

Comments Welcome

## **Syndicated Loan Risk: The Effects of Covenants and Collateral\***

by

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### **Abstract**

This paper presents a new approach that quantifies how a credit rating agency and investors believe collateral and covenants affect the risk of syndicated loans. First, it analyzes how a loan's covenants and collateral affect the difference between the loan's credit rating and the senior, unsecured credit rating of the borrowing firm. Second, it examines how a loan's covenants and collateral affect the difference between the borrowing firm's senior, unsecured credit default swap (CDS) spread and its loan's credit spread. The credit rating agency and investors agree that collateral and particular types of covenants (interest or fixed charge coverage and dividend restrictions) are especially important for reducing loan risk, and the impacts of these loan provisions are greater the riskier is the borrowing firm. They also agree that other covenants (excess cashflow and equity issuance sweeps) are actually detrimental to a loan's credit quality. There is some disagreement on the relative importance of collateral and covenants for term loans versus revolving lines of credit.

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Global syndicated loan issuance was \$4.7 trillion in 2015, with U.S. loans accounting for about half of the volume.<sup>1</sup> Evaluating the risks of this large market is complex because a loan's default losses depend on the financial condition of its borrowing firm and also the intricate terms of its loan agreement. Specifically, a loan contract's covenants and collateral may alter the loan's default risk relative to that of debt that lack these provisions, such as most corporate bonds.<sup>2</sup> Quantifying how default risk is influenced by collateral and various types of covenants is the focus of this study.

There is substantial theoretical research on the role of collateral and covenants in debt contracting. While the literature generally agrees that, *ceteris paribus*, collateral and covenants reduce a loan's default risk, it lacks consensus as to whether high-risk firms or low-risk firms will typically employ these contract terms.<sup>3</sup> Similarly, theory has ambiguous predictions on how firm risk relates to the choice of loan covenants.<sup>4</sup> These divergent theoretical predictions create challenges to empirically estimating the impact of collateral and covenants on loan risk because simply comparing loan risk measures, such as credit spreads, for loans with and without these contract terms can lead to biased inference. If collateral and covenants are chosen more often by high (*low*) risk firms, credit spreads of collateralized and covenant-intensive loans will underestimate (*exaggerate*) the impact of these contract terms if there is not proper account of the firms' higher (*lower*) risk.

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<sup>1</sup> Volume in 2015 was 3% lower than in 2014. See Thomson Reuters *Syndicated Loans Review*, Full Year 2015. For comparison, issuance of U.S. corporate bonds was below \$1.5 trillion for both 2014 and 2015 <http://www.sifma.org/research/statistics.aspx>.

<sup>2</sup> Bradley and Roberts (2015) survey prior research showing that public bonds typically have little or no covenants.

<sup>3</sup> For example, in Bester (1985), Chan and Kanatas (1985), and Besanko and Thakor (1987) collateral creates incentives for a firm to select low-risk projects or it acts as a quality screening device. In these models, firms with collateralized debt have low risk, in equilibrium. In contrast, collateralized debt can solve a firm's underinvestment problem, as in Stulz and Johnson (1985), or give the lender the power to force a debt renegotiation, as in Bester (1994). In these models, collateralized loans are more likely to be chosen by riskier firms.

<sup>4</sup> Covenants will be more common in loans of risky firms if they give lenders the power to force early liquidation, as in Berlin and Mester (1992), or create incentives for lenders to monitor, as in Rajan and Winton (1995) and Park (2000). However, in Gârleanu and Zwiebel (2009) covenants are a screening device where lower-risk firms choose covenant-intensive loans.

Indeed, empirical evidence suggests that collateral requirements and covenants are more common features in debt issued by riskier firms. Without conditioning on firm risk, Berger and Udell (1990) find that collateralized loans have higher credit spreads than uncollateralized ones. John, Lynch, and Puri (2003) present evidence that the credit spreads of secured bonds exceed those of unsecured bonds.<sup>5</sup> Regarding covenants, Malitz (1986), Begley (1994), and Billett et al. (2007) find that the bonds of smaller and higher-leveraged firms are more likely to contain covenants. Bradley and Roberts (2015) examine syndicated loans issued over the 1993 to 2001 period and find that a loan's likelihood of containing various types of covenants is positively-related to leverage and negatively-related to size.

Bradley and Roberts (2015) show that when not conditioning on the borrowing firm's risk, the credit spread on a syndicated loan is positively-related to the loan's covenant intensity. However, they also use a Heckman (1979) -type model to estimate what would be a loan's credit spread with and without covenants based on the firm's risk characteristics. For example, for a firm having a particular covenant in its loan, they estimate what would be the loan's credit spread if the firm's loan did not have this covenant.<sup>6</sup> The results of their estimation show that a firm's selection of covenants is consistent with a decline in the loan's credit spread.

