2003), who show that corporate bonds are twice as likely to be downgraded as upgraded following the announcement of repurchase programs.

My findings also reveal that the adoption of board independence rules leads to a re-

tion that the structure of boards (and their different committees) is determined mainly by the majority independence rule. This view is corroborated by statistics which show that the rate of noncompliance with other exchange regulations is considerably higher when the majority of the board is not comprised of independent directors (Guo and Masulis 2015).

[7] Hu and Kumar (2004) also document complementarities between board independence and institutional blockholders in that they jointly reduce the need to use dividends as a disciplining device.

[8] This finding is a step toward the resolution of the "counterintuitive results" documented in Chava et al. (2010), who report that entrenchment reduces the need for payout covenants.

duction in the use of financing covenants. This is consistent with entrenched managers' incentives to select suboptimal levels of (short-term) debt in order to minimize their human capital risk (Fama 1980) by avoiding the disciplining force of lenders and the constraints that they impose on cash flows (Jensen 1986). It also conforms to inferences from Datta et al. (2005) in that shocks to entrenchment lead to more (less) reliance on short-term (long-term) debt.[9] This has two implications for the use of financing covenants in bond contracts. First, if there are net benefits to cross-monitoring (Diamond 1984), bondholders may be inclined to reduce restrictions on short-term (senior) debt. Second, if correcting suboptimality in capital structure reduces demand for long-term debt, as Billett et al. (2007) argue, this could also mitigate incentives for imposing constraints on firms' long-term financing activities.

Event-related covenants, primarily those that reduce incentives for takeovers through the use of poison put provisions, decline as well. This result is supported by evidence on tradeoffs between internal and external governance mechanisms reported in Gillan et al. (2011). They show that firms with higher board independence also have more antitakeover charter provisions, indicating that the market for corporate control is less effective as a disciplining mechanism in these firms. It then follows that exogenous increases in the proportion of independent directors will act as a substitute for external governance and reduce bondholder demand for event risk covenants.[10]

Examining restrictions on real activities, I find that the board independence rules have no impact on investment covenants. This outcome is likely driven by the contemporaneous change in the intensity of restrictions imposed on payout and financing activities and event risk transactions. Smith and Warner (1979) emphasize the importance of this interrelatedness and demonstrate how covenants designed to restrict one economic activity affect incentives to the impose restrictions on other activities. Specifically, a potential consequence of the decline in payout restrictions is that underinvestment problems will be exacerbated (Myers 1977; Kalay 1982), leading to lower demand for investment covenants. Nevertheless, overall restrictions on investments could remain unchanged because the reduction in financing and event-related covenants is likely to induce overinvestment in risky ventures, justifying greater restrictions on real activities.

My results also show that the rules have had no effect on the use of accounting covenants. The relevance of accounting-based restrictions depends largely on incentives that shape the quality of financial reporting. Leuz et al. (2003) show that these incentives are influenced by the extent to which managers extract private benefits. Entrenchment-reducing shocks can alter managers' incentives and enhance accounting quality. This view

[9] Berger et al. (1997) also show that threats to entrenched managers' job security are on average followed by persistent increases in total leverage.

[10] Chava et al. (2010) argue to the contrary and suggest that self-interested managers will naturally resist takeover bids and as such, their incentives will be aligned with those of bondholders. This view, however, is incomplete in that it ignores the endogeneity of entrenchment and the important tradeoffs that define the overall governance environment.

is backed by evidence in Armstrong et al. (2014), who show that exogenous increases in CEO monitoring improve corporate transparency. From a contracting perspective, if the net benefits of using covenants are sufficiently large, as Li et al. (2014) contend, greater transparency might generate demand for more covenants. However, given its endogenous nature, higher accounting quality might be merely signaling managers' commitment to not expropriate bondholders, in which case, the use of accounting covenants should either decline or as my findings indicate, remain unchanged.

I perform a battery of additional tests to extend the baseline results. First, I examine whether the documented decline in the use of covenants is sensitive to delegated monitoring by banks. Stringent cross-monitoring induces free-riding (Diamond 1984) as it offers bondholders with a low-cost monitoring alternative that can act as a substitute for weak internal governance. Using the covenant index of Bradley and Roberts (2015), the covenant slack measure of Demerjian and Owens (2016), and registered covenant violations from Nini et al. (2012), I find that the intensity of cross-monitoring by banks has little or no effect in moderating my baseline results.

Next, I explore the effects of the board independence rules on blockholder-bondholder agency frictions and its contracting implications. Consistent with the important role of boards in disciplining blockholders and curbing their expropriation of corporate resources (Dahya et al. 2008), I find that the rules lead to statistically and economically similar contracting outcomes in firms with high and low shareholder control. Following Cremers et al. (2007), I also study the interplay between the market for corporate control and bondholder agency risk and show that the board independence rules are most effective when takeover vulnerability is high and when firms are incorporated in states with weak antitakeover statutes.

Finally, I perform four tests based on directors' private incentives and monitoring ability. To examine incentives, similar to Becker and Strömberg (2012), I exploit the cross-sectional variation in firms' state of incorporation and find that the consequences of mandatory board independence are more pronounced in Delaware firms due to the expanded fiduciary duties that their directors owe to creditors. This effect is particularly visible in firms with a lower distance to default. Following Coles et al. (2014), I also assess the impact of co-option and find that the private incentives of newly-appointed independent directors dominate their allegiance to the CEO. To examine monitoring ability, I focus on directors' information costs and busyness. My results are broadly consistent with Duchin et al. (2010) and show that the effectiveness of the rules depends largely on directors' information costs. Consistent with Core et al. (1999) and Fich and Shivdasani (2006), my findings also suggest that the contracting benefits of the board independence rules accrue mainly to those firms that have fewer busy independent directors.

My paper contributes to the literature in four important ways. First, while prior research identifies the equity market and internal monitoring consequences of the board independence reforms (e.g., Chhaochharia and Grinstein 2009; Linck et al. 2009; Guo and

Masulis 2015), little, if any, evidence is available on its public debt contracting (side) effects.[11] My study fills this void by documenting a causal relation between an exogenously-induced change in internal governance and bondholders' agency risk and their incentives to restrict firms' economic activities.

Second, my findings show how an equity-centric regulatory intervention in governance, which aims to align the incentives of managers and shareholders, affects bondholder agency risk in ways that are consistent with the predictions of corporate finance theory. In doing so, my results add to the novel evidence reported in Cremers et al. (2007) and Chava et al. (2010) by documenting the interaction between shareholder governance and bondholder governance through debt covenants.

I also add to the literature which identifies the importance of directors' monitoring incentives (Cohen et al. 2012; Coles et al. 2014) and their information costs (Duchin et al. 2010). My findings show that the public debt contracting benefits of governance reforms accrue mainly when nominally-independent directors have strong private incentives and the ability to exercise effort and engage in active CEO monitoring.

Finally, my evidence speaks to the debate on whether entrenchment-reducing regulatory interventions are sufficiently effective in inducing an optimal level of monitoring that can mitigate agency conflicts. While skeptics argue that adopting "one-size-fits-all" board independence rules will amount to no more than mere "window-dressing" (Romano 2005), which ultimately lead to suboptimal outcomes (Bainbridge 2002), my findings suggest otherwise and indicate that the reforms induced economically important contracting consequences in firms that were affected by the rules.

The rest of this paper is structured as follows. In Section 1.2, I lay out the empirical method. Section 1.3 describes the data and Section 1.4 reports the main results. In Section 1.5, I conduct robustness tests. Section 1.6 offers further analyses and Section 1.7 concludes.

1.2 Empirical method and identification strategy

1.2.1 Difference-in-differences design

Empirical studies on the debt contracting consequences of corporate governance quality are often confounded by endogeneity issues. This is mainly because contracting outcomes and the proxies used to gauge governance quality are jointly determined in equilibrium. To mitigate this concern, I exploit the quasi-experimental setting offered by the mandatory

[11] This is particularly surprising given the economic relevance of the corporate bond market as an important platform for raising long-term capital. Statistics from the Securities Industry and Financial Markets Association indicate that in 2015 alone, over $1.4 trillion of bonds were offered on the primary market leading to $8.2 trillion in outstanding bonds. The average daily trading volume of bonds in the same year was approximately $26.6 billion, which indicates a turnover rate of 82% relative to outstanding issues. Goldstein et al. (2016) compare turnover rates across financial markets and show that from 1996 to 2007, the average turnover rate of bond funds is almost twice as large as that of equity funds.

adoption of the NYSE and NASD board independence rules, which required a subset of (noncompliant) firms to increase the proportion of independent directors on their boards.[12] This strategy allows me to first assign firms to noncompliant (treatment) and compliant (control) groups and to then adopt a difference-in-differences (DiD) research design. To implement the DiD design, I estimate different variations of the following baseline model:

$$\begin{aligned} Covenant\ intensity_{i,j,t} = \beta_0 + \beta_1 Post_t \times Noncompliant_{i,2001} \\ + \sum \gamma_k' X_{k,j,t} + \sum \delta_l' Y_{l,i,t-1} + \sum \zeta_m' Z_{m,i,t-1} \\ + FFE_i + TFE_t + \varepsilon_{i,j,t}\ , \end{aligned} \tag{1.1}$$

where *Covenant intensity* is the number of covenants associated with bond j of firm i issued in period t. *Post* is an indicator variable that identifies the break year for the post-treatment period; it is equal to one for periods on or after 2003, and is zero otherwise.[13] *Noncompliant* is an indicator variable that identifies treatment firms in the benchmark year; it takes the value of one if issuer i is noncompliant with the board independence rules at the 2001 meeting date, and is zero otherwise.[14] X is the $(k \times 1)$ vector of bond-level controls measured at the date of issue. Y is the $(l \times 1)$ vector of lagged board- and CEO-related controls and Z is the $(m \times 1)$ vector of lagged firm-level controls.

To control for any omitted, unobservable, time-invariant credit risk factors that may differ across bond issuers, I include firm fixed effects (FFE) in all estimations. Similarly, to control for the impact of market trends and macroeconomic changes on creditors' demand for restrictions in bond contracts, I add time (year) fixed effects (TFE) to all estimations. Separate main effect indicators are not included for *Post* and *Noncompliant* as they are absorbed in the firm and time fixed effects. I cluster the standard errors at the firm and time (year) levels to control for cross-sectional and time-series dependence, respectively (Petersen 2009; Gow et al. 2010).

[12] To satisfy compliance with the thresholds set forth in the NYSE and NASD board independence rules, firms could also reorganize or reduce the size of their boards. However, findings in Linck et al. (2009) suggest otherwise and show that the average firm increases the number of its directors following the exchange listing requirements and other contemporaneous governance mandates.

[13] Ideally, the post-treatment indicator (*Post*) should switch to one after treatment firms comply with the board independence rules. However, the stricter standard applied by RiskMetrics in evaluating the independence of directors complicates assessments of board independence. This is mainly because directors who may be, and in some cases are, classed as "independent" in the real world are categorized as "linked" by RiskMetrics due to a relationship that they have had with the firm in the past (regardless of how immaterial that relation may have been). My selection of 2003 as the break year is consistent with prior studies (e.g., Duchin et al. 2010; Armstrong et al. 2014) and is also supported by statistics which indicate that a majority of firms responded to the board independence rules in 2002 and 2003.

[14] In February 2002, the SEC requested that the exchanges revise their governance standards. The NYSE and the NASD presented their proposals to the SEC in August and October, respectively and the Commission approved the proposed rules in November 2003. Therefore, the slate of directors in 2001 represents the board structure before firms could have responded to any forthcoming governance regulation.

1.2.2 Entropy balance matched sample

The parallel path assumption in the DiD design implies that absent exogenous interventions, average change in covenant intensity is equal across noncompliant and compliant firms. However, since corporate boards are endogenously determined (Hermalin and Weisbach 1998, 2003), the same fundamentals that explain observed board structures and determine compliance, could also affect the temporal trend of nonprice terms in bond contracts, ultimately leading to bias in the DiD estimates.[15] To address this concern and formally examine whether the DiD specification is influenced by violations of the parallel path assumption, I use the entropy balancing method of Hainmueller (2012) to generate a more plausible counterfactual set of control firms. The method endogenously determines a weighting among the covariates of noncompliant and compliant firms and matches the moments of the covariates' data for the two groups. Put differently, entropy balancing uses a binary outcome (in this case, whether or not a firm is compliant with the board independence rules in the benchmark year) and reweights the compliant sample observations such that different moments of the distribution of the underlying fundamentals in the noncompliant and weighted compliant subsamples in the pre-adoption period are identical.

To generate a matched sample, I rely on Boone et al. (2007), who develop three hypotheses on the firm-level and managerial determinants of board independence. The scope and complexity hypothesis implies that size and diversity of operations are key drivers of demand for monitoring by an independent board. Large, diversified firms have more contracting relationships, which give rise to a host of agency frictions that require monitoring by independent directors. The monitoring hypothesis, on the other hand, suggests that board structure is affected by the information environment. High information asymmetry firms (e.g., R&D intensive firms) are relatively costly to monitor by independent directors. As a result, these firms are more likely to have insider-dominated boards. The negotiation hypothesis predicts that boards are shaped by the power of the CEO. As the influence of the CEO grows, more insiders and affiliated directors will take up available board positions.

For matching purposes, I use data from 1995 to 2000 for a set of observable covariates associated with each of these theories and impose covariate balance constraints on their first three moments across compliant and noncompliant firms. I use size, leverage, profitability, the number of historical business segments, and firm age to capture the scope and complexity of operations; I use free cash flow as a measure of the private benefits of control and the market-to-book ratio, R&D intensity, and stock return volatility to capture independent directors' monitoring costs; I also use CEO stock ownership to proxy for the bargaining power of the CEO.

[15] Atanasov and Black (2016) note that evaluating covariate balance between treatment (noncompliant) and control (compliant) firms is particularly relevant when DiD analysis is conducted over long periods. While my use of an extended window is primarily due to the infrequent nature of transactions in the primary bond market, a benefit of doing so is that it enables me to ensure that bond market participants' perceptions about the contracting effects of mandatory board independence rules are not transitory reactions to new regulation.

1.3 Sample and data

I start by identifying the set of corporate bonds issued between 1996 and 2007 by nonfinancial U.S. domiciled and incorporated firms that are covered in the Mergent Fixed Income Securities Database (FISD).[16] Similar to Chava et al. (2010), I exclude perpetual, foreign currency, preferred, and exchangeable issues as well as Yankee and Canadian bonds. The selection is restricted to corporate debentures and corporate convertibles with maturities over one and no more than 30 years. To be included in the sample, I require that data on bond attributes (i.e., issue size, offering and maturity dates, coupon, security, and covenants) are available. Initial credit ratings from S&P, Moody's, and Fitch are from Mergent FISD and Bloomberg. To select a representative rating when an issue is rated by multiple agencies, I follow Ellul et al. (2015) and first select the S&P rating; in cases where this is missing, I use the rating from Moody's, and if this is also missing, the rating is from Fitch. These refinements yield a preliminary sample of 11,203 bonds issued by 3,987 firms.

I subsequently merge this sample with the universe of firms covered in the RiskMetrics directors legacy file. To obtain unique firm and director identifiers and to address issues with annual meeting dates and incorrect director entries, I implement the adjustments outlined in Coles et al. (2014). I use hand-collected data from Definitive Statement 14A (proxy statement) forms filed in the SEC's EDGAR database to update RiskMetrics for missing and incorrect director start dates, missing and inconsistent entries for the number of outside directorships, and missing CEO and chairman indicators. CEO start dates are from ExecuComp. In the absence of a CEO match between RiskMetrics and ExecuComp or when the exact CEO start dates are unclear (e.g., when CEOs have multiple start dates or the CEO start date falls after the annual meeting date), I hand-collect the data from the proxy statements. I exclude controlled companies from the sample due to their exemption from the board independence requirements.[17] Single-director and multiple-CEO firms and those that are not listed on the NYSE, NASDAQ, or AMEX are also dropped from the selection process.

Following Chhaochharia and Grinstein (2009) and Guo and Masulis (2015), I impose two additional requirements on the merged sample. First, given that my identification strategy is based on classifying firms as compliant (control) or noncompliant (treatment) in the benchmark year, I restrict the selection to those firms that have non-missing board

[16] The selection of 1996 as the first year in the sample is driven by data availability on RiskMetrics. I end the sample period in 2006 for two reasons. First, directors data contained in the RiskMetrics legacy file are compiled following the methodology of the Investor Responsibility Research Center (IRRC). Beginning in 2007, data on the directors file are retrieved and maintained based on the new collection system of the RiskMetrics Group (RMG) and the Institutional Shareholder Service (ISS). As a result, the time-series of directors data within the legacy and current files are not necessarily comparable. Second, I restrict the selection of bond issues to 2007 due to the sharp decline in the number of new offerings in the primary bond market during the credit crunch and the financial crisis period between 2007 and 2009.

[17] A majority of previously-noncompliant controlled companies claim to have voluntarily implemented the board and committee independence requirements. Nevertheless, I drop these firms from the sample due to differences in their adoption incentives and the self-selection bias associated with their voluntary implementation of regulatory requirements.

data on RiskMetrics for the 2001 meeting date. Second, to ensure that selected firms are uniformly subjected to the board independence rules and that the results are not influenced by firms moving into or out of the sample, I require that all firms have an equity listing from 2001 to 2005. Applying these restrictions together with data availability requirements on firm fundamentals from Compustat and equity market data from the Center for Research in Security Prices (CRSP) reduces the sample to 2,147 corporate bonds issued by 510 firms. Table 1.1 summarizes the selection process and sample properties.

Summary statistics are reported in Table 1.2. All variables are defined in Appendix A.1. Panel A presents the firm-level variables for the full sample. To minimize the influence of outliers, all continuous variables included in this panel are winsorized at the 1st and 99th percentile. The data show that the average bond issuer in the sample has a market value of over $6.2 billion. In comparison, the average market capitalization of all NYSE (NYSE/NASDAQ) firms during the sample period is around $4.3 ($2.1) billion, revealing that the sample firms are relatively large. The average firm in the sample is also heavily reliant on debt with mean leverage levels of about 63%. This is not surprising because the sample firms are those with access to the primary bond market.

Panel B reports the characteristics of the board and the CEO. Average board independence measures at just below 69%, which is consistent with related studies using the RiskMetrics database (e.g., Duchin et al. 2010; Guo and Masulis 2015).[18] The average board has about 11 directors with a mean tenure of 8 years and a co-option rate of over 40%. On average, 31% of independent board members are classed as busy directors. This is higher than the level reported in past studies (e.g., 17.11% reported in Fich and Shivdasani 2006), possibly due to the lower threshold that I adopt from Perry and Peyer (2005) to identify busyness and the lower mean outside directorship level in my sample (1.12, untabulated). The number of independent and busy directors is also positively correlated (ρ=0.28, untabulated), indicating that demand for and the workload of directors increases after the board independence rules. Less than 30% of firms have a non-CEO chairman and more than half of them have outsider CEOs who assumed their role within a year after joining the firm's board.

In Panel C, I compare the treatment and control firms in 2001. While the two groups do not exhibit major differences across many of the firm-level variables, compliant firms are significantly larger and more levered than noncompliant firms. Similar to the results in Duchin et al. (2010), analyst forecast dispersion, a measure of information costs, is slightly higher in compliant firms. Noncompliant firms have fewer antitakeover provisions, consistent with complementarities between board independence and the strength of char-

[18] My reading of firms' proxy statements suggests that there is variation in the implementation of the categorical standards of materiality for independence purposes. Given that this can be a potential source of inconsistency in the underlying level of independence reflected in proxy statements, I make no adjustments to reclassify "linked" directors (e.g., based on whether three years have passed since the termination of their employment with the firm) and rely on the RiskMetrics classification to identify independent directors.

ter provisions as well as tradeoffs between internal and external governance mechanisms reported in Cremers and Nair (2005) and Gillan et al. (2011). Turning to board-related factors, as the partitioning of firms is based on compliance status, by design, noncompliant firms have lower independence ratios. These firms also exhibit features that are commonly associated with managerial entrenchment; specifically, they have smaller boards that are more likely to be co-opted and their CEOs are entrenched by virtue of their significantly longer tenures (9.9 versus 6.4 years). However, the effect of these factors might be offset by lower levels of CEO duality and board busyness in these firms.

Table 1.3 presents the main characteristics of the sample bonds. The mean issue size is $435 million with an average maturity of 12 years. A large fraction of the bonds (79.6%) are callable while only 16.9% are convertible. At-issue credit ratings average at 8.7, which is tilted toward the lower tail of the investment-grade category. Aggregate covenant intensity and its breakdown into five categories following Chava et al. (2010) and Nikolaev (2010) are reported in Panel B. Covenants included within these categories are defined in Appendix A.2. *Covenant intensity* is the main outcome variable of interest and is defined as the total number of covenants included in the bond contract. Mean covenant intensity is over 5.55, with investment restrictions being the most prevalent type of covenant, followed by state-contingent event-related restrictions, and limitations imposed on firms' subsequent refinancing ability. Panel C tabulates the seniority rank of the sample bonds from senior secured to subordinated issues. In my sample, over 86% of the bonds are within the senior category, comparable to levels reported in related studies (e.g., Miller and Riesel 2012).

A key identifying consideration in conducting the difference-in-differences analysis is to assess whether nonprice (covenant) terms in bond contracts of treatment and control firms exhibit a similar trend in the pre-adoption period. Figure 1.1 presents a visual illustration of the time-series behavior of board independence ratios and covenant intensity levels in the two groups of firms. In the top panel, I plot the mean board independence ratio between 1996 and 2006. The proportion of independent directors in noncompliant firms remains fairly stable up to the benchmark year, but increases significantly by more than 50% from 2001 to 2005, revealing how the mandatory board independence rules acted as a shock to the composition of boards in these firms. Board independence ratios in compliant firms also exhibit an upward trend over the sample period, albeit at a more moderate rate.

The bottom panel shows the average bond covenant intensity of compliant and noncompliant firms between 1996 and 2007. Noncompliant issuers are assigned to two groups based on the likely impact of the rules on their board structures: noncompliant light (heavy) denotes firms with board independence ratios above (below) 40% in 2001. The light partition represents the majority (78%) of noncompliant firms. Up to 2004, the first post-implementation year, bond covenant intensity in these firms exhibits an on-average similar behavior to that of compliant firms. Thereafter, a sharp break becomes evident and covenant intensity declines by 51% from 2004 to 2007. Covenants of noncompliant (heavy) firms exhibit a fairly random behavior up to 2003, when the pattern begins to converge to

that of noncompliant (light) issuers before experiencing a decline of about 39% in covenant intensity in the post-2004 period. In more formal comparisons of pre-adoption differences in nonprice terms of bond contracts, as in Atanasov and Black (2016), I conduct placebo tests (untabulated) by using 1999 and 2000 as pseudo-intervention benchmark years and find no differences with respect to covenant intensity between compliant and noncompliant firms.

1.4 Results

1.4.1 Baseline results

Table 1.4 reports the DiD results from estimating model (1.1). In Panel A, the outcome variable is aggregate covenant intensity. Column 1 in this panel includes bond-level controls only. In the next three columns, I sequentially add controls for board and CEO attributes, firm characteristics, and at-issue credit ratings. The coefficient on the double interaction term (β_1) is negative and statistically significant across all variations of the baseline model. This suggests that relative to the average compliant firm, the exogenous shock to CEO monitoring by independent directors in noncompliant firms leads to a decline in the use of covenants in their bond contracts. The economic magnitude of this effect is large and ranges between 15% (column 1) to 18% (column 3) relative to the sample mean (5.55).

In Panel B, I examine whether the impact of the board independence rules varies across different covenant categories and find that the causal effect is driven mainly by reductions in payout, financing, and event-related covenants. The result on payout covenants corroborates the predictions in Fluck (1999) and Myers (2000) and suggests that monitoring by independent directors mitigates entrenched managers' incentives to use dividends as protection against disciplinary interventions by shareholders.[19] Decline in financing covenants conforms to the notion that shocks to managerial entrenchment lead to less reliance on long-term debt (Datta et al. 2005) which, in turn, reduces the need for restricting financing activities. Event-related covenants decline as well, which is consistent with complementarities between board independence and internal takeover defenses reported in Cremers and Nair (2005) and Gillan et al. (2011).

While investment covenants are not affected by the board independence requirements, this is likely due to the rules' contemporaneous effect on payout restrictions and covenants that limit subsequent financing and event risk transactions. Myers (1977) and Kalay (1982) show that less restrictive payout covenants could exacerbate underinvestment problems, hence leading to lower demand for investment covenants. However, this effect could be offset by the overinvestment implications of less stringent financing and event-related

[19] Chava et al. (2010) do not present direct tests on the role of board independence in explaining payout restrictions, as data for a sizeable percentage of independent directors in their sample are not available. As an alternative, they rely on CEO duality and show that it is negatively associated with demand for dividend covenants.

covenants, and as a result, overall restrictions on investments could remain unchanged. My findings are consistent with this notion.

I also find that the rules have no statistically detectable effect on the use of accounting covenants. While entrenchment-reducing shocks can alter managers' reporting incentives and lead to improvements in corporate transparency (Leuz et al. 2003; Armstrong et al. 2014), the debt contracting implication of this effect is not clear. Li et al. (2014) argue that high quality financial reporting increases the contracting relevance of accounting numbers and facilitates *ex post* monitoring by bondholders through covenants. This view, however, disregards the endogenous nature of accounting and the fact that financial reporting may be a signaling platform for managers to credibly convey their commitment to not expropriate bondholders. In this case, accounting covenants should either decline or as my findings indicate, remain unchanged.

Although my main focus is on examining the contracting consequences of board independence rules, I also assess their implications for at-issue credit ratings as a widely-used proxy for the cost of debt. The results are reported in Panel C and suggest that the rules had an important impact on credit rating agencies' assessments of default risk associated with bond issues. The economic magnitude of this effect is significant as well and, on average, ranges between 60% (column 3) to 90% (column 1) of a one-notch improvement in the initial rating of bond issues.

1.4.2 Entropy balancing

Table 1.5 provides test results using the entropy balance matched sample. Panel A reports the first (mean), second (variance), and third (skewness) moments of the distribution of covariates identified in Boone et al. (2007) across compliant and noncompliant firms before and after the matching procedure. For example, before entropy balancing, compliant firms are on average larger, have higher R&D intensity, and higher market-to-book ratios. After entropy balancing, the distributions of all covariates are indistinguishable across the noncompliant and weighted compliant groups.

Panel B presents the DiD estimates using the weighted control (compliant) group. The results are consistent with those reported in Table 1.4 and confirm that the average noncompliant firm experiences a relative reduction in covenant intensity following the implementation of the board independence rules. However, the economic magnitude of the rules' effects is slightly attenuated and now ranges between 12% (column 3) and 14% (column 1). In Panels C and D, I report the DiD estimates for each of the five covenant categories and for at-issue credit ratings using the weighted control group. Again, the results are broadly consistent with those obtained using the unweighted sample, mitigating concerns about the potential effects of control sample differences on the paper's main results.

1.5 Role of banks in delegated monitoring

Beatty et al. (2012) show that monitoring by senior banks as "credible specialists" provides a low-cost monitoring alternative to bondholders and increases their demand for cross-acceleration covenants. They further demonstrate that the benefits of cross-monitoring increases with the intensity of covenants used in loan contracts.[20] These findings have potential implications for my main results. Specifically, to the extent that monitoring by banks induces free-riding by bondholders (Diamond 1984), or acts as a substitute for internal governance, my evidence concerning the effects of mandatory board independence rules on bond covenant intensity could be biased.[21]

Another channel through which cross-monitoring might affect bond contracting relates to the transfer of control rights in the event of loan covenant violations. Roberts and Sufi (2009) and Nini et al. (2012) highlight banks' engagement in governance through loan covenants. They report that covenant violations are, on average, followed by reductions in acquisitions and capital expenditures, lower debt issuance and shareholder payouts, and increases in CEO turnover. In a similar vein, Ferreira et al. (2015) rely on the notion of state-contingent allocations of control rights and document that the number of independent directors on boards increases significantly following covenant violations. This suggests that higher board independence and lower bond covenant intensity may be joint outcomes of loan covenant violations.[22]

To explore these possibilities, I augment the baseline model and explicitly control for the intensity of bank monitoring in loan contracts. For delegated monitoring, my main proxy is the *Loan covenant index* of Bradley and Roberts (2015). I also use three measures of covenant slack from Demerjian and Owens (2016). *Covenant strictness* is the probability of covenant violation across all financial covenants in a loan deal at its inception, while *C_Covenant strictness* and *P_Covenant strictness* capture the tightness of capital and performance covenants, respectively.[23] Finally, to examine the impact of covenant violations, following Nini et al. (2012), I define *Covenant violation* as the number of loan covenant violations reported in firms' SEC filings. All measures of delegated monitoring are based on loans originated within three years prior to a bond issue.

Panel A of Table 1.6 reports summary statistics for the proxies of bank monitoring based on 1,585 USD-denominated loan deals reported on Dealscan that are issued between

[20] In earlier work, Datta et al. (1999) examine the debt pricing benefits of cross-monitoring and find that offering yields on first-time bond issues are considerably lower when issuers have bank debt.

[21] In unreported analysis, I examine the impact of the board independence rules on nonprice terms negotiated in the private debt market and find that the rules had little or no effect on covenant and collateral structures in syndicated loan agreements. This finding is consistent with banks' recontracting flexibility and suggests that the dynamic nonprice terms of loan contracts incorporate superior information about the underlying quality of firms' internal monitoring.

[22] Denis and Wang (2014) present evidence on loan covenant renegotiations and show that even outside technical default states, banks exercise their control rights over the operating and financial policies of the firm in a state-contingent manner.

