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Abstract We examine the determinants of events of default clauses in syndicated loan and bond contracts, provisions that allow lenders to request the repayment of principal and to terminate lending commitments. We document significant variation in the use of default clauses and their restrictiveness within the same type of lending contract but also across loans and bonds. We find that default clauses in public bond contracts are less restrictive than those in syndicated loan contracts. We also document that two ex ante proxies for bankruptcy costs, the level of intangible assets and capitalized research and development expenditures at the time of debt contracting, are associated with less restrictive default clauses, especially in bond contracts. We conclude that bondholders attempt to mitigate the occurrence of inefficient defaults. Given their inability to coordinate with each other and their ownership of subordinated claims, bondholders incur higher default costs than bank lenders.

Keywords Events of default · Default clauses · Loan contracts · Bond contracts · Cross-default

JEL Classification G21 · G33 · M41

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1 Introduction

The incomplete contracting theory emphasizes the efficient allocation of control rights in debt contracting relationships in the presence of unforeseeable contingencies and agency conflicts between shareholders and debtholders. Debtholders are granted control rights in a state-contingent manner when borrowers miss debt payments (Hart and Moore 1988) or financially underperform (e.g., Aghion and Bolton 1992; Dewatripont and Tirole 1994). The conditions allowing these control rights to be transferred to lenders are usually described in provisions in debt contracts, which are generally termed "events of default" clauses. Although these clauses are critical in facilitating the enforcement of lenders' rights, very little is known about their specification and the role they play in debt contracting. In this paper, we use a large sample of bond and syndicated loan contracts and provide evidence on the characteristics of default clauses in debt contracts as well as the economic factors that determine these characteristics.

If the majority of lenders in a debt contract agree that an event of default has occurred, control rights over the borrower are effectively transferred to debtholders. A default arises when an event specified in the default clauses (e.g., a missed payment, a bankruptcy filing, a covenant breach, etc.) takes place and, in many instances, when such an event reaches a certain financial threshold or lasts beyond a predetermined grace period. The financial threshold triggers and grace periods that characterize the events of default introduce a materiality test into the definition of default and a time limit for the borrower to cure the default, respectively. The presence of these features indicates that lenders strive to limit instances when a suboptimal event of default is triggered as a default generates significant costs that outweigh the benefits. For instance, triggering an event of default when a borrower is financially healthy is costly for lenders because it does not add additional monitoring benefits and negatively impacts the borrower's operations. Declaring that a healthy borrower is in default can adversely impact the borrower's ability to obtain additional and cheaper debt to finance new investments and incentivizes others to avoid business transactions with the borrower.

We hypothesize that lenders will set *less* restrictive default clauses if they expect high costs when events of default are triggered. These costs are larger when the borrower needs to recontract the debt via an in-court restructuring instead of privately negotiating with lenders. In-court restructurings are more likely when there are serious coordination and holdout problems among creditors due to their dispersion or conflicting incentives (e.g., Asquith et al. 1994; Bolton and Scharfstein 1996; Bris and Welch 2005; Gilson 1997). In addition, the costs incurred by a particular lender when a default clause is triggered increase if the lender's claim is junior to other debtholder claims, the borrower enters into a corporate reorganization (or even liquidation), or the borrower's assets in place have low liquidation values. We test our hypothesis using a large sample of 4627 bond prospectuses and 9361 syndicated loan contracts issued by public firms in the United States from 1996 through 2009.

We read the events of default section in each bond or loan contract and manually code all types of default clauses, along with their terms (i.e., financial threshold

triggers and grace periods). We start by documenting significant variation in these clauses and their characteristics consistent with the interpretation that lenders consider the consequences of default clauses on the value of their claims when they design debt contracts. We identify four events of default that are present in all bond and loan contracts: (1) the declaration of insolvency, bankruptcy, or reorganization; (2) the failure to pay the debt principal; (3) the failure to pay interest on the outstanding debt; and (4) the violation of a covenant.[1] Other common events of default specified in debt contracts are cross-acceleration or cross-default (52 % of bond contracts have cross-acceleration clauses and 95 % of loan contracts have cross-default clauses),[2] the failure to pay court judgments above certain thresholds (10 % of bond contracts and 92 % of loan contracts), and the existence of guarantees that become invalid (8 % of bond contracts and 28 % of loan contracts). Some events of default are unique to loan contracts, such as Employee Retirement Income Security Act of 1974 (ERISA) events (95 % of loan contracts),[3] changes of control ownership (71 % of loan contracts), and the existence of pending litigation (2 % of loan contracts). Bond-specific events of default clauses mainly relate to particular bond features. The most common are the failure to make payments to sinking funds (62 % of bond contracts) and the failure to redeem the bond principal when bondholders exercise their redemption rights (41 % of bond contracts).

We capture the overall restrictiveness of the set of default clauses with two measures: (1) a default clause index that takes into account all clauses and the relative restrictiveness of their terms and (2) the total number of clauses in the contract. Using these measures, we provide evidence consistent with the hypothesis that default clauses in debt contracts are less restrictive if the costs of triggering events of default are high for lenders. First, we assess differences in the restrictiveness of default clauses across bonds and syndicated loans. We expect that bondholders incur higher event of default costs relative to bank syndicates for several reasons. Bondholders face more serious coordination and free-riding problems due to their dispersed bond ownership, which limits their ability to negotiate favorable outcomes with borrowers and other lenders. Also, some bonds that trade in the secondary market are acquired by hedge funds and other distressed investors, who have different incentives from other bondholders when borrowers are in distress. These investors often induce holdout problems that increase default costs (e.g., Hotchkiss and Mooradian 1997; Ivashina et al. 2013; Jiang et al. 2012). Finally, bondholders' claims are subordinated to those of senior and secured bank syndicates. As a result, bondholders have significantly lower loan recovery rates

[1] Although these clauses seem to be standard, their grace periods vary significantly. For instance, the grace period for missed interest payments ranges from 0 to 90 days, depending on the type of lending contract.

[2] We use the term *cross-default* to describe both cross-default and cross-acceleration clauses. Wight et al. (2009) point out differences between these two provisions. Cross-default allows the credit agreement to be accelerated whenever a default or an event of default occurs on another instrument, whether or not the debt under that instrument has been or may be accelerated. Cross-acceleration allows the credit agreement to be accelerated only when the other debt has been accelerated.

[3] To the extent that a company pays retired employees a defined pension benefit, the company is required under ERISA to pay into a trust an amount sufficient to cover its future benefit obligations. ERISA events are situations in which a firm fails to meet its pension funding obligations.

than banks (e.g., Grossman et al. 1997). Consistent with our hypothesis, we document that default clauses are significantly less restrictive in bond contracts than in syndicated loan contracts. The restrictiveness of the default clauses in bond contracts based on our indices is lower by approximately 30 % than the restrictiveness in loan contracts. This result is consistently robust in both univariate and multivariate tests including within-firm analyses.

Second, we focus on bond contracts and investigate whether the restrictiveness of default clauses varies with costs that bondholders expect to incur if a borrower goes through a corporate reorganization (a filing under Chapter 11) or liquidation (a filing under Chapter 7). We measure the expected costs of restructurings under Chapters 11 or 7 with three proxies: (1) the level of investments in intangible assets, (2) the level of capitalized research and development (R&D) expenditures, and (3) the amount of senior debt outstanding. Bankruptcy costs are expected to be higher when firms have more intangibles because these firm-specific assets increase risk shifting and have low liquidation value (e.g., Rajan and Zingales 1995).[4] Moreover, bondholders are typically junior claimants who are less likely to recover their investments in bankruptcy when there is more senior debt outstanding. Our results indicate that default clauses in bond contracts are significantly less restrictive if borrowers have high levels of intangible assets, capitalized R&D expenditures, and syndicated loans outstanding, suggesting that bondholders aim to avoid low recovery rates due to forced sales of illiquid intangible assets. For instance, a one standard deviation increase in the level of investments in intangible assets (the amount of senior debt outstanding) decreases the default clause index by 14 % (18 %) of its standard deviation.

We further test whether inter-creditor coordination costs, proxied by the presence of more senior claims relative to junior claims (the ratio of the total amount of loans outstanding to the amount of bond issued), exacerbate the impact of expected bankruptcy costs on the restrictiveness of bond default clauses. We find that, when there are more senior debt claims, the negative relationship between the level of intangible assets and the bond default clause restrictiveness is stronger. These cross-sectional results indicate that bondholders prefer less restrictive default clauses to avoid pushing borrowers into bankruptcy when the coordination costs with other creditors are likely to be higher.

In a final set of tests, we provide evidence on the different impact of bankruptcy costs on the default clause restrictiveness specified in bond and loan contracts. We predict that the expected bankruptcy costs that could be triggered by the declaration of an event of default will have a greater negative impact on the restrictiveness of bond default clauses than on that of loan default clauses. This is because senior bank lenders typically obtain strong control rights in bankruptcy to protect their claims (e.g., Ayotte and Morrison 2009; McGlaun 2007).[5] Also, an event of default in a

[4] Consistent with this argument, Gilson et al. (1990) document that lenders prefer to avoid in-court corporate reorganizations if the borrower has a large fraction of intangible assets.

[5] Ayotte and Morrison (2009) document that senior bank creditors' exercise substantial control over bankrupt firms by adding strict terms to additional financing they provide in bankruptcy through debtor-in-possession loans. These terms include liens on all the firm's assets, restrictions on the use of cash while operating in bankruptcy, the imposition of specific budgets, requirements of detailed reports on cash receipts and expenditures, and so on. Dahiya et al. (2003) find that a majority of the firms that file for Chapter 11 obtain debtor-in-possession financing from senior banks that provided debt before the filing.

loan contract is less likely to lead to costly firm reorganizations or liquidations due to banks' abilities to renegotiate their loans at low cost (e.g., Roberts 2014). We document that the restrictiveness of default clauses in bond contracts is more negatively associated with the level of intangible assets reported by borrowers, relative to loan contracts. While the borrower's level of investments in intangible assets significantly decreases the restrictiveness of loan default clauses, the economic magnitude of the effect is less than half of that for bond contracts and the difference is statistically significant. Also, the amount of capitalized R&D expenditure is not associated with the restrictiveness of loan default clauses but is negatively associated with the clause restrictiveness in bond contracts. These results are robust to a propensity score matching methodology where we match borrowers issuing bonds and loans based on their fundamentals and credit risk. Our evidence indicates that bondholders demand less restrictive default clauses when expected liquidation costs are high to limit instances of default, consistent with their more passive role in bankruptcy and the fact that their claims are more likely to be covered by low value and illiquid intangible assets. In contrast, while senior and secured bank lenders demand more restrictive default clauses, these clauses are not a function of liquidation costs given that banks can exercise significant control over the borrower's activities in bankruptcy.

Our study makes several contributions. First, we contribute to the debt contracting literature by providing new and comprehensive evidence on the structure of default clauses in both bond and loan contracts. We document significant variation in the types of default clauses and their characteristics, suggesting that these ubiquitous provisions play a critical role in debt contracting. We also show that lenders require default clauses that minimize costs associated with defaults. While Beatty et al. (2012) examine a particular event-of-default clause in only one set of debt contracts (i.e., the cross-acceleration clause in bond contracts), we view the evidence in the literature on the determinants and role of default clauses in debt contracts as very limited.[6] Our study is also relevant to the incomplete debt-contracting theory which has investigated the allocation of control rights to creditors (e.g., Grossman and Hart 1986; Hart and Moore 1988), as default clauses are the only debt contract provision that allows the transfer of control rights from the borrower to its lenders.