[23] For a discussion of capital and performance covenants commonly used in private loan contracts, see Christensen and Nikolaev (2012)

1993 and 2007.[24] All variables are defined in Appendix A.1. Panel B presents the results from estimating the augmented baseline model. The findings show a positive association between the main measures of delegated monitoring and restrictions in bond contracts. More importantly, however, is the observation that the bond contracting effect of mandatory board independence rules is a robust finding after controlling for the intensity and strictness of bank monitoring. The economic magnitude of the rules is nonetheless slightly attenuated, which suggests that bondholders might substitute their reliance on independent boards for cross-monitoring by senior lenders. Comparing the estimates presented in columns 1 and 2 of this panel with the results reported in column 3 of Table 1.4, for example, indicates that the coefficient of interest (β_1) drops from -0.993 to -0.958 and -0.944. This suggests that cross-monitoring reduces the net contracting effect of the rules by approximately 5%. In untabulated tests, I also find that delegated monitoring has little or no effect on the results reported for the five covenant categories.

Having established *whether* monitoring by independent boards can affect covenant terms in bond contracts, in the next section, I turn to tests that aim to shed light on *when* mandatory board independence rules are likely to matter most.

1.6 Further analysis

1.6.1 Shareholder control and takeover vulnerability

The effects of blockholder monitoring on bondholder risk is *ex ante* unclear. On the one hand, by adopting intervention strategies or by voting with their feet, they can discipline managers, reduce moral hazard, and induce shared benefits, which could lower bondholder risk. On the other hand, however, blockholders may have incentives to abuse their power and expropriate wealth from bondholders by influencing the firm to underinvest and make excessive payouts, or engage in costly asset substitutions.

Past studies support the notion that dominant shareholders aggravate the agency cost of debt and that covenants are used as a mechanism to alleviate blockholder-bondholder frictions. Chava et al. (2010), for example, report that blockholder power increases the likelihood of observing financing and event-related covenants in bond contracts, while strong antitakeover provisions reduce the odds of using these covenants.[25] Cremers et al. (2007), however, highlight the importance of substitutions between governance mechanisms and report that blockholders increase (decrease) bondholder risk only when takeover defenses are weak (strong). Dahya et al. (2008) make a similar argument in relation to the role of boards in curbing blockholders' expropriation of corporate resources. They contend that

[24] The findings reported in this section are constrained by loan covenant data availability on Dealscan for deals initiated before 1994. In unreported analysis, I limit the test window for bond issues to the 1998-2007 period and use loan contracts originated within three years prior to each bond issue. I find qualitatively similar results to those reported here.

[25] Liao (2015) reports similar results in the private debt contracting setting by showing that the propensity for bank loans to contain accounting- and payout-related restrictions increases with outside blockholdings.

while dominant shareholders can replace directors, at the margin, it is often costly for them to do so. Moreover, given their fiduciary duties, independent directors will be motivated to monitor blockholders. This suggests that the impact of shareholder control on bondholders could also depend on how well they are disciplined by the board of directors.

To examine this conjecture, I conduct two tests. First, I investigate whether the contracting consequences of board independence rules vary based on the extent of shareholder control. Second, following Qiu and Yu (2009) and Francis et al. (2010), I assess whether these consequences are influenced by the strength of firms' charter provisions and state-level antitakeover statutes. To proxy for shareholder control, I use *Institutional blockholders*, defined as the percentage of shares held by institutional blockholders as reported on the Thomson-Reuters Institutional Holdings (13–F) database. To measure takeover vulnerability, I use the *Governance index* from Gompers et al. (2003). I also use the Bebchuk and Cohen (2003) classification to partition the sample based on the strength of state-level antitakeover statutes. All variables are defined in Appendix A.1.

Table 1.7 summarizes the findings from these tests. In columns 1 and 2 of Panel A, I modify the baseline model to account for differences in shareholder control. In these two columns, *High* (*Low*) is a binary variable that is defined based on whether blockholdings are above (below) the sample median (0.191). Institutional blockholdings are measured in the quarter immediately before each bond issue. The results indicate that the board independence rules lead to statistically and economically similar contracting outcomes in firms with high and low institutional ownership (e.g., −1.037 and −0.982 in column 1). The magnitude of the effect is also comparable to that obtained for the full sample, indicating an average decline of approximately 18% in the intensity of bond covenants in noncompliant firms. This result suggests that the extent of shareholder control does not influence bondholders' perception about the net benefits of board monitoring.[26]

In columns 3 and 4, I split the sample based on the strength of firms' takeover defenses. *High* (*Low*) is defined as an indicator of whether a firm-year is in the bottom (top) quantile of the Governance index. The results show that the contracting benefits of board independence rules accrue mainly to firms that are exposed to takeovers. Differences in the magnitude of this effect across firms with high and low takeover vulnerability are statistically significant and economically large (e.g., 22% compared to 2% decline in covenant intensity in column 3). This finding conforms to the view that although the threat of takeovers acts as a substitute for internal governance in aligning the interests of managers and shareholders (Gillan et al. 2011), it exacerbates the agency cost of debt. An exogenous increase in board independence, however, substitutes for the disciplinary effects of the market for corporate control, protects bondholders from unwanted takeovers, and reduces the need to use covenants to resolve agency conflicts.

[26] To assess the sensitivity of this finding to the selected measure of shareholder control, in untabulated analysis, I re-estimate the model using the percentage of shares held by the top five largest institutional blockholders and the Herfindahl-Hirschman index of ownership concentration and obtain qualitatively similar results.

In Panel B, I split the sample firms based on whether they are incorporated in states with weak to moderate (0 to 3 statues) or strong (4 to 5 statutes) antitakeover statutes. I find that the contracting effects of the board independence rules are most pronounced when firms have weak internal takeover defenses and are incorporated in states with weak antitakeover statutes.[27] Differences between high and low takeover vulnerability firms are no longer statistically significant once I control for default risk, but the estimated benefit to the former group is twice as large as that in the latter subset of firms (-1.028 versus -0.478). Taken together, these findings highlight the relevance of substitution effects between firm-level charter provisions and state-level antitakeover statutes in explaining the contracting consequences of mandatory board independence rules.

1.6.2 The Delaware effect and default risk

A premise underlying corporate law is that the fiduciary duties of directors are owed primarily to the firm and its owners. An important departure from this legal position occurred in 1991, when a Delaware court ruling in *Credit Lyonnais Bank Nederland, N.V. v. Pathe Communications Corporation* (hereafter, the court ruling) expanded the fiduciary duties owed by directors of Delaware-incorporated firms and established a precedent that would allow creditors to sue directors for a breach of fiduciary duties. Becker and Strömberg (2012) examine the effects of this legal episode and find that it was followed by reductions in operational and financial risk, slight increases in leverage, and a reduced reliance on bond covenants in distressed firms.[28]

The expanded fiduciary duties of directors in Delaware firms offers a useful setting to examine the contracting consequences of board independence rules. The reason for this stems from the impact of the rules on directors' exposure to shareholder litigation risk as evidenced by substantial increases in director and officer (D&O) insurance premiums (Linck et al. 2009) and court decisions that signal a trend toward stricter judicial scrutiny of directors' decisions (Grossman 2007).[29] Since wealth recovered through shareholder litigation harms the interests of creditors, the board independence rules may not be beneficial to bondholders at all, unless directors owe similar fiduciary duties to the firm's creditors. Accordingly, I expect the contracting effects of the board independence rules to be more pronounced in Delaware firms.

To examine this issue, I partition the sample firms based on their state of incorporation

[27] The reported effect for high (low) takeover vulnerability firms that are incorporated in states with weak to moderate antitakeover statutes is unlikely to be driven by Delaware issuers, given that firms incorporated in this state are almost evenly distributed between the high (59%) and low (41%) takeover vulnerability subsets of firms.

[28] In a related study, Huang et al. (2015) also show that the court ruling motivated trade-offs in firms' strategic choices in ways that are consistent with aligning the preferences of debtholders and (dedicated) shareholders.

[29] Gutiérrez (2003) formally demonstrates that D&O insurance contracts could actually increase the incentives of shareholders and creditors to sue the director, due to the "deep pocket" effect.

into Delaware and non-Delaware firms. To avoid the backfill bias in Compustat data, I obtain dynamic data on reincorporations from the RiskMetrics legacy file and define *Del* (*NDel*) as binary variables that take the value of one if a firm's state of incorporation is (is not) Delaware, and is zero otherwise. I augment the baseline specification by interacting the state of incorporation indicators with the main double interaction term in the model.

Panel A of Table 1.8 reports the contracting consequences of the board independence rules conditional on state laws that govern directors' fiduciary duties. Consistent with expectations, I find that the effects are more pronounced in Delaware firms. Reported differences between Delaware- and non-Delaware-incorporated firms are statistically significant and economically meaningful across all model specifications.[30] The magnitude of decline in covenant intensity of Delaware-incorporated issuers ranges between 20% (column 1) to 26% (column 4) relative to the sample mean. This finding suggests that the contracting benefits of exogenously increasing independent directors on corporate boards accrue mainly when those directors are sufficiently incentivized to monitor on behalf of *both* shareholders and creditors.[31]

I conduct further tests to examine whether the effects of board independence rules are influenced by firms' default risk. I do so for two reasons. First, a salient feature of the Delaware court ruling is that it creates stronger fiduciary duties to creditors when firms are in the "vicinity of insolvency." As a result, contracting consequences should be particularly visible in bond issuers that are in financial distress. Second, bondholders are vulnerable to the risk of wealth expropriation that arises due to asset substitution and underinvestment problems. To the extent that governance mechanisms contribute to the resolution of these agency problems, the effects of mandatory board independence should be more pronounced in firms with higher agency risk.

To proxy for financial distress, I use *Distance-to-default* as a common measure of default risk (Merton 1974). I obtain distance-to-default data from the Risk Management Institute at the National University of Singapore and define firms as relatively high (low) default risk if their distance-to-default is worse (better) than the sample median. I expect the effects of the board independence rules to vary across high distance-to-default (*HDtD*) and low distance-to-default (*LDtD*) firms in ways that are predicted by both expanded fiduciary duties under the Delaware court ruling as well as the theoretical link between the agency cost of debt and default risk.

The results reported in Panel B confirm this expectation and show that the contracting

[30] To examine the effect of any misclassifications in RiskMetrics, I re-estimate the model using the static data on state of incorporation from Compustat and find that my inferences are unchanged, possibly because of the small number of reincorporations in my sample (less than 5%).

[31] Two subsequent court rulings in late 2006, *Trenwick America Litigation Trust v. Ernst & Young LLP* and *North American Educational Programming Foundation, Inc. v. Gheewalla*, reversed the judicial course from the 1991 ruling and constrained the default rights of creditors and their legal ability to deter or penalize actions taken by directors that damage their economic interests. Given the timing of these rulings, they will likely have little or no effect on bondholders' *ex ante* beliefs about default rights and the monitoring incentives of directors in my sample.

consequences of the rules are considerably higher in issuers with high default risk (i.e., those with a lower distance-to-default). Differences between high and low default risk firms (e.g., −2.612 versus −0.876 reported in column 1) are significant at the conventional levels and economically important even after controlling for other governance factors (column 2). Examining whether this effect varies across Delaware and non-Delaware bond issuers, the results in columns 3 and 4 reveal that consistent with the stronger fiduciary duties owed by directors to creditors in distressed firms, decline in the intensity of covenants is most pronounced in low distance-to-default bond issuers that are incorporated in Delaware.

1.6.3 Shock to co-option

The incentives of independent directors are central to understanding their role in resolving agency frictions. However, this is usually complicated by the fact that the nomination of independent directors is tightly controlled by the CEO and incumbent board members. Past studies show that independent directors nominated by the CEO are often captured (Shivdasani and Yermack 1999) and less likely to act as effective monitors (Core et al. 1999; Coles et al. 2014). In summary, CEOs' involvement in the nomination process can impair substantive independence and distort the incentives of independent directors.

The mandatory adoption of board independence rules triggers an exogenous increase in co-option. This is mainly because (noncompliant) firms appointed new independent directors to their boards in order to satisfy the listing requirements of the exchanges (Linck et al. 2009). But given the influence and role of sitting CEOs in the recruitment process, newly-appointed directors are likely to cater to their demands, thus implying that their monitoring will have a limited, if any, effect on resolving agency conflicts.[32] In other words, if nominally-independent directors are truly beholden to the CEO who approved their nomination, this could weaken their potential role in reducing the agency risks faced by bondholders.

To test the effects of increased co-option, I use two measures proposed in Coles et al. (2014). First, I calculate *Board co-option* as the fraction of co-opted directors on the board. Given that co-opted directors are likely to become even more captured over time, as a second proxy, I employ *Board tenure-weighted co-option*, which is calculated as the number of tenure-years served by co-opted directors as a fraction of the tenure of all board members. To explore whether the contracting consequences of board independence rules are influenced by co-option, I define *HCopt* (*LCopt*) as a variable which indicates whether the adopted measure of co-option in a given firm-year is higher (lower) than the sample median.

The results reported in Panel A of Table 1.9 show that relative to the average high

[32] Yermack (2004) shows that personal gains from compensation, ownership, and opportunities to obtain additional outside directorships are important economic drivers of independent directors' performance. In a similar vein, Masulis and Mobbs (2014) report that independent directors appear to distribute their time and monitoring efforts strategically and in ways that conforms to their reputational incentives.

co-option compliant firm, the corresponding noncompliant firm experiences a decline in covenant intensity ranging between 15% (−0.861 in column 3) and 24% (−1.357 in column 2). This finding is somewhat striking and largely inconsistent with past evidence on the outcomes of board capture, especially given that the reported differences between the high and low co-option partitions of the sample are not statistically significant either. This effectively implies that despite being captured, private incentives of newly-appointed directors dominate their loyalty and allegiance to the CEO.

To examine the role of incentives based on directors' legal liability, in Panel B, I again split the sample into Delaware and non-Delaware firms. I do so mainly because directors' personal costs associated with breaches of fiduciary and legal responsibilities owed to creditors are substantially higher in Delaware firms. The results are consistent with this view and reveal how heterogeneity in monitoring incentives leads to different contracting outcomes. High co-option (noncompliant) firms in Delaware benefit from a decline in covenant intensity that ranges between 33% (−1.842 in column 1) and 28% (−1.596 in column 3) relative to the sample mean. To the contrary, bond contracts of high co-option (noncompliant) non-Delaware firms exhibit an average increase in covenant intensity of up to 24% (1.343 in column 2). Differences in bond contracting outcomes between high and low co-option firms in both partitions are statistically and economically significant, although low co-option firms are largely unaffected by the board independence rules.[33]

1.6.4 Information costs

Duchin et al. (2010) show that exogenous increases in board independence will be beneficial only when information costs are low. Their findings are rooted in the notion that independent directors are at an information disadvantage relative to insiders (Jensen 1993; Adams and Ferreira 2007) and that the consequences of this disadvantage are far greater when the cost of becoming informed is high, i.e., when firms are informationally opaque.[34] The efficient contracting hypothesis (Smith and Warner 1979), however, predicts that bondholders' monitoring costs are substantially lower when borrowers are more transparent, in which case, they may opt to rely less on firms' internal governance. Evidence in Li et al. (2014) supports this view and shows that the association between covenant intensity and corporate governance quality is considerably stronger when the quality of borrowers' accounting information is low.

To explore these two competing viewpoints, as in Duchin et al. (2010), I measure information costs based on two properties of analysts' earnings forecasts from the Institutional Brokers' Estimate System (IBES). First, given that higher idiosyncratic transparency at-

[33] In unreported analysis, I also investigate whether the presence of interlocking directorships impairs the bond contracting benefits of the board independence rules. I find no evidence supporting this notion, mainly due to the low frequency of reported board interlocks (less than 2% of firms and 1.5% of bond issues) in my sample.

[34] Armstrong et al. (2014) extend this literature by demonstrating that corporate transparency evolves in response to the informational demands of independent directors following the NYSE and NASD board independence rules.

tracts greater analyst following, I use the number of analysts that posted a one-year ahead earnings per share forecast for the firm (*Analyst following*). Second, to measure homogeneity in forecasts, I use the standard deviation of earnings forecasts across analysts covering the firm (*Forecast dispersion*). I average both variables over a four-quarter period prior to each bond issue. To capture the monitoring implications of directors' information costs, I define two indicator variables. *LIC* is defined based on whether a firm-year is in the top (bottom) quantile of the distribution for analyst following (forecast dispersion), while *HIC* denotes whether a firm-year is in the bottom (top) quantile of the distribution for analyst following (forecast dispersion).

Table 1.10 presents the estimation results. In all specifications, I allow the contracting consequences of the board independence rules to depend on directors' information costs by using triple interaction terms. In Panel A, information costs are measured based on analyst following. The findings across all variants of the augmented model conform to the view that the monitoring effectiveness of independent directors depends largely on their information costs. When these costs are low, the average noncompliant firm experiences an economically significant decline in covenant intensity (e.g., 24% in column 4). In Panel B, I repeat the analysis using forecast dispersion as the proxy for information costs and find similar results. While the high- and low-cost partitions of the sample are no longer statistically different, the coefficient estimates for the high-cost partition are not significant at the conventional levels across any of the specifications.

1.6.5 Busy (independent) directors

According to Adams et al. (2010), the theory underlying the "busyness problem" is that directors with a high number of outside directorships are likely to devote less effort to each of their duties.[35] Empirical findings that anchor on this theory are nonetheless mixed. For example, Core et al. (1999) and Fich and Shivdasani (2006) show that busy directors are detrimental to performance and firm value, while evidence in Ferris et al. (2003) suggests that busyness is not harmful to performance nor does it increase the likelihood of fraud. Field et al. (2013) share this view and show that busy directors contribute to firm value mainly though their experience and extensive contacts.

An implicit assumption in studies on busyness is that the number of directorships is exogenous. To address this issue, Falato et al. (2014) use the death of directors and CEOs as an attention shock to interlocked independent directors' workload and report that negative market reactions to this shock are more pronounced when interlocked directors are busy. Mandatory board independence rules can also be perceived as a regulatory intervention that induces an exogenous increase (decrease) in the level of demand for (supply

[35] A mutually exclusive reputation-based explanation for the busyness problem can traced back to Hermalin and Weisbach (1998), who posit that those directors that value multiple appointments may also be inclined to establish a reputation as individuals who refrain from making waves or disrupting the status quo by engaging in intensive monitoring of the CEO. As a result, they are less likely to behave as effective actors on the board.

of) independent directors. This view is backed by Linck et al. (2009), who show that these rules increased the workload and risk of directors. They further document that the proportion of busy directors in large firms declines in the period following these governance reforms, which is consistent with the view that directors would prefer to avoid the scrutiny of being considered as overstretched or distracted.[36]

To assess the consequences of busyness and its impact on bondholders' tendency to rely on monitoring by independent directors, I follow Perry and Peyer (2005) and Linck et al. (2009) and identify a busy director as an individual who holds two or more outside directorships.[37] For empirical tests, I condition the baseline model so as to allow for the effects of the board independence rules to depend on the extent of independent directors' busyness. To do so, I split the sample based on *Board busyness* into issuers with above median (*HBusy*) and below median (*LBusy*) levels of busyness. I expect the impact of the board independence rules to be more pronounced when a larger percentage of board members are able to devote their time and attention to active monitoring.

The findings are reported in Table 1.11 and show that across all variations of the augmented model, the net contracting benefits of the board independence rules accrue mainly to those firms with fewer busy independent directors on their boards. In untabulated tests, I find that the magnitude of this outcome is significantly larger when bond issuers display symptoms of financial distress (i.e., a below-median distance-to-default). This suggests that when agency conflicts between shareholders and bondholders are relatively more severe, independent directors' busyness would be even more detrimental to their perceived monitoring role on corporate boards.

1.7 Conclusion

This paper examines the debt contracting (side) effects of mandatory board independence rules instituted by the NYSE and the NASD. As an equity-centric intervention in corporate governance, these rules were designed primarily with the objective of aligning the interests of managers and shareholders. I show that the entrenchment-reducing nature of board independence rules induces economically important bond contracting consequences, namely in the form of less stringent restrictions on firms' payout, financing, and event risk transactions. Credit rating agencies also appear to account for these effects and incorporate them into their ratings of new offerings in the primary bond market.

The results reported in this paper also shed new light on the importance of directors'

[36] In practice, firms would also prefer to have directors that are not distracted by multiple appointments. According to the Spencer Stuart Board Index for 2015, 59% of S&P 500 firms define explicit numerical thresholds for other board service for all of their directors; 5% limit outside directorships to two, 33% impose a cap of three additional directorships, 39% at four, and 23% set the limit at five or six.

[37] My selection of two outside directorships as the threshold for busyness conforms to real world practice as well. The Spencer Stuart Board Index for 2015 reports that although independent directors could serve on many boards, the average S&P 500 director has 2.1 other corporate affiliations, and that this average has remained fairly constant for several years.

incentives and their willingness and ability to engage in active CEO monitoring. Extant studies generally identify financial, reputational, and social incentives as important economic drivers of independent directors' performance. My findings highlight the importance of directors' private incentives as an equally-important channel through which the bond contracting consequences of mandatory board independence rules can be explained. I further show that when these incentives are sufficiently strong, they can dominate the directors' allegiance and loyalty to the CEO.

When taken as a whole, my findings speak to the debate on the interaction between equity-centric governance reforms, managerial entrenchment, and bondholder agency risk. They are also important in evaluating ongoing concerns about the potentially cosmetic nature of mandatory board independence rules. Finally, the results documented in my paper suggest that market forces alone might not have been sufficient in inducing an optimal level of CEO monitoring that aligns the interests of managers, shareholders, and bondholders; as such, my paper is also relevant to the discussion around the effectiveness of the "one-size-fits-all" approach to regulatory interventions in corporate governance.

Figure 1.1: Board independence and bond covenant intensity

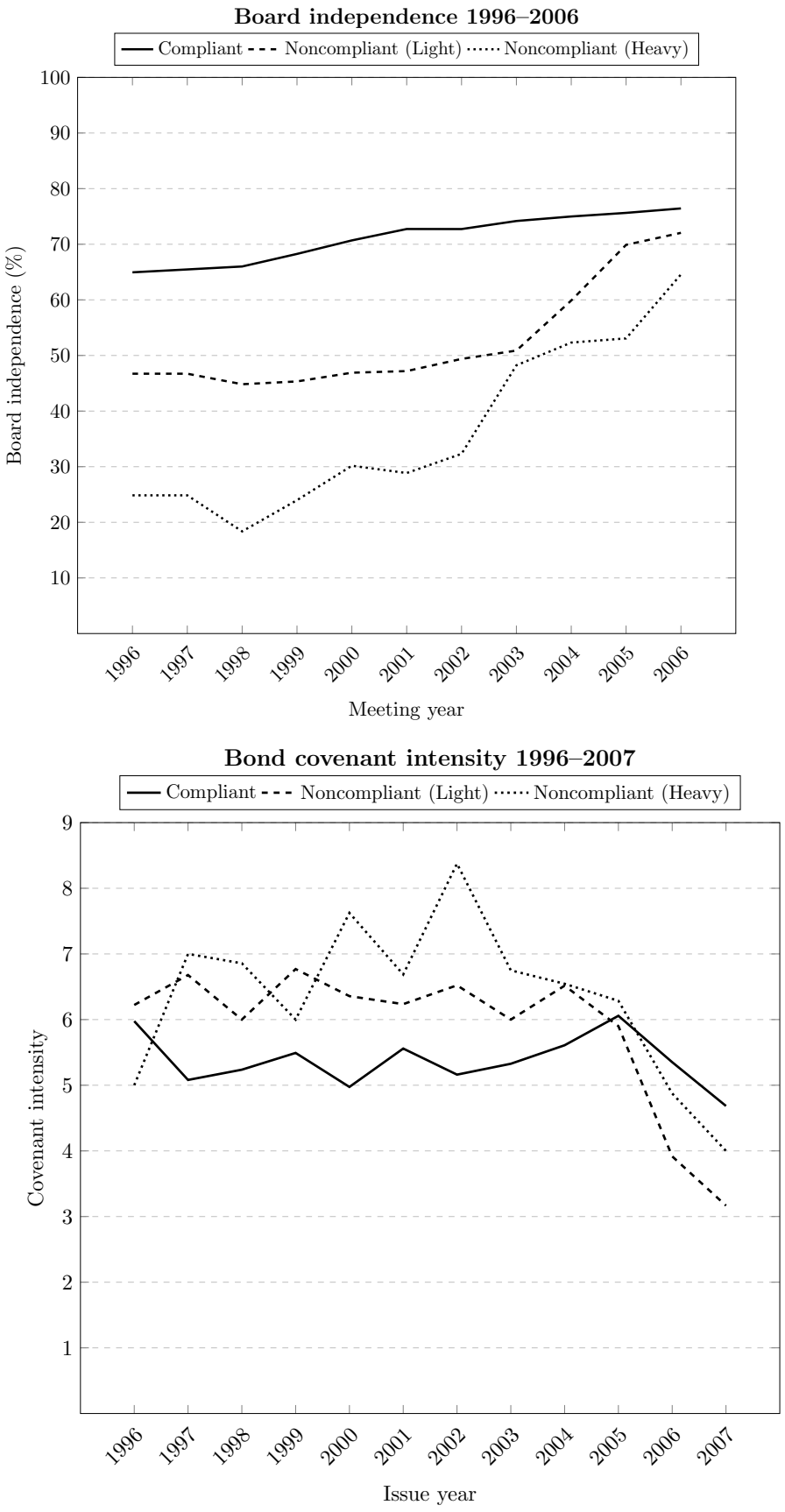


Table 1.1: Sample characteristics

The sample consists of 2,147 bonds issued by 510 nonfinancial firms from January 1996 to December 2007. Panel A reports the procedure I follow to identify primary bond market issues that lie at the intersection of the Mergent FISD and RiskMetrics databases. Controlled firms are exempt from the NYSE and NASD board independence rules and are excluded from the sample. Panel B delineates the industry affiliation of the sample firms based on the Fama-French 12 industry classification (excluding financials). Panel C reports issuers' state of incorporation (Delaware versus non-Delaware) over the sample period.

Panel A: Sample selection

	Bonds	Issuers
Bond issues covered by Mergent FISD	17,371	4,644
Bond issues with missing or incomplete covenant data	(6,168)	(657)
	11,203	3,987
Issuers not covered by RiskMetrics, Compustat, and CRSP	(9,013)	(3,466)
Issuers exempt from the NYSE/NASD listing requirements	(43)	(11)
	2,147	510

Panel B: Industry composition

	Bonds	Issuers
Consumer non-durables	194	42
Consumer durables	43	13
Manufacturing	340	94
Oil, gas, and coal extraction and products	111	26
Chemicals and allied products	132	32
Business equipment	285	94
Telephone and television transmission	63	13
Utilities	198	44
Wholesale, retail and some services	307	60
Healthcare, medical equipment and drugs	162	36
Other	312	56
	2,147	510

Panel C: State of incorporation

	Bonds	Issuers
Delaware incorporated	1,279	303
Non-Delaware incorporated	868	207
	2,147	510

Table 1.2: Summary statistics

Panel A reports summary statistics for the sample of 510 nonfinancial firms that lie at the intersection of RiskMetrics and Mergent FISD. Panel B presents the board- and CEO-related attributes. Panel C partitions the sample and compares noncompliant (treatment) and compliant (control) firms in 2001 based on the NYSE and NASD listing rule that requires firms to have a majority-independent board. The last column in this Panel reports the results of t-tests for differences in means of firm-level and board- and CEO-related variables between compliant and noncompliant firms. Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively. All variables are defined in Appendix A.1.

Panel A: Firm-level characteristics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Size	2,147	8.731	1.483	7.639	8.796	9.707
Leverage	2,071	0.627	0.165	0.534	0.624	0.736
Profitability	2,139	0.184	0.128	0.104	0.159	0.247
Tangibility	2,130	0.364	0.229	0.175	0.322	0.547
Volatility	2,018	-2.421	0.493	-2.757	-2.439	-2.104
Beta	2,018	1.014	1.027	0.372	0.867	1.439
Analyst following	1,829	14.643	6.993	9.500	13.857	19.250
Forecast dispersion	1,825	0.067	0.081	0.023	0.040	0.079
Entrenchment index	1,849	2.216	1.264	1	2	3
Governance index	1,849	9.804	2.579	8	10	12
Institutional blockholders	1,840	0.197	0.141	0.095	0.191	0.289
Distance to default	1,942	5.062	2.578	3.106	4.603	6.542

Panel B: Board- and CEO-related attributes

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Board size	2,147	11.071	2.649	9	11	13
Board independence	2,147	0.685	0.166	0.571	0.714	0.818
Board tenure	2,147	8.372	3.087	6.363	8.167	9.909
Board attendance problem	2,147	0.175	0.380	0	0	0
Board co-option	2,147	0.412	0.321	0.111	0.385	0.667
Board tenure-weighted co-option	2,147	0.229	0.297	0	0.099	0.321
Board busyness	2,147	0.310	0.214	0.143	0.300	0.455
CEO duality	2,147	0.714	0.452	0	1	1
CEO tenure	2,147	6.751	6.709	2	5	9
CEO outsider	2,147	0.517	0.499	0	1	1
CEO experience	2,147	3.018	4.525	0	1	4
CEO busyness	2,147	0.899	1.036	0	1	2

Panel C: Compliant and noncompliant firms in 2001					
	Compliant (n=408)		Noncompliant (n=102)		Difference
	Mean	SD	Mean	SD	
Firm-level variables					
Size	8.101	1.489	7.823	1.469	0.278*
Leverage	0.590	0.178	0.556	0.179	0.034*
Profitability	0.153	0.129	0.174	0.126	−0.021
Tangibility	0.331	0.212	0.334	0.255	−0.003
Volatility	−2.190	0.455	−2.128	0.453	−0.062
Beta	0.991	1.017	0.979	1.103	0.012
Analyst following	11.809	7.046	12.136	7.517	−0.327
Forecast dispersion	0.069	0.068	0.055	0.060	0.014*
Entrenchment index	2.457	1.224	1.821	1.266	0.636***
Governance index	9.991	2.491	8.577	2.332	1.414***
Institutional blockholders	0.227	0.160	0.195	0.150	0.032
Distance to default	4.046	1.848	3.904	1.541	0.142
Board- and CEO-related variables					
Board size	10.054	2.567	9.461	2.838	0.593**
Board independence	0.737	0.109	0.406	0.089	0.331***
Board tenure	8.105	3.228	9.881	4.244	−1.776***
Board attendance problem	0.186	0.389	0.167	0.374	0.019
Board co-option	0.398	0.334	0.495	0.361	−0.097***
Board tenure-weighted co-option	0.233	0.304	0.349	0.379	−0.116***
Board busyness	0.318	0.217	0.177	0.156	0.141***
CEO duality	0.748	0.435	0.559	0.498	0.189***
CEO tenure	6.458	6.574	9.931	10.013	−3.473***
CEO outsider	0.571	0.496	0.608	0.491	−0.037
CEO experience	2.811	4.612	3.176	6.684	−0.365
CEO busyness	0.841	1.009	0.627	0.984	0.214**

Table 1.3: Corporate bond issues

This table reports the main attributes of corporate bonds included in the sample. All data are from the Mergent FISD and Bloomberg. The selection of corporate bond issues is restricted to corporate debentures, corporate medium-term notes, and corporate convertibles. All perpetual, foreign currency, preferred, exchangeable, Yankee, and Canadian bonds are excluded from the sample. Panel A presents the bond characteristics. Panel B tabulates the stringency of bond covenants. Panel C reports the distribution of the security attributes for the sample bonds. All variables are defined in Appendix A.1.

Panel A: Bond characteristics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Issue	2,147	0.435	0.413	0.200	0.300	0.500
Maturity	2,147	11.98	8.586	5.060	10.01	14.64
Coupon	2,147	5.797	2.340	4.875	6.125	7.250
Redeemable	2,147	0.796	0.403	1	1	1
Putable	2,147	0.115	0.319	0	0	0
Convertible	2,147	0.169	0.375	0	0	0
Rule 144A	2,147	0.035	0.184	0	0	0
Credit rating	2,006	8.721	3.398	6	9	10
Investment-grade	2,006	0.644	0.479	0	1	1

Panel B: Bond covenants

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Covenant intensity	2,147	5.559	2.840	4	5	6
Payout restrictions	2,147	0.207	0.599	0	0	0
Investment restrictions	2,147	3.069	1.107	2	4	4
Financing restrictions	2,147	0.922	0.675	1	1	1
Accounting restrictions	2,147	0.296	0.713	0	0	0
Event-related restrictions	2,147	1.065	1.183	0	1	1

Panel C: Bond security attributes

	Frequency	Percentage
Senior secured	24	1.12
Senior	1,854	86.35
Senior subordinate	218	10.15
Junior subordinate	5	0.23
Subordinate	46	2.14

Table 1.4: Mandatory board independence and debt contracting

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity, the five covenant categories, and the cost of debt. In Panel A, the outcome variable is *Covenant intensity*, which captures the overall restrictiveness of bond covenants. In Panel B, the baseline model is re-estimated by using the covenant categories of Chava et al. (2010) and Nikolaev (2010). In Panel C, the outcome variable is the initial credit rating as a proxy for the cost of debt. In all specifications, *Post* denotes the break year for the post-treatment period; it is equal to one for periods on or after 2003, and is zero otherwise. *Noncompliant* is an indicator variable that identifies treatment firms in the benchmark year; it takes the value of one if the issuer is noncompliant with the NYSE/NASD board independence requirement at the 2001 meeting date, and is zero otherwise. Bond-level controls, board- and CEO-related variables, and firm-level controls are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Mandatory board independence rules and covenant intensity

	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant	−0.837**	−0.909***	−0.993***	−0.945***
	(2.51)	(2.78)	(3.61)	(2.89)
Issue	0.134	0.120	0.200	0.099
	(1.06)	(0.95)	(1.04)	(0.51)
Maturity	−0.019**	−0.019**	−0.016**	−0.019**
	(2.12)	(2.26)	(2.00)	(2.32)
Coupon	0.233***	0.231***	0.179***	0.201***
	(3.35)	(3.38)	(2.86)	(3.17)
Redeemable	0.045	0.069	0.045	0.060
	(0.30)	(0.46)	(0.34)	(0.40)
Putable	1.043***	1.079***	0.675**	0.765**
	(2.65)	(2.73)	(1.96)	(2.19)
Convertible	−2.463***	−2.519***	−2.930***	−2.601***
	(5.16)	(5.28)	(5.11)	(4.24)
Rule 144A	−1.539***	−1.569***	−1.518***	−1.745***
	(3.07)	(3.02)	(2.75)	(3.09)
Security	−0.166	−0.159	0.156	0.239
	(0.47)	(0.45)	(0.45)	(0.61)
Investment-grade				−0.798***
				(2.62)
Board size		−0.065*	0.001	−0.037
		(1.65)	(0.45)	(0.61)
Board tenure		−0.086**	−0.083**	−0.081**
		(2.00)	(2.32)	(2.13)
Board attendance problem		0.006	−0.006	0.089
		(0.03)	(0.03)	(0.39)

(*continued*)

Panel A (continued)

	Covenant intensity			
	(1)	(2)	(3)	(4)
CEO duality		−0.197	−0.124	−0.173
		(0.83)	(0.47)	(0.62)
CEO tenure		0.008	0.003	−0.004
		(0.50)	(0.25)	(0.53)
CEO outsider		−0.579**	−0.564*	−0.602*
		(2.01)	(1.79)	(1.86)
CEO experience		−0.046*	−0.022	−0.030
		(1.68)	(0.53)	(0.57)
CEO busyness		0.015	0.026	0.055
		(0.25)	(0.34)	(0.59)
Size			−0.714***	−0.681***
			(3.54)	(3.10)
Leverage			2.231**	2.498**
			(1.99)	(2.41)
Profitability			2.739*	2.148
			(1.69)	(0.91)
Tangibility			−1.721**	−1.433
			(2.01)	(1.41)
Volatility			0.033	−0.045
			(0.12)	(0.13)
Beta			0.181*	0.215**
			(1.80)	(2.01)
Entrenchment index				−0.002
				(0.05)
Governance index				0.036
				(0.24)
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.77	0.77	0.79	0.80
Observations	2,147	2,147	1,929	1,619

Panel B: Mandatory board independence rules and covenant categories

	Payout	Investment	Financing	Accounting	Event
Post×Noncompliant	−0.196**	−0.072	−0.256***	−0.090	−0.379***
	(2.46)	(0.73)	(4.08)	(0.71)	(2.60)
Bond-level controls	Yes	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Governance controls	No	No	No	No	No
Credit rating	No	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.77	0.79	0.77	0.72	0.77
Observations	1,929	1,929	1,929	1,929	1,929

Panel C: Mandatory board independence rules and credit ratings

	At-issue credit rating			
	(1)	(2)	(3)	(4)
Post×Noncompliant	−0.917***	−0.865***	−0.602***	−0.698***
	(3.69)	(3.40)	(2.63)	(3.16)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.92	0.92	0.94	0.94
Observations	2,006	2,006	1,793	1,619

Table 1.5: Entropy balance matched sample

This table reports the coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity, the five main covenant categories, and the cost of debt using an entropy balance matched sample design. Panel A presents the different moments of the covariates used in the matching process across the compliant and noncompliant firms. Covariate balance weights are estimated using data from 1996 to 2000. Panels B, C, and D report the baseline results using the matched sample with balanced covariates. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Entropy balancing moments – Matching covariates

	Compliant (n=379)						**Noncompliant** (n=92)		
	Pre-balance moments			Post-balance moments			Moments		
	First	Second	Third	First	Second	Third	First	Second	Third
Size	8.112	2.251	0.463	7.798	2.221	0.747	7.798	2.222	0.748
Leverage	0.587	0.032	−0.296	0.543	0.030	−0.028	0.543	0.031	−0.029
Profitability	0.152	0.016	0.242	0.172	0.016	1.387	0.172	0.017	1.395
R&D intensity	0.050	0.008	2.604	0.029	0.004	2.875	0.029	0.004	2.865
Market-to-book	2.886	13.270	−0.646	2.555	5.187	−0.768	2.555	5.182	−0.777
Free cash flow	0.006	0.018	−2.049	−0.004	0.016	−2.932	−0.004	0.016	−2.932
Volatility	−2.187	0.211	0.231	−2.128	0.204	0.056	−2.128	0.205	0.056
Age	32.12	498.8	0.603	19.92	229.6	1.817	19.92	229.5	1.816
CEO ownership	2.101	29.98	4.545	4.829	80.85	2.709	4.829	80.84	2.709

Panel B: Mandatory board independence rules and covenant intensity
Entropy balance matched sample

	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant	−0.681***	−0.698***	−0.759***	−0.739***
	(2.76)	(2.80)	(3.07)	(2.89)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Credit rating	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.83	0.83	0.85	0.85
Observations	1,935	1,935	1,895	1,699

Panel C: Mandatory board independence rules and covenant categories
Entropy balance matched sample

	Payout	Investment	Financing	Accounting	Event
Post×Noncompliant	−0.168***	−0.033	−0.215***	−0.099	−0.244**
	(2.69)	(0.34)	(3.58)	(1.17)	(2.34)
Bond-level controls	Yes	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Governance controls	No	No	No	No	No
Credit rating	No	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.81	0.79	0.83	0.77	0.82
Observations	1,895	1,895	1,895	1,895	1,895

Panel D: Mandatory board independence rules and credit ratings
Entropy balance matched sample

	At-issue credit rating			
	(1)	(2)	(3)	(4)
Post×Noncompliant	−0.521***	−0.519***	−0.495***	−0.633***
	(3.81)	(3.92)	(4.12)	(4.90)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.94	0.95	0.96	0.96
Observations	1,802	1,802	1,762	1,589

Table 1.6: Delegated monitoring

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on the strictness of monitoring by banks in syndicated loan agreements. Panel A reports summary statistics for loan covenants and covenant violations in deals originated between 1993 and 2007 for the sample of bond issuers. Panel B presents the baseline test results after controlling for the role of banks as delegated monitors. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Bank monitoring measures

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Loan covenant index	1,585	1.751	1.698	1	1	3
Covenant strictness	1,457	0.281	0.391	0.001	0.035	0.622
C_Covenant strictness	1,457	0.233	0.368	0	0.012	0.328
P_Covenant strictness	1,457	0.070	0.219	0	0	0.016
Covenant violation	–	0.169	0.685	0	0	0

Panel B: Mandatory board independence rules and delegated monitoring

	Covenant intensity				
	Covenant index	Covenant strictness	C_Covenant strictness	P_Covenant strictness	Covenant violation
	(1)	(2)	(3)	(4)	(5)
Post×Noncompliant	−0.958***	−0.944***	−0.967***	−0.935***	−0.977***
	(3.40)	(3.38)	(3.59)	(3.31)	(3.45)
Delegated monitoring	0.158*	0.717*	0.643	1.133**	0.212
	(1.67)	(1.86)	(0.83)	(2.13)	(0.95)
Bond-level controls	Yes	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Governance controls	No	No	No	No	No
Credit rating	No	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.79	0.79	0.79	0.79	0.79
Observations	1,929	1,929	1,929	1,929	1,925

Table 1.7: Shareholder control and takeover defenses

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on the strength of shareholder control and issuers' takeover defenses. In Panel A, sample firms are partitioned based on institutional blockholder ownership and takeover vulnerability: *High* is an indicator variable that takes the value of one if *Institutional blockholders*(*Governance index*) is above (below) the sample median, and is zero otherwise. Similarly, *Low* is an indicator variable that takes the value of one if *Institutional blockholder* (*Governance index*) is below (above) the sample median, and is zero otherwise. In Panel B, the sample is partitioned based on the strength of state-level antitakeover statutes following Bebchuk and Cohen (2003). Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Shareholder control, takeover defenses, and covenant intensity

	Covenant intensity			
	Shareholder control		Takeover vulnerability	
	(1)	(2)	(3)	(4)
Post×Noncompliant×High	−1.037***	−0.909**	−1.244***	−1.187***
	(2.76)	(2.13)	(3.63)	(3.45)
Post×Noncompliant×Low	−0.982**	−0.977**	−0.068	−0.016
	(2.39)	(2.20)	(0.31)	(0.05)
(High−Low)×Post×Noncompliant	−0.055	0.068	−1.176***	−1.171***
(p value)	(0.92)	(0.91)	(0.00)	(0.00)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Governance controls	No	No	No	No
Credit rating	No	Yes	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.79	0.80	0.79	0.80
Observations	1,709	1,595	1,732	1,619

Panel B: Takeover defenses and state-level antitakeover statutes

	Covenant intensity			
	Statutes: Weak/Moderate		Statutes: Strong	
	(1)	(2)	(3)	(4)
Post×Noncompliant×High	−1.152***	−1.028***	0.681	0.997
	(3.19)	(3.00)	(0.47)	(0.79)
Post×Noncompliant×Low	−0.305	−0.478	0.122	0.591
	(0.44)	(0.57)	(0.26)	(1.08)
(High−Low)×Post×Noncompliant	−0.847*	−0.550	0.559	0.406
(p value)	(0.09)	(0.23)	(0.71)	(0.77)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Governance controls	No	No	No	No
Credit rating	No	Yes	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.81	0.82	0.79	0.80
Observations	1,130	1,055	602	564

Table 1.8: The Delaware effect and default risk

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on state laws governing directors' fiduciary duties to creditors. In Panel A, sample firms are partitioned based on their state of incorporation: *Del* (*NDel*) is an indicator variable that takes the value of one if state of incorporation is (is not) Delaware, and is zero otherwise. In Panel B, the sample is further partitioned based on bond issuers' *Distance-to-default*: *LDtD* (*HDtD*) is an indicator variable that takes the value of one if distance-to-default is below (above) the sample median, and is zero otherwise. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: State of incorporation, board independence, and covenant intensity

	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant×Del	−1.115***	−1.192***	−1.343***	−1.466***
	(2.75)	(2.98)	(4.45)	(4.48)
Post×Noncompliant×NDel	0.145	0.067	0.012	0.482
	(0.25)	(0.12)	(0.02)	(1.00)
(Del−NDel)×Post×Noncompliant	−1.260**	−1.259***	−1.355***	−1.948***
(p value)	(0.02)	(0.01)	(0.00)	(0.00)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Credit rating	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.77	0.77	0.79	0.79
Observations	2,147	2,147	1,929	1,619

Panel B: Distance-to-default: Delaware versus non-Delaware issuers				
	Covenant intensity			
	Full sample		Del	NDel
	(1)	(2)	(3)	(4)
Post×Noncompliant×LDtD	−2.612***	−2.226***	−2.287***	−2.886
	(4.04)	(2.82)	(3.36)	(1.40)
Post×Noncompliant×HDtD	−0.876***	−0.890**	−1.079***	0.231
	(2.63)	(2.37)	(3.03)	(0.38)
(LDtD−HDtD)×Post×Noncompliant	−1.736***	−1.336*	−1.208*	−3.117
(p value)	(0.01)	(0.08)	(0.07)	(0.15)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Governance controls	No	Yes	No	No
Credit rating	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.80	0.80	0.81	0.80
Observations	1,818	1,670	1,058	760

Table 1.9: Shock to co-option

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on the degree to which directors are captured by the CEO. In Panel A, sample firms are partitioned based on *Board co-option* and *Board tenure-weighted co-option*: *LCopt* (*HCopt*) is an indicator variable that takes the value of one if co-option (tenured-weighted co-option) is below (above) the sample median, and is zero otherwise. In Panel B, the sample is further partitioned based on the firms' state of incorporation: *Del* denotes issuers incorporated in Delaware and *NDel* represents non-Delaware-incorporated issuers. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Co-option – Full sample

	Covenant intensity			
	Co-option		TW co-option	
	(1)	(2)	(3)	(4)
Post×Noncompliant×LCopt	−0.593**	−0.595*	−0.814***	−0.756**
	(2.53)	(1.76)	(3.05)	(2.32)
Post×Noncompliant×HCopt	−1.205**	−1.357***	−0.861*	−1.002**
	(2.12)	(2.62)	(1.76)	(1.98)
(LCopt−HCopt)×Post×Noncompliant	0.432	0.762	0.050	0.246
(p value)	(0.29)	(0.20)	(0.93)	(0.66)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes
Firm-level controls	No	Yes	No	Yes
Governance controls	No	Yes	No	Yes
Credit rating	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.76	0.77	0.79	0.80
Observations	1,791	1,791	1,703	1,549

Panel B: Co-option – Delaware versus non-Delaware issuers				
	Covenant intensity			
	Co-option		TW co-option	
	Del	NDel	Del	NDel
	(1)	(2)	(3)	(4)
Post×Noncompliant×LCopt	−0.417	−0.572	−0.393	−0.830
	(1.61)	(1.02)	(1.16)	(1.34)
Post×Noncompliant×HCopt	−1.842***	1.343*	−1.596***	1.189**
	(4.24)	(1.67)	(3.24)	(1.98)
(LCopt−HCopt)×Post×Noncompliant	1.425***	−1.915**	1.203***	−2.019***
(p value)	(0.00)	(0.05)	(0.01)	(0.01)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes
Credit rating	No	No	No	No
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.81	0.81	0.81	0.81
Observations	990	742	990	742

Table 1.10: Information costs

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on the information costs of independent directors. Sample firms are partitioned based on analyst following (Panel A) and forecast dispersion (Panel B): *LIC* is an indicator variable that takes the value of one if *Analyst following* (*Forecast dispersion*) is above (below) the sample median, and is zero otherwise. Similarly, *HIC* is an indicator variable that takes the value of one if *Analyst following* (*Forecast dispersion*) is below (above) the sample median, and is zero otherwise. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Independent directors' information cost – Analyst following

	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant×LIC	−1.231***	−1.309***	−1.321***	−1.279***
	(2.63)	(3.15)	(4.61)	(3.86)
Post×Noncompliant×HIC	−0.244	−0.214	−0.089	0.081
	(0.52)	(0.48)	(0.17)	(0.15)
(LIC−HIC)×Post×Noncompliant	−0.987*	−1.095**	−1.232**	−1.360**
(p value)	(0.10)	(0.05)	(0.02)	(0.00)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Credit rating	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.76	0.77	0.79	0.80
Observations	1,791	1,791	1,703	1,549

Panel B: Independent directors' information cost – Forecast dispersion				
	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant×LIC	−1.187***	−1.185***	−1.209***	−1.199***
	(2.70)	(2.97)	(3.01)	(2.82)
Post×Noncompliant×HIC	−0.863	−0.947	−0.779	−0.714
	(1.28)	(1.37)	(1.55)	(1.29)
(LIC−HIC)×Post×Noncompliant	−0.324	−0.238	−0.430	−0.430
(p value)	(0.67)	(0.77)	(0.56)	(0.53)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Credit rating	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.76	0.77	0.79	0.80
Observations	1,787	1,787	1,699	1,545

Table 1.11: Busy (independent) directors

This table reports coefficient estimates from OLS regressions on the effect of mandatory board independence rules on bond covenant intensity conditional on independent board members' outside directorships. Sample firms are partitioned based on *Board busyness*: *LBusy* (*HBusy*) is an indicator variable that takes the value of one if board busyness is below (above) the sample median, and is zero otherwise. Bond-level controls, board- and CEO-related variables, and firm-level controls are those used in the baseline model. All variables are defined in Appendix A.1. Numbers reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on two-dimensional clustering at the firm- and year-level (Petersen 2009; Gow et al. 2010). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Busy directors, mandatory board independence rules, and covenant intensity				
	Covenant intensity			
	(1)	(2)	(3)	(4)
Post×Noncompliant×LBusy	−1.416***	−1.435***	−1.374***	−1.402***
	(4.56)	(4.63)	(4.05)	(3.60)
Post×Noncompliant×HBusy	0.242	0.155	−0.024	0.091
	(0.50)	(0.32)	(0.05)	(0.15)
(LBusy−HBusy)×Post×Noncompliant	−1.174***	−1.280***	−1.350**	−1.493**
(p value)	(0.00)	(0.00)	(0.04)	(0.05)
Bond-level controls	Yes	Yes	Yes	Yes
Board/CEO controls	No	Yes	Yes	Yes
Firm-level controls	No	No	Yes	Yes
Governance controls	No	No	No	Yes
Credit rating	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
R-squared	0.77	0.77	0.79	0.80
Observations	2,147	2,147	1,929	1,619

Chapter 2

Balance sheet quality and the design and pricing of public debt contracts

2.1 Introduction

Beginning with Smith and Warner (1979), a growing literature identifies a role for accounting information in mitigating shareholder-debtholder agency frictions and in facilitating the role of covenants in the timely transfer of decision rights from managers to debtholders (Holthausen and Watts 2001). In spite of much progress that has been made in establishing a contracting role for accounting numbers in private debt (loan) arrangements, the relevance of financial reporting in determining the nature and type of covenants in public debt (bond) indentures and in explaining bond market pricing is not well understood (Christensen et al. 2016).

In this paper, we explore this issue by examining the contracting and economic relevance of balance sheet information in the corporate bond market. Our motivation is driven by structural differences in the contracting technologies that are commonly used in public and private debt markets and the role that accounting information plays in these two settings. We extract the component of the book-to-market ratio capturing "accounting bloat" in net asset values and define balance sheet quality to be high when bloat in net asset values is low. Defined this way, balance sheet quality depends positively on the combined effects of past timely loss recognition (conditional conservatism) and the adoption of conservative accounting policies (unconditional conservatism). Applying this proxy, we pursue two objectives in empirical tests. First, we study the relation between balance sheet quality and the intensity of covenants in bond contracts. We then turn to debt pricing and examine whether balance sheet quality is associated with offering yields, credit spreads, at-issue credit ratings, and the likelihood of disagreement between credit rating agencies (CRAs).

Balance sheet quality can influence the intensity of restrictions in bond indentures in two important ways. First, as Beaver and Ryan (2000, 2005) and Roychowdhury and Watts (2007) argue, when the balance sheet reflects the lower bound of net asset values, the likelihood of future write-downs is restricted. This, in turn, is predicted to reduce the relative effectiveness of covenants related to accounting numbers. In other words, in negotiating bond indentures, lenders observe the extent of unrecorded impairments, anticipate the level of *ex post* bias and set the degree of covenant intensity accordingly (Guay and Verrecchia 2006; Guay 2008). Second, as Guay and Verrecchia (2007) posit, creditors are especially interested in the lower end distribution of net asset values because recovery rates in the event of bankruptcy depend on asset liquidation values. Incomplete recognition of past economic losses creates uncertainty about net asset values and gives rise to a need for more costly monitoring. Conservative estimates of net asset values contribute to the resolution of this uncertainty, enhance verifiability of liquidation values, and reduce the need for *ex post* monitoring. Building on these notions, we expect restrictions in bond indentures to be negatively associated with issuers' balance sheet quality.

Our prediction in respect to the debt pricing effects of balance sheet quality is motivated by the incomplete accounting model of Duffie and Lando (2001), according to which, balance sheet numbers are imprecise estimates of assets' true economic values. It then follows that the measurement uncertainty associated with debt issuers' net asset values will increase the transparency spread, influence risk assessments by CRAs, and affect the degree of consensus across CRAs about the credit quality of a debt instrument or the issuing entity. Moreover, given bondholders' payoff function (Watts 2003) and CRAs' loss function (Beaver et al. 2006), the magnitude of these effects will be asymmetric; i.e., they will be more pronounced when economic losses are not recognized in a timely fashion. Therefore, when balance sheet numbers more reliably reflect the lower bound estimates of issuers' net asset values, we expect the lower information uncertainty will be reflected in lower offering yields and credit spreads, more favorable credit ratings, and a lower likelihood of split ratings.

We test these predictions using a sample of 301 publicly-traded, non-financial, U.S. incorporated and domiciled firms that issued 1,508 corporate bonds over the 1994-2013 period and for which the necessary bond-level and credit ratings data are available. The baseline results are consistent with our expectations on the relation between balance sheet quality and the intensity of restrictions in bond indentures. Specifically, we find that, on average, covenants tend to be significantly less restrictive for bonds issued by firms with higher quality balance sheets. Following convention in the literature (e.g., Chava et al. 2010), we also assign covenants to five subgroups and find that the magnitude of the balance sheet quality effect tends to be more pronounced in relation to accounting- and events-related covenants and to a lesser degree to restrictions on issuers' payout and refinancing activities. We find no statistically detectable relation between balance sheet quality and investment-related covenants.

Our results on the debt pricing effects of balance sheet information indicate that bonds issued by firms with higher balance sheet quality attract lower offering yields and credit spreads. Analyzing bond credit ratings, we show that balance sheet quality is associated with more favorable at-issue ratings and that the propensity for observing agreement (disagreement) among rating agencies about bonds' credit risk is increasing (decreasing) in the proxy for balance sheet quality. Conditioning on rating shopping, however, our results suggest that the role of the balance sheet in inducing agreement among CRAs is solely attributable to those issuers that seek no more than two ratings for their bond issues.

In further analysis, we first examine whether delegated monitoring by banks in private loan agreements affects the contracting role of the balance sheet in the bond market. Begley and Freedman (2004) document a declining trend in the number of accounting-based restrictions in bond contracts and report that covenants appear to focus less on balance sheet numbers. Beatty et al. (2012) examine whether this trend is associated with bondholders' decisions to delegate monitoring to "credible specialists," namely banks and other intermediaries in the private debt market. They argue that the benefits of delegated monitoring will be higher when banks have stronger incentives to monitor, or when issuers have low financial reporting quality. In our setting, this implies that stringent monitoring by banks will generate incentives for delegated monitoring and that this will attenuate the sensitivity of bond covenants to issuers' balance sheet quality. Using data from bond issuers' syndicated loans, we find evidence consistent with this view. Specifically, our results show that conditioning on the intensity of loan covenants slightly weakens the relation between balance sheet quality and restrictions in bond indentures. The magnitude of this effect, however, is not economically significant, which may be due to the fact that the bond issuers we study are a selected sample of large, high credit quality firms with access to the bond market.

Finally, we turn to evaluating the key premise underlying our main argument, in that debt market participants will always favor conservative over aggressive balance sheet numbers. The debt contracting benefits of conservatism are not necessarily a foregone conclusion. For instance, conservative accounting has been linked to managers' ability to create hidden reserves, which can be reversed in the future at the discretion of shareholders (Leuz 1998). In a similar vein, Leuz (2001) contends that excessive conservatism might induce tighter covenants that could restrict debt issuers' investment and financing policies or trigger costly renegotiations between the firm and its lenders on the public debt market.[1] To address these concerns and establish a sharper empirical link between the

[1] In the same spirit, Gigler et al. (2009) and Venugopalan (2009) show that under symmetric information and full verifiability, conservatism reduces contracting efficiency as it triggers the violation of covenants too often and induces erroneous interim liquidations of viable projects. Caskey and Hughes (2012), however, argue to the contrary and demonstrate that covenants based on an accounting system that requires the timely recognition of impairments limit inefficient project selection. In related work, Lu et al. (2012) examine interactions between debt contracts and real decisions. They show that when asset substitutions are unverifiable, debt contract efficiency induces demand for conservatism and that this demand will be more pronounced under the commitment regime (corporate bonds) than under the renegotiation regime (private loans).

supply of high quality balance sheets and demand for covenants in bond indentures, we rely on a plausibly exogenous judicial decision in Delaware, which substantially limited the legal liability of directors and their fiduciary duties to creditors.

In late 2006, two Delaware court cases, *Trenwick America Litigation Trust v. Ernst & Young LLP* and *North American Educational Programming Foundation, Inc. v. Gheewalla* (hereafter "the court rulings"), constrained the default rights of creditors and their ability to recover damages from directors for a violation of fiduciary duties. These decisions reversed the judicial course from the 1991 case between *Credit Lyonnais Bank Nederland, N.V. v. Pathe Communications Corporation*, which expanded the scope of directors' fiduciary duties and allowed creditors to sue directors for damages arising from a breach of fiduciary duties or deepening insolvency.

The effect of the court rulings on firms' incentives to supply high quality balance sheets and its relation with demand for bond covenants is *ex ante* unclear. On the one hand, a decline in directors' litigation risk could reduce their incentives to report economic losses in a timely manner. This could, in turn, lead to a buildup of accounting bloat and reduce the quality and contracting relevance of balance sheet numbers. But at the same time, diminished creditor rights could induce bondholders to demand greater conservatism, and as a consequence, the quality of the balance sheet may remain relatively unchanged. A final possibility, however, is that directors' incentives to supply will dominate creditors' pressure to demand timely loss recognition and a result, the overall relevance of the balance sheet could decline in periods following the court rulings.

Using the court rulings as the basis for identification within a difference-in-differences design, we find evidence consistent with supply-side incentives dominating demand-side effects. We first show that the decline in bondholders' *ex post* litigation rights following the court rulings reduces the sensitivity of bond covenant intensity to balance sheet quality in Delaware-incorporated issuers. The results indicate that the change in the contracting relevance of the balance sheet between the pre- and post-court rulings periods is statistically and economically significant. Analyzing the full sample, the findings confirm that relative to non-Delaware issuers, the contracting relevance of Delaware issuers' balance sheet numbers declines significantly in the post-court rulings period. In other words, as a consequence of directors' diminished fiduciary and legal duties to bondholders, incentives for both timely loss recognition and adopting (unconditionally) conservative accounting policies appear to decline in Delaware-incorporated firms, and this ultimately leads to lower quality balance sheets.

Our paper extends the literature on the role of accounting information in debt markets in three important ways. First, we establish an association as well as a causal link between balance sheet quality and the intensity of bond covenants. This finding is closely related to Nikolaev (2010), who documents post-issuance timely loss recognition as an outcome of tight bond covenants. While our results are consistent with Nikolaev (2010), our focus is on the *ex ante* role of the balance sheet as a determinant of covenants in bond indentures.

We also add to the strand of studies that examine the interplay between creditor protection, accounting quality, and contract design. Aier et al. (2014) is an important study in this domain. They show that enhanced creditor protection following the 1991 Delaware court ruling is associated with an increase in timely loss recognition. They interpret their results as indicating that as creditor protection increases, lenders will demand more timely loss recognition. However, they do not consider an alternative explanation – namely the possibility that financial reporting incentives for timely loss recognition increase when directors face higher litigation risk. We extend the findings in Aier et al. (2014) by using the subsequent judicial decision in Delaware reversing the 1991 court ruling. Consistent with supply-side incentives for financial reporting, we show that the decline in creditor rights reduces the quality and relevance of balance sheets in explaining covenant structures in bond contracts.