Second, we add to the extensive literature on the drivers and role of covenants in debt contracts (e.g., Billett et al. 2004; Bradley and Roberts 2004; Christensen and Nikolaev 2012; Nash et al. 2003; Nini et al. 2009). We document that default clauses cover a wide set of events that trigger the transfer of control rights to lenders, not just covenant breaches. In addition, we show that these clauses reflect inter-creditor conflicts that appear when borrowers land in financial trouble. Except for few clauses that are debt security specific, most clauses are common across bond and loan contracts. This significant overlap ensures comparability across different types of debt contracts and allows us to contrast the control rights allocation

[6] Our paper complements Beatty et al. (2012) by providing unique insights on the determinants of the full set of default clauses and their characteristics (grace periods and financial threshold triggers) and by explaining differences between bond and loan contracts. We find that our bond sample results are not fully driven by the cross-acceleration provision.

preferences of lenders with different incentives, monitoring capabilities, and information access (i.e., syndicate banks and bond investors). In contrast, covenant specifications across loan and bond contracts are diverse and not comparable given that they are based on lenders' monitoring capabilities and information access.[7]

In Sect. 2, we provide the institutional background and develop our hypotheses. We describe the data and provide descriptive evidence in Sect. 3. In Sect. 4, we compare the default clause restrictiveness in bond and loan contracts. In Sect. 5, we discuss the multivariate analyses of the cross-sectional variation of default clause restrictiveness. We conclude in Sect. 6.

2 Institutional background and hypotheses development

Historically, when firms are solvent, a firm's management owes fiduciary duties to shareholders, not debtholders. However, when firms become insolvent or are approaching insolvency, management owes fiduciary duties to the firm's debtholders too (e.g., Becker and Stromberg 2012; Branch 2000). As a result, to protect their interests, debt holders stipulate provisions with their rights in the debt contracts.

We focus on one set of these provisions, the so-called events of default clauses, whose main role is to facilitate the transfer of control rights to lenders when there are signs that the borrower may default. The events of default specify circumstances associated with financial troubles, such as the failure to pay interest and debt principal, covenant violations, presence of invalid guarantees, among others. These clauses provide lenders with the legal means to demand the immediate repayment of their claims' face value, to stop extending credit to the borrower (especially in the case of revolving bank loans), or to exercise remedies against the borrower.

One remedy option available to lenders when a default occurs is an out-of-court restructuring whereby they voluntarily exchange their debt securities or restate the terms of these securities. This resolution is the fastest and the least costly for both lenders and borrowers. Thus it is not surprising that about 75 % of defaulting firms choose such a path (e.g., Emery and Cantor 2005). An alternative is a corporate reorganization via a traditional or pre-packaged bankruptcy filing under Chapter 11.[8] Most firms entering Chapter 11 do so only after attempting to resolve their financial difficulties out of court, as a court resolution can be quite costly. For instance, Franks and Torous (1994) find that lenders' average recovery rates are about eighty cents on one dollar of creditor claims for distressed exchanges of debt securities out of court and substantially lower at fifty-one cents on one dollar in Chapter 11 reorganizations. A final option, when the firm's stakeholders cannot agree on reorganization, is Chapter 7 bankruptcy, which provides for the orderly liquidation

[7] For instance, bank lending agreements rely on financial covenants to monitor the performance of a borrower, while bond contracts require mainly event-driven covenants (e.g., asset sales, M&As or additional borrowing restrictions).

[8] In a traditional Chapter 11 case, the debtor files a bankruptcy petition with the court. Under US bankruptcy codes, the debtor then has the exclusive right to propose a plan of reorganization within 120 days following the filing date. With a prepackaged filing, the bankruptcy petition and the plan of reorganization are filed concurrently.

of a firm's assets, with debtholders receiving payments generally in the order of their seniority. This option is the most costly to debtholders, as their recovery rates are significantly lower than in Chapter 11 (e.g., Bris et al. 2006).

While the presence of more restrictive default clauses provides benefits to debtholders by potentially facilitating the timely transfer of control rights when borrowers underperform, creditors can incur significant costs when events of default are triggered. We hypothesize that these costs are an important determinant of the restrictiveness of default clauses.

The costs associated with default clauses arise for several reasons. First, the presence of potentially serious coordination problems among creditors is likely to increase the cost of an event of default because the borrowing firm is more likely to file for Chapters 7 or 11 when creditors disagree. In the presence of multiple classes of debt holders, strict default clauses elicit defaults that result in inefficiencies, as different types of lenders often fail to coordinate renegotiations and to agree on reorganization plans. For instance, Bris and Welch (2005) posit that lenders fail to coordinate efficiently when they are dispersed and that a group of concentrated creditors obtains a higher recovery rate than a large group of uncoordinated creditors. A concentrated set of creditors has more bargaining power when dealing with a distressed borrower because they do not face mutual free-riding incentives. Also, Bolton and Scharfstein (1996) suggest that, from an ex ante perspective, the liquidation value of a firm is lower when there are multiple creditors and the firm is credit risky. Second, conditional on a firm going into corporate reorganization or liquidation, the cost of an event of default to lenders is higher if the firm's assets in place have low market value. Lenders incur higher liquidation costs if the assets are firm-specific and illiquid as these assets can only be sold at prices below their value in best use (e.g., Gilson et al. 1990; Rajan and Zingales 1995). Third, an event of default triggers larger losses for unsecured and junior creditors, who are paid only after senior and secured creditors receive in full the face value of their claims, along with the associated accrued interest.[9]

In our setting, we expect that, relative to syndicated bank lenders, bondholders face higher losses when an event of default occurs. One reason is that bondholders do not coordinate with each other efficiently when a borrower defaults as the diffused bond ownership gives some bondholders free-riding incentives.[10] Coordination problems are exacerbated by the fact that (1) the identity of individual bondholders changes regularly due to bond trading in the secondary market, (2) there are conflicting incentives and holdout problems when opportunistic bond investors have hedged against default while others have not or have a strategy of pushing the company into bankruptcy to take it over (e.g., distressed fund investors),

[9] In addition, unsecured creditors suffer further losses because the strict priority of claims rule is violated in reorganization. These claimants often receive lower recovery rates because they accept compensation for even more junior creditors and equityholders to induce them to accept a reorganization plan sooner. See Weiss (1990) for empirical evidence.

[10] The models of Bergman and Callen (1991) and Rajan (1992) provide support for this argument. They show that an increase in the number of lenders lowers the probability that a single lender is pivotal in renegotiation. In particular, small lenders have an incentive to free ride, thereby increasing the inefficiencies in liquidity defaults.

and (3) bondholders face significant information asymmetries given their limited access to firm-specific information. In contrast, banks have concentrated ownership with respect to the syndicated loans they issue, allowing for better coordination and lower renegotiation costs.[11] Banks also have a comparative cost advantage in monitoring borrowers and gaining superior access to private information (Campbell and Kracaw 1980; Diamond 1984; Fama 1985; Ramakrishnan and Thakor 1984). These factors contribute to better decisions and stronger negotiation abilities in defaults, which decrease the costs of a default.

Another reason why bondholders are worse off than bank lenders is because bondholders' claims are subordinate to banks' claims. Not only do bank lenders receive payments ahead of bondholders in liquidation, but they can close lines of credit, suspend the processing of borrower's payments, or obtain substantial control rights in bankruptcy (e.g., Ayotte and Morrison 2009), thus further contributing to a drop in the residual value left to bondholders.[12] Thus we expect bondholders' losses to be larger when there are more senior bank lenders with outstanding claims. Bondholders' losses in default are also exacerbated if the borrower relies to a greater extent on highly illiquid firm-specific assets (e.g., intangibles). These assets are more likely to be used to cover bondholders' junior claims, given that bank lenders receive mainly tangible assets as collateral. Consistent with these arguments, Grossman et al. (1997) find that syndicated loan recovery rates, measured just after borrowers emerge from distress, are 82 % (absolute value), while the recovery on subordinated bonds of the same issuers is much lower, at around 40 %.[13]

In sum, the arguments above indicate that lenders balance the costs and benefits associated with default clauses in debt contracts. In particular, to mitigate potential losses on their investments in case of default, bondholders might prefer to require *less* restrictive default clauses than bank syndicates, especially when liquidation costs are high (i.e., large senior claims are present or a firm's assets in place have low liquidation values). Less restrictive clauses lower the probability of default and allow bondholders to avoid the costs associated with default.[14] However, this outcome is not straightforward. Relative to senior lenders who can expropriate their wealth, bondholders have an inferior status in liquidation negotiations and face

[11] Gilson et al. (1990) study the restructuring of 169 financially distressed US companies. They find that companies are more likely to be successfully restructured when the number of lenders is small and the share of bank debt is high. More recently, Ivashina et al. (2013) find that distressed borrowers with a more concentrated set of creditors go through Chapter 11 restructuring faster and have a lower likelihood of liquidation.

[12] Banks often obtain super-seniority in bankruptcy proceedings by providing debtor-in-possession loans to the firm. These loans are typically short-term revolving lines of credit that enable a financially distressed firm to restructure its financial and operational base.

[13] In liquidations, lenders bear additional costs such as the costs associated with investigating the borrower's true financial resources, filing claims with the borrower or its liquidator, hiring legal advisors, following up through an insolvency process, communicating and negotiating with the borrower, loss of tax credits that the firm would have received had it not gone bankrupt, etc. All these costs are paid before debtholders' claims are covered, further contributing to the lower recovery rate of junior bondholders.

[14] We note that in return for less restrictive default clauses, bondholders could obtain other contractual terms that are more favorable, such as higher yields. An analysis of the tradeoff between the restrictiveness of default clauses and offering bond yields is beyond the scope of our paper.

greater information asymmetry. Thus bondholders might obtain benefits that outstrip the costs if they receive control rights earlier. In this situation, they might prefer default clauses that are as restrictive, if not more restrictive, than the default clauses in syndicated loan contracts.

3 Sample selection and descriptive statistics on events of default clauses

3.1 Sample selection

To construct the bond sample, we begin with regulatory filings that contain bond prospectuses or prospectus supplements for the 1996–2009 period.[15] Under the Securities Act of 1933, firms must disclose significant information about securities offered for public sale via filings with the Securities and Exchange Commission (SEC). Since the majority of bond prospectuses and prospectus supplements are filed with the SEC in Forms S-3 and 424, we start by retrieving these forms, as well as other SEC filings that may contain prospectuses. We are guided by the types of SEC forms mentioned in the Mergent Fixed Income Securities Database (FISD).[16] We use a text-search software program to scan all SEC filings downloaded for the keywords "event(s) of default" and "indenture." This allows us to remove filings that include information from equity prospectuses.

Next, we match the identified SEC filings with the FISD and Compustat databases based on central index key (CIK) numbers and filing dates. We first manually match the FISD and Compustat databases using issuers' CUSIPs, names, and industries. We then match the merged FISD-Compustat sample with the SEC filings that contain bond prospectuses and prospectus supplements using as matching fields the CIKs and filing dates. We exclude filings on bonds issued by financial institutions and non-US corporate borrowers, as well as privately placed bonds. We manually confirm the accuracy of the remaining documents and code the default clauses. (We discuss the coding below.) Our final bond sample consists of 4627 bonds issued by 865 nonfinancial firms in the US.

We also obtain a comprehensive sample of syndicated loan contracts. We start with 10-K, 10-Q, and 8-K SEC filings for 1996–2009, as material debt agreements are typically disclosed in these forms. We extract SEC filings that include loan agreements using the keywords "event(s) of default" and "credit agreement," "loan agreement," or "credit facility." We then manually map the extracted filings to the DealScan and Compustat databases using loan origination dates, loan amounts, and borrower names. Following this matching, we obtain 9361 loan contracts issued by 4033 nonfinancial firms in the US.

[15] We start with the year 1996 because before 1995, electronic filings are not available on a large scale in EDGAR, the SEC's electronic filing system.

[16] FISD identifies 82 types of SEC forms from which it collects bond-specific data.

3.2 The coding of events of default

All events that trigger the declaration of default are described in the default clause section of the debt contract with the exception of covenant terms. Although the violation of a covenant is an event of default in all debt contracts, the types of covenants required and their characteristics are covered in a separate covenant section. We start by coding the default clauses using pilot samples of 100 bond contracts and 100 loan contracts. This approach allows us to identify common events of default that are required by lenders in debt contracts, as well as their most important characteristics. Events of default that do not appear in the pilot sample are classified as "other clauses." A total of 82.5 % (3.6 %) of the loan (bond) contracts contain other default clauses.