Finally, our results on the credit market consequences of balance sheet quality add to the literature by documenting the role of the balance sheet in lowering the uncertainty component of spreads and improving credit ratings. These findings are consistent with Jorion et al. (2009) and Arora et al. (2014), who show that uncertainty in asset measurements reduces the credit relevance of accounting information. Kraft (2014) also highlights rating agencies' demand for conservative net asset values, since their most important hard adjustment relates to the recognition of off-balance-sheet liabilities. Our results on the effect of balance sheet quality on split ratings also add to earlier evidence in Morgan (2002), Livingston et al. (2007), and Akins (2017) who identify that uncertainty and opacity about the valuation of assets is a potential source of disagreement between CRAs. While our evidence in broadly consistent with these latter findings, we demonstrate the role that conservative balance sheet numbers can play in enhancing verifiability, resolving uncertainty, and generating confidence in net asset values.

The remainder of this paper proceeds as follows. In Section 2.2, we outline the empirical proxies and describe our sample. Section 2.3 presents our empirical findings on covenant structures and bond pricing. In Section 2.4, we provide further analysis. Section 2.5 concludes the study.

2.2 Empirical proxies and data

2.2.1 Balance sheet quality

From an accounting standpoint, book equity measures the extent to which total assets exceed total liabilities. However, in the event of bankruptcy, debtholders are concerned about the economic value of the firm's assets-in-place relative to its liabilities. We define a balance sheet as "high quality" when the likelihood that book equity exceeds economic value is low. Thus, an initial benchmark for estimating balance sheet quality is the book-to-market ratio.

To the extent that a firm's accounting policies are conservative and do not recognize as assets valuable resources controlled by the firm, measure other assets at less than economic value or remeasure asset values asymmetrically by recognizing reductions in economic value at a faster rate than gains in economic value, the book-to-market ratio will be less than one. However, the book-to-market ratio captures accounting conservatism with error mainly because the market value of equity also reflects the value of economic rents earned by a firm in deploying its assets-in-place, and the economic value of growth options. The carrying values of assets-in-place do not fully reflect economic rents unless carried at fair value and growth options are generally not recognized on the balance sheet unless subsumed as part of purchased goodwill. A further possible factor unconnected to balance sheet quality that can potentially influence the book-to-market ratio is general market sentiment which might cause prices to temporarily deviate from fundamental economic value.

To isolate the component of book-to-market associated with balance sheet quality, we follow the decomposition in Sunder et al. (2017) and calculate a firm-year measure of balance sheet quality. We regress the book-to-market ratio on variables that reflect short- and long-term growth, economic distress, industry competition and market sentiment using the following model. We use firm-year residuals from this model as our measure of balance sheet quality.

$$\begin{aligned} -1 * BTM_{i,t} = {} & \beta_0 + \beta_1 Long-term\ growth_{i,t} + \beta_2 Short-term\ growth_{i,t} \\ & + \beta_3 Return\ on\ assets_{i,t} + \beta_4 Volatility_{i,t} + \beta_5 Issuer\ rating_{i,t} \\ & + \beta_6 Concentration_{i,t} + \beta_7 Sentiment_t + \beta_8 S\&P\ Composite_t \\ & + IFE_i + TFE_t + \varepsilon_{i,t}\ , \end{aligned} \tag{2.1}$$

In model (2.1), BTM is the ratio of the book value of equity to the market value of equity at the fiscal year end. For ease of interpretation in our subsequent tests, we multiply the dependent variable by (-1) so that larger residual values indicate higher balance sheet quality. To measure growth options that are capitalized in market values, we use two proxies for expected and realized growth, predicting that both are positively associated with the inverse of the book-to-market ratio. First, we measure *Long-term growth* based on the median of long-term growth in EPS estimates by equity analysts. To measure realized growth, we use *Short-term growth*, defined as the percentage growth in net sales. Profitability is measured based on *Return on assets*, which is earnings before interest, tax, depreciation, and amortization scaled by lagged total assets. We expect a positive sign for the coefficient on the measure of profitability because this variable proxies for economic rents. *Volatility* is the natural log of the standard deviation of daily stock returns, imposing a requirement of a minimum number of 125 observations per period as in Bushee and Noe (2000). *Issuer rating* is the S&P long-term domestic issuer credit rating. When ratings are missing, we implement the credit risk estimation procedure of Barth

et al. (1998) and develop a set of predicted ratings.[2] We expect negative coefficients for both *Volatility* and *Issuer rating*. *Concentration* is the Herfindahl-Hirschman industry concentration ratio calculated by summing the squares of the market shares (based on net sales) of firms operating in each four-digit SIC code. Similar to Sunder et al. (2017), to account for possible over- and under-valuation of firms due to market perceptions about their growth options, we also include *Sentiment* (Consumer Sentiment Index (CSI) from Thomson Reuters) and the *S&P Composite index* level in our model. We make no predictions for the sign on the coefficient of industry concentration but anticipate a positive association between market sentiment and the inverse of the book-to-market ratio. All variables are defined in Appendix B.1.

Table 2.1 presents descriptive statistics and results from estimating model (2.1) in a panel regression using all U.S. firms at the intersection of the CRSP and Compustat databases (excluding financial and utilities companies) over the period 1993-2012, corresponding to the range of fiscal periods immediately prior to the bond issuance years in our sample. We include industry and time fixed effects in our estimation to control for industry- and year-specific shocks to the book-to-market ratio and cluster the standard errors by firm and year (Petersen 2009). All variables (except *Sentiment* and *S&P Composite*) are winsorized on both tails at 1 percent.

The results are largely consistent with our expectations and with those reported in Sunder et al. (2017). They also confirm the directional predictions noted in Roychowdhury and Watts (2007). Growth opportunities, profitability, and market sentiment exhibit a positive association with the inverse of the book-to-market ratio, indicating a premium that is priced by the market but not fully reflected in the book value of equity. Similarly, firms with higher stock return volatility and those with lower credit quality are priced at a discount by the market. We extract our sample of bond issuers from the larger population of firms included in the estimation of model (2.1) and employ their firm-year residuals as a proxy for balance sheet quality in the period immediately before each respective corporate bond issue.[3]

2.2.2 Bond sample and data

To construct the bond sample, we begin by identifying a subset of primary market corporate bonds covered in the Mergent Fixed Income Securities Database (FISD) that are issued between 1994 and 2013 by U.S. domiciled and incorporated publicly-listed firms.

[2]This procedure is based on estimating a pooled cross-sectional regression of ratings on variables identified in Barth et al. (1998, 2008) with industry and time fixed effects. These variables include *Total assets*, *Return on assets*, *Debt-to-assets*, and indicator variables for *Dividends*, *Subordinated debt*, and *Loss*. We apply the parameters obtained from this estimation to firms' financial information in each cross-section over our sample period to derive an approximation of issuer ratings.

[3]Given that our proxy for balance sheet quality in all subsequent tests is based on residual error terms from estimating model (2.1), our evidence may suffer from an errors-in-variables problem (Pagan 1984; Shanken 1992). To ensure that potential errors arising from self-generated regressors are not influencing our results, we re-run our main tests using the unrefined raw book-to-market ratio and obtain statistically and to a large degree, economically, similar results.

Similar to Chava et al. (2010) and Dick-Nielsen et al. (2012), we exclude variable- and zero-coupon, perpetual, foreign currency, preferred, and exchangeable issues as well as private placement, Yankee, and Canadian bonds. We further restrict our selection to include only corporate debentures (CDEB) and corporate medium-term notes (CMTN) with maturities over one and less than or equal to 30 years. We also limit our selection to industrial firms and exclude issuers from the financial and utilities sectors. To be included in our sample, we require that data on bond contract attributes (i.e., issue size, offering and maturity dates, coupon, security, and covenants) are available.

We obtain credit ratings issued by S&P, Moody's, and Fitch from Mergent FISD. Following Ellul et al. (2015), to select a representative rating when an issue is rated by multiple CRAs, we first select the S&P rating. In cases where the S&P rating is missing in the database, we rely on ratings from Moody's, and if this is also missing, we use the Fitch rating. We employ two additional measures of a firm's cost of debt. First, we use offering yields as a widely-adopted proxy for the cost of debt financing (e.g., Anderson et al. 2004; Mansi et al. 2011) that reflects the credit quality and default risk of a bond. This is defined as the yield-to-maturity based on the coupon and any discount or premium to par value at the date of initial offering. We further use the credit spread as an alternative measure that controls for intertemporal changes in the risk-free yield curve. We follow Campbell and Taksler (2003) and Chen et al. (2007) and define the spread as the difference between a bond's yield-to-maturity and the closest benchmark risk-free Treasury by time-to-maturity. Offering yields are from Mergent FISD. Maturity-matched risk-free yields are obtained by linearly interpolating benchmark Treasury yields contained in the Federal Reserve H-15 release for constant maturities.

Finally, we obtain annual fundamentals and stock market data from Compustat and CRSP, respectively. Merging the contract-level data with credit ratings, offering yields, credit spreads and other required firm-level data, we obtain a final test sample of 1,508 corporate bonds issued by 301 firms.

Panel A of Table 2.2 presents statistics on the main attributes of our sample bonds. The mean issue size is about $593 million with an average time-to-maturity of just under 9 years. The average initial credit rating is 7.8, which is tilted more toward the lower end of the investment-grade rating category (between A– and BBB+). The data also indicate that over 86 percent of the sample bonds are investment-grade issues. In Panel B, we report the covenant intensity index and the breakdown of covenants into five subgroups following Chava et al. (2010) and Nikolaev (2010). Covenant index is a rank variable, which we define based on assigning bonds to the following four covenant intensity categories: (i) low (0 to 5 covenants), (ii) medium (6 to 10 covenants), (iii) high (11 to 15 covenants), and (iv) very high (16 to 21 covenants). The mean covenant score is over 2.25 indicating an above-average level of covenant intensity in our sample. Analyzing the covenant categories, investment restrictions appear to be the most common, followed by events-related restrictions, and covenants written on accounting numbers. Panel C tab-

ulates the security and seniority rank of the issues from senior secured to unsecured. In our sample, more than 96 percent of the bond issues fall within the senior category.

Consistent with predictions on the informativeness of credit ratings about default probabilities, Panel D reveals large differences between the cost of debt across the investment-grade and speculative bond categories (4.8 versus 7.3 percent for offering yields and 1.4 versus 3.7 percent for credit spreads). These findings are in line with past evidence on the relation between credit ratings, access to debt finance, and the cost of borrowing (e.g., Kliger and Sarig 2000; Sufi 2009). Panel E offers further granularity on the initial credit rating distribution of the sample bonds. Almost 43 percent of the issues are at the lower end of the investment-grade category (BBB), and only 2.3 percent are at the higher end of the rating scale (AAA). Within the speculative-grade issues, 9.3 percent are low-grade bonds (ratings of BB) and about 4.3 percent fall in the very speculative category (ratings of B or less). We examine the time-series trend of initial bond ratings and find that consistent with Blume et al. (1998) and Baghai et al. (2014), credit ratings appear to have become slightly more conservative over the sample period. The linear trend for mean and median initial credit ratings is presented in Figure 2.1.

Evaluating consensus among the rating agencies about the underlying credit quality of new issues, Panel E shows that over 47 percent of the sample bonds have split (initial) credit ratings and in 11 percent of these cases, the extent of disagreement is at least two notches. Moreover, 46 percent of the bonds have more than two initial credit ratings, highlighting the possibility that issuers are soliciting and shopping for ratings from multiple CRAs and then choosing the most favorable one. In Panel F, we offer the comparative distribution of credit ratings by S&P and Moody's. The diagonal denotes 726 (53%) ratings where the two CRAs are in agreement about the debt instruments' credit risk. All off-diagonal entries, on the other hand, are representative of split ratings. Examining the 652 cases of split ratings, Moody's is the more conservative CRA, issuing 402 (62%) ratings that are lower than those of S&P for the same bond.

In Table 2.3, we present descriptive statistics for the firm- and market-level variables used in our estimations. All variables are defined in Appendix B.1. To minimize the influence of outliers, all continuous variables included in this table are winsorized at the 1st and 99th percentile. Panel A presents the distribution of our measure of balance sheet quality with a mean (median) of 0.031 (0.029). The data show that our sample firms are relatively large, with a mean log of total assets of 9.44 (about $12.6 billion). Sample firms rely heavily on debt as demonstrated by the mean leverage of 61 percent. Operating profitability averages at just over 24 percent, while tangibility and asset specificity have mean values of 37 and 2.9 percent, respectively. Mean volatility based on the natural log of the standard deviation of daily stock returns measures at about –2.6 and the average entrenchment index from Bebchuk et al. (2009) is around 2.4 in our sample. We also present pairwise correlations of all variables employed in our analyses in Panel B, the results of which conform to the predicted relations between the set of variables.

2.3 Results

2.3.1 Covenant structure in bond indentures

We begin by examining the association between balance sheet quality and the intensity of covenants in new public bond issues. Specifically, we estimate the following baseline model:

$$Covenant\ index_{i,t} = \beta_0 + \beta_1 BSQ_{i,t-1} + \sum \gamma_k' X_{k,i,t} + FFE_i + TFE_t + \varepsilon_{i,t}\ , \qquad (2.2)$$

where *Covenant index* measures the intensity of restrictions in indenture agreements. *BSQ* denotes balance sheet quality and is our main variable of interest. In this model, X is the vector of bond- and firm-specific controls that are drawn from prior studies on factors that explain demand for monitoring in debt contracts (e.g., Beatty et al. 2012). Bond characteristics include the face value of bonds (*Issue*), time-to-maturity (*Maturity*), interest rate applicable to the issue (*Coupon*), indicators for callable (*Redeemable*) and interchangeable (*Fungible*) bonds, seniority indicators (*Security*), and an indicator for issues' credit rating category (*Investment-grade*). Firm-level controls are those presented in Table 2.3. We estimate model (2.2) for bonds issued between 1994 and 2013 using OLS regressions with firm and time fixed effects and cluster the standard errors at the firm level.

Panel A of Table 2.4 presents the baseline estimation results. Columns 2 and 3 in this panel report our variable of interest, *BSQ*, and show that bond issues of firms with higher balance sheet quality, on average, attract less intensive covenants. Specifically, in column 2, where we estimate the model without the additional control for governance, an increase of one standard deviation (0.268) in *BSQ* is associated with a 21 percent decrease in the rank of the covenant index. In column 3, once we control for entrenchment, the relation between balance sheet quality and covenant intensity becomes sightly more accentuated, suggesting that the contracting relevance of the balance sheet is higher when governance quality is lower.

Turning to the control variables, as expected, larger issues attract more intensive covenants, while investment-grade bonds are associated with fewer restrictions. The results also point to potential substitutions between the stringency of security and demand for covenants. Larger firms have less restrictive covenant terms, while indentures of high leverage firms and those with high asset specificity (e.g., R&D) include more intensive covenants.

In Panel B, we re-estimate the model but replace the linear measure of *BSQ* with its quintiles as explanatory variables. We divide bond issuers into five quintiles and include indicators for quintiles 2 through 5 (*BSQ2* to *BSQ5*) in the model (the effect of *BSQ1* is subsumed by the intercept). This allows us to examine how the impact of *BSQ* on covenant intensity varies across firms with very high or low balance sheet quality. While the results suggest that the contracting relevance of balance sheet quality increases across

the *BSQ* quintiles, they also point to economically and statistically significant differences in the association between balance sheet quality and covenant intensity in the high and low quintiles.

Next, we re-estimate model (2.2), but replace the aggregate index with the covenant categories identified in Chava et al. (2010) and Nikolaev (2010). Panel C presents our findings for covenants that fall under *Payout restrictions*, *Investment restrictions*, *Financing restrictions*, *Accounting restrictions*, and *Event-related restrictions*. Comparing the results reported for the different covenant categories in this panel suggests that the aggregate relation between balance sheet quality and covenant intensity is largely due to its impact on accounting and event-related covenants. The economic magnitude of this effect is weaker for payout and refinancing restrictions. We find no statistically detectable relation between *BSQ* and demand for investment restrictions. Nevertheless, the positive sign on the coefficient for this variable is counterintuitive, in that firms with on average "cleaner" balance sheets attract more stringent restrictions on their investment activities. Given that these covenants constrain future merger and acquisition transactions, the observed result may be due to creditors' incentives to protect their interests by restricting the borrower from becoming a target of potential takeover bids.

2.3.2 Cost of debt

We estimate the association between *BSQ* and the cost of debt using model (2.3). Consistent with prior studies, we use offering yields, credit spreads, and credit ratings as proxies for the initial cost of public bond issues.

$$Cost\ of\ debt_{i,t} = \beta_0 + \beta_1 BSQ_{i,t-1} + \sum \gamma_k' X_{k,i,t} + FFE_i + TFE_t + \varepsilon_{i,t}\ , \qquad (2.3)$$

where as before, *BSQ* is the main variable of interest that represents the firm-year measure of balance sheet quality. To the extent that debt market participants attach a premium to reliability in balance sheet numbers, we predict that this measure will be negatively associated with the *Cost of debt*. In model (2.3), X is the vector of bond-level controls (including the covenant index) and firm-specific attributes defined earlier. We estimate this model for bonds issued between 1994 and 2013 using OLS regressions with firm and time fixed effects, and cluster the standard errors at the firm level.

Table 2.5 reports the results we obtain from estimating model (2.3) using the three proxies for the cost of debt. The results are consistent with our prediction and show that there is a strong negative relation between the cost of debt and balance sheet quality. The coefficient estimates for *BSQ* in the three columns of the table provide evidence that bond investors and CRAs take account of the reliability of balance sheet numbers when assessing an issue's credit risk. The economic magnitude of *BSQ* in debt pricing is also significant. An increase of one standard deviation (0.268) in *BSQ* is associated with a decline in offering yields and credit spreads by 36 and 30 basis points, respectively. This

effect is equivalent to a 7 (17) percent decline in offering yields (credit spreads) relative to their reported means (5.2 and 1.7 percent). Our findings for credit ratings reveal similar economically-significant effects. Specifically, a one standard deviation increase in balance sheet quality is associated with more favorable credit ratings by 37 percent of a notch. This effect is equivalent to about 5 percent of the sample's mean credit rating (7.893).

2.3.3 Split ratings

To assess whether balance sheet quality lowers information uncertainty and induces greater agreement between the rating agencies, we estimate model (2.4) below.

$$Split\ rating_{i,t} = \beta_0 + \beta_1 BSQ_{i,t-1} + \sum \gamma_k' X_{k,i,t} + IFE_i + TFE_t + \varepsilon_{i,t}\ , \tag{2.4}$$

where *Split rating* is a rank variable that is measured based on the absolute value of the count of notch differences between credit rating agencies' at-issue ratings. We cap this variable at two notches on the upper tail to minimize the effects of outlier split ratings in our sample. Our main variable of interest is *BSQ*, which we predict will be negatively associated with the probability of split ratings. The model is estimated using an ordered probit regression that includes bond- and firm-level controls. Consistent with prior studies on the determinants of CRAs' assessments of credit risk and the role of accounting information in this process (e.g., Kim et al. 2013; Kraft 2015), we use industry (defined at the two-digit SIC level) and time fixed effects in our estimations.

The results from estimating model (2.4) are reported in Table 2.6. In column 1, the findings confirm our expectation on a negative relation between balance sheet quality and the probability of split ratings. Analyzing the marginal effects (at means) for *BSQ*, we find that higher balance sheet quality increases the likelihood of agreement (*Split rating*= 0) and decreases the likelihood of disagreement (*Split rating*= 1 or *Split rating*= 2). We then examine whether the credit relevance of the balance sheet varies between issuers that obtain up to two ratings (e.g., from S&P and Moody's only) and those that seek more than two initial ratings (i.e., rating shopping). The results presented in columns 2 and 3 suggest that the documented aggregate effect of balance sheet quality on the probability of split ratings is solely associated with the 792 issues for which the bond issuers are not engaged in rating shopping.

2.4 Further analysis

2.4.1 Role of delegated monitoring

Beatty et al. (2012) document that demand for covenants in bond contracts is associated with the benefits of monitoring by "credible specialists," namely banks involved in private loan deals with bond issuers. To assess the robustness of our main results, we conduct additional tests that control for the intensity of bank monitoring in firms' private

debt contracts. To do so, we use data on syndicated loans initiated within five years prior to each bond issue in our sample. We obtain deal-level and covenant data on syndicated loan packages from the Loan Pricing Corporation (LPC) Dealscan database.

Panel A of Table 2.7 reports summary statistics on 1,214 USD-denominated syndicated loan deals issued between 1993 and 2012 to 262 firms covered in our bond sample.[4] To capture the effect of delegated monitoring, we use three proxies. First, we rely on the intensity of *Capital covenants* and *Performance covenants* associated with each loan deal following the classification in Christensen and Nikolaev (2012). Next, we employ the *Loan covenant index* of Bradley and Roberts (2015). This index assigns one point for each of the following covenants: secured debt, dividend covenants, more than two financial covenants, asset sweep, debt sweep, and equity sweep. All variables are defined in Appendix B.1.

To assess the effect of monitoring by banks, we augment model (2.2) and explicitly control for *Delegated monitoring* in our estimations.

$$\begin{aligned} Covenant\ index_{i,t} = \beta_0 + \beta_1 BSQ_{i,t-1} + \beta_2 Delegated\ monitoring_{i,t-1} \\ + \sum \gamma_k' X_{k,i,t} + FFE_i + TFE_t + \varepsilon_{i,t}\ , \end{aligned} \tag{2.5}$$

where *Delegated monitoring* is defined based on proxies that capture the intensity of covenants in loan agreements. All other variables follow earlier definitions. Estimation results are reported in Panel B and indicate a positive association between bank monitoring and restrictions in bond contracts. Important to our objectives, however, is the finding that the contracting relevance of the balance sheet is a robust result even after controlling for the intensity of delegated monitoring. The economic magnitude of the balance sheet effect is nonetheless slightly attenuated. Comparing the results in column 3 of this table with those reported earlier in Table 2.4, for instance, indicate a decrease in the coefficient on *BSQ* from 0.781 to 0.739, which translates into a 21 versus 19 percent decrease in the rank of the covenant index for a one standard deviation change in balance sheet quality.

2.4.2 Creditor protection laws

Fiduciary and legal duties of directors generate incentives which ensure that their actions are aligned with the best interests of the firm's shareholders. However, a 1991 Delaware court ruling in *Credit Lyonnais Bank Nederland, N.V. v. Pathe Communications Corporation* expanded the scope of directors' fiduciary duties and allowed creditors to sue directors for a breach of fiduciary duties or deepening insolvency. Becker and Strömberg (2012) examine the relevance of this ruling for shareholder-bondholder conflicts and show that it was followed by an increase in leverage and a reduced reliance on bond covenants. Aier et al. (2014) study the financial reporting consequences of expanded

[4] Our analysis is constrained by the fact that covenants data for syndicated loan deals initiated before 1992 are either missing or incomplete on Dealscan. To address this concern, in untabulated analysis, we limit our test window for bond issues to the 1998-2013 period and find qualitatively similar results to those reported here.

creditor rights stemming from the ruling and find that it caused an increase in timely loss recognition; an outcome, which they argue is driven by change in debtholder demand for conservative accounting.

Two subsequent court rulings in late 2006, *Trenwick America Litigation Trust v. Ernst & Young LLP* and *North American Educational Programming Foundation, Inc. v. Gheewalla*, reversed the judicial course from the 1991 ruling and constrained the default rights of creditors and their legal ability to deter or penalize actions taken by directors that damage their economic interests. We exploit the setting offered by the change in creditors' rights following the court rulings to establish a causal link between balance sheet quality and contracting in the bond market. To do so, we initially partition our sample by state of incorporation.[5] Panel A in Table 2.8 reports the descriptive statistics for Delaware and non-Delaware bond issuers in the pre- and post-court rulings periods. Comparing the two subsets of firms between the two time periods indicates that bond covenant intensity increases for all firms, albeit at different rates. On the other hand, while non-Delaware firms exhibit an increase in balance sheet quality, no statistically meaningful change can be detected for Delaware firms.

Univariate difference-in-differences test results for covenant intensity and balance sheet quality are reported in Panel B. The findings suggest that relative to the benchmark set of non-Delaware firms, covenant intensity declines slightly in Delaware issuers. Applying the same approach, we find that balance sheet quality in Delaware firms does not increase at the same rate as non-Delaware firms, thus registering an overall decline from the pre- to post-court rulings period. This pattern is observable in the time-series trend of balance sheet quality for Delaware and non-Delaware firms presented in Figure 2.2.

2.5 Conclusion

In this study, we examine the contracting and economic relevance of balance sheet information in the public bond market. Using the component of the book-to-market ratio capturing accounting bloat in net asset values, we find that covenants in bond indenture agreements are on average less restrictive for issuers with high quality balance sheets. This result is robust to controlling for delegated monitoring by banks in syndicated loan deals. To the extent that balance sheet quality is a persistent firm-specific trait, our finding on the contracting relevance of the balance sheet is largely consistent with the *ex post* association between bond covenant intensity and timely loss recognition reported in Nikolaev (2010).

Our results on the debt pricing effects of accounting information in the primary bond market show that firms with high quality balance sheets attract lower offering yields and

[5]The state of incorporation field reported on Compustat is a static data item; i.e., at any point in time, it reports firms' current state of incorporation. To ensure that our analysis is not influenced by this backfill bias and misclassifications arising from reincorporations, we cross-check and update this field in our data by using the RiskMetrics legacy and current files from the Institutional Shareholder Services.

credit spreads, and more favorable initial credit ratings on their bond issues. We further document that the likelihood of disagreement between CRAs is decreasing in balance sheet quality. These findings add novel evidence to the extant debt market literature that has so far been largely focused on examining the role of accounting information in private debt contracts.

Using judicial decisions by Delaware courts in 2006 that reduced creditors' legal and default rights, we provide causal evidence on a decline in the sensitivity of covenants to the quality of the balance sheet. Our findings further indicate that supply-side incentives likely dominate demand-side pressures for timely loss recognition. These findings add to extant evidence on the interplay between creditor rights and directors' incentives for timely loss recognition documented in Aier et al. (2014). Collectively, we believe that these results shed new light on the role of accounting information in the public debt market and should be of interest to present and prospective bond investors, bond market information intermediaries, and debt market regulators.

Figure 2.1: Bond credit ratings (1994-2013)

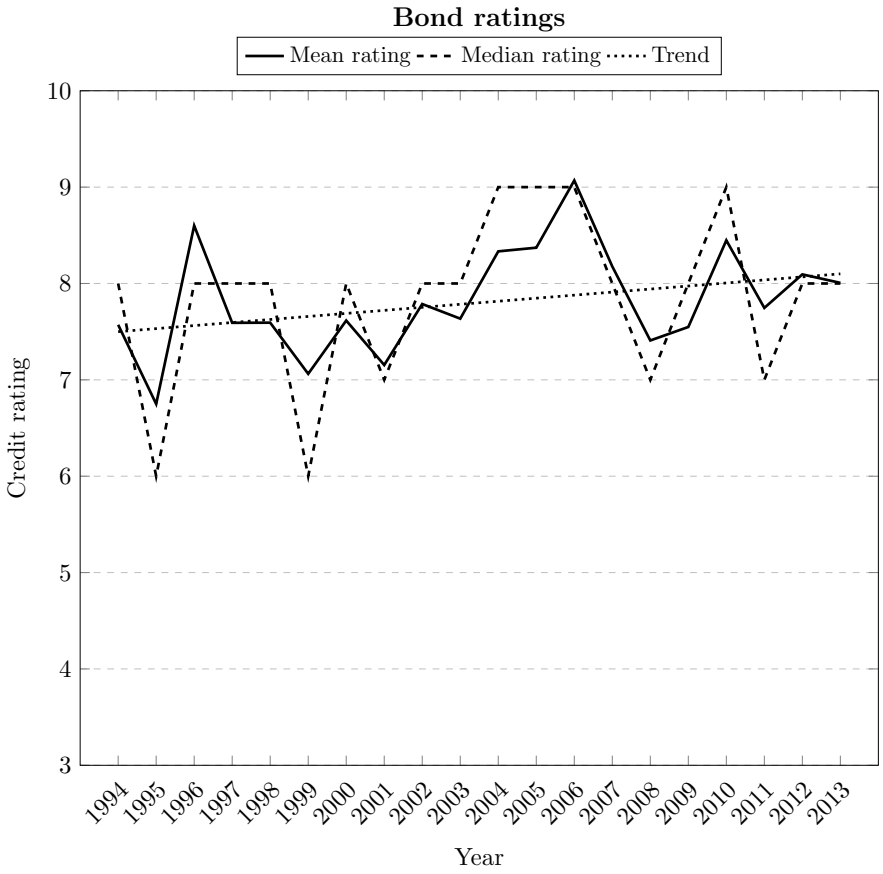


Figure 2.2: Delaware and non-Delaware bond issuers

Table 2.1: Estimating balance sheet quality

Panel A presents descriptive statistics for variables used in estimating balance sheet quality based on Sunder et al. (2017). *Book-to-market* is the outcome variable and is presented in the inverse form. All variables are defined in Appendix B.1. Panel B presents results from estimating balance sheet quality from 1993 to 2012 using a panel regression with industry and time fixed effects. The estimation period corresponds to fiscal year-ends immediately before corporate bond issues in the sample. Figures presented in parentheses are the absolute values of t-statistics based on two-dimensional clustering of standard errors (Petersen 2009) at the firm- and year-level. Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively). Firm-year residuals from this estimation are used as the proxy for balance sheet quality (BSQ) in subsequent tests.

Panel A: Descriptive statistics

	N	Mean	Median	SD
Book-to-market	22,953	-0.605	-0.456	0.611
Long-term growth	22,953	0.055	0.057	0.052
Short-term growth	22,953	0.199	0.097	0.560
Return on assets	22,953	0.113	0.134	0.186
Volatility	22,953	-3.533	-3.554	0.504
Issuer rating	22,953	11.90	12.00	3.415
Concentration	22,953	0.247	0.184	0.203
Sentiment	22,953	85.56	87.60	13.01
S&P Composite	22,953	0.119	0.123	0.031

Panel B: Estimating balance sheet quality		
Variables	Predicted sign	(-1)*Book-to-market
Long-term growth	(+)	0.761***
		(7.05)
Short-term growth	(+)	0.082***
		(6.35)
Return on assets	(+)	0.237***
		(8.24)
Volatility	(−)	−0.248***
		(16.01)
Issuer rating	(−)	−0.022***
		(4.06)
Concentration	(?)	0.219***
		(4.68))
Sentiment	(+)	0.042***
		(8.84)
S&P composite	(+)	0.989***
		(5.37)
Constant	(?)	−5.384***
		(12.83)
Industry fixed effects		Yes
Time fixed effects		Yes
Observations		22,953
Adj. R-squared		0.24

Table 2.2: Corporate bond issues

This table presents attributes of corporate bonds included in the sample. All data are from Mergent FISD. The sample comprises 1,508 bonds issued from January 1994 to December 2013 by 301 U.S. domiciled and incorporated non-financial firms that are at the intersection of the CRSP, Compustat, and Mergent FISD databases. Panel A reports the main attributes of corporate bonds included in the sample. Panel B tabulates the aggregate intensity of covenants and the distribution of the five main covenant categories. Panel C presents the bond issues' security attributes. Panel D summarizes the cost of debt measures and Panels E and F outline the features of at-issue credit ratings for the sample. All variables are defined in Appendix B.1

Panel A: Bond characteristics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Issue	1,508	0.593	0.585	0.250	0.500	0.750
Maturity	1,508	8.955	4.824	5.046	10.004	10.034
Coupon	1,508	5.180	2.109	3.637	5.475	6.625
Redeemable	1,508	0.878	0.327	1	1	1
Fungible	1,508	0.731	0.443	0	1	1
Credit rating	1,485	7.893	2.836	6	8	9
Investment-grade	1,485	0.864	0.343	1	1	1

Panel B: Bond covenants

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Covenant index	1,477	2.256	1.076	1	2	3
Payout restrictions	1,477	0.209	0.688	0	0	0
Investment restrictions	1,477	3.289	1.066	2	4	4
Financing restrictions	1,477	1.009	0.599	1	1	1
Accounting restrictions	1,477	0.923	1.249	0	0	2
Event-related restrictions	1,477	1.436	1.152	1	1	2

Panel C: Bond security attributes

	Frequency	Percentage
Senior secured	10	0.66
Senior	1,455	96.49
Subordinate	42	2.79
Unsecured	1	0.07

Panel D: Offering yield and credit spread

	Bonds	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Offering yield (%):						
Full sample	1,508	5.219	2.121	3.708	5.492	6.656
Investment-grade	1,283	4.832	1.920	3.379	5.081	6.330
Speculative-grade	202	7.348	1.757	6.250	7.125	8.250
Credit spread (%):						
Full sample	1,508	1.737	1.365	0.807	1.323	2.246
Investment-grade	1,283	1.420	0.999	0.761	1.182	1.793
Speculative-grade	202	3.749	1.491	2.768	3.549	4.305

Panel E: At-issue credit ratings, split ratings, and rating shopping

	Frequency	Percentage
Credit rating:		
AAA	35	2.36
AA	90	6.06
A	523	35.22
BBB	635	42.76
BB	139	9.36
B	62	4.18
CCC and below	1	0.07
Split rating:		
Split	652	47.31
Non-split	726	52.69
Split rating (notch difference):		
Zero	726	52.69
One	499	36.21
Two and above	153	11.10
Rating shopping:		
More than two credit ratings	693	46.67
No more than two credit ratings	792	53.33

Panel F: Distribution of at-issue split ratings

		Standard & Poor's																	
		Investment-grade										Speculative-grade							
		(1) AAA	(2) AA+	(3) AA	(4) AA-	(5) A+	(6) A	(7) A-	(8) BBB+	(9) BBB	(10) BBB-	(11) BB+	(12) BB	(13) BB-	(14) B+	(15) B	(16) B-	(17) CCC+	(18) C	Split
Moody's																			
Investment-grade	(1) Aaa	24	-																0%
	(2) Aa1	4	0	6															100%
	(3) Aa2	4	-	5	7	5													76%
	(4) Aa3		2	15	25	26		11											68%
	(5) A1			15	3	41	29	8											57%
	(6) A2			3	-	32	143	19	8										30%
	(7) A3				-	22	41	57	31	4	1								63%
	(8) Baa1				3	5	13	34	107	31	1								45%
	(9) Baa2						2	2	37	171	32								30%
	(10) Baa3							1	9	56	73	9	4						52%
Speculative-grade	(11) Ba1									4	22	31	3	4		1			52%
	(12) Ba2									1	2	11	12	4	1	-			61%
	(13) Ba3											1	16	11	2	-			63%
	(14) B1											3	2	9	11	-			56%
	(15) B2												3	2	10	10	2		63%
	(16) B3												2	3	1	7	5	-	72%
	(17) Caa1																	0	1	100%
	(18) Caa2																	-	0	0%
	Total	32	2	44	38	131	228	132	192	267	131	55	42	33	25	18	7	0	1	
	Split	25%	100%	87%	34%	69%	37%	57%	44%	36%	44%	44%	71%	66%	56%	44%	29%	0%	100%	

Table 2.3: Sample characteristics

Panel A reports firm-level summary statistics for the sample of 301 nonfinancial firms that lie at the intersection of the CRSP, Compustat, and Mergent FISD databases. In Panel B, Pearson correlations are presented (significant correlations at the 5 percent level are shown in bold). All variables are defined in Appendix B.1.

Panel A: Firm-level characteristics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl	IQR
BSQ	1,508	0.031	0.268	-0.136	0.029	0.200	0.336
Size	1,508	9.446	1.368	8.512	9.463	10.368	1.856
Leverage	1,477	0.608	0.145	0.506	0.612	0.705	0.199
Profitability	1,508	0.242	0.171	0.140	0.207	0.309	0.169
Tangibility	1,508	0.368	0.260	0.154	0.299	0.559	0.405
Specificity	1,508	0.029	0.053	0.000	0.007	0.033	0.033
Volatility	1,499	-2.597	0.445	-2.906	-2.601	-2.273	0.633
Entrenchment index	1,367	2.440	1.370	1	2	3	2

Panel B: Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) BSQ	–							
(2) Size	**-0.163**							
(3) Leverage	**0.271**	**0.113**						
(4) Profitability	**-0.065**	**0.098**	**-0.218**					
(5) Tangibility	**0.066**	**-0.138**	0.014	**0.338**				
(6) Specificity	**-0.135**	**0.174**	**-0.261**	**0.114**	**-0.337**			
(7) Volatility	**0.278**	**-0.291**	-0.006	-0.038	**0.179**	**-0.077**		
(8) Entrenchment index	0.034	**-0.289**	**-0.131**	-0.013	**0.053**	-0.033	**0.174**	–

Table 2.4: Balance sheet quality and bond covenants

This table presents coefficient estimates from OLS regressions on the association between balance sheet quality (*BSQ*) and bond covenant intensity. Panel A reports the baseline estimation results, where the outcome variable is the *Covenant index* that captures the aggregate restrictiveness of covenants. In Panel B, the baseline model is re-estimated using indicators of *BSQ*, from *BSQ1* to *BSQ5*, each of which takes the value of one if balance sheet quality is in the first to fifth quintile, respectively and is zero otherwise. In Panel C, the aggregate covenant index is decomposed into the five covenant categories of Chava et al. 2010 and Nikolaev 2010: (i) *Payout restrictions*, (ii) *Investment restrictions*, (iii) *Financing restrictions*, (iv) *Accounting restrictions*, and (v) *Event-related restrictions*. Bond- and firm-level controls are defined in Appendix B.1. Figures reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on one-dimensional clustering at the firm-level (Petersen 2009). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Balance sheet quality and aggregate covenant intensity

	Covenant index		
	(1)	(2)	(3)
BSQ	–	−0.745***	−0.781***
		(3.26)	(3.18)
Issue	0.091**	0.117***	0.121***
	(1.98)	(2.61)	(2.63)
Maturity	0.001	0.003	0.002
	(0.08)	(0.80)	(0.35)
Coupon	−0.002	−0.028	−0.015
	(0.06)	(0.94)	(0.51)
Redeemable	−0.027	−0.036	−0.029
	(0.25)	(0.34)	(0.28)
Fungible	0.008	−0.001	0.023
	(0.08)	(0.02)	(0.21)
Investment-grade	−0.885***	−0.904***	−0.897***
	(3.07)	(3.26)	(2.85)
Security	−0.448*	−0.463*	−0.532
	(1.66)	(1.70)	(1.36)
Size	−0.257***	−0.358***	−0.371
	(2.68)	(3.67)	(3.51)
Leverage	0.508	0.811*	0.789*
	(1.06)	(1.81)	(1.91)
Profitability	0.397	0.418*	0.574**
	(1.60)	(1.93)	(2.29)
Tangibility	−0.199	−0.079	−0.197
	(0.28)	(0.12)	(0.30)

(*continued*)

Panel A (continued)

	Covenant index		
	(1)	(2)	(3)
Specificity	3.769**	4.068**	4.457***
	(2.09)	(2.47)	(2.81)
Volatility	0.071	0.132	0.137
	(0.54)	(1.04)	(1.03)
Entrenchment index	–	–	0.082
			(1.33)
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Adj. R-squared	0.79	0.80	0.78
Observations	1,477	1,477	1,477

Panel B: Balance sheet quality quintiles and aggregate covenant intensity

	Covenant index	
	(1)	(2)
BSQ2	−0.127	−0.101
	(1.53)	(1.20)
BSQ3	−0.212**	−0.206*
	(1.98)	(1.89)
BSQ4	−0.324***	−0.339***
	(2.64)	(2.66)
BSQ5	−0.429***	−0.422***
	(2.93)	(2.79)
Entrenchment index	–	0.082
		(1.30)
BSQ5−BSQ2	−0.302***	−0.321***
(p value)	(0.01)	(0.01)
Bond-level controls	Yes	Yes
Firm-level controls	Yes	Yes
Firm fixed effects	Yes	Yes
Time fixed effects	Yes	Yes
Adj. R-squared	0.79	0.78
Observations	1,477	1,477

Panel C: Balance sheet quality and covenant categories

	Payout	Investment	Financing	Accounting	Event
BSQ	−0.267**	0.253	−0.345**	−0.572**	−0.496*
	(1.99)	(1.31)	(1.99)	(2.16)	(1.87)
Bond-level controls	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	1,477	1,477	1,477	1,477	1,477
Adj. R-squared	0.89	0.79	0.64	0.85	0.84

Table 2.5: Balance sheet quality and the cost of debt

This table reports coefficient estimates from OLS regressions on the association between *BSQ* and three proxies for the cost of debt: *Offering yield*, *Credit spread*, and *Credit rating*. Bond- and firm-level controls are defined in Appendix B.1. Figures reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on one-dimensional clustering at the firm-level (Petersen 2009). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

	Cost of debt		
	Offering yield	Credit spread	Credit rating
BSQ	−1.350***	−1.127***	−1.367***
	(4.27)	(3.07)	(3.13)
Issue	0.431***	0.302***	0.074
	(6.60)	(5.31)	(1.07)
Maturity	0.089***	0.010**	−0.009
	(11.97)	(2.43)	(1.56)
Redeemable	0.205*	0.231***	0.271
	(1.73)	(2.65)	(1.52)
Fungible	−0.033	0.044	−0.215
	(0.27)	(0.42)	(1.20)
Investment-grade	−1.458***	−1.317***	–
	(5.20)	(4.82)	
Covenant index	−0.064	−0.009	0.273***
	(1.04)	(0.17)	(2.85)
Security	0.110	0.191	−1.607***
	(0.26)	(0.48)	(4.48)
Size	−0.211*	−0.174	−0.542***
	(1.64)	(1.45)	(2.59)
Leverage	1.509***	1.487***	4.259***
	(2.61)	(2.65)	(4.92)
Profitability	−1.199***	−1.198***	−1.103*
	(3.16)	(3.67)	(1.72)
Tangibility	0.709	0.732	−2.379**
	(1.02)	(1.18)	(1.98)
Specificity	1.268	1.048	−2.585
	(0.49)	(0.65)	(0.65)
Volatility	0.404***	0.306***	0.604***
	(3.04)	(2.63)	(2.94)
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,508	1,508	1,485
Adj. R-squared	0.88	0.79	0.93

Table 2.6: Balance sheet quality and split ratings

This table reports coefficient estimates from ordered probit regressions on the association between *BSQ* and *Split rating*. *Rating shopping* is a binary variable, equal to one if the issuer obtains more than two ratings, and zero otherwise. Bond- and firm-level controls are defined in Appendix B.1. Marginal effects (and p values) are reported for (*BSQ*) at *Split rating*=0 (agreement), *Split rating*=1 (split by one notch), and *Split rating*=2 (split by two or more notches). Figures reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on one-dimensional clustering at the firm-level (Petersen 2009). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

	Split rating (notch difference)		
	Full sample	Rating shopping=1	Rating shopping=0
	(1)	(2)	(3)
BSQ	−0.667***	−0.648	−0.761***
	(2.98)	(1.34)	(2.83)
Investment-grade	−0.526***	−0.373	−0.488**
	(2.70)	(1.07)	(2.10)
Size	−0.070	−0.131	−0.104
	(1.01)	(1.12)	(1.38)
Leverage	−0.677	−0.668	−0.341
	(1.40)	(0.75)	(0.58)
Profitability	0.276	−0.460	0.265
	(0.93)	(0.98)	(0.80)
Tangibility	0.341	−1.913*	1.001
	(0.58)	(1.85)	(1.56)
Specificity	5.418***	12.948***	3.045**
	(4.07)	(4.07)	(2.31)
Volatility	0.023	−0.237	0.108
	(0.16)	(0.92)	(0.61)
S&P Composite	−23.598***	−23.776***	−17.081**
	(3.48)	(2.96)	(2.18)
Split rating=0	0.266***	0.249	0.301***
	(0.00)	(0.18)	(0.00)
Split rating= 1	−0.125***	−0.197	−0.113***
	(0.00)	(0.17)	(0.01)
Split rating= 2	−0.142***	−0.053	−0.188***
	(0.00)	(0.21)	(0.00)
Bond controls	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,485	693	792
Adj. R-squared	0.12	0.27	0.12

Table 2.7: Balance sheet quality and delegated monitoring

This table reports coefficient estimates from OLS regressions on the association between balance sheet quality and bond covenant intensity conditional on monitoring by banks. Panel A reports the attributes of the loan packages. Panel B presents the baseline results that control for bank monitoring using: *Capital covenants*, *Performance covenants*, and *Loan covenant index*. Bond- and firm-level controls are those used in the baseline model. All variables are defined in Appendix B.1. Figures reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on one-dimensional clustering at the firm-level (Petersen 2009). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Syndicated loan characteristics

	Deals	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Amount	1,214	1.042	1.613	0.300	0.575	1.150
Maturity (months)	1,214	50.558	19.751	36	60	60
Packages (per year)	1,214	1.188	0.460	1	1	1
Secured	1,214	0.382	0.486	0	0	1
Dividend covenants	1,214	0.644	0.479	0	1	1
Financial covenants	1,214	0.117	0.321	0	0	0
Capital covenants	1,214	0.655	0.718	0	1	1
Performance covenants	1,214	1.357	0.891	1	1	1
Asset sale sweep	1,214	0.218	0.413	0	0	0
Debt issue sweep	1,214	0.173	0.379	0	0	0
Equity issue sweep	1,214	0.147	0.354	0	0	0
Loan covenant index	1,214	1.682	1.665	0	1	3

Panel B: Balance sheet quality, bond covenants, and delegated monitoring

	Covenant index		
	(1)	(2)	(3)
BSQ	−0.713***	−0.733***	−0.739***
	(3.14)	(3.27)	(3.10)
Capital covenants	0.059	–	–
	(0.72)		
Performance covenants	0.157*	–	–
	(1.67)		
Loan covenant index	–	0.115*	0.113*
		(1.92)	(1.87)
Bond controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Governance controls	No	No	Yes
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,477	1,477	1,477
Adj. R-squared	0.80	0.80	0.79

Table 2.8: Creditor protection rules

This table reports test results on the association between balance sheet quality and bond covenants following changes to creditor protection rules. Panel A presents comparative statistics for bond-, firm-, and loan-related variables between Delaware and non-Delaware issuers. Panel B reports 2×2 analyses of covenants and balance sheet quality for Delaware and non-Delaware issuers. Panel C includes test results from difference-in-differences estimations using OLS regressions with firm and time fixed effects. In this Panel, *Delaware* is an indicator variable that is equal to one if a firm's state of incorporation is Delaware, and is zero otherwise. *Pre* and *Post* are binary variables which identify periods before and after the Delaware court rulings. Bond- and firm-level controls are those used in the baseline model and are defined in Appendix B.1. Figures reported in parentheses are the absolute values of heteroskedasticity-robust t-statistics based on one-dimensional clustering at the firm-level (Petersen 2009). Statistical significance at the 10, 5, and 1 percent levels are indicated by *, **, and ***, respectively.

Panel A: Sample characteristics - Delaware and non-Delaware firms

	Credit Lyonnais ruling (1994-2006)			*Trenwick-Gheewalla rulings* (2007-2013)			Post-Pre Diff.	
	Del=1	Del=0	Diff.	Del=1	Del=0	Diff.	Del=1	Del=0
Covenant index	1.882	1.712	0.170**	2.616	2.644	−0.028	0.734***	0.932***
BSQ	0.039	−0.023	0.062***	0.049	0.042	0.007	0.010	0.065***
Size	8.856	9.191	−0.335***	9.808	9.864	−0.056	0.952***	0.673***
Leverage	0.639	0.608	0.031***	0.578	0.627	−0.049***	−0.061***	0.019*
Profitability	0.215	0.219	−0.004	0.271	0.242	0.029**	0.056***	0.023
Tangibility	0.395	0.417	−0.022	0.347	0.314	0.033*	−0.048***	−0.103***
Specificity	0.023	0.026	−0.003	0.032	0.035	−0.003	0.009***	0.009**
Volatility	−2.532	−2.660	0.128***	−2.585	−2.657	0.072***	−0.053*	0.003
Entrenchment index	2.350	2.102	0.248**	2.638	2.531	0.107	0.288***	0.429***
Loan covenant index	0.805	0.405	0.400***	0.784	0.801	−0.017	−0.021	0.396***

Panel B: Two-by-two analysis of Delaware versus non-Delaware firms

Covenant index:	*Credit Lyonnais ruling* (1994-2006)	*Trenwick-Gheewalla rulings* (2007-2013)	Diff.
Delaware	1.882 (n= 352)	2.644 (n= 622)	0.734***
Non-Delaware	1.712 (n= 250)	2.616 (n= 284)	0.932***
Diff.	0.170**	−0.028	−0.198*
BSQ:	*Credit Lyonnais ruling* (1994-2006)	*Trenwick-Gheewalla rulings* (2007-2013)	Diff.
Delaware	0.039 (n= 352)	0.049 (n= 622)	0.010
Non-Delaware	−0.023 (n= 250)	0.042 (n= 284)	0.065***
Diff.	0.062***	−0.007	−0.055**

Panel C: Pre-post test results around the court ruling – Delaware issuers			
	Covenant index		
	(1)	(2)	(3)
Pre×BSQ	−1.295***	−1.901***	−1.741***
	(3.44)	(6.32)	(5.34)
Post×BSQ	−0.256	−0.799**	−0.669**
	(0.93)	(2.36)	(2.18)
Entrenchment index	–	0.068	0.049
		(0.85)	(0.69)
Loan covenant index	–	–	0.170**
			(2.08)
Pre×BSQ − Post×BSQ	−1.039**	−1.102***	−1.072***
(p value)	(0.03)	(0.01)	(0.01)
Bond controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	974	974	974
Adj. R-squared	0.82	0.82	0.83

Panel D: Difference-in-differences test results around the court ruling			
	Covenant index		
	(1)	(2)	(3)
Pre×Del×BSQ	−0.889***	−1.189***	−1.144***
	(2.66)	(3.65)	(3.46)
Post×Del×BSQ	−0.258	−0.445	−0.378
	(0.98)	(1.50)	(1.35)
Entrenchment index	–	0.090	0.082
		(1.39)	(1.37)
Loan covenant index	–	–	0.1130*
			(1.88)
Pre×Del×BSQ − Post×Del×BSQ	−0.631*	−0.744*	−0.766**
(p value)	(0.09)	(0.07)	(0.04)
Bond controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,477	1,477	1,477
Adj. R-squared	0.78	0.79	0.79

Chapter 3

A matter of trust? The bond market benefits of corporate social capital

3.1 Introduction

Financial contracts are the "ultimate trust-intensive" transactions: the capital provider exchanges a sum of capital today for a promise of a future payment (Guiso et al. 2004). While the legal enforceability of the contract and the financier's ability to monitor the financee's actions are crucial in determining whether such an exchange can take place, trust is also an important factor.

Social capital, and the trust it engenders, can facilitate financial contracting by mitigating adverse selection and moral hazard problems.[1] When trust prevails, counterparties in economic transactions need to spend less time, effort, and resources in protecting themselves from the risk of being exploited. In exchanges characterized by mutual trust, demand for formal written contracts is lower, and written contracts that do exist need not specify every possible contingency. Extending this notion to agency relationships, principals need to engage in less stringent monitoring of agents. These factors lead to broad economic benefits such as increased stock market participation and greater economic and financial development.[2]

Recent evidence shows that the benefits of social capital and trust also accrue to individual firms. *Endowed trust*, which we define as externally "acquired" trust that a firm enjoys from being located in a high-trust society/environment, is associated with less-intensive formal contracting, better financial performance, higher stock valuations (Hilary and Huang 2016), and moderately better terms in private loan deals (Hasan et al. 2017).

[1] Social capital can be defined in terms of generalized trust, civic norms, beliefs, and dispositions which affect agents' propensity to cooperate (e.g., Putnam 1993, 2000; Knack and Keefer 1997; La Porta et al. 1997), or as cooperative networks that exist among agents (e.g., Coleman 1988, 1990; Lin 2001).

[2] See, for example, Guiso et al. (2004, 2008); Putnam (1993); Fukuyama (1995); Knack and Keefer (1997); La Porta et al. (1997).

Earned trust, which is internally "generated" through a firm's own investment in social capital, also pays off: during crisis-of-trust periods, firms with higher earned trust earn higher stock returns (Lins et al. 2017). Studying the economic effects of earned trust is particularly interesting because it is discretionary in nature: endowed social capital is not something a firm can easily modify, whereas a firm can choose its own level of internally-generated social capital to a large extent.

In this paper, we investigate the role of earned trust in a setting where managerial moral hazard is of particular concern: the corporate bond market. Debtholders, in general, are mainly concerned with downside risk, given their lack of upside potential. Bond investors, however, are more susceptible to agency frictions than banks in private loan agreements. This is largely due to the arm's length nature of bond contracts and structural differences between private and public debt in terms of lenders' monitoring ability, their information costs, and recontracting flexibility (Smith and Warner 1979; Rajan 1992; Roberts and Sufi 2009). In this setting, we anticipate that trust, defined as "the expectation that another person will perform actions that are beneficial, or at least not detrimental, to us regardless of our capacity to monitor those actions" (Gambetta 1988), will play a more pronounced role. However, since corporate bonds are typically held by financially savvy, informed institutional investors, the benefits of earned trust in the corporate bond market may be less prominent than in a setting with greater heterogeneity in investor sophistication, such as the equity market.[3]

Given that the corporate bond market is the most important source of external capital for many large corporations (e.g., Philippon 2009),[4] understanding the determinants of bond contract terms is of key importance. We postulate that an individual firm's social capital, and the trust it earns, can affect the design and pricing of its bond contracts through both a direct and an indirect channel.

The direct channel is via a reduction in activities that benefit shareholders at the expense of bondholders, broadly known as the agency costs of debt. Managers, acting in the interest of shareholders, have incentives to expropriate bondholders by investing in risky projects as the firm becomes financially distressed (Jensen and Meckling 1976), even if these projects reduce firm value. Similarly, managers of distressed firms have an incentive to pay out cash to shareholders in the form of dividends or repurchases prior to bankruptcy if they are allowed to do so. Bondholders anticipate this potential for asset substitution and/or cash diversion and demand higher rents, thus raising the firm's cost of debt capital. These moral hazard concerns are alleviated, however, when trust is higher; if bondholders believe that stakeholder-focused managers are unlikely to engage in risk shifting or cash diversion, thereby potentially jeopardizing the firm's survival, they will

[3] Guiso et al. (2008) show that the effect of social capital on stock market participation is weaker for individuals with more education.

[4] According to the Securities Industry and Financial Markets Association, US bond issues originated between 1996 and 2017 averaged $940 billion per year and the size of the total US corporate bond market as of the second quarter of 2017 exceeded $8.6 trillion.

demand lower rents. Thus, by mitigating the agency costs of debt, social capital can lower the firm's cost of debt capital, particularly for those firms more prone to asset substitution and cash diversion.

The indirect channel is a result of externalities. Recent evidence suggests that a firm's social capital helps build stakeholder cooperation, which delivers economic benefits in the form of higher cash flows and/or a reduction in risk. For example, firms that pay more attention to employees and other stakeholders exhibit higher stock returns and valuations (Edmans 2011; Servaes and Tamayo 2013; Guiso et al. 2015; Ferrell et al. 2016). Stakeholder cooperation is particularly beneficial for bondholders when companies face financial difficulties. In such times, stakeholders of high-social-capital firms are more likely to exert additional effort to ensure the recovery of the firm. This is the reciprocity concept often discussed in studies of social capital (Fehr and Gächter 2000): I will be good to you with the expectation that you will be good to me when I need it. Thus, reciprocity may also lead to a lower cost of debt for all firms investing in CSR, regardless of their potential for asset substitution and cash diversion.

We hypothesize that these channels are more relevant to bondholders when the overall level of trust in companies is low, particularly for bondholders of firms that are more able to increase asset risk or divert cash flows to shareholders. In low-trust periods, bondholders are more likely to believe that companies will not protect their interests unless the firms themselves are deemed trustworthy, something they can signal by investing in social capital. When overall trust is high, a firm's level of social capital matters less for bondholders, as they do not expect to be expropriated in the first place.

Of course, a competing argument to those noted above is that stakeholder-oriented firms are merely wasting the firm's resources by diverting cash flows to invest in activities that benefit some stakeholders but do not necessarily add value to the firm (e.g., Friedman 1970; Masulis and Reza 2015; Cheng et al. 2016). If true, bondholders will demand higher compensation to lend to these firms.

To capture an individual firm's social capital, we follow recent academic work in economics and finance (Aoki 2011; Sacconi and Degli Antoni 2011; Lins et al. 2017; Servaes and Tamayo 2017) and use a firm's Corporate Social Responsibility (CSR) activities as a proxy for its investment in social capital. The view that CSR activities generate social capital and earned trust is also widely held by practitioners and corporations.[5] Thus, we test whether, and to what extent, firms that are managed to take into account the interests of a broad set of stakeholders, i.e., high-CSR firms, reap financial benefits in the corporate bond market.

We investigate both secondary market bond trades and primary market bond originations. Our main analyses are conducted using a large sample of publicly-traded, non-

[5]Practitioners have long held the view that CSR helps build trust (Fitzgerald 2003); but following the financial crisis, this view has become even more widespread as evidenced by views expressed in recent global surveys of CEOs (PricewaterhouseCoopers 2013, 2014).

financial, U.S. domiciled firms with bond trade data available between 2005 and 2013. We also identify a sample of corporate bond issues that were offered on the primary market over the period 2007-2013.

We start by analyzing the relation between secondary market bond spreads and firms' CSR ratings over the full sample period. While endogeneity concerns make it difficult to draw causal inferences from such an estimation, our results indicate a modest negative CSR-credit spread relation, consistent with Goss and Roberts (2011), who study private debt and conclude that "CSR is at most a second-order determinant of yield spreads" (p.1795). However, when we control for time fixed effects, the modest relation between CSR and bond spreads disappears entirely. Thus, on average, there is no relation between corporate bond spreads and CSR. Moreover, when we consider firms that are more prone to asset substitution or cash diversion, we do not find any relation either.

Next, we turn to the financial crisis of 2007-2009. The crisis combines an exogenous shock to firms' default risk and an erosion of overall trust in firms, markets, and institutions, thereby increasing the potential importance of firm-level social capital for bondholders. Following prior work (e.g., Duchin et al. 2010; Ivashina and Scharfstein 2010; Sapienza and Zingales 2012; Lins et al. 2017), we identify two distinct periods: the credit crunch – the period of July 2007 through July 2008, when the supply of credit suffered a shock but general trust had not yet eroded; and the trust crisis – the period of August 2008 through March 2009, when a shock to trust occurred. The characterization of this period as one during which trust declined is also consistent with survey evidence. For example, Edelman (the world's largest independent public relations firm) reports that trust in business in the U.S. remained stable until early 2008 (it was 53% in early 2007 and 58% in early 2008), but declined precipitously to 38% in early 2009. Thus, by identifying these two time periods, we are able to isolate the corporate bond market effects of social capital when overall trust in markets and the economy was severely eroded compared to a period when credit market access was constrained.

We conduct multiple difference-in-differences tests using the shock to trust as a quasi-experimental setting. For our empirical tests, we rely on pre-crisis levels of CSR because it is unlikely that firms could have adjusted their CSR spending in anticipation of the financial crisis. Since the crisis is an exogenous event with respect to firms' CSR decisions, we can also circumvent endogeneity concerns that arise in studies on the relation between firms' CSR and financial performance.

Our results are unambiguous: during the crisis of trust, secondary market credit spreads of high-CSR firms did not rise as much as the spreads of low-CSR firms. Further, we find that the effect of CSR on bond spreads during the crisis is stronger for firms with fewer tangible assets and for firms incorporated in states that do not impose dividend restrictions on insolvent firms. These are firms that have more opportunity to engage in asset substitution (Williamson 1988; Johnson 2003) or to divert cash to shareholders when in distress (Wald and Long 2007). For these firms, the implicit commitment that these

activities are unlikely to occur, as captured by CSR investments, is most valuable. In addition, high-CSR firms were able to raise more capital on the primary bond market during the trust crisis, and those (high-CSR firms) that did access the bond market benefited from lower at-issue spreads relative to treasuries, better initial credit ratings, and longer debt maturities. These effects are economically substantial as well. For example, a one standard deviation increase in our measure of CSR is associated with 34 basis points lower credit spreads in the secondary market during the financial crisis. For firms more able to either engage in asset substitution or diversion of cash to shareholders when in distress, the effect increases to 43 and 52 basis points, respectively.