The terms of an event of default clause are a matter of contract. There are standard specifications of events of default that appear in most debt contracts but also events that are tailored to better suit individual borrowers. In "Appendix 1", we provide a list with the main events of default and a complete description of each event, as well as examples of infrequent default clauses that we code as "other clauses." Table 1 reports descriptive evidence on default clauses in bond and loan contracts. In Panel A, we present the frequencies of nine events of default that are common to both bond and loan contracts: bankruptcy filings (100 % in bonds and loans), principal payment defaults (100 % in bonds and loans),[17] interest payment defaults (100 % in bonds and loans), covenant breaches (100 % in bonds and loans), cross-default clause (52 % in bonds and 95 % in loans), court order clauses (10 % in bonds and 92 % in loans),[18] invalid guarantees (8 % in bonds and 28 % in loans), defaults on nondebt liabilities (1 % in bonds and 0.1 % in loans), and failures to report the occurrence of a fundamental change (0.2 % in bonds and 0.1 % in loans).[19]

The cross-default clause in bond contracts typically takes the form of cross-acceleration (i.e., bondholders can accelerate the payment of their debt only if other lenders accelerate their debt).[20] This is potentially *less* restrictive than a regular cross-default, which is more common in syndicated loan contracts (i.e., banks can accelerate their debt if the borrower has defaulted on other debt contracts, regardless

[17] In the case of syndicated loans, the clause on missed principal payments has relevance when a loan is amortizing (i.e., payable in installments) or the loan agreement provides for mandatory partial prepayments.

[18] Although this clause is not common in bond contracts, it can have significant consequences. For example, in 1984, Texaco faced an $11 billion judgment for allegedly interfering with Pennzoil's acquisition of Getty Oil. Because the lawsuit could contribute to a breach in debt agreements, Texaco was forced to file for bankruptcy to gain the benefit of the bankruptcy code's automatic stay and thereby gain the time it needed to appeal.

[19] A fundamental change may involve a merger, an acquisition, a sale-and-leaseback transaction, or the delisting of the company's stock (see "Appendix 1" for more details). Also, another clause that triggers default is material misrepresentations. We do not report this clause because it is mentioned in all loan agreements and is implicitly required in all bond agreements according to the Securities Exchange Act of 1934.

[20] See Beatty et al. (2012) for a detailed investigation of the determinants of cross-acceleration clauses in bond contracts.

Table 1 Descriptive evidence of default clauses

Panel A: Frequency and restrictiveness index of individual default clauses

Default clause	Bond				Loan				Difference (bond–loan)	
	N	Freq. (%)	Mean	Median	*N*	Freq. (%)	Mean	Median	Mean	Median
Common clause										
Bankruptcy filing	4627	100	2.00	2.00	9361	100	1.76	1.75	0.24***	0.25***
Principal payment	4627	100	1.98	2.00	9361	100	1.98	2.00	0.00	0.00***
Interest payment	4627	100	1.63	1.67	9361	100	1.96	1.97	−0.32***	−0.30***
Covenant breach	4627	100	1.41	1.50	9361	100	1.95	2.00	−0.54***	−0.50***
Cross-default	4627	51.52	0.96	1.64	9361	94.66	1.84	1.97	−0.88***	−0.33***
Court order	4627	10.15	0.17	0.00	9361	91.51	1.65	1.82	−1.47***	−1.82***
Invalid guarantees	4627	8.23	0.08	0.00	9361	28.31	0.28	0.00	−0.20***	−0.00***
Nondebt liabilities	4627	0.60	0.01	0.00	9361	0.10	0.00	0.00	0.01***	0.00***
Report of fundamental change	4627	0.23	0.00	0.00	9361	0.10	0.00	0.00	0.00**	0.00**
Bond-specific clause										
Sinking fund	4627	62.45	1.21	2.00						
Redemption	4627	41.19	0.82	0.00						
Conversion	4627	0.84	0.01	0.00						
Loan-specific clause										
ERISA events					9361	94.80	1.84	2.00		
Change in control					9361	70.88	0.71	1.00		
Pending litigation					9361	1.92	0.04	0.00		

Table 1 continued

Panel B: Grace periods of individual default clauses

Default clause	Bond				Loan				Difference (bond–loan)	
	N	Mean	Median	SD	*N*	Mean	Median	SD	Mean	Median
Common clause										
Bankruptcy filing	4627	0	0	0	9361	29	30	29	−29***	−30***
Principal payment	4627	0.55	0	2	9361	0.58	0	2	−0.03	−0***
Interest payment	4627	33	30	13	9361	4	3	5	29***	27***
Covenant breach	4627	71	60	19	9361	6	0	12	65***	60***
Cross-default	2384	17	10	16	8861	1	0	6	16***	10***
Court order	470	55	60	17	8566	34	30	18	21***	30***
Bond-specific clause										
Sinking fund	2890	6	0	16						
Redemption	1906	2	0	8						
Conversion	39	52	60	40						
Loan-specific clause										
Pending litigation					180	14	0	23		

Panel C: Threshold amounts of individual default clauses (% of total assets)

Default clause	Bond				Loan				Difference (bond–loan)	
	N	Mean	Median	SD	*N*	Mean	Median	SD	Mean	Median
Common clause										
Cross-default	2384	0.60	0.20	1.00	8861	0.78	0.41	1.18	−0.18***	−0.21***

Table 1 continued

Panel C: Threshold amounts of individual default clauses (% of total assets)

Default clause	Bond				Loan				Difference (bond–loan)	
	N	Mean	Median	SD	*N*	Mean	Median	SD	Mean	Median
Court order	470	1.20	0.70	1.40	8566	0.94	0.57	1.19	0.26***	0.13***
Loan-specific clause										
ERISA events					8874	0.40	0.00	0.86		

Panel D: Default clause restrictiveness at contract level

Default clause	Bond			Loan			Difference (bond–loan)	
	N	Mean	Median	*N*	Mean	Median	Mean	Median
Default clause index	4627	10.34	10.58	9361	16.63	16.32	−6.29***	−5.74***
No. of default clauses (common)	4627	4.70	5.00	9361	6.14	6.00	−1.44***	−1.00***
No. of default clauses (all)	4627	5.80	6.00	9361	10.44	10.00	−4.64***	−4.00***

This table presents descriptive statistics for individual default clauses (Panel A), grace periods (Panel B), and financial threshold triggers (Panel C) of default clauses, as well as the default clause index (Panel D), for the full bond and loan samples. In the last two columns of each panel, we report the results of *t* tests and nonparametric tests for the differences in means and medians across bonds and loans

***, **, * Significance at the 1, 5, and 10 % levels, respectively

of whether those lenders accelerate their debt). We combine the cross-acceleration and cross-default clauses since they both require early repayment of the debt conditional on events concerning other debt securities. Both clauses can significantly affect a borrower's ability to repay the lenders and may trigger foreclosure on collateral (if the other creditors are secured) or even a bankruptcy filing (e.g., Wight et al. 2009). The cross-default to other debt is probably one of the most serious events-of-default clauses, as it may have an unintended domino effect that could seriously weaken the borrower's financial position. We find that cross-default clauses are included in about half of the bond contracts (52 %) and in almost all loan contracts (95 %).

In Panel A of Table 1, we also present events of default that are unique to bond contracts, including the failure to make installment payments into sinking funds (62 %), the failure to meet redemption requirements (41 %), and the failure to deliver the settlement amount on the conversion of bonds into equity when bondholders exercise their conversion rights (1 %). These clauses originate from bond-specific characteristics such as the presence of sinking fund provisions or convertibility/redemption options. Event of default clauses unique to loan contracts include the failure to meet ERISA funding obligations (95 %), the occurrence of a change in control with respect to the equity shares of the borrower (71 %), and the presence of pending litigation (1.9 %).[21] The change in control event is an example of an event of default that is not within the borrower's control, as the borrower cannot determine the shareholders' sale of the stock.

Certain default clauses state that the event of default can be remedied within a certain grace period. Thus default will occur only if the event of default continues beyond the grace period. The longer the grace period, the more time a borrower has to remedy the issue, thus making the default clause less restrictive. Panel B of Table 1 presents the summary statistics for the grace periods of various default clauses. We find that grace periods range from 0 to 120 days, depending on the nature of the default clause and the debt claim. The principal payment clause has a very short grace period: the average grace period is about half a day for both bonds and loans. Such a short period is stipulated to prevent missed payments due to wire transfer difficulties or administrative errors. The court order clause, on the other hand, has a relatively long grace period: on average, 55 days for bonds and 34 days for loans, indicating that lenders are willing to provide borrowers with a long period to make payments required by court decisions.

A few liability-related clauses, which include cross-default, court orders, and ERISA events, also specify a threshold amount that triggers the event of default. In the case of a cross-default clause, the default of another debt security with a principal above a certain amount prompts a default of the current debt contract. More restrictive default clauses have lower threshold amounts. Panel C in Table 1 provides the summary statistics for the threshold amounts present in default clauses as a percentage of the borrower's total assets. The threshold amounts above which

[21] A pending litigation clause differs from a court order clause. Although both relate to litigation, the former can trigger an event of default if a lawsuit is brought against a borrower, while the latter constitutes an event of default only if the borrower cannot pay an amount set by a court judgment.

default is triggered are generally <1 % of a borrower's total assets in the case of both bonds and loans. These low thresholds indicate that the clauses are relatively restrictive.

4 Default clause restrictiveness in bond and loan contracts

4.1 Empirical measures of default clause restrictiveness

To measure the overall restrictiveness of default clauses, we construct two default clause measures. The first measure is a count of the number of default clauses present in the lending contract. The second measure is an index that takes into account the three dimensions of default clauses: the presence of a default clause, the grace period (if allowed), and the threshold amount (if required).[22]

We construct the default clause index by first computing an individual restrictiveness score for each default clause. Individual scores are computed differently depending on the default clause type. For default clauses that do not specify a grace period or a threshold amount (e.g., invalid guarantees, nondebt liabilities, report of fundamental change, or change in control), we assign to the individual clause score the value of 1 when the clause is present and 0 otherwise. If the default clause's specification includes either a grace period or a threshold amount, the score is given the value of 1, to indicate the existence of the default clause, plus a value from 0 (least restrictive) to 1 (most restrictive), depending on the relative strictness of the grace period or threshold amount. The relative strictness is computed using the distribution of grace periods and threshold amounts for the full sample of bonds and loans.[23] Specifically, we measure the restrictiveness of a clause with a grace period as follows:

$$Score_{clause} = 1 + \frac{Maximum\ grace\ period_{sample} - Grace\ period_{clause}}{Maximum\ grace\ period_{sample} - Minimum\ grace\ period_{sample}}, \tag{1}$$

where the restrictiveness of the grace period is measured by the difference between the maximum grace period of the same clause across the bond and loan samples and the grace period of the clause whose restrictiveness is being measured, scaled by the range of the grace periods computed using all same type clauses in the combined

[22] Both measures are imperfect proxies for the restrictiveness of default clauses due to their potentially arbitrary computation. However, they have several advantages. First, they provide an aggregate measure of the overall restrictiveness of default clauses. Second, they are potentially more objective than if one were to focus on the presence of an individual clause or a subset of clauses. The use of individual clauses, as opposed to an aggregate measure, requires a subjective assessment of their relative importance. Third, these indices are transparent and thus easy to replicate. Similar indices have been constructed to assess the restrictiveness of covenant packages (e.g., Bradley and Roberts 2004; Moody's 2010).

[23] In this approach, we assume that default clauses without a grace period or a threshold amount are comparable to the most lenient case of clauses that have one of these features. We also calculate two alternative indices by assigning either 1.5 or 2 to clauses without features, assuming that these clauses are comparable to clauses with the medium or toughest strictness in the group of clauses that have these features. All results are robust to these alternative indices.

sample. (If the clause has a threshold amount, we replace the grace periods with the corresponding threshold amounts.) This approach gives us a ranking of the restrictiveness of the grace period, relative to grace periods attached to similar types of clauses in the sample. Thus the individual restrictiveness score captures both the presence of the clause in the debt contract and the strictness of its grace period. It can take values from 0 (if the clause is not present) to 2 (if the clause is present and the grace period is the shortest in the sample). We use Eq. (1) to code the individual restrictiveness scores for clauses on the failure to make principal and interest payments, covenant breaches, defaults on sinking fund provisions, the failure to redeem/convert a bond, the presence of pending litigation, and ERISA payment failure events.