We conclude that corporate social capital affects bond contracting and pricing when it matters most: when there is a crisis of trust and bondholders seek reassurance that they will not be expropriated. In such periods, a firm's social capital is perceived as an insurance policy against excessive risk-taking that can harm stakeholders and bondholders.[6]

Our findings contribute to three strands of the literature. First, we extend nascent studies on the role of social capital in financial contracting by highlighting its importance for the corporate bond market, particularly for those firms more prone to asset substitution and cash diversion when distressed. Lins et al. (2017) report that firms with higher pre-crisis social capital had higher crisis-period stock returns, but these superior returns could, in principle, come at the expense of bondholders due to increased asset substitution or diversion. Our evidence illustrates that this is not the case, given that bondholders more exposed to these agency costs of debt are the ones who benefited the most during the crisis.

Second, we add to the literature on the determinants of corporate bond spreads. Extant studies in this area show that bond spreads can be explained by default risk, liquidity, systematic risk, and market frictions (e.g., Duffee 1999; Elton et al. 2001; Collin-Dufresne et al. 2001; Longstaff et al. 2005; Dick-Nielsen et al. 2012). These are mostly factors that firms cannot directly control. We extend this literature by documenting the credit relevance of firms' social capital, as proxied by CSR, primarily in times when overall trust in corporations and markets is low. Importantly, firms do have, to some extent, control over their CSR investments and can thus adjust them over time, thereby influencing their cost of debt.

Third, our results contribute to the literature on the determinants of firms' contractual arrangements with creditors in the primary market (e.g., Berger and Udell 1998; Billett et al. 2007; Chava et al. 2010) and on firms' credit ratings (e.g., Mansi et al. 2004; Becker and Milbourn 2011; Baghai et al. 2014). Our evidence on high-CSR firms' abil-

[6] Our paper documents the role of social capital, as measured by CSR activities, in mitigating the perception of risk-taking when there is an economy-wide shock to trust. Other papers have examined the role of CSR in mitigating the consequences of firm-specific shocks. Using prosecutions of the Foreign Corrupt Practices Act, Hong and Liskovich (2016) report that more socially responsible firms pay lower fines for bribery when violating the Foreign Corrupt Practices Act. Jeffers (2015) finds that officials are more lenient with penalties for Occupational Safety and Health Administration (OSHA) violations ascribed to high-CSR firms. Albuquerque et al. (2017) model CSR as a product differentiation strategy allowing firms to benefit from higher profit margins which lessens systematic risk.

ity to attract more debt capital at more favorable terms during the crisis suggests that internally-generated social capital contributes to establishing trust and mitigating agency frictions between contracting parties. These features, in turn, exert a positive influence on credit ratings.

The remainder of the paper proceeds as follows. In Section 3.2, we describe the sample and present summary statistics. Section 3.3 reports preliminary results for secondary market spreads while Section 3.4 presents the results using the financial crisis as an exogenous shock. In Section 3.5, we expand our analyses to the primary market. Section 3.6 concludes the paper.

3.2 Sample and summary statistics

3.2.1 Sample construction

To construct our sample of corporate bonds on the secondary market, we start with the universe of bonds covered in the TRACE database from 2005 to 2013.[7] As in Dick-Nielsen et al. (2012), we exclude variable- and zero-coupon, perpetual, foreign currency, preferred, puttable, and exchangeable issues as well as private placements and Yankee and Canadian bonds. We further restrict our selection to include only corporate debentures and corporate medium-term notes with a time-to-maturity of more than one month and 30 years or less. We also exclude issuers from the financial sector (SIC codes 6000-6999) as these firms received government support during the 2008-2009 crisis, which could affect our inferences. To be included in our sample, we further require that data on relevant bond contract attributes (i.e., issue size, offering and maturity dates, coupon, collateral, and covenants) are available on Mergent FISD. Merging the two databases, we obtain a sample of bond trades comprising 2,212 bonds issued by 342 firms. To account for liquidity biases and erroneous entries in TRACE, we follow the method in Dick-Nielsen (2009).[8] We further apply the price-based filters used in Edwards et al. (2007) and Han and Zhou (2016) to remove outliers and observations with likely data errors.[9] Applying these refinements reduces our sample to 2,177 bonds issued by 338 firms.

We merge this sample with CSR ratings data from the MSCI ESG Stats Database,

[7] Our selection of 2005 as the starting point of the sample period is driven by data availability on TRACE. The Financial Industry Regulatory Authority (FINRA) is responsible for the collection and reporting of over-the-counter (OTC) bond trades. Before 2005, data on bond trades were disseminated in phases, beginning in July 2002 with Phase I requiring the reporting of investment-grade securities of $1 billion in face value or greater. Over the course of Phases II and III in late 2004, trade reporting was expanded to cover approximately 99% of all OTC transactions. As of July 2005, FINRA requires all of its members to report their trades within 15 minutes of the transaction.

[8] The procedure removes retail-sized non-institutional trades (i.e., those with a value below $100,000), dirty prices that include dealer commissions, trades with missing execution time or date or missing trade size, genuine duplicates, trade reversals along with the original trade that is being reversed, trades with missing or negative yields, as well as same-day trade corrections and cancellations.

[9] Specifically, we exclude trades with prices less than $1 or greater than $500, and trades with prices that are 20 percent away from the median of the reported prices in the day or 20 percent away from the previous trading price.

which contains yearly environmental, social, and governance ratings of large, publicly-listed companies. This database has been used in a number of studies examining the effect of CSR on firm value and performance (e.g., Hong and Kostovetsky 2012; Deng et al. 2013; Servaes and Tamayo 2013; Albuquerque et al. 2017) and covers roughly the 3,000 largest U.S. companies. Finally, we obtain annual fundamentals and daily stock market data from Compustat and CRSP, respectively.

Merging these databases yields a final sample of 1,989 corporate bonds issued by 296 firms with secondary market trade data from 2005 to 2013, as noted in Panel A of Table 3.1. Panel B outlines the industry composition, where the manufacturing sector constitutes the largest proportion of bond issues (14.2%), while other sectors have a fairly balanced representation in the overall sample.

3.2.2 CSR variable construction and descriptive statistics

Our main independent variable is the CSR index, which we construct following Servaes and Tamayo (2013). We concentrate on five of the 13 categories that ESG Stats uses to classify a firm's environmental, social, and governance performance: community, diversity, employment, environment, and human rights. We do not consider the six ESG Stats categories that penalize firms' participation in controversial industries (alcohol, gaming, firearms, military, nuclear, and tobacco), as there is nothing that firms can do about industry concerns, except to change industries.[10] We further exclude the ESG Stats product category because it contains a number of elements that we consider to be outside the scope of CSR, such as product quality and innovation. Finally, we leave out the ESG Stats corporate governance category because governance is usually considered to be outside a firm's CSR remit. However, since strong governance may also be beneficial to bondholders (e.g., Bhojraj and Sengupta 2003; Klock et al. 2005; Bradley and Chen 2011, 2015), we control for governance in our regression specifications.

For each of the five categories we consider, ESG Stats constructs a number of indicators on both strengths and concerns. To combine this information into one CSR metric, we first divide the number of concerns and the number of strengths in each of the five categories by its possible maximum in a given year (as there is time-series variation in the number of indicators), and subtract the resulting scaled concerns number from the scaled strengths number. This procedure yields an index for each of the five categories ranging from -1 to $+1$. Our CSR metric is the sum of the individual measures across the five categories. Thus, it ranges from -5 to $+5$.

Our main dependent variable is a bond's credit spread, computed as the difference between the bond's yield to maturity from TRACE and the Treasury yield matched by maturity (e.g., Campbell and Taksler 2003; Chen et al. 2007; Huang and Huang 2012).[11]

[10] In addition, in all of our estimations, we control for either industry or firm fixed effects.

[11] Maturity-matched risk-free yields are obtained by linearly interpolating benchmark Treasury yields contained in the Federal Reserve H-15 release for constant maturities.

As in Becker and Ivashina (2015), we employ the median yield of all transactions taking place on the last active trading day of a given month to compute the spreads. We winsorize credit spreads to be no greater than 1000 basis points in order to alleviate the influence of outliers.[12]

Table 3.2 provides summary statistics on the characteristics of the bonds in our sample, the CSR index, credit spreads, and other control variables. All continuous control variables are winsorized at the 99th percentile and also at the 1st percentile unless their lower bound is zero. Appendix C.1 presents detailed definitions of all the variables employed in our analyses. Panel A contains the bond characteristics that remain constant over the life of the bond issues. As such, we count each bond only once in the summary statistics. The mean issue size in our sample is $578 million. About 42 percent of the sample bonds are offered concurrently in global and domestic markets while 90 percent of the indenture agreements include an option for early redemption. The security rank captures the seniority of the bond issue and ranges from 1 for junior subordinate bonds to 5 for senior secured bonds, with subordinate, senior subordinate, and senior as the intermediate categories. The mean security rank is just below 4, while its 25th, 50th, and 75th percentiles are all equal to 4, which indicates that the majority of issues in our sample are senior bonds. More than 50 percent of the bond indentures in our sample include at least six covenants.[13]

Panel B of Table 3.2 reports those bond characteristics that could potentially vary on a monthly basis. As such, we count each bond/month pair as a separate observation. The bonds in our sample have a mean time-to-maturity of just over 6.5 years (78.2 months). There is considerable cross-sectional variation in credit spreads, with an average of just under 200 basis points. Credit ratings are converted to numerical values, starting with 1 for AAA ratings through 21 for C ratings. The mean credit rating of 8.6 indicates that the bonds in our sample are rated between BBB and BBB+, on average.[14]

Panel C of Table 3.2 contains summary statistics on firm characteristics. All of the variables included in this panel vary annually, except for (stock return) volatility, which we re-compute on a monthly basis. The firms in our sample are large (average market capitalization of $18.6 billion) and profitable (operating income to sales exceeds 22%). The median of our explanatory variable of interest, CSR, is -0.075, which indicates that more than half of the firms in our sample have more CSR concerns than strengths, consistent with Deng et al. (2013), Servaes and Tamayo (2013), and Borisov et al. (2016).

[12] Our results hold when we remove these bonds from the sample rather than winsorize them.

[13] To measure covenant intensity, we follow Chava et al. (2010) and Bradley and Roberts (2015) and count the number of covenants in the five main categories (payout, investment, financing, accounting, and event-related restrictions) reported on Mergent FISD.

[14] We obtain credit ratings issued by S&P, Moody's, and Fitch from Mergent FISD and Bloomberg. As in Ellul et al. (2015), to designate a representative rating when an issue is rated by multiple agencies, we first select the S&P rating; if missing, we use ratings from Moody's, and if both are missing, we use ratings from Fitch.

3.3 The CSR-credit spread relation

In this section, we examine whether there is a relation between CSR and bond spreads over the entire sample period from 2005 to 2013. We conduct this analysis by regressing bond spreads in the secondary market on firm CSR ratings and controls. As a firm's CSR policy is likely jointly determined with other firm characteristics, we are not able to draw any causal inferences from this analysis; our results should therefore be viewed as suggestive of correlations only.

Specifically, we estimate the following pooled regression model using monthly spread data:

$$Spread_{i,j,t} = \beta_1 CSR_{i,t-1} \sum \gamma_k' X_{k,j,t-1} + \sum \delta_l' Z_{l,i,t-1} + FFE_i + \varepsilon_{i,t} \,, \qquad (3.1)$$

where *Spread* denotes the credit spread of firm i's bond j during month t, and *CSR* is firm i's total net CSR index measured at time t-1, our explanatory variable of interest. X is the $(k \times 1)$ vector of bond-level controls measured at the date of issue and Z is the $(l \times 1)$ vector of firm-level controls measured at time t-1. In addition, we include firm fixed effects, *FFE*, to control for unobservable time-invariant credit risk factors. We double cluster the standard errors at the firm and time (monthly) levels to control for cross-sectional and time-series dependence, respectively (Petersen 2009).

To control for bond characteristics, we include *Amount*, *Coupon*, *Time-to-maturity*, *Redeemable* (equal to one if the bond issue may be redeemed under conditions specified in the indenture agreements), *Fungible* (equal to one if the bond issue is, by virtue of its terms, equivalent, interchangeable, or substitutable), *Offering market* (equal to one if the bond offering is global), *Security* (i.e., collateral stringency), and *Covenant intensity*, following prior work on corporate bonds (e.g., Datta et al. 1999; Miller and Puthenpurackal 2005; Nini et al. 2012; Bradley and Roberts 2015). We further control for contemporaneous bond liquidity using the Amihud (2002) illiquidity measure that captures the price impact of trades. Because this measure requires multiple trades in a day, it is not available for all bonds.

Our issuer-level controls also follow prior research on corporate bonds (e.g., Campbell and Taksler 2003; Chen et al. 2007; Acharya et al. 2012): (i) *Ln(Size)* (Log market equity), (ii) *Profitability*, (iii) *Short-term leverage*, (iv) *Long-term leverage*, (v) *Cash holdings*, (vi) *Tangibility*, (vii) *Coverage ratio*, and (viii) *Stock return volatility*. We further control for *Capital expenditure* as Baghai et al. (2014) document that this factor plays an important role in explaining issuers' credit ratings. Finally, we control for corporate governance as research suggests that debt investors demand lower spreads for bonds of better-governed firms (e.g., Klock et al. 2005; Bradley and Chen 2015). We use the entrenchment index (*E-index*) proposed by Bebchuk et al. (2009) as a proxy for corporate governance quality. This index combines six provisions that capture managerial entrenchment and

insulation from takeovers.[15] Thus, a higher index implies worse governance. The data to construct the *E-index* are gathered from the Institutional Shareholder Services. The accounting-based firm characteristics and CSR data are updated annually. To ensure that the accounting data are publicly available, we update these items three months after a firm's fiscal year-end. CSR is updated annually in April when the ratings for the previous year are released. *Volatility* is re-estimated each month based on the previous year's daily returns data. Finally, the *E-index* is available bi-annually and we keep it constant during the year for which data are not available.

Our findings from estimating model (3.1) are reported in Table 3.3. In Panel A, we first present the results from a simple regression of credit spreads on CSR, controlling for firm fixed effects (column 1). The coefficient on CSR is -0.215, suggesting that high-CSR firms have lower spreads. We next control for bond-level attributes (column 2) and find that the coefficient on CSR is substantially lower at -0.138. As a gauge of economic significance, a one standard deviation increase in CSR of 0.644 (Table 3.2) is associated with an 8.9 basis points reduction in average credit spreads. This effect is modest, at best. The modest negative relation between CSR and credit spreads that we document in the first two models of Table 3.3 is consistent with prior work based on bank loans (e.g., Goss and Roberts 2011; Hasan et al. 2017).

We next include time fixed effects (monthly dummies) in column 3. This addition has a substantial impact on the explanatory power of the model, increasing the R-squared from 54% to 80%. Importantly, the coefficient on CSR becomes statistically (and economically) insignificant in this specification. This suggests that, on average, there is no relation between CSR and bond credit spreads, and highlights the importance of controlling for the overall time-series variation in spreads when estimating models of bond yields. In column 4, we further control for firm-level characteristics that may vary over time; the addition of these controls has no additional impact on our results.

In Panel B of Table 3.3, we re-estimate these four models, but also control for credit ratings (e.g., Campbell and Taksler 2003). Adding this additional control has little or no effect on the coefficient of CSR and its economic significance. Once time fixed effects are added to the regressions, as in columns 3 and 4, there is no relation between credit spreads and CSR.

We also investigate whether the CSR-spread relation is stronger for firms with more intangible assets and firms incorporated in states that provide less bondholder protection during insolvency. These are firms that have more of an opportunity to shift risk and divert cash to shareholders at the expense of bondholders. We do not find that these factors affect the CSR-spread relation.[16]

[15] The *E-index* consists of the following six provisions: (i) a staggered board, (ii) limits to amend the charter, (iii) limits to amend bylaws, (iv) supermajority voting requirements, (v) golden parachutes for executives, and (vi) the presence of a poison pill.

[16] These results are not tabulated. In Section 3.4.3, we motivate these tests in greater detail and discuss their relevance during the financial crisis.

3.4 CSR and credit spreads: Evidence from an exogenous shock to trust

3.4.1 CSR and credit spreads during the financial crisis

In this section, we seek to understand whether the bond market payoffs to firms' CSR activities are more pronounced when overall trust is low, and a firm's social capital may become more valuable. We focus on the financial crisis, which constituted an exogenous shock to public trust in corporations, capital markets and institutions, and led to a decline in stock prices and an increase in bond spreads for the vast majority of firms. The exogenous nature of this shock to trust also helps alleviate the endogeneity concerns associated with model (3.1).

We start by plotting the time series of debt spreads of high- and low-CSR firms in Figure 3.1, where the cutoff between the two groups is based on the median CSR value of the year. Firms are included in a high/low portfolio in April of each year, when new CSR scores are released, and they remain in this portfolio until April of the following year. The variation in the spread differential between high- and low-CSR firms over time is striking: up to August 2008 there is little difference between the two spreads. After August, the differential shoots up, and reaches its maximum level in November 2008. The differential remains high until March 2009, when the market hit its lowest point of the crisis; afterwards, there is still a marked difference between the spreads of high- and low-CSR firms, but the magnitude is notably smaller than during the crisis. The period of August 2008 to March 2009 (shaded region in the figure), when the difference becomes considerable, coincides with the crisis of trust described in Sapienza and Zingales (2012) and Lins et al. (2017), among others. This figure suggests that CSR is related to bond spreads mainly when a firm's social capital is more highly valued. In what follows, we examine this relation more formally.[17]

Our sample period for this analysis begins in 2007, prior to the onset of the crisis, and ends in 2013, several years into the economic recovery. We adopt a quasi-difference-in-differences approach and examine whether firms that entered the crisis period with higher CSR scores enjoyed relatively lower spreads during the crisis.[18] In particular, we estimate the following model:

$$\begin{aligned} Spread_{i,j,t} = \beta_1 CSR_{i,2006} \times Crisis_t + \beta_2 CSR_{i,2006} \times Post\text{-}crisis_t \\ + \sum \gamma_k' X_{k,j,t-1} + \sum \delta_l' Z_{l,i,t-1} + FFE_i + TFE_t + \varepsilon_{i,t} \ , \end{aligned} \tag{3.2}$$

where, as before, *Spread* denotes the spread of firm i's bond j at time t, X is a $(k \times 1)$ vector of bond-level controls measured at time t-1, and Z is a $(l \times 1)$ vector of firm-level

[17] The figure looks very similar if we divide firms into two groups based on their CSR scores for the year 2006 (prior to the onset of the financial crisis) and make no subsequent changes to the composition of these groups.

[18] We start this analysis in 2007 because we study credit spreads after observing pre-crisis CSR in 2006.

controls measured at time t-1. We include firm fixed effects, *FFE*, to control for unobservable time-invariant credit risk factors, and time fixed effects, *TFE*, specified at the monthly level.[19] We measure CSR as of year-end 2006, well before the onset of the financial crisis, to eliminate the concern that firms might have adjusted their CSR activities in anticipation of the crisis.[20] *Crisis* is an indicator variable that takes the value of 1 for the crisis of trust period, starting in August 2008 and ending in March 2009 (as in Lins et al. 2013, 2017), and *Post-crisis* is an indicator variable that takes a value of 1 from April 2009 to December 2013. As before, we double cluster the standard errors at the firm and time (monthly) levels to control for cross-sectional and time-series dependence, respectively.

In model (3.2), the coefficient on the interaction term $CSR_{i,2006} \times Crisis_t$, β_1, captures the difference between the effect of CSR on credit spreads in the crisis versus the pre-crisis period (the pre-crisis effect itself is captured by the time and firm fixed effects). The coefficient on the interaction variable $CSR_{i,2006} \times Post\text{-}crisis_t$, β_2, captures the difference between the effect of CSR on credit spreads in the post-crisis versus the pre-crisis periods. This coefficient could also be negative given that overall trust in companies, markets, and institutions continued to be low after the crisis for some time. However, in absolute terms, we expect β_1 to be larger than β_2, given that the most pronounced erosion of trust occurred during the crisis.

The results from estimating model (3.2) are reported in Panel A of Table 3.4. We first control for bond attributes in column 1 and then include firm characteristics in column 2. Estimation results reported in both columns indicate that CSR has a statistically and economically significant impact on bond spreads during the crisis. Based on the regressions reported in column 2, a one standard deviation increase in pre-crisis CSR is associated with 34 basis points lower spreads during the crisis period.[21] The benefit accrued to high-CSR firms during the crisis disappears in the post-crisis period (the difference between β_1 and β_2 is statistically significant at the 1% level in both specifications).

Next, we also control for corporate governance using the firm's E-index. As discussed previously, better-governed firms have lower bond spreads. These firms also performed better during the crisis (Lins et al. 2013; Nguyen et al. 2015); thus, if governance is correlated with our CSR measure, we could be suffering from an omitted variable bias. We report the results of the spreads regression after inclusion of the E-index in column 3. The coefficient on CSR remains virtually unchanged in this specification, and, hence, the impact of CSR on spreads during the crisis cannot be attributed to better governance. The E-index itself is negatively related to bond spreads (after controlling for numerous factors, including firm characteristics and firm fixed effects), indicating that bond investors

[19] We also estimate this model without time fixed effects, but with dummies for the crisis and post-crisis periods. These indicator variables capture the change in spreads during and after the crisis for firms with a CSR score of zero. Our inferences remain unchanged when we employ this alternative specification.

[20] Our 2006 CSR measure is static and is thus absorbed by the firm fixed effects. In untabulated tests, we confirm that our results hold when we use a time-varying, lagged measure of CSR.

[21] The standard deviation of CSR for the 2007-2013 sub-period is 0.553, slightly smaller than the standard deviation of CSR for the whole period reported in Table 3.2.

demand lower spreads from firms with worse governance. While counterintuitive, this relation might be caused by the fact that the E-index captures a firm's insulation from takeovers – if such takeovers were to be financed by debt, this would likely raise credit spreads (see Eisenthal et al. 2017).[22]

In our last specification reported in column 4, we also control for credit ratings. As expected, firms with better ratings (i.e., those with lower numerical credit rating scores) have lower spreads, but the CSR variable remains significant in this model. In fact, the economic importance of CSR increases somewhat in this specification: a one standard deviation increase in CSR is associated with 36 basis points lower spreads.

From these analyses, we conclude that the spreads of high-CSR firms' bonds increased less during the financial crisis relative to the spreads of low-CSR firms' bonds. This finding is consistent with bondholders valuing a firm's social capital and its "earned trust" more in periods when being trustworthy is particularly important, such as in a crisis of trust.

3.4.2 CSR and credit spreads during the credit crunch

Next, we conduct further analyses to corroborate that our results are indeed driven by a shock to market-wide trust rather than a shock to the supply of credit. In July 2007, LIBOR rates started to increase dramatically as the solvency of the banking sector weakened, which had a negative impact on the ability of firms to borrow (e.g., Duchin et al. 2010 and Ivashina and Scharfstein 2010). This shock to the supply of credit persisted until at least March 2009, thereby overlapping partly with the period during which there was a shock to trust. If high-CSR firms were less affected by the credit crunch, the differential in the spreads that we document could be due to this phenomenon rather than a shock to trust. High-CSR firms may have been more able to borrow over the credit crunch given that the agency costs of debt argument that we describe can hold in any crisis in general. Our contention, however, is that if a firm's CSR investments engender trust, the effect of CSR on debt spreads should be particularly salient when trust is more valued. Furthermore, in a crisis of trust, the (perceived) reduction in the agency costs of debt for high-CSR firms is compounded with positive real effects derived from reciprocity.

Figure 3.1 suggests that the difference in spreads between high- and low-CSR firms only manifests itself starting in August 2008 and not earlier. To investigate debt spreads during the credit crunch more formally, we augment model (3.2) with an interaction term between CSR and the "pure" credit crunch period, which we define as the period of July 2007 through July 2008. During this period, the shock to credit supply had already happened, but the shock to trust had not yet occurred (Sapienza and Zingales 2012; Lins et al.

[22] We also construct an alternative governance measure from the governance information available on the ESG Stats database using the same approach as for the CSR elements. Specifically, for each firm, we divide the number of governance concerns by its possible maximum and subtract it from the number of governance strengths divided by its possible maximum. This approach yields a governance index that ranges from -1 to +1. The inclusion of this governance index has little effect on the magnitude or significance of the coefficient on CSR.

2017). As in Panel A of Table 3.4, we estimate various specifications of this augmented regression, starting with a more parsimonious model and sequentially adding additional controls in subsequent specifications. The findings are reported in Panel B of Table 3.4. Across all models, the impact of CSR on debt spreads is never significant during the credit crunch, but it is always highly significant during the trust crisis, and only marginally significant in one specification in the post-crisis period. Moreover, the effect of CSR on bond spreads is significantly different between the crisis and the credit crunch and between the crisis and the post-crisis periods under all specifications. In terms of economic importance, the effect of CSR on spreads during the crisis increases relative to the models reported in Panel A. For example, based on specification in column 4, increasing CSR by one standard deviation attenuates the overall rise in spreads by 42 basis points during the crisis. The magnitude of the post-crisis effect for the same change in CSR is a 13 basis point attenuation in the rise in credit spreads.

Overall, the results reported in Panel B of Table 3.4 indicate that the effect of CSR on debt spreads that we uncover does not occur during the credit crunch, but only during the shock to trust.

3.4.3 Determinants of bond market benefits

To better understand the mechanisms behind our findings, we conduct three additional tests. First, we examine whether the effect of CSR on spreads during the crisis is more pronounced in firms with low asset tangibility. Williamson (1988) and Johnson (2003) argue that these firms have more of an opportunity to engage in asset substitution when distress risk increases. If the spreads of high-CSR firms are lower during the crisis than those of low-CSR firms because bond investors expect less asset substitution from high-CSR firms, we would expect this effect to be more pronounced for firms that have more opportunities to shift risk.

We investigate this possibility by splitting the sample into two groups according to asset tangibility, defined as property, plant, and equipment (net) divided by assets. Firms are assigned to a group based on tangibility as of year-end 2006 and this grouping remains unchanged throughout the sample period. In column 1 of Table 3.5, we show the results of the spreads regression for firms with tangibility below the median (<33.29%). The model includes all control variables, equivalent to the estimation reported in column 4 of Panel A of Table 3.4. For this group, CSR has a strong negative impact on spreads during the crisis period, but not afterwards. In terms of economic significance, increasing CSR by one standard deviation (which for this subset is 0.52), reduces spreads by 43 basis points. In column 2, we report the results for the high tangibility group. The coefficient on the CSR×Crisis interaction term for this subsample is less than half the coefficient of the low tangibility sample, and it is not statistically significant. The fact that our results are much stronger for the subgroup of firms that have more opportunities to engage in asset substitution supports our contention that bond investors believe that high-CSR firms are

less likely to take advantage of that opportunity.[23]

One could argue that partitioning the sample based on the median tangibility of 33.29% leaves a large number of firms in the high tangibility group that have room to increase firm risk. Therefore, we also change the low tangibility cutoff to the 75th percentile of the distribution (55.88%), and split the sample into two groups based this alternative cutoff. We then re-estimate the spreads regression for each subgroup (not reported in the table). CSR has a significant effect on crisis period spreads for all firms in the low tangibility group, which comprises the first three quartiles, while it is not significant for the top quartile. These results provide further support for the view that our findings are partly due to a reduction in the perceived probability of asset substitution for high-CSR firms during the crisis.

Second, we examine whether our results are stronger for firms incorporated in states that provide weaker bondholder protection in case of insolvency. In particular, we use the classification of Wald and Long (2007) and Mansi et al. (2009) to divide states into two groups, depending on whether they allow firms with negative book equity to pay dividends or not. Mansi et al. (2009) find that bond yields are higher in states without payout restrictions, which indicates that bondholders penalize firms for the possibility that cash flows of distressed firms will be diverted to shareholders.

The results for this analysis are reported in column 3 of Table 3.5 for states with no restrictions and in column 4 of Table 3.5 for states with restrictions. The effect of CSR on spreads during the crisis is only significant in states where firms face no restrictions on dividend payments during insolvency. In states where bondholders have more protection, the coefficient on the CSR×Crisis interaction is also negative, but does not attain statistical significance. These findings suggest that CSR is particularly relevant in the crisis when there is less formal protection for bondholders. This is exactly when trust becomes more important. In terms of economic significance, increasing CSR by one standard deviation reduces spreads by 52 basis points during the crisis in states without dividend restrictions. This effect is only 16 percentage points in states with restrictions. We note that in states with no protection, the effect of CSR on spreads remains significant in the post-crisis period but its importance is reduced by more than 70% relative to the crisis effect. This is consistent with the fact that by the end of our sample period, trust had not entirely been restored to pre-crisis levels (for example, the trust component of the Global Competitiveness Index of the World Economic Forum was still lower in September 2013 than in September 2008).