Some default clauses, such as cross-defaults and court orders, specify both grace periods and threshold amounts. Following the approach in Eq. (1), we measure the restrictiveness of these clauses by assigning equal weights to the grace periods and threshold amounts. For instance, the score of the cross-default clause incorporates the presence of the cross-default clause as well as the relative restrictiveness of its grace period and threshold amount as follows (the score is computed similarly for the court order clause):

$$Score_{clause} = 1 + 0.5 \times \frac{Maximum\ grace\ period_{sample} - Grace\ period_{clause}}{Maximum\ grace\ period_{sample} - Minimum\ grace\ period_{sample}} + 0.5 \times \frac{Maximum\ amount_{sample} - Threshold\ amount_{clause}}{Maximum\ amount_{sample} - Minimum\ amout_{sample}}. \quad (2)$$

In the last step, after computing a score for each default clause present in the loan or bond contract, we sum the individual scores to obtain the restrictiveness index for all default clauses in the debt contract. Thus a contract with more restrictive default clauses has a higher default clause index.

4.2 Univariate results

We provide a set of univariate tests that assess differences between the restrictiveness of default clauses in bond and loan contracts. We start by comparing the means and medians of the restrictiveness scores of individual default clauses. The results in Panel A of Table 1 indicate that, for five out of nine common default clauses, their individual bond clause scores are significantly lower than the loan clauses. In addition, the frequencies of three common default clauses (cross-default, court order, and invalid guarantees) are significantly higher in the loan sample. For instance, 94.7 % of the loan contracts include cross-default clauses, compared to 51.5 % of the bond contracts, while 91.5 % of the loan contracts include court order clauses, compared to only 10.2 % of the bond contracts.

In Panel B in Table 1, we report the restrictiveness of the grace periods attached to the default clauses that are common to bond and loan contracts. The results indicate that grace periods in the bond contracts are significantly longer than those

in loan contracts for the majority of the common default clauses. The average grace period of the interest payment clause is 33 days for bonds, compared to only 4 days for loans, while the average grace period of the covenant breach clause is 71 days for bonds, compared to 6 days for loans. In contrast, loan contracts allow for grace periods of about 30 days on average for bankruptcy filings, while bond contracts do not provide any grace periods. One explanation for this finding is that bank lenders give the borrower more time in bankruptcy because they obtain strong control rights relative to bondholders by providing debtor-in-possession financing. In Panel C in Table 1, we report the differences between the threshold amounts specified in cross-default and court-order clauses across bonds and loans and there are no consistent differences. The average minimum threshold amount associated with the cross-default clause of bond contracts is 0.60 % of assets, which is significantly lower (and thus more restrictive) than for loans (0.78 % of assets). However, the average minimum threshold amount related to the court-order clause is higher in bond contracts (1.20 % of assets) than in loan contracts (0.94 % of assets).

In Panel D in Table 1, we report the aggregate default clause index, as well as the number of clauses across bonds and loans. We find that the aggregate measures are significantly more restrictive in loan contracts than in bond contracts. For instance, the default clause index is about 60 % higher in loan contracts than in bond contracts as the loans have an average (median) index of 16.6 (16.3) relative to the bonds with 10.3 (10.6). We also find that the default clause index exhibits significant cross-sectional variation, with a standard deviation of 2.0 and 2.7 in the bond and loan contracts, respectively (untabulated). The number of default clauses common to both bond and loan contracts is also significantly higher for loans than for bonds. On average, loan contracts have approximately 1.4 more common clauses than bond contracts.

In Fig. 1a, we plot the average default clause indices for the loan and bond samples over time. Consistent with the results above, the figure clearly shows that loan contracts include more restrictive default clauses than bond contracts in each sample year. While the restrictiveness of default clauses in the loan contracts is relatively stable over time, default clauses in bond contracts exhibit more variation, which could be driven by their higher sensitivity to macroeconomic shocks relative to loans (e.g., Greenwood et al. 2010). Interestingly, after 2007, the default clause index of bond contracts drops slightly, while that of loan contracts increases. These changes indicate that, during the peak of the credit crisis, default costs became more relevant. They have a stronger negative effect on the restrictiveness of default clauses in bond contracts because of the higher renegotiation costs and lower priority claims but also because the liquidation costs are higher in challenging economic times. In Fig. 1b, we plot the average number of common default clauses in both loan and bond contracts over our sample period. The time distribution of the number of default clauses exhibits a fairly similar pattern, showing that loan contracts in each year have a greater number of default clauses, on average, than bond contracts.

In Fig. 2a, b, we plot the average default clause index and number of common default clauses for each category of credit ratings (from AAA to D) to assess whether the average findings documented above might be due to differences in

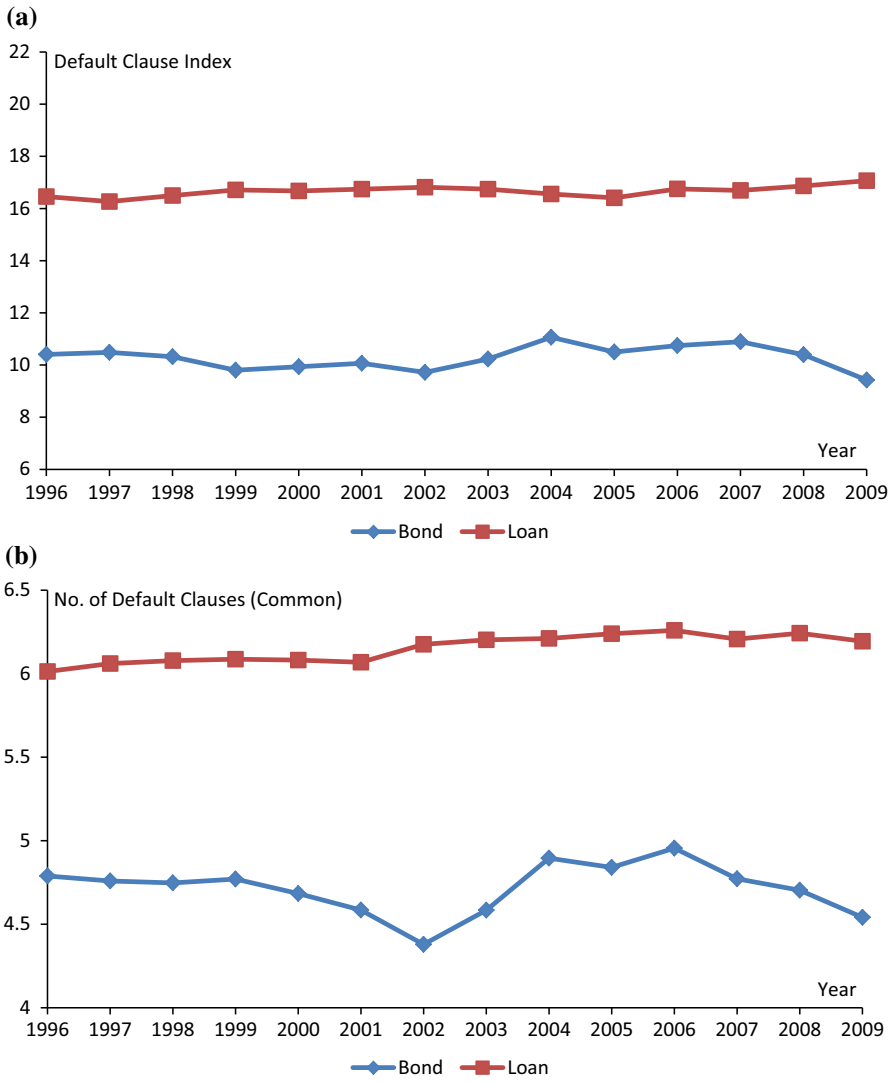

Fig. 1 Distribution of default clause index and number of default clauses over time. **a** The average default clause index for bonds and loans over time. **b** The average number of the nine common default clauses for bonds and loans over time

credit risk between firms that issue bonds and loans. Figure 2a shows that the default clause indices increase as credit ratings reflect higher risks from AAA to D. As credit quality deteriorates, the default clauses in both bond and loan contracts become more restrictive, consistent with default clauses providing more lender protection. However, regardless of the credit rating level, the default clause indices are significantly more restrictive for loans than bonds. The relationship between credit ratings and the restrictiveness of default clauses continues to hold in the bond

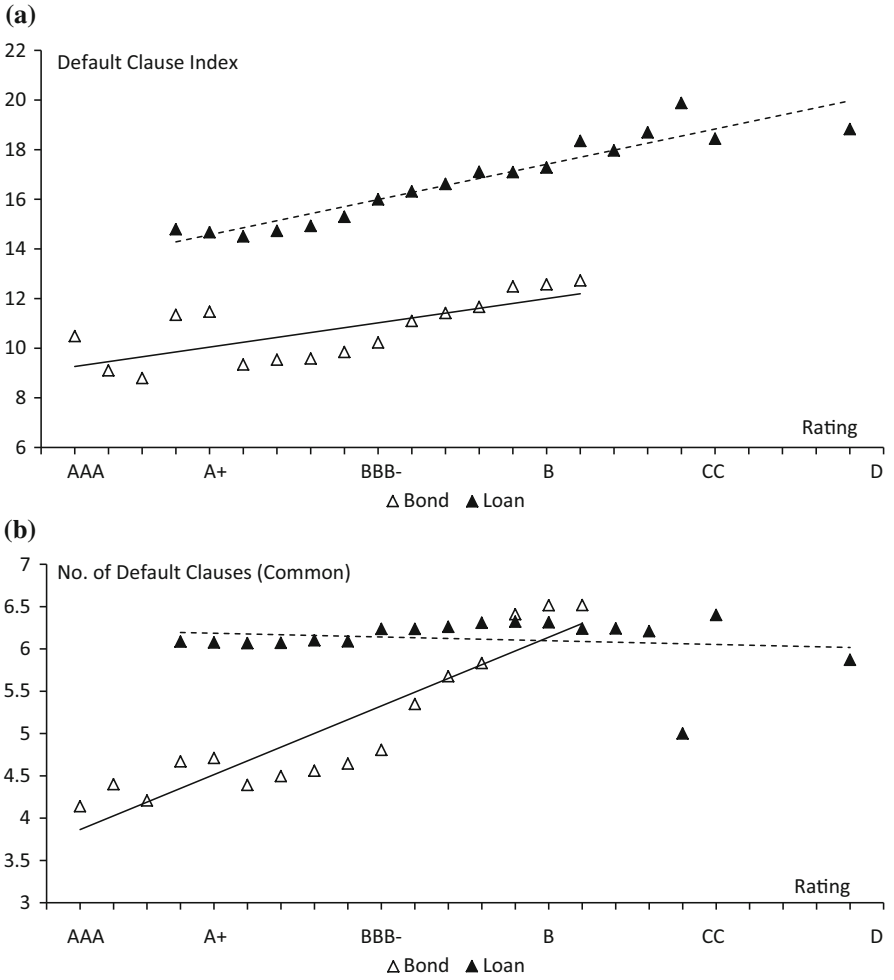

Fig. 2 Distribution of the default clause index and number of default clauses by credit rating. **a** The average default clause index for each credit rating category. **b** The average number of the nine common default clauses for each credit rating category

sample when we plot the average number of common default clauses against credit ratings in Fig. 2b. We note that, relative to bond contracts, the slope of the linear approximation is flatter in the loan sample, indicating that the steep relation between credit ratings and the restrictiveness of default clauses in Fig. 2a might be driven by the restrictiveness of the terms in the default clauses in loan contracts (i.e., grace periods and threshold amounts). For high credit quality borrowers, bondholders demand fewer common default clauses than bank syndicates, indicating that bondholders are less concerned about protecting the value of their claims when the probability of the borrower becoming insolvent is low. However, for riskier borrowers, bondholders demand as many common clauses as the banks.

One downside of the comparisons above is that the firms that issue bonds and loans are different and unobservable firm-specific factors may contribute to the "restrictiveness gap" between default clauses in bond and loan contracts. To mitigate this concern, we compare the default clause restrictiveness for bonds and loans issued by the same firm in the same year. We identify 522 firms that issue both bonds and loans during the same year; this sample allows us to assess within-firm variation in the default clauses. In Panel A of Table 2, we report the differences in the default clause index, the number of common default clauses, and the number of clauses between bond and loan contracts. We find that all differences are negative and significant. More than 95 % of the differences between bonds and loans are

Table 2 Default clauses of bonds and loans issued by the same firm in the same year

Panel A: Default clause index

	Difference (bond–loan)				
	N	Mean	Median	SD	% Negative
Default clause index	522	−4.98***	−4.96	2.59	97
No. of default clauses (common)	522	−1.16***	−1.00	1.04	76
No. of default clauses (all)	522	−3.27***	−3.00	1.80	96

Panel B: Presence of individual default clauses

	Difference (bond–loan)				
	N	Mean	Median	SD	% Negative
Bankruptcy filing	522	0.26***	0.25	0.25	0
Principal payment	522	0.00	0.00	0.06	3
Interest payment	522	−0.31***	−0.27	0.14	98
Covenant breach	522	−0.51***	−0.50	0.20	96
Cross-default	522	−0.85***	−0.21	0.95	87
Court order	522	−1.29***	−1.74	0.83	92
Invalid guarantees	522	−0.06***	0.00	0.46	16
Nondebt liabilities	522	0.01	0.00	0.04	0
Report of fundamental change	522	0.01	0.00	0.07	0

Panel C: Grace period (days)

	Difference (bond–loan)				
	N	Mean	Median	SD	% Positive
Bankruptcy filing	522	−32***	30	31	0
Principal payment	522	0	0	2	3
Interest payment	522	29***	25	13	98
Covenant breach	522	62***	60	24	96
Cross-default	299	13***	10	17	58
Court order	115	22***	30	17	70

Table 2 continued

Panel D: Timing of bond and loan issuances

	Difference (bond–loan)				
	N	Mean	Median	SD	% Negative
Bond offering date > Loan issuance date	222	−5.04***	−5.22***	2.66	96
Bond offering date = Loan issuance date	9	−5.10***	−4.70***	4.34	89
Bond offering date < Loan issuance date	291	−4.91***	−4.89***	2.54	98
p value for mean difference of Groups 1 versus 3		0.57			

This table presents descriptive statistics of default clauses for a subsample of firms that issue both bonds and loans in the same year (522 firm-years). For each firm-year, we report the difference between the bond(s) and loan(s) with regard to the use of default clauses in general (Panel A), individual default clauses (Panel B), and grace periods of individual default clauses (Panel C). In Panel D, we classify the 522 firm-years into three groups based on the timing of the bond offering/loan issuance and report for each group the difference between the bonds and loans with regard to the default clause index. If there is more than one bond (or loan) issue for a firm-year, we take the average for all bonds (or loans) and report the difference between bonds and loans

***, **, * Significance at the 1, 5, and 10 % levels

negative for the default clause index or the total number of default clauses. We also compare the restrictiveness of the nine common clauses (Table 2, Panel B) and grace periods of the six clauses that include this feature (Table 2, Panel C). The results are generally consistent with those in Table 1, indicating that borrower differences do not explain the differences in the restrictiveness of the default clauses across bond and loan contracts. Finally, in Panel D of Table 2, we partition the sample based on the relative timing of the issuance of the bond and loan contracts. We find that, regardless of whether a bond is issued before or after a loan, the default clauses in bond contracts are significantly less restrictive, suggesting that bondholders do not simply free ride the default clauses in the loan contracts.

To summarize, the univariate results in this section indicate that, consistent with our prediction that lenders require less restrictive default clauses when the expected costs of triggering them are higher, default clauses are less restrictive in bond contracts than in syndicated loan contracts. Bondholders expect greater default costs due to their inability to coordinate efficiently and because they own more subordinated claims.

4.3 Multivariate results

We examine the difference between bond and loan default clause restrictiveness in a multivariate analysis by pooling all bonds and loans and estimating the following model:

$$\begin{aligned} \textit{Default clause index (No. of default clauses)} = {} & \alpha_0 + \beta_0 \textit{Bond} + \beta_1 \textit{Firm controls} \\ & + \beta_2 \textit{Bond/Loan controls} + \textit{Year FE} + \textit{Industry FE} + \textit{Lead underwriter FE} + \varepsilon, \end{aligned} \tag{3}$$

where *Bond* is an indicator variable equal to one if the contract is a bond contract and zero if it is a loan contract. We employ an OLS (Poisson) regression when the dependent variable is the default clause index (the number of default clauses). Since a firm may issue multiple debt securities, we cluster the standard errors at the firm level to correct for any within-firm dependence.

We rely on the following variables to control for the effect of credit quality on the restrictiveness of default clauses: firm size (*Firm size*), leverage ratio (*Leverage*), interest coverage ratio (*Interest coverage*), market-to-book ratio (*Market-to-book*), and credit rating (*Credit rating*). Credit quality is an important factor in determining the restrictiveness of default clauses (as illustrated by Fig. 2). We expect that default clauses will be more restrictive in the debt contracts of firms with lower credit quality; these are the firms that likely face greater agency problems. We use firm credit ratings for loan contracts and bond ratings at issuance for bond contracts. All firm characteristics are measured in the fiscal year before the debt issuance date. We also control for a number of other bond/loan characteristics: the bond yield or loan spread (*Yield/Interest spread*), the size of the bond/loan (*Bond/Loan size*), the maturity of bond/loan (*Maturity*), and the number of covenants in the bond/loan contract (*Number of covenants*).[24] These contractual terms may substitute or supplement the monitoring role of the default clauses. Although a covenant violation is an event of default in all contracts, the default clauses do not specify the details of covenants' terms. Therefore, it is important to control for the number of covenants in Eq. (3). The relation between the number of covenants and the default clause restrictiveness, however, is unclear. Lenders may require both a higher number of covenants and more restrictive default clauses when there is higher uncertainty about the future performance of the borrower. However, a higher number of covenants enhances a lender's monitoring, thus the number of covenants may also substitute for default clause restrictiveness.

Finally, we control for year and industry fixed effects to consider time series changes in contractual arrangements that are driven by changing conditions in debt markets and industry-specific factors that may affect the specification of debt contracts, respectively. Year fixed effects also account for macroeconomic conditions. Investors require more protection when aggregate default risk increases in unfavorable economic times (e.g., Collin-Dufresne et al. 2001). We further control for underwriter fixed effects. Choi and Triantis (2013) and Kahan and Klausner (1997), among others, suggest that underwriters learn from the analysis of the contractual terms employed by peers or from the prior contracts they write. They have substantial influence on contract terms because of their contractual experience and their responsibility to market the debt securities.[25]

Table 3 reports the summary statistics of the bond (Panel A) and loan (Panel B) samples used in the regressions. The requirement for availability of control variables leads to a significant drop in the sample sizes. Nevertheless, the average number of default clauses and the default clause index of bonds and loans remain

[24] Our results are robust to dropping these bond/loan variables from the regressions.

[25] In the context of bond contracts, De Franco et al. (2014) document that the restrictiveness of covenant packages is very sticky over time. This is partly driven by bond underwriters.

Table 3 Summary statistics

Panel A: Bond sample

Variable	*N*	Mean	P25	Median	P75	SD
Default clause index	2366	10.10	8.92	10.17	11.16	1.78
No. of default clauses	2366	5.69	5.00	6.00	6.00	1.01
Intangible capital	2366	0.16	0.04	0.13	0.23	0.15
R&D capital (%)	2366	2.92	0.00	0.00	5.76	4.60
Total assets ($MM)	2366	34,955	5158	15,965	33,341	56,293
Leverage	2366	0.25	0.16	0.23	0.32	0.13
Interest coverage	2366	13.72	4.63	9.40	17.27	13.58
Market-to-book	2366	1.84	1.28	1.58	2.21	0.78
Prior loan ($MM)	2366	4522	650	2319	5188	6116
Credit rating	2366	7.49	6.00	7.00	9.00	3.13
Yield spread	2366	1.78	0.81	1.43	2.31	1.39
Bond size ($MM)	2366	398	135	300	500	414
Bond maturity (years)	2366	11.62	5.00	10.00	11.00	8.64
No. of covenants	2366	4.69	2.00	5.00	6.00	3.40

Panel B: Loan sample

Variable	*N*	Mean	P25	Median	P75	SD
Default clause index	2495	16.29	14.73	16.00	17.55	2.43
No. of default clauses	2495	10.04	8.00	10.00	11.00	2.23
Intangible capital	2495	0.19	0.05	0.16	0.29	0.16
R&D capital	2495	2.28	0.00	0.00	2.55	4.79
Total assets ($MM)	2495	5450	939	2083	5404	8624
Leverage	2495	0.31	0.17	0.28	0.41	0.19
Interest coverage	2495	12.07	3.11	5.70	10.95	33.01
Market-to-book	2495	1.64	1.14	1.42	1.87	0.80
Credit rating	2495	11.14	9.00	11.00	13.00	3.36
Interest spread	2495	1.60	0.63	1.25	2.25	1.25
Loan size ($MM)	2495	19.65	18.98	19.67	20.37	1.10
Loan maturity (years)	2495	3.94	3.00	5.00	5.00	1.84
No. of covenants	2495	5.27	3.00	4.00	8.00	3.28

This table reports summary statistics for the full samples of bonds and loans used in the regression analyses. Variable definitions are in "Appendix 2". The sample sizes are smaller than those in Table 1 due to missing explanatory variables

very similar to those reported in Table 1. An average firm that issues bonds has total assets of $35 billion and a leverage ratio of 25 %; the average bond yield spread is about 178 basis points, and the average bond maturity is around 12 years (Panel A). Not surprisingly, the average firm size in the loan sample is significantly smaller than that in the bond sample, consistent with large firms being more likely to issue public debt (e.g., Denis and Mihov 2003; Houston and James 1996). On average, the

loans in the sample have an interest spread of 160 basis points and a maturity of 4 years (Panel B).

The multivariate regression results are reported in Panel A of Table 4. In addition to the results based on the full sample of bonds and loans (columns 1 and 3), we also report results for the sample of bond and loans issued by the same firm in the same year (columns 2 and 4). We find consistent and strong evidence that default clauses are less restrictive in bond contracts than in loan contracts, as reflected by the negative and strongly significant coefficient on the indicator variable *Bond*. The effect is economically significant: controlling for firm fundamentals and debt contract characteristics, the bond default clause index is smaller by at least 5 units relative to the loan index, representing approximately 30 % of the mean default clause index in loan contracts. Among the control variables, the effect of *Credit Rating* is positive and significant, consistent with our expectation that default clauses are less restrictive for higher quality borrowers. The coefficients of *Number of covenants* are significantly positive, indicating that covenant intensity and the default clause restrictiveness complement each other in monitoring the borrowing firm. Lenders employ both more restrictive default clauses and more intensive covenants to monitor riskier borrowers.[26]

In Panel B of Table 4, we provide further evidence on the difference between bonds and loans by examining the difference in the grace periods of two default clauses—interest payment and covenant breach clauses—in a multivariate analysis. As shown in Table 1, these two clauses are present in all bond and loan contracts, and their grace periods have significant variation. We re-estimate Eq. (3) using as the dependent variable the natural logarithm of one plus the grace period of the interest payment or covenant-breach clause. The coefficient on the indicator variable *Bond* is positive and significant across all columns, indicating that the grace periods of interest-payment and covenant-breach clauses in bond contracts are significantly longer than those in loan contracts, consistent with these two clauses being less restrictive in bond contracts. Given that the dependent variable is the logarithm of one plus the grace period, the results indicate that, for a loan contract with average grace periods for interest payment and covenant breach clauses, the corresponding grace periods in a bond contract are longer by 7 and 30 times, respectively.

Overall, the results indicate that banks demand more restrictive default clauses than bondholders, consistent with our hypothesis that lenders require less restrictive default clauses when the costs of triggering them are higher. This evidence implies that banks' ability to coordinate in debt renegotiations, as well as their monitoring efficiency and superior access to private information, allow them to demand and enforce more protective default clauses. These clauses facilitate a more timely allocation of control rights to banks, ahead of bondholders, allowing banks to extract value from borrowers instead of forcing them into bankruptcy (e.g., Ayotte and Morrison 2009; Gilson et al. 1990). In contrast, bondholders' preference for

[26] In untabulated tests, we try two alternative specifications that use the full sample of bonds and loans. First, we include all loans in Table 4 and replace *Credit rating* with *O-score*. Second, we include all loans in Table 4, assign the lowest rating to unrated firms and include a dummy variable for unrated firms. In both cases, the results are very similar to those in Table 4.