Third, since Lins et al. (2017) find that high-CSR firms earned excess stock returns during the crisis compared to low-CSR firms, we seek to determine whether the bond

[23] We have more observations in the regression for low tangibility firms because the sample is split based on median firm tangibility at the end of 2006 and it turns out that firms in the low tangibility subsample have more bonds outstanding that trade for a longer period of time. Our inferences are unchanged if we split the sample such that both subsamples have the same number of observations.

spread effect that we document is incremental to the stock return effect or whether the bond performance is just a reflection of superior stock market performance. To do so, we control for the firm's contemporaneous stock returns in the baseline credit spread regression of model (3.2). Moreover, we allow the effect of returns to vary during the crisis- and post-crisis periods. Specifically, we estimate the following augmented regression model:

$$\begin{aligned} Spread_{i,j,t} = {} & \beta_1 CSR_{i,2006} \times Crisis_t + \beta_2 CSR_{i,2006} \times Post\text{-}crisis_t \\ & + \beta_3 Ret_{i,t} + \beta_4 Ret_{i,t} \times Crisis_t + \beta_5 Ret_{i,t} \times Post\text{-}crisis_t \\ & + \sum \gamma_k' X_{k,j,t-1} + \sum \delta_l' Z_{l,i,t-1} + FFE_i + TFE_t + \varepsilon_{i,t} \ , \end{aligned} \tag{3.3}$$

where Ret is firm i's raw stock return during month t and all other explanatory variables follow earlier definitions. The findings from estimating this model are reported in Table 3.6. In column 1, the effect of contemporaneous stock returns is held fixed throughout the period, while in column 2, we allow the stock return effect to vary across subperiods. Both estimations illustrate that the effect of CSR on bond spreads during the crisis is incremental to the stock price effect. Moreover, the estimated coefficient on CSR is similar to that in the models that do not control for stock returns. As expected, firms with higher stock returns have lower bonds spreads, especially during the crisis, but because stock returns are very noisy, this effect is estimated imprecisely.

Overall, the findings from these additional tests indicate that the effect of CSR on bond spreads during the crisis is not solely due to reciprocity, but also reflects bondholders' expectations of the likelihood of asset substitution or diversion taking place.

3.5 CSR, bond offerings, and contracting terms

Our results thus far show that high-CSR firms benefited from lower yields on their outstanding bonds during the crisis of trust that occurred in 2008-2009. In this section, we examine whether these benefits also carry over to the primary market. Specifically, we investigate whether high-CSR firms were able to raise more debt on the bond market, and whether they were able to do so with better contract terms.

3.5.1 CSR and bond offerings during the financial crisis

To investigate bond originations on the primary market during the financial crisis, we adopt a sample selection procedure similar to that described in Section 3.2 for secondary market bond trades. From Mergent FISD we obtain the details of bonds that were issued between 2007 and 2013 by U.S. domiciled and incorporated publicly-listed non-financial firms, excluding bonds with uncommon features (e.g., perpetual, preferred, private placements, Canadian, and Yankee bonds). This procedure yields 4,092 new issues by 1,424 firms. We require firms to have CSR ratings as of year-end 2006, reducing our sample to 2,117 bonds issued by 634 firms. After merging these data with annual fundamentals and

market data from Compustat and CRSP respectively, our resulting bond-issuance sample contains 1,684 corporate bonds issued by 476 firms over the period from 2007 to 2013.

To examine whether high-CSR firms were able to raise more debt in the primary market during the crisis, we estimate the following regression for all issuing firms:

$$\begin{aligned} Issue_{i,j,t} = \beta_0 CSR_{i,2006} + \beta_1 CSR_{i,2006} \times Crisis_t + \beta_2 CSR_{i,2006} \times Post\text{-}crisis_t \\ + \sum \delta_l' Z_{l,i,t-1} + IFE_i + TFE_t + \varepsilon_{i,t} \ , \end{aligned} \tag{3.4}$$

where *Issue* is defined as the offering amount scaled by total assets for firm i's bond j issued at time t, and Z is a $(l \times 1)$ vector of lagged firm-level controls that are typically used in studies on new debt issuance (e.g., Leary and Roberts 2005; Badoer and James 2016). Specifically, we control for: (i) *Ln(Size)* (natural log of equity market capitalization), (ii) *Book-to-market* (iii) *Profitability*, (iv) *Leverage*, (v) *Tangibility*, (vi) *Capital expenditure*, (vii) *Asset maturity*, (viii) *Dividend indicator*, and (ix) *Investment-grade indicator*. As with earlier estimations, we update these variables three months after a firm's fiscal year-end.

We are unable to include firm fixed effects in this specification because the frequency with which firms access the bond market is relatively low and, as such, the addition of firm fixed effects would remove much of the variation in issuance. Instead, we include industry fixed effects, *IFE*, (based on two-digit SIC codes) to account for unobservable time-invariant industry-level factors associated with the demand for corporate bonds. Similarly, because the number of bonds issued on a monthly basis is low (17.65 on average) we include time fixed effects at the quarterly level instead of the monthly level. Therefore, we double cluster standard errors at the industry and quarterly level, instead of at the firm and monthly level as in Tables 3.3 through 3.6. Because the model does not include firm fixed effects, we also include the firm's 2006 CSR measure as an explanatory variable.

We present summary statistics for the variables used in our bond offerings estimations in Panel A of Table 3.7. The average bond issue is 7.3% of assets with a median of 4% indicating that the increase in a firm's assets as a result of the bond issue is substantial.

Panel B of Table 3.7 contains the regression results. In column 1, we include crisis and post-crisis dummies, while the specification in column 2 contains time dummies defined at the quarterly level. Both models indicate that, outside of the crisis period, CSR has no influence on the relative size of a firm's bond issues. During the crisis, however, the amount raised by high-CSR firms relative to low-CSR firms increases substantially, as indicated by the significant coefficient on the interaction between CSR and the crisis dummy. In terms of economic significance, based on the estimation results reported in column 2, increasing CSR by one standard deviation increases the amount issued as a percentage of assets by 11 basis points before the crisis but by 98 basis points during the crisis. The crisis effect is substantial when compared to the average issuance of 7.3% of assets over the entire sample period and 3.6% (untabulated) of assets during the crisis months.

In unreported models, we also study debt market access; we find no evidence that the likelihood of accessing the debt market is related to a firm's CSR score during any of the subperiods. Thus, while the probability of access does not depend on CSR, the results reported in Panel B of Table 3.7 indicate that CSR has a significant impact on the amount raised during the crisis.

3.5.2 CSR and contracting terms during the financial crisis

Given the role of CSR in explaining the amount of public debt that firms were able to raise during the crisis, we now examine its effect on the pricing and contracting terms of new bond issues. We adopt a similar approach as in the prior tests on the amount raised. Due to the nature of our tests, however, we impose additional restrictions on the sample, requiring data availability for credit ratings as well as for covenants and security structures stipulated in the indenture agreements. Applying these requirements yields a sample of 1,483 bonds issued by 381 firms between 2007 and 2013. We then estimate the following specification:

$$\begin{aligned} Terms_{i,j,t} = \beta_0 CSR_{i,2006} + \beta_1 CSR_{i,2006} \times Crisis_t + \beta_2 CSR_{i,2006} \times Post\text{-}crisis_t \\ + \sum \gamma_k' X_{k,j,t-1} + \sum \delta_l' Z_{l,i,t-1} + IFE_i + TFE_t + \varepsilon_{i,t} \ , \end{aligned} \tag{3.5}$$

where *Terms* is the dependent variable of interest. We study at-issue credit spreads, initial credit ratings, and maturity. The vectors of bond and firm controls X and Z, are the same as in model (3.2). As in model (3.4), we also control for industry fixed effects, *IFE*, to capture unobservable time-invariant industry-specific determinants of credit risk, and time fixed effects, *TFE*, defined at the quarterly level. Standard errors are again double clustered at the industry and quarterly level, and the firm's 2006 CSR level is also included as an explanatory variable.

We present bond-level descriptive statistics for bonds originated in the primary market over our test window in Table 3.8. The mean credit spread for new bond issues is 2.12%. As expected, there are large differences between the credit spreads of investment-grade and speculative-grade bonds (1.75% versus 4.30%). While 85 percent of the bonds are investment-grade issues (with ratings in the BBB category and above), a large fraction (44% of total issues) are concentrated in the bottom of the investment-grade credit rating category (BBB). The mean issue size is about $678 million with an average time-to-maturity of just over 8 years (99 months).

In Panel A of Table 3.9, we report the results from estimating model (3.5) for at-issue credit spreads for our sample of bonds issued from 2007-2013. We first control for bond-level variables (column 1), and then add firm-level attributes (column 2) and governance controls (column 3). In all specifications, the effect of CSR on offering spreads is negative and significant only during the crisis. During this period, the effect is also economically important. For instance, based on the estimation results presented in column

3, a one standard deviation increase in pre-crisis CSR is associated with 31 basis points lower spread on bonds issued during the crisis period.[24] Because the coefficient on CSR itself is positive, albeit statistically insignificant, we verify that the sum of the CSR coefficient and the CSR×Crisis interaction term is negative and significantly different from zero (not reported in the table). The effect of CSR on spreads during the post-crisis period is also negative, but not statistically significant, consistent with our findings for secondary market credit spreads. Finally, the difference between the coefficients for the crisis and post-crisis periods is always statistically significant.

We study two additional issue terms to assess the extent to which bond investors and credit rating agencies value the social capital built through CSR activities during a crisis of trust. First, we use initial credit ratings to capture the assessment of the rating agencies about the risk of bond issues. Panel B of Table 3.9 shows that at-issue credit ratings are better (as evidenced by a lower ratings number) for high-CSR issuers, but only during the crisis period; an increase in CSR by one standard deviation improves the bond's credit rating by over one third of a notch during the crisis period. While this effect appears modest, it holds after controlling for bond and firm characteristics normally associated with bond ratings.

Second, we assess the relation between CSR and the maturity of bond issues. Imposing a shorter maturity can be viewed as an extreme type of debt covenant, given bondholders' limited flexibility in recontracting due to unanimous consent requirements (e.g., Rey and Stiglitz 1993; Berger and Udell 1998). If CSR engenders trust, high-CSR firms may be able to issue bonds with relatively longer maturities when prevailing trust levels have been eroded. To assess the impact of CSR on bond maturity, we regress time-to-maturity, expressed in months, on bond- and firm-level controls as in model (3.5). The results from this estimation are reported in Panel C of Table 3.9 and show a significant positive relation between CSR and bond maturity during the crisis. Based on the estimation in column 3, a one standard deviation increase in the pre-crisis level of CSR translates into a 10-month longer time-to-maturity (equivalent to approximately 10 percent of the mean level of maturity in the sample) during the crisis compared to the pre-crisis period. We also verify that the sum of the coefficients on CSR and the CSR×Crisis interaction term is positive and statistically significant, and find that this is the case for the models estimated in columns 3 and 4.[25]

In sum, our primary bond market tests provide further evidence that bondholders value the trust earned from building social capital: during the crisis, high-CSR firms are able to raise more debt at more favorable interest rates, with better credit ratings, and for a longer period of time.

[24] The standard deviation of CSR is 0.649 for the sample of bond issuers on the primary market.

[25] The results on spreads, credit ratings, and maturity in the primary market also remain virtually unchanged when we add the issue size relative to assets as an additional explanatory variable to our regression models.

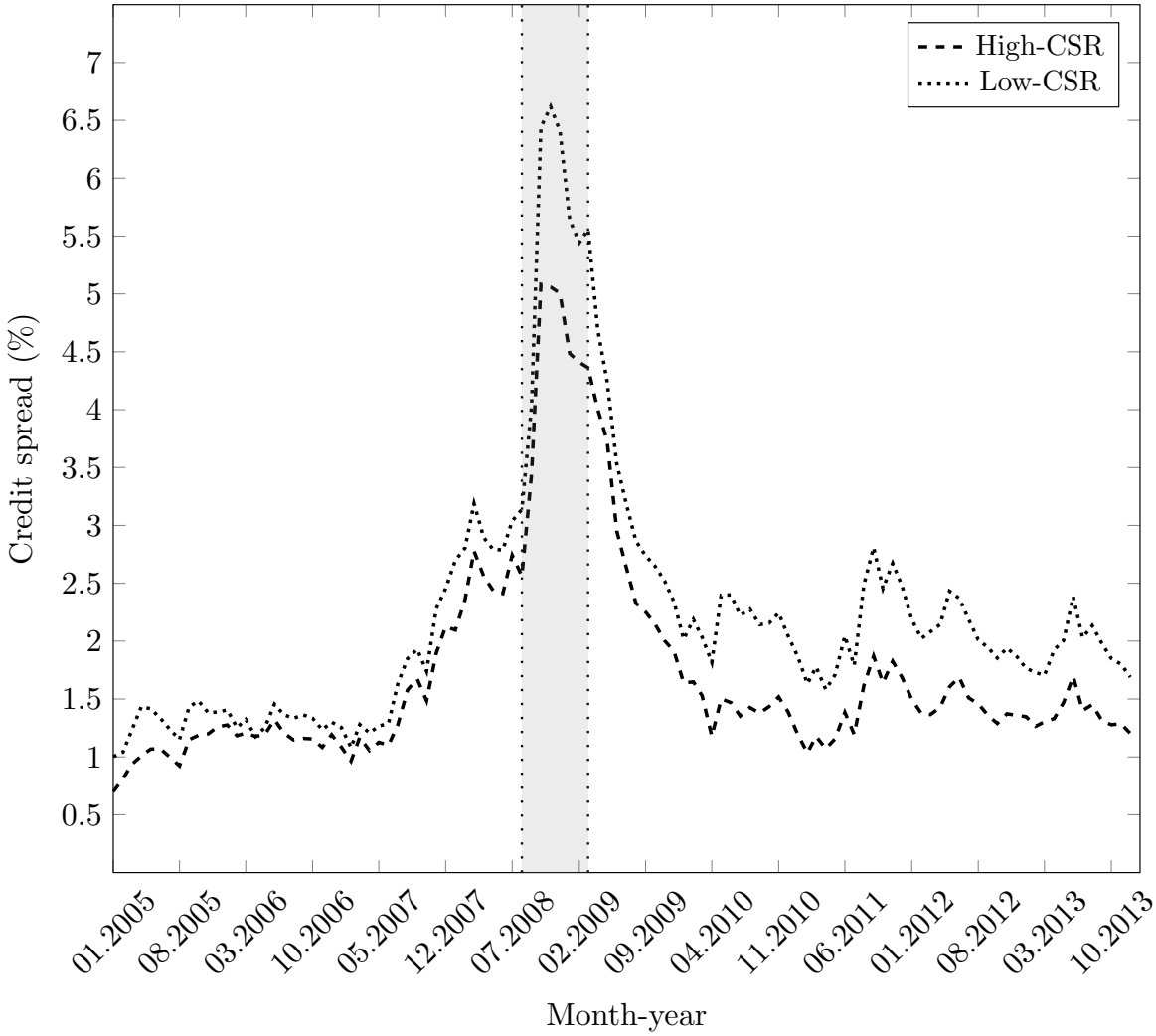
3.6 Conclusion

In this paper we study the importance of social capital, and the trust that it engenders, for the corporate bond market. We employ a firm's investments in CSR as a proxy for social capital and find that when the market and the economy faced a severe shock to overall trust during the 2008-2009 financial crisis, high-CSR firms had bond spreads that were substantially lower than those of low-CSR firms. These effects are more pronounced for firms with lower asset tangibility and firms incorporated in states that provide less bondholder protection during insolvency – these are exactly the firms that would have more of an opportunity to engage in asset substitution or diversion. We further show that high-CSR firms were able to raise more capital on the bond market during the crisis period. Among those firms that did access the market, high-CSR firms issued bonds with lower offering spreads, longer maturities, and better initial credit ratings, holding everything else constant. During normal times, on the other hand, social capital has no influence on bond spreads even for firms more prone to asset substitution and diversion.

Our results suggest that *earned* trust, generated through a firm's investments in social capital, pays off for bondholders when general levels of trust are low. Since firms can enhance their social capital through investments in CSR, they can exert some influence on their cost of debt, particularly when the agency costs of debt are higher. In addition, credit rating agencies, which are important intermediaries in bond markets, take social capital into account into their determination of the default risk of the firm. Our findings highlight the importance of firm-level trust in a market where downside risk matters most and managerial moral hazard is of particular concern: the corporate bond market.

Figure 3.1: Secondary market credit spreads (2005–2013)

High- versus low-CSR bond issuers



This figure plots the average credit spread of corporate bonds of high- and low-CSR firms over the 2005-2013 period. High-CSR (low-CSR) firms are defined as those firms with CSR scores above (below) the median CSR value of the year. For each portfolio, the spread is equally weighted across all the outstanding bonds. The period of August 2008 to March 2009 coincides with the crisis of trust described in Sapienza and Zingales (2012) and Lins et al. (2017).

Table 3.1: Sample of secondary market bond trades

Panel A describes the sample selection process for our secondary market bond spreads analysis of 1,989 publicly traded bonds for 296 U.S. domiciled and incorporated non-financial firms that are at the intersection of the TRACE, CRSP, Compustat, MSCI ESG STATS, and Mergent FISD databases. The selection of bond issues is restricted to corporate debentures and corporate medium-term notes. All perpetual, foreign currency, preferred, exchangeable, puttable, convertible, private placement (Rule 144A), Yankee, and Canadian bonds are excluded from the sample. Panel B reports our sample distribution across industries.

Panel A: Sample selection

	Bonds	Issuers
Bonds with trade data on TRACE and issue data on FISD	2,212	342
Refinement for liquidity biases in TRACE	(35)	(4)
	2,177	338
Issuers not covered by MSCI ESG STATS	(182)	(41)
Issuers not covered by Compustat and CRSP	(6)	(1)
	1,989	296

Panel B: Industry composition

	Bonds	Issuers
Consumer non-durables	189	24
Consumer durables	33	7
Manufacturing	282	46
Oil, gas, and coal extraction and products	250	41
Chemicals and allied products	156	19
Business equipment	171	20
Telephone and television transmission	141	16
Utilities	210	46
Wholesale, retail and some services	119	15
Healthcare, medical equipment and drugs	186	28
Other	252	34
	1,989	296

Table 3.2: Summary statistics

Panel A presents the contract-level attributes of the 1,989 bonds in our sample. Each bond is counted as one observation. Panel B contains monthly data on credit spreads and other time-variant bond characteristics. Each bond/month is counted as one observation. Panel C contains annual data on firm characteristics where each firm/year is counted as one observation, with the exception of volatility which is computed monthly and each firm/month represents one observation. The sample comprises corporate debentures (CDEB) and corporate medium-term notes (CMTN) with a time-to-maturity over one month and less than 30 years. All variables are defined in Appendix C.1. All continuous firm-level variables are winsorized at the 1st and 99th percentiles, except for variables than cannot take on negative values, which are winsorized at the 99th percentile.

Panel A: Bond contract features

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Amount (USD bn)	1,989	0.578	0.543	0.275	0.450	0.750
Coupon	1,989	5.541	2.163	4.000	5.750	7.000
Redeemable	1,989	0.899	0.301	1	1	1
Fungible	1,989	0.762	0.426	1	1	1
Offering market	1,989	0.419	0.493	0	0	1
Security	1,989	3.992	0.235	4	4	4
Covenant intensity	1,945	6.757	3.154	5	6	8

Panel B: Bond secondary market attributes (monthly)

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Credit spread (%)	72,638	1.921	1.736	0.769	1.326	2.463
Illiquidity	63,780	0.009	0.015	0.001	0.004	0.010
Time-to-maturity (months)	72,638	78.24	62.63	38.00	67.00	101.00
Credit rating	72,334	8.559	2.993	6	9	10

Panel C: Firm characteristics (annual and monthly)

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
CSR	2,198	-0.015	0.644	-0.381	-0.075	0.226
Size (USD bn)	2,198	18.587	32.190	2.949	6.914	18.675
Profitability	2,197	0.223	0.158	0.122	0.187	0.293
Short-term debt	2,198	0.034	0.044	0.004	0.019	0.046
Long-term debt	2,198	0.265	0.136	0.169	0.251	0.329
Cash holdings	2,198	0.076	0.076	0.019	0.049	0.109
Tangibility	2,198	0.374	0.258	0.145	0.317	0.577
Capital expenditure	2,198	0.062	0.066	0.024	0.041	0.074
Coverage 1	2,198	4.271	1.234	3.786	5	5
Coverage 2	2,198	2.249	2.234	0	1.581	5
Coverage 3	2,198	1.849	3.396	0	0	1.928
Coverage 4	2,198	1.924	9.222	0	0	0
E-index	2,044	3.342	1.375	2	3	4
Volatility	71,480	0.019	0.010	0.012	0.017	0.023

Table 3.3: CSR and bond pricing in the secondary market

This table reports various specifications of regression models of secondary market bond credit spreads as a function of CSR and bond- and firm-level control variables. Panel A presents the baseline results. Panel B includes credit ratings as an additional control variable. All variables are defined in Appendix C.1. Numbers reported in parentheses are heteroscedasticity robust standard errors based on two-dimensional clustering at the firm- and month-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively).

Panel A: CSR and credit spreads

	Credit spread			
	(1)	(2)	(3)	(4)
CSR	−0.215***	−0.138***	0.025	0.017
	(0.061)	(0.050)	(0.046)	(0.038)
Illiquidity		23.37***	5.998***	5.095***
		(3.251)	(0.699)	(0.649)
Ln(Amount)		0.055**	−0.033	−0.021
		(0.034)	(0.025)	(0.023)
Coupon		0.121***	0.064***	0.044***
		(0.014)	(0.009)	(0.009)
Time-to-maturity		0.001***	0.002***	0.003***
		(0.000)	(0.000)	(0.000)
Redeemable		0.175**	−0.024	−0.021
		(0.070)	(0.058)	(0.056)
Fungible		0.063	−0.076**	−0.051*
		(0.047)	(0.035)	(0.032)
Offering market		0.109**	0.028	0.004
		(0.050)	(0.033)	(0.031)
Security		−0.471***	−0.484***	−0.407**
		(0.159)	(0.155)	(0.186)
Covenant intensity		0.021**	0.017**	0.012*
		(0.009)	(0.008)	(0.007)
Ln(Size)				−0.292***
				(0.111)
Profitability				0.134
				(0.307)
Short-term debt				−2.103***
				(0.636)
Long-term debt				−0.170
				(0.415)
Cash holdings				0.196
				(0.450)

(*continued*)

Panel A (continued)

	Credit spread			
	(1)	(2)	(3)	(4)
Tangibility				0.755
				(0.489)
Capital expenditure				−0.223
				(0.972)
Coverage 1				−0.077*
				(0.041)
Coverage 2				−0.063***
				(0.022)
Coverage 3				0.001
				(0.010)
Coverage 4				−0.001
				(0.002)
Ln(Volatility)				0.632***
				(0.136)
E-index				−0.059*
				(0.032)
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes
Observations	72,638	62,693	62,693	58,909
R-squared	0.48	0.54	0.80	0.81

Panel B: CSR and credit spreads - Sensitivity to default risk

	Credit spread			
	(1)	(2)	(3)	(4)
CSR	−0.214***	−0.138***	0.032	0.020
	(0.059)	(0.049)	(0.045)	(0.038)
Credit rating	0.097***	0.069**	0.105***	0.042*
	(0.029)	(0.032)	(0.025)	(0.025)
Bond controls	No	Yes	Yes	Yes
Firm controls	No	No	No	Yes
Governance controls	No	No	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	No	No	Yes	Yes
Observations	72,334	62,438	62,438	58,675
R-squared	0.48	0.55	0.81	0.81

Table 3.4: CSR and bond pricing during the financial crisis

This table presents the results from regressions of secondary market bond credit spreads as a function of CSR/time period interactions and control variables. *CSR* is measured at the end of 2006. Panel A reports regression estimates of credit spreads on CSR during the crisis and post-crisis periods. *Crisis* is an indicator variable that captures the time period from August 2008 to March 2009. *Post-crisis* is an indicator variable that reflects the time period from April 2009 to December 2013. In Panel B, we re-estimate the models but report separate results on the role of CSR during the credit crunch. In this panel, *Crunch* is an indicator variable that represents the time period from July 2007 to July 2008. All variables are defined in Appendix C.1. Numbers reported in parentheses are heteroscedasticity-robust standard errors based on two-dimensional clustering at the firm- and month-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively)

Panel A: CSR and credit spreads during the financial crisis

	Credit spread			
	(1)	(2)	(3)	(4)
CSR×Crisis	−0.577**	−0.619**	−0.644***	−0.654***
	(0.259)	(0.255)	(0.249)	(0.250)
CSR×Post-crisis	−0.033	−0.069	−0.091	−0.118
	(0.097)	(0.082)	(0.082)	(0.085)
Illiquidity	5.329***	4.864***	4.752***	4.765***
	(0.652)	(0.611)	(0.609)	(0.612)
Ln(Amount)	−0.018	−0.010	−0.011	−0.006
	(0.025)	(0.023)	(0.023)	(0.021)
Coupon	0.054***	0.043***	0.045***	0.041***
	(0.011)	(0.010)	(0.009)	(0.009)
Time-to-maturity	0.003***	0.002***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
Redeemable	0.005	−0.009	−0.003	−0.014
	(0.061)	(0.058)	(0.059)	(0.056)
Fungible	−0.120***	−0.111***	−0.094***	−0.094***
	(0.033)	(0.032)	(0.030)	(0.031)
Offering market	0.057	0.037	0.027	0.024
	(0.035)	(0.032)	(0.032)	(0.031)
Security	−0.659***	−0.640***	−0.566***	−0.499**
	(0.160)	(0.172)	(0.214)	(0.212)
Covenant intensity	0.013*	0.009	0.014**	0.009
	(0.007)	(0.007)	(0.008)	(0.007)
Credit rating				0.064**
				(0.029)
Ln(Size)		−0.417***	−0.414***	−0.383***
		(0.122)	(0.125)	(0.124)

(*continued*)

Panel A (continued)

	Credit spread			
	(1)	(2)	(3)	(4)
Profitability		0.312	0.297	0.192
		(0.268)	(0.277)	(0.263)
Short-term debt		−1.836**	−1.986**	−1.862**
		(0.748)	(0.783)	(0.789)
Long-term debt		0.711	0.708*	0.590
		(0.500)	(0.508)	(0.523)
Cash holdings		−0.173	−0.246	−0.262
		(0.485)	(0.496)	(0.498)
Tangibility		0.290	0.197	0.350
		(0.645)	(0.661)	(0.659)
Capital expenditure		−1.164	−0.829	−0.601
		(0.789)	(0.883)	(0.852)
Coverage 1		−0.041	−0.034	−0.022
		(0.041)	(0.046)	(0.045)
Coverage 2		−0.028	−0.029	−0.030
		(0.022)	(0.021)	(0.020)
Coverage 3		−0.005	−0.005	−0.003
		(0.010)	(0.010)	(0.009)
Coverage 4		−0.002	−0.001	−0.002
		(0.002)	(0.002)	(0.002)
Ln(Volatility)		0.411**	0.465***	0.440**
		(0.169)	(0.176)	(0.179)
E-index			−0.067*	−0.063*
			(0.035)	(0.035)
(Crisis−Post-crisis)×CSR	−0.544***	−0.550***	−0.553***	0.536***
(p value)	(0.01)	(0.01)	(0.01)	(0.01)
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	50,598	50,124	47,966	47,836
R-squared	0.82	0.83	0.83	0.83

Panel B: CSR and credit spreads during the credit crunch and financial crisis				
	Credit spread			
	(1)	(2)	(3)	(4)
CSR×Crunch	−0.064	−0.111	−0.145	−0.159
	(0.094)	(0.099)	(0.109)	(0.108)
CSR×Crisis	−0.622**	−0.697**	−0.747***	−0.768***
	(0.311)	(0.308)	(0.301)	(0.300)
CSR×Post-crisis	−0.077	−0.147	−0.193	−0.231*
	(0.143)	(0.127)	(0.127)	(0.127)
Credit rating				0.065**
				(0.029)
(Crisis−Crunch)×CSR	−0.558**	−0.586***	−0.602***	−0.609***
(p value)	(0.02)	(0.01)	(0.01)	(0.01)
(Crisis−Post-crisis)×CSR	−0.545***	−0.550***	−0.554***	−0.537***
(p value)	(0.01)	(0.01)	(0.01)	(0.01)
(Crunch−Post-crisis)×CSR	−0.013	0.036	−0.048	−0.094
(p value)	(0.87)	(0.62)	(0.52)	(0.36)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	No	Yes	Yes	Yes
Governance controls	No	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	50,598	50,124	47,966	47,836
R-squared	0.82	0.83	0.83	0.83

Table 3.5: CSR and credit spreads: Subsample analysis

This table presents regressions of secondary market bond credit spreads as a function of CSR/time period interactions and control variables, estimated separately for firms with tangibility below and above the median and for firms incorporated in states with and without restrictions on payouts during insolvency. CSR is measured at the end of 2006. *Crisis* is an indicator variable that captures the time period from August 2008 to March 2009. *Post-crisis* is an indicator variable that reflects the time period from April 2009 to December 2013. All variables are defined in Appendix C.1. Numbers reported in parentheses are heteroscedasticity-robust standard errors based on two-dimensional clustering at the firm- and month-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively).

	Credit spread			
	Tangibility		Payout restrictions	
	Low	High	No	Yes
	(1)	(2)	(3)	(4)
CSR×Crisis	−0.824**	−0.319	−1.077***	−0.358
	(0.359)	(0.370)	(0.313)	(0.372)
CSR×Post-crisis	−0.139	0.075	−0.319***	−0.058
	(0.112)	(0.162)	(0.102)	(0.134)
(Crisis−Post-crisis)×CSR	0.685**	−0.394	−0.758***	−0.300
(p value)	(0.03)	(0.14)	(0.00)	(0.35)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes
Governance controls	Yes	Yes	Yes	Yes
Credit rating	Yes	Yes	No	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	25,031	22,805	29,300	18,536
R-squared	0.81	0.85	0.83	0.82

Table 3.6: CSR, credit spreads, and stock returns

This table presents the results from a regression of secondary market bond credit spreads as a function of pre-crisis CSR, CSR/time period interactions, contemporaneous stock returns, and stock return/time period interactions. *CSR* is measured at the end of 2006. *Crisis* is an indicator variable that captures the time period from August 2008 to March 2009. *Post-crisis* is an indicator variable that reflects the time period from April 2009 to December 2013. All variables are defined in Appendix C.1. Numbers reported in parentheses are heteroscedasticity-robust standard errors based on two-dimensional clustering at the firm- and month-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively).

	Credit spread	
	(1)	(2)
CSR×Crisis	−0.651***	−0.639***
	(0.249)	(0.249)
CSR×Post-crisis	−0.121	−0.121
	(0.084)	(0.084)
Stock returns	−0.348	−0.263
	(0.222)	(0.288)
Stock returns×Crisis		−0.954
		(0.924)
Stock returns×Post-crisis		0.103
		(0.377)
(Crisis−Post-crisis)×CSR	−0.530***	−0.518***
(p value)	(0.01)	(0.01)
Bond controls	Yes	Yes
Firm controls	Yes	Yes
Governance controls	Yes	Yes
Credit rating	Yes	Yes
Firm fixed effects	Yes	Yes
Time fixed effects	Yes	Yes
Observations	47,822	47,822
R-squared	0.83	0.83

Table 3.7: CSR and bond offerings during the financial crisis

This table reports the results from regressions of the relative size of bond issues as a function of CSR, CSR/time period interactions, and control variables. The models are estimated from 2007 to 2013, and CSR is measured at the end of 2006. *Issue* is the dependent variable of interest and is defined as total offering amount scaled by total assets. Panel A reports the descriptive statistics for variables used in the estimations. In Panel B, *Crisis* is an indicator variable that captures the time period from August 2008 to March 2009. *Post-crisis* is an indicator variable that reflects the time period from April 2009 to December 2013. All variables are defined in Appendix C.1. Numbers reported in parentheses are the values of heteroscedasticity-robust standard errors based on two-dimensional clustering at the industry- and quarter-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively).

Panel A: Descriptive statistics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
CSR	1684	-0.056	0.575	-0.412	-0.075	0.258
Issue	1684	0.073	0.116	0.019	0.040	0.086
Size (USD bn)	1681	33.508	51.602	3.810	12.077	32.227
Book-to-market	1681	0.453	0.333	0.248	0.389	0.598
Profitability	1684	0.229	0.149	0.127	0.203	0.302
Leverage	1684	0.284	0.156	0.174	0.262	0.373
Tangibility	1684	0.344	0.258	0.125	0.275	0.563
Capital expenditure	1684	0.059	0.062	0.021	0.041	0.072
Asset maturity	1621	6.085	5.671	2.217	3.993	7.889
Dividend indicator	1684	0.779	0.414	1	1	1
Investment-grade indicator	1684	0.755	0.430	1	1	1

Panel B: CSR and bond offerings during the financial crisis

	Issue	
	(1)	(2)
Crisis	−0.002	
	(0.006)	
Post-crisis	−0.001	
	(0.006)	
CSR	0.002	0.002
	(0.007)	(0.008)
CSR×Crisis	0.016***	0.015***
	(0.004)	(0.004)
CSR×Post-crisis	−0.003	−0.004
	(0.007)	(0.008)
Ln(Size)	−0.047***	−0.047***
	(0.007)	(0.006)
Book-to-market	−0.082***	−0.074***
	(0.025)	(0.024)
Profitability	0.034	0.021
	(0.039)	(0.033)
Leverage	−0.088*	−0.077*
	(0.045)	(0.043)
Tangibility	−0.029	−0.036
	(0.037)	(0.035)
Capital expenditure	0.204*	0.272**
	(0.110)	(0.113)
Asset maturity	−0.001	0.001
	(0.001)	(0.001)
Dividend indicator	−0.012	−0.012
	(0.014)	(0.014)
Investment-grade indicator	−0.035**	−0.032*
	(0.015)	(0.017)
(Crisis−Post-crisis)×CSR	0.019***	0.019***
(p value)	(0.00)	(0.00)
Industry fixed effects	Yes	Yes
Time fixed effects	No	Yes
Observations	1,619	1,619
R-squared	0.42	0.44

Table 3.8: Summary statistics on new bond issues

This table reports the main attributes of 1,483 bonds issued from 2007 to 2013 by 381 U.S. domiciled and incorporated non-financial firms that are at the intersection of the CRSP, Compustat, MSCI ESG STATS, and Mergent FISD databases. The selection of bond issues is restricted to corporate debentures and corporate medium-term notes. All perpetual, foreign currency, preferred, exchangeable, puttable, convertible, private placement (Rule 144A), Yankee and Canadian bonds are excluded from the sample. Panel A presents the bond characteristics. Panel B reports the distribution of at-issue credit ratings. All variables are defined in Appendix C.1

Panel A: Bond characteristics

	N	Mean	SD	25th pcntl	50th pcntl	75th pcntl
Credit spread (%):						
Full sample	1,483	2.119	1.614	0.963	1.604	2.857
Investment-grade	1,270	1.753	1.294	0.866	1.424	2.193
Speculative-grade	213	4.302	1.611	3.166	4.094	5.353
Amount (USD bn)	1,483	0.678	0.598	0.350	0.500	0.850
Time-to-maturity (months)	1,483	98.97	46.23	60	120	120
Redeemable	1,483	0.979	0.143	1	1	1
Fungible	1,483	0.903	0.296	1	1	1
Offering market	1,483	0.701	0.458	0	1	1
Security	1,483	4.995	0.144	5	5	5
Covenant intensity	1,460	7.232	2.996	6	7	9

Panel B: At-issue credit ratings

	Frequency	Percentage
Credit rating:		
AAA	31	2.09
AA	88	5.94
A	493	33.29
BBB	657	44.36
BB	144	9.72
B	65	4.39
CCC and below	3	0.20

Table 3.9: CSR, primary market spreads, ratings, and maturity

This table presents the results of regressions of at-issue bond credit spreads, credit ratings, and maturity as a function of CSR, CSR/time period interactions, and control variables. The models are estimated from 2007 to 2013. CSR is measured at the end of 2006. Panel A reports regressions of at-issue credit spreads on CSR during the crisis and post-crisis periods. Panel B reports regressions of credit ratings. In Panel C, we report regressions of time-to-maturity in months. *Crisis* is an indicator variable that captures the time period from August 2008 to March 2009. *Post-crisis* is an indicator variable that reflects the time period from April 2009 to December 2013. All other variables are defined in Appendix C.1. Numbers reported in parentheses are the values of heteroscedasticity-robust standard errors based on two-dimensional clustering at the industry- and quarter-level (significance at the 10, 5, and 1 percent level is indicated by *, **, and ***, respectively).

Panel A: CSR and at-issue credit spreads during the financial crisis

	Credit spread		
	(1)	(2)	(3)
CSR	0.053	0.113	0.123
	(0.162)	(0.148)	(0.143)
CSR×Crisis	−0.559***	−0.459*	−0.484**
	(0.154)	(0.241)	(0.243)
CSR×Post-crisis	−0.173	−0.065	−0.071
	(0.138)	(0.087)	(0.079)
Ln(Amount)	−0.188***	0.357***	0.339***
	(0.072)	(0.087)	(0.082)
Time-to-maturity	0.002***	0.001	0.001
	(0.001)	(0.001)	(0.001)
Redeemable	0.126	−0.158	−0.128
	(0.213)	(0.136)	(0.127)
Fungible	0.046	−0.157	−0.144
	(0.141)	(0.112)	(0.106)
Offering market	−0.249*	0.014	0.012
	(0.149)	(0.085)	(0.091)
Security	0.082	−0.289	−0.399
	(0.473)	(0.433)	(0.441)
Covenant intensity	0.222***	0.069***	0.055**
	(0.026)	(0.024)	(0.025)
Ln(Size)		−0.490***	−0.496***
		(0.059)	(0.060)
Profitability		0.228	0.405
		(0.274)	(0.262)
Short-term debt		0.206	0.186
		(0.489)	(0.484)
Long-term debt		0.980***	0.617
		(0.348)	(0.364)

(*continued*)

Panel A (continued)

	Credit spread		
	(1)	(2)	(3)
Cash holdings		0.126	0.006
		(0.337)	(0.310)
Tangibility		−0.501	−0.492
		(0.504)	(0.483)
Capital expenditure		2.226**	1.535
		(0.933)	(1.070)
Coverage 1		−0.177**	−0.172***
		(0.079)	(0.065)
Coverage 2		−0.076**	−0.079**
		(0.032)	(0.033)
Coverage 3		0.026	0.021
		(0.022)	(0.023)
Coverage 4		−0.001	−0.001
		(0.003)	(0.002)
Ln(Volatility)		0.951***	0.927***
		(0.162)	(0.250)
E-index			−0.040
			(0.033)
(Crisis−Post-crisis)×CSR	−0.386***	−0.394**	−0.413**
(p value)	(0.01)	(0.02)	(0.05)
Industry fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,459	1,322	1,263
R-squared	0.63	0.79	0.78

Panel B: CSR and at-issue credit ratings during the financial crisis			
	At-issue credit rating		
	(1)	(2)	(3)
CSR	−0.263	−0.032	0.019
	(0.446)	(0.259)	(0.262)
CSR×Crisis	−0.567***	−0.563***	−0.589***
	(0.188)	(0.129)	(0.114)
CSR×Post-crisis	−0.274	0.022	−0.005
	(0.245)	(0.152)	(0.137)
(Crisis−Post-crisis)×CSR	−0.318	−0.585***	−0.584***
(p value)	(0.35)	(0.01)	(0.01)
Bond controls	Yes	Yes	Yes
Firm controls	No	Yes	Yes
Governance controls	No	No	Yes
Industry fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	1,457	1,320	1,261
R-squared	0.61	0.83	0.81

Panel C: CSR and time-to-maturity of bond issues during the financial crisis				
	Time-to-maturity			
	(1)	(2)	(3)	(4)
CSR	−8.687	−9.541	−7.182	−7.839
	(5.477)	(6.794)	(5.636)	(4.567)
CSR×Crisis	8.410*	17.104***	15.686***	13.546***
	(4.500)	(3.821)	(3.411)	(3.529)
CSR×Post-crisis	1.957	6.014	3.516	4.522
	(5.959)	(7.512)	(7.361)	(6.742)
Credit rating				−4.801***
				(1.418)
(Crisis−Post-crisis)×CSR	6.453*	11.090**	12.170**	9.024*
(p value)	(0.09)	(0.05)	(0.05)	(0.09)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	No	Yes	Yes	Yes
Governance controls	No	No	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	1,459	1,322	1,263	1,291
R-squared	0.09	0.11	0.11	0.12

Appendices

Appendix A:

A.1 Variable definitions

Variable	Definition
Bond-level variables:	
Issue	Face (nominal) value of the bond issue ($ billion).
Maturity	Time difference (in years) between a bond's issue and maturity dates.
Coupon	Annual interest rate that the issuer is obligated to pay the bondholders.
Redeemable	Binary variable, equal to 1 if the bond can be redeemed under certain conditions, and 0 otherwise.
Putable	Binary variable, equal to 1 if the bond includes a put option that offers the bondholder the option to sell the security back to the issuer at a specified price and time, and 0 otherwise.
Convertible	Binary variable, equal to 1 if the bond can be converted to common equity, and 0 otherwise.
Rule 144A	Binary variable, equal to 1 if the bond is offered to a limited number of institutional investors and is exempt from registration under SEC Rule 144A, and 0 otherwise.
Credit rating	Rank variable defined based on the conversion of alphabetical ratings to numerical values (e.g., AAA=1 ..., C=21).
Investment grade	Binary variable, equal to 1 if the initial credit rating of the bond is investment-grade, and 0 otherwise.
Covenant intensity	Number of covenants included in the bond indenture.
Payout restrictions	Number of covenants that restrict dividend payments, transfers and distributions to external parties by the issuer and its subsidiaries.
Investment restrictions	Number of covenants that restrict the issuer and its subsidiaries from engaging in investments, merger and acquisition activity, sales or transfers of assets, and sale-and-leaseback transactions.
Financing restrictions	Number of covenants that restrict the issuance of senior debt, subordinated debt, collateralized debt, debt of higher priority and negative pledge restrictions, and limitations on liens and covenants that limit a firm's or its subsidiaries' ability to issue preferred or common stock.
Accounting restrictions	Number of covenants that are defined on the basis of the minimum net worth of the issuer or its subsidiaries, their coverage of interest, and other earnings, as well as leverage tests and limitations on indebtedness.
Event-related restrictions	Number of covenants that include restrictions on transactions with affiliates, changes in control, cross-default covenants, cross acceleration provisions, change of control put provisions, and rating decline triggers.
Security	Rank variable defined based on the following collateral stringency levels: (1) Unsecured, (2) Subordinate, (3) Junior subordinate, (4) Senior subordinate, (5) Senior, and (6) Senior secured.

Variable	Definition
Loan attributes and delegated monitoring variables:	
Loan covenant index	Loan covenant intensity index from Bradley and Roberts (2015)
Covenant strictness	Aggregate probability of covenant violation (at the loan inception date) across all covenants included in a loan package following Demerjian and Owens (2016).
C_Covenant strictness	Aggregate probability of covenant violation (at the loan inception date) across all capital covenants included in a loan package following Demerjian and Owens (2016).
P_Covenant strictness	Aggregate probability of covenant violation (at the loan inception date) across all performance covenants included in a loan package following Demerjian and Owens (2016).
Covenant violation	Count of the number of registered loan covenant violations from Nini et al. (2012).
Board- and CEO-related variables:	
Board size	Number of directors on the board.
Board independence	Number of independent directors on the board divided by board size.
Board tenure	Mean tenure of all directors on the board, measured based on the number of years between each director's start date and the applicable meeting date.
Board attendance problem	Binary variable, equal to 1 if the proxy statement indicates that a board member attended less than 75% of the required meetings, and 0 otherwise.
Board co-option	Number of co-opted board members divided by the number of (non-CEO) directors on the board.
Board tenure-weighted co-option	Sum of the tenure of co-opted board members divided by the total tenure of all directors.
Board busyness	Number of independent directors who hold two or more outside directorships divided by board size.
CEO duality	Binary variable, equal to 1 if the CEO is also the chairman of the board, and 0 otherwise.
CEO tenure	Number of years the director has served in the capacity of CEO.
CEO ownership	Percentage of shares held by the CEO relative to total shares outstanding.
CEO outsider	Binary variable. equal to 1 if the CEO joined the firm's board less than or equal to a year before being appointed as CEO, and 0 otherwise.
CEO experience	Number of years that the CEO has been in the firm's employment in a non-CEO capacity.
CEO busyness	Number of outside directorship the CEO holds at each applicable meeting date.
Firm-level variables:	
Size	Natural log of the market value of equity.
Leverage	Total assets minus the book value of equity minus income taxes payable scaled by total assets.

Variable	Definition
Profitability	Operating income before depreciation scaled by net sales.
Tangibility	Net property, plant, and equipment scaled by total assets.
R&D intensity	Research and development expense scaled by net sales.
Market-to-book	Market value of equity divided by the book value of equity.
Free cash flow	Net cash flow from operating activities plus net cash flow from investing activities scaled by lagged total assets.
Business segments	Number of business segments reported by the firm.
Volatility	Natural log of the standard deviation of daily stock returns from CRSP based on the previous 252 trading days' data.
Beta	Adjusted beta following the method in Dimson (1979).
Age	Number of years since the firm first appeared on the CRSP database.
Analyst following	Count of the number of analysts who posted one-year ahead EPS forecasts for the firm in a given period.
Forecast dispersion	Standard deviation of earnings forecasts across analysts averaged over four quarters in a given period.
Entrenchment index	Entrenchment index of Bebchuk et al. (2009), which is based on the sum of 6 antitakeover provisions.
Governance index	Governance index of Gompers et al. (2003), which is based on 24 antitakeover provisions.
Institutional blockholders	Percentage of shares held by institutional blockholders.
Distance-to-default	Firm-level estimate of the distance-to-default measure generated based on the Black-Scholes-Merton structural model of default probabilities.

A.2 Covenant definitions

Covenant	Definition
Payout covenants:	
Dividend payments (Parent)	Payment of dividends by the issuer is limited to a certain percentage of net income or some other ratio.
Dividend payments (Subsidiary)	Payment of dividends by the issuer's subsidiaries is limited to a certain percentage of net income or some other ratio.
Restricted payments	Payments (other than dividends) to shareholders and to other parties by the issuer are restricted.
Investment covenants:	
Mergers and consolidations	Consolidation or merger of the issuer with another entity is restricted.
Investments (Parent)	The investment policy of the issuer is restricted in order to prevent risky investments.
Investments (Subsidiary)	The investment policy of the issuer's subsidiaries is restricted in order to prevent risky investments.
Divestments (Parent)	The ability of the issuer to sell assets or to use the proceeds from the sale of assets is restricted. Such restrictions require the issuer to use part or all of the proceeds to repurchase debt.
Divestments (Subsidiary)	The issuer must use proceeds from the sale of subsidiaries' assets (either certain asset sales or all asset sales beyond a predefined threshold) to reduce debt.
Sale-leaseback (Parent)	The issuer is restricted as to the type or amount of properties it can use in a sale-leaseback transaction as well as its use of the proceeds of the sale.
Sale-leaseback (Subsidiary)	The issuer's subsidiaries are restricted from selling and leasing back assets that provide security to bondholders.
Financing covenants:	
Senior debt issuance	The issuer is restricted as to the amount of senior debt that it may issue in the future.
Subordinated debt issuance	The issuer's ability to issue junior or subordinated debt is restricted.
Funded debt (Subsidiary)	The issuer's subsidiaries are restricted from issuing additional funded debt (debt with an initial maturity over one year).
Liens (Parent)	In the event of default, bondholders have the legal right to sell mortgaged property to satisfy their unpaid obligations.
Liens (Subsidiary)	The issuer's subsidiaries are restricted from acquiring liens on their property.
Negative pledge	The issuer is restricted from issuing secured debt unless it secures the current issue on a pari passu basis.
Common stock (Parent)	The issuer is restricted from issuing additional common stock.
Common stock (Subsidiary)	The issuer is restricted from issuing common stock through restricted subsidiaries.
Preferred stock (Subsidiary)	The issuer's subsidiaries are restricted from issuing preferred stock.
Stock sale restrictions	The issuer is restricted from transferring, selling, or disposing its own common stock or the common stock of a subsidiary.

Covenant	Definition
Accounting covenants:	
Maintenance of net worth	The issuer must maintain a minimum specified net worth.
Minimum net worth trigger	If the issuer's net worth falls below a minimum level, certain bond provisions are triggered.
Indebtedness (Parent)	The issuer is restricted from incurring additional debt; limits are defined in terms of the total dollar amount of debt outstanding or as a percentage of total capital.
Indebtedness (Subsidiary)	Total indebtedness of the issuer's subsidiaries is restricted.
Leverage test (Parent)	The level of the issuer's total indebtedness is restricted.
Leverage test (Subsidiary)	Leverage in the issuer's subsidiaries is restricted.
Net earnings test	Profitability thresholds are set that the issuer must achieve or maintain in order to issue additional debt.
Coverage ratio (Parent)	The issuer is required to maintain a minimum ratio of net income for fixed charges.
Coverage ratio (Subsidiary)	The issuer's subsidiaries are required to maintain a minimum ratio of net income for fixed charges.
Event-related covenants:	
Cross default provisions	A protective covenant that will activate an event of default in their issue, if an event of default has occurred under any other debt.
Cross acceleration provisions	A protective covenant that allows bondholders to accelerate their debt, if any other debt has been accelerated due to an event of default.
Credit rating decline trigger put	A decline in the credit rating of the issuer (or the issue) triggers a bondholder put provision.
Change in control poison put	Upon a change of control in the issuer, bondholders have the option of selling the issue back to the issuer.
Transactions with affiliates	The issuer is restricted from certain business dealings with its subsidiaries.
Subsidiary guarantees	The issuer's subsidiaries are restricted from issuing guarantees for the payment of interest and/or principal of certain debt obligations.
Subsidiary redesignation	A flag that indicates whether restricted subsidiaries may be reclassified as unrestricted subsidiaries. Restricted subsidiaries are those which are considered to be consolidated for financial test purposes.

Appendix B:

B.1 Variable definitions

Variable	Definition
Bond-level variables:	
Issue	Face (nominal) value of the bond issue ($ billion).
Maturity	Time difference (in years) between a bond's issue and maturity dates.
Coupon	Annual interest rate that the issuer is obligated to pay the bondholders.
Redeemable	Binary variable, equal to 1 if the bond can be redeemed under certain conditions, and 0 otherwise.
Fungible	Binary variable, equal to 1 if the bonds are, by virtue of their terms, equivalent, interchangeable, or substitutable, and 0 otherwise.
Investment grade	Binary variable, equal to 1 if the initial credit rating of the bond is investment-grade, and 0 otherwise.
Covenant index	Rank variable defined based on the following covenant intensity levels: low (0 to 5 covenants), medium (6 to 10 covenants), high (11 to 15 covenants), and very high (16 to 21 covenants).
Payout restrictions	Number of covenants that restrict dividend payments, transfers and distributions to external parties by the issuer and its subsidiaries.
Investment restrictions	Number of covenants that restrict the issuer and its subsidiaries from engaging in investments, merger and acquisition activity, sales or transfers of assets, and sale-and-leaseback transactions.
Financing restrictions	Number of covenants that restrict the issuance of senior debt, subordinated debt, collateralized debt, debt of higher priority and negative pledge restrictions, and limitations on liens and covenants that limit a firm's or its subsidiaries' ability to issue preferred or common stock.
Accounting restrictions	Number of covenants that are defined on the basis of the minimum net worth of the issuer or its subsidiaries, their coverage of interest, and other earnings, as well as leverage tests and limitations on indebtedness.
Event-related restrictions	Number of covenants that include restrictions on transactions with affiliates, changes in control, cross-default covenants, cross acceleration provisions, change of control put provisions, and rating decline triggers.
Security	Rank variable that takes the value of 1 to 4 for unsecured, subordinate, senior, and senior secured bonds, respectively.
Offering yield	At-issue yield-to-maturity (in percentage) and is based on the coupon and any discount or premium to par value at the time of sale.

Variable	Definition
Credit spread	Difference between the at-issue yield-to-maturity and the Treasury yield. Maturity-matched risk-free yields are obtained by linearly interpolating benchmark Treasury yields contained in the Federal Reserve H-15 release for constant maturities of 1, 2, 3, 5, 7, 10, 20, and 30 years.
Credit rating	Rank variable defined based on the conversion of alphabetical ratings to numerical values (e.g., AAA=1, ..., C=21). If an issue is rated by multiple CRAs, the representative rating is from S&P. When this is not available, credit ratings are from Moody's and if this is missing, the rating is from Fitch.
Split rating	Rank variable defined based on the absolute value of the count of notch difference between credit rating agencies' at-issue ratings.
Rating shopping	Binary variable, equal to 1 if the issuer obtains more than two at-issue credit ratings for the bond, and 0 otherwise.
Loan attributes and delegated monitoring variables:	
Amount	Face (nominal) value of all facilities included in a syndicated loan package ($ billions).
Maturity	Weighted-average maturity of all facilities included in a syndicated loan package.
Packages	Number of syndicated loan packages per firm-year.
Secured	Binary variable, equal to 1 if any of the facilities included in the syndicated loan package is secured, and 0 otherwise.
Dividend covenant	Binary variable, equal to 1 if the syndicated loan package includes a restriction on dividend payments, and 0 otherwise.
Financial covenants	Number of financial covenants included in a syndicated loan package that impose restrictions on a borrower's accounting-based ratios.
Capital covenants	Number of capital-related covenants included in a syndicated loan package following Christensen and Nikolaev (2012).
Performance covenants	Number of performance-related covenants included in a syndicated loan package following Christensen and Nikolaev (2012).
Asset sale sweep	Binary variable, equal to 1 if the syndicated loan package includes an asset sweep covenant, and 0 otherwise. Asset sweep covenants require repayment of principal with the net cash proceeds of asset sales conditional on whether the asset sale exceeds a certain threshold.
Debt issue sweep	Binary variable, equal to 1 if the syndicated loan package includes an debt issue sweep covenant, and 0 otherwise. Debt sweep covenants require repayment of principal from proceeds of new debt issues conditional on whether the issuance exceeds a certain threshold.
Equity issue sweep	Binary variable, equal to 1 if the syndicated loan package includes an equity issue sweep covenant, and 0 otherwise. Equity sweep covenants require repayment of principal from proceeds of new equity issues conditional on whether the issuance exceeds a certain threshold.

Variable	Definition
Loan covenant index	Loan covenant intensity index from Bradley and Roberts (2015). The index assigns one point for each of following six covenants: secured debt, dividend covenants, more than two financial covenants, asset sale sweep, debt issue sweep, and equity issue sweep. The index values range from 0 to 6.
Firm characteristics, industry attributes, and market variables:	
Size	Natural log of total assets.
Leverage	Total assets minus the book value of equity minus income taxes payable scaled by total assets.
Debt-to-assets	Sum of long-term debt and long-term debt due in one year scaled by total assets.
Subordinated debt	Binary variable, equal to 1 if subordinated debt is non-missing and non-zero, and 0 otherwise.
Profitability	Operating income before depreciation scaled by net sales.
Return on assets	Income before extraordinary items scaled by lagged total assets.
Loss	Binary variable, equal to 1 if return on assets is negative, and 0 otherwise.
Dividends	Binary variable, equal to 1 if common dividends are non-missing and non-zero, and 0 otherwise.
Tangibility	Net property, plant, and equipment scaled by total assets.
Specificity	Research and development expense scaled by total assets.
Capital expenditure	Capital expenditures scaled by total assets.
Book-to-market	Book value of equity divided by the market value of equity.
Short-term growth	Percentage change in net sales in each period relative to the prior period.
Long-term growth	Median estimate of analysts' forecasts of long-term growth in EPS.
Volatility	Natural log of the standard deviation of daily stock returns from CRSP based on the previous 252 trading days' data.
Issuer rating	S&P domestic long-term issuer credit rating where available, or a predicted rating based on the credit risk estimation methodology of Barth et al. (1998) when ratings are missing.
Entrenchment index	Entrenchment index from Bebchuk et al. (2009) and is the sum of six antitakeover indicators from the Institutional Shareholder Service (ISS) including: (1) classified (staggered) board, (2) poison pill, (3) golden parachutes for executives, (4) limited ability to amend charter, (5) limited ability to amend bylaws, and (6) supermajority voting requirements.
Concentration	Herfindahl-Hirschman Industry Concentration Ratio, calculated by summing the squares of the market shares (based on net sales) of firms operating in each four-digit SIC code.
Sentiment	Consumer Sentiment Index.
S&P Composite	S&P Composite Index.

Appendix C:

C.1 Variable definitions

Variable	Definition
Bond-level variables:	
Amount	Face (nominal) value of the bond issue $ billion).
Issue	Face (nominal) value of the bond issue scaled by total assets.
Coupon	Applicable annual interest rate that the issuer is obligated to pay the bondholders.
Redeemable	Binary variable, equal to 1 if the bond can be redeemed under certain conditions, and 0 otherwise.
Fungible	Binary variable, equal to 1 if the bonds are, by virtue of their terms, equivalent, interchangeable, or substitutable, and 0 otherwise.
Offering market	Binary variable, equal to 1 if the bond issue is offered globally and 0 if the offering is made to the domestic market only.
Security	Rank variable that takes the value of 1 to 5 for junior subordinate, subordinate, senior subordinate, senior, and senior secured bonds, respectively.
Covenant intensity	Count of the number of covenants in the five main categories (payout, investment, financing, accounting, and event-related restrictions) reported on Mergent FISD.
Credit spread	Difference between the yield-to-maturity and the maturity-matched Treasury yield. Monthly credit spreads are based on the median yield of all transactions taking place on the last active trading day of a given month. Maturity-matched risk-free yields are obtained by linearly interpolating benchmark Treasury yields contained in the Federal Reserve H-15 release for constant maturities of 1/12, 3/12, 6/12, 1, 2, 3, 5, 7, 10, 20, and 30 years.
Illiquidity	Amihud (2002) measure of illiquidity that is defined based on the price impact of a secondary market bond trade per unit traded, implemented after filtering out trading days with less than two trades and measuring monthly illiquidity as the median of the daily price impact estimators.
Time-to-maturity	Time difference (in months) between a bond's issue date (in the case of new issues on the primary market) or trade date (in the case of outstanding issues on the secondary market) and its fixed maturity date.
Credit rating	Rank variable based on the conversion of alphabetical ratings to numerical values (e.g., AAA=1, ..., C=21). If an issue is rated by multiple credit rating agencies, the representative rating is from S&P. When this is not available, credit ratings are from Moody's and if this is not available, the rating is from Fitch.
Investment grade	Binary variable, equal to 1 if the initial credit rating of the bond issue (issuer) is from (AAA=1) to (BBB=10), and 0 otherwise.

Variable	Definition
Firm characteristics and equity market variables:	
CSR	Total net (strengths minus concerns) corporate social responsibility rating computed based on the sum of the net CSR indices for the following categories: environment, employees, human rights, community, and diversity, available from the MSCI ESG Stats database.
Size	Market value of equity.
Book-to-market	Book value of equity divided by the market value of equity.
Profitability	Operating income before depreciation divided by net sales.
Leverage	Total debt in current and long-term liabilities scaled by total assets.
Short-term debt	Debt in current liabilities scaled by total assets.
Long-term debt	Debt in long-term liabilities scaled by total assets.
Cash holdings	Cash and short-term investments scaled by total assets.
Tangibility	Net property, plant, and equipment scaled by total assets.
Capital expenditure	Capital expenditures scaled by total assets.
Coverage ratio	Interest coverage ratio defined as operating income after depreciation plus interest expense scaled by interest expense. Following Blume et al. (1998), the maximum value of the ratio is truncated at 100 and its negative values are set to zero. Four indicator variables are then identified based on the ratio's boundaries at 5, 10, and 20.
Asset maturity	Book-value-weighted average maturity of current assets and long-term assets following the methodology of Stohs and Mauer (1996). The maturity of current assets is measured as current assets divided by costs of goods sold and the maturity of long-term assets is measured as net property, plant, and equipment divided by depreciation expense.
Dividend indicator	Binary variable, equal to 1 if common dividends are greater than zero, and 0 otherwise.
E-index	Entrenchment index from Bebchuk et al. (2009) and is the sum of six antitakeover indicators from the Institutional Shareholder Service (ISS) including: (1) classified (staggered) board, (2) poison pill, (3) golden parachutes for executives, (4) limited ability to amend charter, (5) limited ability to amend bylaws, and (6) supermajority voting requirements.
Volatility	Standard deviation of daily stock returns from CRSP re-estimated in each month based on the previous 252 trading days' data.

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