Table 4 Default clause restrictiveness for bonds and loans: multivariate analyses

Panel A: Default clause measures				
	Default clause index		No. of default clauses	
	Full sample 1	Same firm sample 2	Full sample 3	Same firm sample 4
Bond	−5.617***	−5.247***	−0.518***	−0.502***
	(−26.11)	(−11.47)	(−27.04)	(−12.17)
Firm size	−0.177**	−0.187*	−0.018***	−0.022**
	(−2.43)	(−1.70)	(−3.02)	(−2.22)
Leverage	−0.071	−0.418	−0.005	−0.021
	(−0.22)	(−0.51)	(−0.18)	(−0.29)
Interest coverage	−0.001	0.001	−0.000	−0.000
	(−0.70)	(0.26)	(−0.31)	(−0.06)
Market-to-book	−0.013	−0.099	−0.000	−0.009
	(−0.22)	(−0.84)	(−0.08)	(−0.87)
Credit rating	0.171***	0.187***	0.018***	0.019***
	(6.55)	(3.17)	(8.67)	(3.04)
Yield/interest spread	0.056	0.055	0.009**	0.007
	(1.23)	(0.78)	(2.03)	(1.04)
Bond/loan size	−0.123*	0.039	−0.009*	0.005
	(−1.95)	(0.35)	(−1.65)	(0.49)
Maturity	0.000	0.002	0.000	0.001
	(0.03)	(0.22)	(0.37)	(0.90)
Number of covenants	0.115***	0.117***	0.008***	0.008**
	(6.74)	(3.09)	(5.31)	(2.38)
Model specification	OLS	OLS	Poisson	Poisson
Industry and year fixed effects	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes
No. of observations	4861	908	4861	908
Adjusted/pseudo R^2	0.79	0.75	0.15	0.11
Panel B: Grace periods				
	Log(1 + grace period)			
	Interest payment		Covenant breach	
	Full sample 1	Same firm sample 2	Full sample 3	Same firm sample 4
Bond	1.899***	1.699***	3.322***	3.185***
	(37.07)	(17.30)	(27.93)	(10.18)
Firm size	0.035***	0.042*	0.066**	0.035
	(2.90)	(1.73)	(2.41)	(0.72)

Table 4 continued

Panel B: Grace periods

	Log(1 + grace period)			
	Interest payment		Covenant breach	
	Full sample 1	Same firm sample 2	Full sample 3	Same firm sample 4
Leverage	0.045	−0.051	−0.038	−0.294
	(0.61)	(−0.32)	(−0.26)	(−0.73)
Interest coverage	0.001	0.002**	−0.000	−0.000
	(1.46)	(2.33)	(−0.21)	(−0.11)
Market-to-book	0.007	0.009	0.028	−0.079*
	(0.53)	(0.39)	(0.78)	(−1.74)
Credit rating	−0.015***	0.004	0.002	−0.000
	(−2.70)	(0.38)	(0.16)	(−0.00)
Yield/interest spread	0.018*	0.007	−0.033*	−0.075
	(1.72)	(0.35)	(−1.73)	(−1.50)
Bond/loan size	0.034***	0.055*	0.019	−0.059
	(3.23)	(1.85)	(0.79)	(−0.59)
Maturity	0.001	0.001	−0.002	0.002
	(0.93)	(0.47)	(−0.98)	(0.79)
Number of covenants	0.000	−0.013	−0.008	−0.009
	(0.09)	(−1.54)	(−0.67)	(−0.45)
Model specification	OLS	OLS	OLS	OLS
Industry and year fixed effects	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes
No. of observations	4861	908	4861	908
Adjusted/pseudo R^2	0.84	0.87	0.79	0.80

This table presents the results for comparing the restrictiveness of default clauses across bonds and loans (Panel A) and the grace periods of interest payment and covenant breach clauses (Panel B) using multivariate analyses. The "Full Sample" consists of all bonds and loans. The "Same Firm Sample" consists of bonds and loans issued by the same firm in the same year. *Bond* is an indicator variable that equals to 1 if the contract is a bond contract and 0 otherwise. In columns 1 and 2 of Panel A, we report OLS regression results, where the dependent variable is the default clause index of a bond, calculated as the sum of individual default clause scores. In columns 3 and 4 of Panel A, we report Poisson regression results, where the dependent variable is the number of default clauses. In Panel B, we report OLS regression results, where the dependent variable is the natural logarithm of one plus the grace period of the interest payment or covenant breach clause. The *t*- (*z*)-statistics are reported in parentheses

***, **, * Significance at the 1, 5, and 10 % levels, respectively. Robust standard errors are clustered at the firm level. Other variable definitions are in "Appendix 2"

fewer and less restrictive default clauses is consistent with their limited ability to negotiate with borrowers to avoid bankruptcy events. These events affect the value of bondholders' claims more negatively due to bankruptcy transaction costs and their lower priority in liquidation proceedings.

5 Costs of default and default clause restrictiveness

5.1 Costs of default measures

In this section, we further investigate how the restrictiveness of default clauses varies with lenders' expected costs when events of default are declared. We examine two types of default costs. The first one is the destruction of going-concern values when assets are sold. Alderson and Betker (1996) argue that the primary cost of liquidation is the destruction of going-concern values when assets are sold.[27] Because intangible assets are often firm specific and are more valuable to the firm itself than to other firms (John 1993), going-concern values are more likely to be preserved if the firm owns a smaller share of intangible assets relative to total assets. We thus measure expected bankruptcy costs with two proxies that capture the amount of intangible assets. The first measure, *R&D capital*, is the amount of capitalized research and development (R&D) expenditures scaled by total assets (multiplied by 100). Following Amir et al. (2003), we assume that R&D expenditures are capitalized over 5 years using the straight-line amortization method. We also assume that R&D expenditures are spent in the middle of the year. The second measure, *Intangible capital*, is the total amount of capitalized R&D, advertising expenses, and goodwill scaled by total assets.[28] We apply the same amortization rate (20 %) to capitalize advertising expenses as in the case of R&D expenditures. We expect that debtholders (especially bond investors) will demand less restrictive default clauses if the firm has significant intangible assets.

The second type of default cost relates to the division of assets among lenders of different seniority classes, which is governed by inter-creditor contracts. In particular, bank debt is generally more senior to public debt; therefore the presence of bank loans in the debt structure will lower the recovery rate of bonds in the bankruptcy process, imposing additional costs on bondholders. We proxy for these default costs for bondholders with the amount of syndicated loans outstanding at the time when a bond is issued (*Prior loan*). To the extent that bondholders' recovery rates decrease when an event of default occurs, we expect a negative relation between the size of outstanding bank loans and the restrictiveness of default clauses in bond contracts, as bondholders are incentivized to avoid an event of default.

[27] There are two other types of bankruptcy costs that are borne by creditors: (1) the direct administrative expenses paid in fees to various third parties involved in the bankruptcy proceedings and (2) the loss of tax credits that the firm would have received had it not gone bankrupt. We cannot measure the expectations about these costs.

[28] As reported intangible assets are less likely to be firm specific (since by definition they are acquired by the firm), we exclude them from the calculation of *Intangible capital*. The results are qualitatively similar when we include them into the measurement of *Intangible capital*.

5.2 Cross-sectional analysis within the bond sample

We begin by separately examining the determinants of the restrictiveness of default clauses in bond contracts, as the costs associated with the presence of senior loans apply only to bondholders. Using the measures that capture the restrictiveness of default clauses defined in Sect. 4 as dependent variables, we estimate the following model:

$$\begin{aligned} \textit{Default clause index}\,(\textit{No. of default clauses}) &= \alpha_0 + \beta_0 \textit{Intangible capital}\,(\textit{R\&D capital}) \\ &+ \beta_1 \textit{Prior loan} + \beta_2 \textit{Firm controls} + \beta_3 \textit{Bond controls} + \textit{Year FE} + \textit{Industry FE} \\ &+ \textit{Lead underwriter FE} + \varepsilon. \end{aligned} \tag{4}$$

We employ an OLS (Poisson) regression when the dependent variable is the default clause index (the number of default clauses). We control for the same firm and bond characteristics as in Eq. (3). Negative values of β_0 and β_1 are consistent with our prediction that default clauses are set less restrictively when the costs of triggering them are larger for bondholders.

Our measures for bondholders' expected bankruptcy costs are economically significant. On average, capitalized R&D expenditures account for about 3 % of total assets, while the total amount of capitalized R&D and advertising expenses and goodwill account for 16 % of total assets (see Table 3, Panel A). The average firm has syndicated loan amounts outstanding of $4.5 billion dollars when it issues a bond; this accounts for about 13 % of average total assets.

In Panel A of Table 5, we present the results of estimating Eq. (4). We report the results for the default clause index in columns 1 and 2 and those for the number of default clauses in columns 3 and 4. The results based on these two measures are fairly consistent, generally supporting our prediction that the restrictiveness of default clauses in bond contracts decreases with expected bankruptcy costs. The coefficients of *Intangible capital* and *R&D capital* are all significantly negative, indicating that bond default clauses are less restrictive for firms with higher liquidation costs. The effects of expected bankruptcy costs are also economically significant. A one standard deviation increase in these proxies lowers the restrictiveness index of default clauses by 0.21–0.24, which accounts for 11–14 % of the standard deviation of the index. The statistical and economic significance of the results are similar when we use the number of default clauses as a dependent variable (columns 3 and 4). We further find that the coefficient of *Prior loan* is negative and statistically significant across all regressions. For instance, the effect of a one standard deviation increase in bank loan amounts outstanding on the default clause index accounts for around 18 % of the index's standard deviation. Our findings show that the increase in liquidation costs as a consequence of higher existing senior claims leads to a significant decrease in the restrictiveness of bond default clauses.

Beatty et al. (2012) show that the use of a cross-acceleration clause in bond contracts increases with borrowers' going-concern relative to liquidation values,

Table 5 Determinants of default clause restrictiveness: bond sample

Panel A: Include cross-default clause

	Default clause index		No. of default clauses	
	1	2	3	4
Intangible capital	−1.616***		−0.175***	
	(−3.41)		(−3.84)	
R&D capital		−0.046***		−0.005***
		(−2.78)		(−3.01)
Prior loan	−0.041***	−0.043***	−0.003***	−0.004***
	(−4.55)	(−5.04)	(−4.25)	(−4.77)
Firm size	−0.084	−0.057	−0.006	−0.004
	(−0.96)	(−0.63)	(−0.75)	(−0.43)
Leverage	0.123	−0.069	0.029	0.008
	(0.17)	(−0.10)	(0.45)	(0.13)
Interest coverage	−0.006	−0.002	−0.000	0.000
	(−0.89)	(−0.35)	(−0.42)	(0.26)
Market-to-book	0.067	0.064	0.003	0.002
	(0.74)	(0.68)	(0.28)	(0.23)
Credit rating	0.100***	0.102***	0.009**	0.010***
	(2.70)	(2.80)	(2.50)	(2.58)
Yield spread	−0.015	0.001	0.001	0.003
	(−0.31)	(0.03)	(0.24)	(0.64)
Bond size	−0.192***	−0.154***	−0.017***	−0.013***
	(−3.88)	(−3.20)	(−3.89)	(−2.83)
Maturity	−0.006	−0.004	−0.001	−0.000
	(−1.28)	(−0.92)	(−1.15)	(−0.81)
Number of covenants	0.216***	0.218***	0.019***	0.019***
	(8.11)	(8.21)	(7.67)	(7.68)
Model specification	OLS	OLS	Poisson	Poisson
Industry and year fixed effects	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes
No. of observations	2366	2366	2366	2366
Adjusted/pseudo R^2	0.40	0.40	0.02	0.02

Panel B: Exclude cross-default clause

	Default clause index		No. of default clauses	
	1	2	3	4
Intangible capital	−0.861**		−0.106**	
	(−2.08)		(−2.47)	
R&D capital		−0.030**		−0.003**
		(−2.12)		(−2.21)

Table 5 continued

Panel B: Exclude cross-default clause

	Default clause index		No. of default clauses	
	1	2	3	4
Prior loan	−0.027***	−0.028***	−0.002***	−0.003***
	(−3.75)	(−4.02)	(−3.30)	(−3.54)
Model specification	OLS	OLS	Poisson	Poisson
Control variables	Yes	Yes	Yes	Yes
Industry and year fixed effects	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes
No. of observations	2366	2366	2366	2366
Adjusted/pseudo R^2	0.32	0.32	0.01	0.01

This table presents the results for the determinants of the restrictiveness of default clauses in the bond sample. In columns 1 and 2 of each panel, we report OLS regression results using as the dependent variable the default clause index of a bond, calculated as the sum of individual default clause scores. In columns 3 and 4, we report Poisson regression results, where the dependent variable is the number of default clauses. Panel A presents the results using all default clauses. Panel B presents the results with the cross-default clause excluded from the calculation of default clause index and number of default clauses. To conserve space, the effects of control variables are omitted from Panel B. The *t*- (z)-statistics are reported in parentheses

***, **, * Significance at the 1, 5, and 10 % levels, respectively. Robust standard errors are clustered at the firm level. Variable definitions are in "Appendix 2"

consistent with our findings in Panel A of Table 5. As different clauses could play different monitoring roles, it is not clear whether Beatty et al.'s conclusions can be extended to other types of default clauses. To rule out the possibility that the results in Panel A of Table 5 are completely driven by the cross-acceleration clause, we repeat the analyses with the cross-acceleration clause excluded and report the results in Panel B. For brevity, we only report the effects of expected bankruptcy costs. We continue to find significantly negative effects for *Intangible capital*, *R&D capital*, and *Prior loan*, indicating that the effects of expected bankruptcy costs are not driven by the cross-acceleration clause.

To provide additional support for the notion that default clauses are designed to partly address inter-creditor coordination issues, we further explore the effects of prior loan lenders on the association between expected bankruptcy costs and the default clause restrictiveness in bond contracts. We compare the effects of expect bankruptcy costs in subsamples constructed based on the magnitude of the loan amount outstanding (scaled by the bond amount), under the assumption that the inter-creditor coordination issues are more significant when there is more senior debt outstanding.[29] The results in Table 6 indicate that the coefficients of *Intangible capital* and *R&D capital* are significantly negative only in the subsample with the largest syndicated debt amount outstanding (i.e., the top quartile). Differences in the

[29] We also compare the effects of expected bankruptcy costs in subsamples constructed based on the number of existing loan lenders, assuming that the inter-creditor coordination problems are more serious when there are more existing loan lenders that need to negotiate. We find similar results.

Table 6 Effects of Expected Bankruptcy Costs on Restrictiveness of Bond Default Clauses: The Role of Prior Loans

	Default clause index				No. of default clauses			
	Quartile of prior loan amounts				Quartile of prior loan amounts			
	Top 1	Bottom 2	Top 3	Bottom 4	Top 5	Bottom 6	Top 7	Bottom 8
Intangible capital	−2.003***	−0.106			−0.201***	−0.028		
	(−2.58)	(−0.13)			(−2.93)	(−0.36)		
R&D capital			−0.060*	0.012			−0.005*	−0.001
			(−1.78)	(0.49)			(−1.65)	(−0.20)
Model specification	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	589	595	589	595	589	595	589	595
Adjusted/pseudo R^2	0.56	0.36	0.52	0.36	0.02	0.02	0.02	0.02
p value for the difference across subsamples	0.090		0.084		0.093		0.221	

This table presents the results for the effects of expected bankruptcy costs on the restrictiveness of bond default clauses in the subsamples with different prior loan amounts. We separately estimate the regressions used to generate the results in Table 5 for the subsamples of the top and bottom quartiles of prior loan amounts scaled by the bond amounts. We report OLS regression results, where the dependent variable is the default clause index of a bond, calculated as the sum of individual default clause scores, and Poisson regressions when the dependent variable is the number of default clauses. To conserve space, the effects of control variables are omitted from both panels. The *t*- (z)-statistics are reported in parentheses

***, **, * Significance at the 1, 5, and 10 % levels, respectively. Robust standard errors are clustered at the firm level. Variable definitions are in Appendix 2

effects of *Intangible capital* across the subsamples are significant at the 10 % level. The results on *R&D capital* are not as strong, which is not surprising given that its economic significance relative to total assets is smaller relative to intangible capital.

In sum, we find that the number and restrictiveness of default clauses in bond contracts significantly decrease with expected bankruptcy costs, and that bondholders use less restrictive default clauses when bank loans are present in the capital structure of the borrower. We further document that the effect of expected bankruptcy costs on default clause restrictiveness is stronger when the potential inter-creditor coordination problem is more pronounced. This evidence is consistent with our hypothesis that lenders require less restrictive default clauses when the expected costs of triggering them are higher. Bondholders design debt contracts to avoid the costs associated with default liquidations by accepting less restrictive default clauses that lower the probability of default.

5.3 The pooled sample of bonds and loans

As discussed in Sect. 2, we expect that loan default clause restrictiveness is less sensitive to liquidation costs than the restrictiveness in bond contracts. An event of default is less likely to lead to asset liquidation in the case of bank lenders due to their lower renegotiation costs. To support this prediction, we combine the bond and loan samples and include an indicator variable for bonds (*Bond*) and its interactions with *Intangible capital* and *R&D capital*. We estimate the following OLS (for the default clause index) or Poisson (for the number of default clauses) regression:

$$\begin{aligned} &\textit{Default clause index } (\textit{No. of default clauses}) = \alpha_0 + \beta_0 \textit{Bond} \\ &\quad + \beta_1 \textit{Intangible capital } (\textit{R\&D capital}) \\ &\quad + \beta_2 \textit{Bond} \times \textit{Intangible capital } (\textit{R\&D capital}) + \beta_3 \textit{Firm controls} + \beta_4 \textit{Bond/Loan} \\ &\quad \textit{Controls} + \textit{Year FE} + \textit{Industry FE} + \textit{Lead underwriter FE} + \varepsilon. \end{aligned} \tag{5}$$

We control for the same set of firm and bond/loan characteristics as in Table 4. In addition to a negative value of β_0 as in Sect. 4.2, we expect that β_2 will be negative. We do not have a prediction on the sign of β_1 because the effect of liquidation costs on the default clause restrictiveness in loan contracts is not clear, as an event of default in loan contracts may not result in liquidation of the borrower's assets.

The results in Table 7 are consistent with our predictions. First, the coefficients on *Bond* are strongly negative in all regressions, consistent with the results in Table 4. Second, the coefficients of the interaction terms are all significantly negative, indicating that the effect of liquidation costs on default clause restrictiveness is stronger in bond contracts than in loan contracts. Third, the effect of *Intangible capital* is insignificant in column 1, while *R&D capital* is insignificant in both columns 2 and 4, indicating that default clause restrictiveness in loan contracts is not affected by expected liquidation costs. The effects of the control

Table 7 Determinants of default clause restrictiveness: pooled sample

	Default clause index		No. of default clauses	
	1	2	3	4
Bond	−5.357***	−5.583***	−0.492***	−0.513***
	(−23.88)	(−25.93)	(−24.62)	(−26.72)
Intangible capital	−0.602		−0.069**	
	(−1.59)		(−2.05)	
Intangible capital × *bond*	−1.608***		−0.171***	
	(−2.84)		(−3.24)	
R&D capital		−0.018		−0.001
		(−1.36)		(−1.24)
R&D capital × *bond*		−0.038*		−0.005***
		(−1.93)		(−2.69)
Firm size	−0.169**	−0.154**	−0.017***	−0.016***
	(−2.47)	(−2.23)	(−3.09)	(−2.76)
Leverage	−0.045	−0.188	−0.001	−0.012
	(−0.14)	(−0.59)	(−0.06)	(−0.47)
Interest coverage	−0.001	−0.001	−0.000	−0.000
	(−0.87)	(−0.47)	(−0.45)	(−0.12)
Market-to-book	0.026	0.039	0.003	0.004
	(0.45)	(0.65)	(0.55)	(0.67)
Credit rating	0.175***	0.177***	0.018***	0.019***
	(6.91)	(7.05)	(8.93)	(8.99)
Yield/interest spread	0.035	0.057	0.007	0.009**
	(0.79)	(1.28)	(1.61)	(2.08)
Bond/loan size	−0.144***	−0.122**	−0.011**	−0.009*
	(−2.68)	(−2.03)	(−2.33)	(−1.72)
Maturity	−0.002	0.001	−0.000	0.000
	(−0.37)	(0.14)	(−0.07)	(0.43)
Number of covenants	0.118***	0.116***	0.008***	0.008***
	(7.05)	(6.84)	(5.70)	(5.38)
Model specification	OLS	OLS	Poisson	Poisson
Industry and year fixed effects	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes
No. of observations	4861	4861	4861	4861
Adjusted/pseudo R^2	0.79	0.79	0.15	0.15

This table presents the results for the determinants of the restrictiveness of default clauses in the pooled sample of bond and loan contracts with credit ratings available. In columns 1 and 2, we report OLS regression results using as the dependent variable the default clause index of a bond, calculated as the sum of individual default clause scores. In columns 3 and 4, we report Poisson regression results, where the dependent variable is the number of default clauses. The *t*- (z)-statistics are reported in parentheses

***, **, * Significance at the 1, 5, and 10 % levels, respectively. Robust standard errors are clustered at the firm level. The variable *Bond* is an indicator variable for bonds. Other variable definitions are in "Appendix 2"

Table 8 Determinants of default clause restrictiveness: propensity score matched sample

Panel A: First-stage probit model for matching

	Bond	
	Coef.	z-stat
Discretionary accruals	−0.015***	−3.07
Firm size	0.503***	40.28
Market-to-book	0.121***	6.51
O-score	−0.041***	−2.85
Tangibility	0.773***	10.69
Leverage	−0.190	−1.43
Capital market access	0.460***	10.10
No. of observations	11,242	
Pseudo R^2	0.42	

Panel B: Summary statistics for bonds and loans in matched sample

	Mean		*p* value for *T* test
	Bonds	Loans	
Discretionary accruals	0.32	0.43	0.297
Firm size	8.53	8.53	0.851
Market-to-book	1.75	1.80	0.124
O-score	−5.29	−5.27	0.815
Tangibility	0.42	0.42	0.691
Leverage	0.27	0.27	0.780
Capital market access	0.83	0.85	0.195
Default clause index	10.35	15.59	0.000
No. of default clauses	5.83	9.35	0.000

Panel C: Determinants of default clause restrictiveness

	Default clause index			No. of default clauses		
	1	2	3	4	5	6
Bond	−5.677***	−5.327***	−5.617***	−0.525***	−0.488***	−0.517***
	(−19.87)	(−17.37)	(−19.70)	(−20.75)	(−18.08)	(−20.49)
Intangible capital		0.282			0.007	
		(0.48)			(0.13)	
Intangible capital × bond		−2.228***			−0.234***	
		(−2.86)			(−3.29)	
R&D capital			0.002			0.000
			(0.10)			(0.22)
R&D capital × bond			−0.037*			−0.005**
			(−1.67)			(−2.44)
Model specification	OLS	OLS	OLS	Poisson	Poisson	Poisson
Control variables	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 continued

Panel C: Determinants of default clause restrictiveness

	Default clause index			No. of default clauses		
	1	2	3	4	5	6
Industry and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Lead underwriter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2164	2164	2164	2164	2164	2164
Adjusted/pseudo R^2	0.74	0.74	0.74	0.11	0.11	0.11

We repeat the regression used to generate the results in Tables 4 and 7 using a matched sample of bonds and loans and report the results in this table. We use propensity score matching to match firms based on the determinants of debt-market choice. Specifically, we match firms that issue bonds to those that issue loans on discretionary accruals, firm size, market-to-book, O-score, tangibility, leverage, and capital market access. Using the nearest neighbor matching with no replacement and a caliper of 0.01, we obtain a matched sample of 2164 observations. Panel A presents the first-stage probit regression results. Panel B reports summary statistics of matching variables and default clause restrictiveness measures for bonds and loans in the matched sample. Panel C presents the regression results for the effects of expected bankruptcy costs on default clause restrictiveness using the matched sample. The *t*- (z)-statistics are reported in parentheses. Robust standard errors are clustered at the firm level. The variable *Bond* is an indicator variable for bonds. Other variable definitions are in "Appendix 2"

***, **, * Significance at the 1, 5, and 10 % levels, respectively

variables are also consistent with those in Tables 4 and 5. In particular, the effects of *Credit rating* and *Number of covenants* are all significantly positive.[30]

Firms issuing bonds and loans differ fundamentally (Bharath et al. 2008; Hadlock and James 2002; Krishnaswami et al. 1999). To further control for the differences in firm characteristics across the two samples of bonds and loans, we employ propensity-score matching to create a matched sample of firms that issue bonds and loans. We match firms that issue bonds to those that issue loans based on firm size, market-to-book, O-score, asset tangibility, leverage ratio, the ability to access capital market, and discretionary accruals (Bharath et al. 2008). Definitions of these matching variables are provided in "Appendix 2". Using nearest neighbor matching with no replacement and a caliper of 0.01, we obtain a matched sample of 2164 observations (1082 bonds and 1082 loans).

Panel A of Table 8 presents the results for the first-stage probit regression. Consistent with Bharath et al. (2008), larger firms and firms with higher accounting quality, higher market-to-book ratio, lower credit risk, higher asset tangibility, and better access to the capital market are more likely to issue bonds. Following Armstrong et al. (2010), we examine the covariate balance between the bonds and loans to ensure that the observable dimensions of the matched pairs are similar. We compare the means of matching variables across bonds and loans in the matched

[30] In untabulated tests, we run two alternative specifications that use the full sample of bond and loans. First, we include all loans by replacing *Credit rating* with *O-score*. Second, we include all loans by assigning the lowest rating to unrated firms and include a dummy variable for unrated firms in the regression. In both cases, the results are very similar to those reported in Table 7.

sample in Panel B of Table 8. The differences across bonds and loans are all statistically insignificant, indicating that we obtain a desirable covariate balance. Finally, we repeat the regressions used to generate the results in Tables 4 and 7 using the matched sample and report the results in Panel C of Table 8. We find qualitatively similar results, which indicates that our findings are robust to controlling for the endogeneity of debt market choice.

The results in this section indicate that bond contracts have less restrictive default clauses when the expected default costs, proxied by the amount of intangible assets and existing syndicated loans, are higher. In contrast, the default clause restrictiveness in loan contracts is less sensitive to the extent to which the borrowing firms rely on intangible assets. This difference is due to the fact that an event of default may not result in the liquidation of the borrower's assets. These findings are consistent with our hypothesis that lenders require less restrictive default clauses when the expected costs of triggering them are higher.

6 Conclusion

We investigate factors that drive the restrictiveness of default clauses, a common set of provisions in debt contracts that allows lenders to request the repayment of debt principal and to terminate lending commitments. Although default clauses provide comprehensive contractual mechanisms that facilitate the allocation of control rights to lenders when borrowers underperform, the literature on the characteristics and determinants of these provisions is limited. We fill this gap by manually coding and analyzing the definitions of events of default in a large sample of bond and loan contracts issued by nonfinancial public firms in the United States.

We predict and find that lenders set less restrictive default clauses if they expect high costs when events of default are triggered. We document that default clauses are more restrictive in loan contracts than in bond contracts, consistent with the higher renegotiation costs faced by bondholders in resolving default and their more subordinated debt claims. We also find that two ex ante proxies for borrower-specific bankruptcy costs, the level of capitalized intangible assets and research and development expenditures at the time of debt contracting, are associated with less restrictive default clauses, especially in bond contracts. Our evidence is consistent with the interpretation that bondholders write default clauses to prevent defaults, given that, relative to bank lenders, their default costs are typically higher. Bondholders' default costs are larger due to their conflicting incentives, inability to coordinate efficiently, and the fact that their claims are typically not secured by tangible asset collateral and are subordinate to banks' claims.

Our evidence on the specification of bond and loan default clauses adds to the debt contracting literature by highlighting that the design of contractual mechanisms that facilitate the transfer of control rights to lenders is impacted by lenders' expected costs when these mechanisms are used. Our findings complement prior work on the contracting role of covenants by documenting the structure of the *full* set of debt contractual mechanisms that provide control rights to lenders. We do not investigate the extent to which the presence of these mechanisms and their

contractual specification has subsequent consequences with respect to borrowers' operational, financial, and investment activities and the value of lenders' claims. We leave these aspects to future research.

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Appendix 1: Descriptions of major default clauses

See Table 9.

Table 9 This appendix provides general descriptions and specific examples (extracted from sample contracts) for all default clauses summarized in Table 1

Name	Debt contract	Description	Examples (from debt contracts)
Bankruptcy filing	Bonds and loans	The borrower's filing for bankruptcy, insolvency, or reorganization	Events of bankruptcy, insolvency, or reorganization
Principal payment	Bonds and loans	The borrower's failure to pay the principal of a bond or loan	Default in the payment of principal or premium, if any, when due
Interest payment	Bonds and loans	The borrower's failure to pay interest on a bond or loan	Failure to pay interest when due
Covenant breach	Bonds and loans	The borrower's violation of a debt covenant	Default in the performance of, or breach of, any other covenant or warranty contained in the contract for the benefit of debt securities
Cross-default	Bonds and loans	The borrower is required to accelerate the payment of the debt principal because an event of default has occurred with respect to other debt instruments or the payment of other debt instruments' principal has been accelerated	Default for 10 days after notice as provided in the contract, in respect of any other indebtedness for borrowed money of the company or any restricted subsidiary in excess of $10,000,000 that has been declared due and payable prior to maturity
Court order	Bonds and loans	The borrower's failure to meet financial obligations from a court order	A final judgment or judgments that exceed $5,000,000 or more in the aggregate, for the payment of money, having been entered by a court or courts of competent jurisdiction against the Company or any of its subsidiaries and such judgment or judgments are not satisfied, stayed, annulled or rescinded within 60 days of being entered

Table 9 continued

Name	Debt contract	Description	Examples (from debt contracts)
Invalid guarantees	Bonds and loans	The guarantees received by the borrower from third parties become invalid	Any of the guarantees cease to be in full force and effect, or any of the guarantees are declared to be null and void or invalid and unenforceable, or any of the subsidiary guarantors denies or disaffirms its liability under its guarantees (other than by reason of release of a subsidiary guarantor in accordance with the terms of the Indenture)
Non-debt liabilities	Bonds and loans	The borrower's failure to meet non-debt liabilities	Failure or refusal to pay when due any taxes, assessments, insurance, claims, liens, or encumbrances
Report of fundamental change	Bonds and loans	The borrower's failure to report fundamental changes with respect to its activities	Failure to provide notice of the occurrence of a merger, acquisition, sale and lease-back transaction, share delisting, significant change in the membership of the board etc. as required by the contract
Sinking funds	Bonds	The borrower's failure to deposit cash into a sinking fund as required in the bond contract	Default in the deposit of any sinking fund payment when due, which default continues for 30 days
Redemption	Bonds	The borrower's failure to redeem the bond when bondholders exercise the redemption option	Default in the obligation to redeem the notes after bondholders have exercised their option to redeem
Conversion	Bonds	The borrower's failure to meet the conversion requirement when bondholders exercise the conversion option	Default in the obligation to deliver the settlement amount on conversion of the notes, together with cash in lieu thereof in respect of any fractional shares, on conversion of any notes, and such default continues for a period of 5 days or more
Change in control	Loans	The acquisition of borrower's ownership above a certain percentage by any person or entity	Any change in control, in which the co-administrative agents and the banks notify the company within 30 days after first being notified by the Company of the change in control that the co-administrative agents and the banks do not consent to the change in control
ERISA events	Loans	The failure to meet the funding obligations under the Employee Retirement Income Security Act (ERISA) of 1974	Any of the following events shall occur with respect to any pension plan: (1) the institution of any steps by the company, any member of its controlled group, or any other person to terminate a pension plan if, as a result of such termination, the company or any such member could reasonably expect to be required to make a contribution to such pension plan, or could reasonably expect to incur a liability or obligation to such pension plan in excess of $75,000,000; or (2) a contribution failure occurs with respect to any pension plan that gives rise to a lien under Section 302(f) of ERISA with respect to a liability or obligation in excess of $75,000,000

Table 9 continued

Name	Debt contract	Description	Examples (from debt contracts)
Pending litigation	Loans	The existence of pending litigation against the borrower that potentially has a material effect	Notice given to the borrower by the agent or any bank that, in the opinion of the agent or such bank, any litigation or governmental proceeding which has been instituted against the borrower or any subsidiary will reasonably be likely to have a material adverse effect, and within 30 days after such notice, (1) such litigation or proceeding is not dismissed or (2) an opinion of the borrower's or the affected subsidiary's trial counsel shall not have been received by each Bank, in form and substance satisfactory to each bank, that the borrower or the affected subsidiary has a meritorious position and will ultimately prevail in the proceedings
Other clauses	Bonds and loans	Other clauses that do not appear in our pilot samples of 100 bonds and 100 loans	Failure by any borrower to furnish financial information when due or when requested, or permit the inspection of its books or records
			Loss of any required government approvals and/or any governmental regulatory authority institutes action which, in the opinion of bank, will adversely affect the borrower's condition, operations, or ability to repay the loan and/or line of credit
			Uninsured Losses. Any loss, theft, damages, or destruction of any material portion of the collateral not fully covered (subject to such deductibles as agent shall have permitted) by insurance

Appendix 2: Variable definitions

See Table 10.

Table 10 This appendix provides the definitions of all variables used in the analyses

Variable	Definition
Bond	Indicator variable equal to 1 if the contract is a bond contract and 0 if it is a loan contract
Bond/loan maturity	Difference between the issue date and the maturity date of the bond/loan
Bond/loan size	The natural logarithm of the bond/loan amount
Capital market access	Indicator variable that takes the value 1 if the firm has a prior bond issue and 0 otherwise
Credit rating	Numeric values assigned to firm/bond ratings offered by S&P's or Moody's, ranging from 1 to 20 with the rating "AAA" equal to 1

Table 10 continued

Variable	Definition
Default clause index	Sum of individual default clause scores
Discretionary accruals	Abnormal accruals computed using the modified Jones model from Dechow et al. (1995)
Firm size	The natural logarithm of total assets
Intangible capital	The sum of capitalized R&D, capitalized advertising expenses, and goodwill scaled by total assets. R&D and advertising expenses are capitalized using a 20 % annual amortization rate
Interest coverage	The ratio of operating income before depreciation to interest expense
Interest spread	Amount the borrower pays in percentage over LIBOR or the LIBOR equivalent for each dollar drawn down
Leverage	The ratio of long-term debt to total assets
Market-to-book	The ratio of market value of a firm's equity to the book value of equity
No. of covenants	Number of covenants included in a bond/loan contract
No. of default clauses	Number of events of default included in a bond/loan contract
O-score	Ohlson's (1980) score: O-score $= -1.32 - 0.407 \times$ log(total assets/GNP price-level index) $+ 6.03 \times$ (total liabilities/total assets) $- 1.43 \times$ (working capital/total assets) $+ 0.076 \times$ (current liabilities/current assets) $- 2.37 \times$ (net income/total assets) $- 1.83 \times$ (funds from operations/total liabilities) $+ 0.285 \times$ (1 if net loss for the last 2 years, else) $- 0.521 \times$ (net income-lag net income)/(|net income| + |lag net income|)
Prior loan	The natural logarithm of (1 + existing loan amounts) at the time of bond issue
R&D capital	The ratio of capitalized R&D expenditures to total assets, multiplied by 100. R&D expenditures are capitalized over 5 years using the straight-line amortization method
Tangibility	Net property, plant, and equipment scaled by total assets
Yield spread	Difference between the bond yield at issuance and the yield of a US. Treasury bill with matched maturity

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