The current paper has a similar goal in seeking to quantify the impact that particular covenants and collateral have on a loan's credit risk. Its approach differs from previous work because it uses direct measures for both the credit risk of a firm's syndicated loan, which reflects covenants and collateral, and for the credit risk of the same firm's debt that excludes covenants and collateral. These measures involve no modeling assumptions, and by comparing them the independent effects of covenants and collateral can be isolated. In fact, this paper analyzes two different sets of credit risk measures: one based on credit ratings and the other based on credit

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<sup>5</sup> Their tests control for the bonds' credit rating, but only at the whole letter level and not at the notch level. They also do not control for time fixed effects in credit spreads nor do they simultaneously control for the presence of both collateral and covenants.

<sup>6</sup> Similarly, for a firm that does not choose a particular covenant in its loan, they model what would be the loan's credit spread if it did have this covenant.

spreads. As a result, the impact of covenants and collateral on loan risk can be estimated from both credit rating agency and investor perspectives.

The first set of measures takes advantage of the now-common practice of assigning credit ratings to syndicated loans. Agencies began rating syndicated loans in the mid-1990s. By 1998 approximately 45% of syndicated loans were rated and around 80% are rated in recent years (Standard & Poor's (2013)). In most cases, a firm that receives an "issue" rating for its syndicated loan will also be rated at the firm or "issuer" level. A firm rating is a general rating of the firm's senior unsecured debt and debt-like obligations that is not linked to a specific debt contract. In contrast, the firm's syndicated loan rating is an issue-specific rating that reflects the existing firm rating but also incorporates the specific terms (including collateral and covenants) of the loan being rated. Therefore, the difference between a given borrower's loan rating and firm rating should measure the collateral and covenant-specific effects on loan risk while cancelling most firm-level variation.

The second set of measures analyzed in this paper are the credit spread on the firm's syndicated loan and a maturity-matched credit default swap (CDS) spread on the firm's senior, unsecured debt. Similar to a firm credit rating, a senior, unsecured CDS spread reflects the risk of a generic class of the firm's uncollateralized debt that typically does not have covenants. Moreover, in a frictionless, arbitrage-free market, a CDS spread equals the credit spread on a floating-rate bond, making it comparable to the spread on a syndicated loan which is also floating-rate debt.<sup>7</sup> Therefore, the difference between a firm's senior, unsecured CDS spread and its syndicated loan spread should eliminate firm-level risk and leave only the reduction in risk associated with the loan's covenants and collateral.

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<sup>7</sup> See, for example, Bomfim (2016) page 73 for a derivation of this result. In principle, the yield spread on a syndicated loan could be compared to the yield spread on one of the firm's bonds. However, most bonds have fixed coupons and are callable, requiring additional adjustments that would involve more approximation error.

By differencing loan-specific versus firm-specific measures of credit ratings or credit spreads, the paper is able to use relatively large numbers of observations reflecting a credit rating agency's and investors' ex-ante views of how covenants and collateral affect default risk. In a similar spirit, Moody's (2003, 2004b) carried out an "ex-post" default comparison based on a smaller sample of firms that had both syndicated loans and bonds when the firms actually defaulted. They found that the default rate on syndicated loans was 20% lower than the default rate on bonds, and for firms that defaulted on both their loans and bonds, the median loss severity rate for loans was 56% of that for the firm's senior unsecured bonds.<sup>8</sup> The current paper also uses a within-firm but "ex-ante" default comparison based on a much larger sample of over 3,500 loans. The larger sample size allows for more detailed analysis of the risk-reduction effects of specific types of covenants on particular types of loans.

The paper's empirical work analyzes how a loan's credit measure, in excess of the firm's senior unsecured credit measure, relates to the loan's collateral status and to various types of covenants contained in the loan's contract. There are three main categories of covenants: affirmative covenants; negative covenants; and financial covenants. Affirmative covenants state actions the borrower must take while the loan is outstanding, such as payment of interest and fees, providing audited financial statements, maintaining insurance, and paying taxes. Since these covenants are bare minimums and exist in virtually all loan contracts, they are excluded in this study because they do not vary across loans.

Negative or "non-financial" covenants restrict a borrower's actions, such as limiting the type and the amount of acquisitions, new issues, and asset sales. They may also require a mandatory loan prepayment, known as a "sweep," if the borrower obtains proceeds from a debt or equity issue or from an asset sale. Financial or "maintenance" covenants require borrowers to

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<sup>8</sup> Loans and bonds have different (non-technical) default rates because some defaults occur outside of bankruptcy. For example, a firm may violate one of its loan covenants, and banks may force a default on the firm's bond payment that leads to a bond restructuring but no default on the loan.

maintain stipulated levels of a financial ratio or value, such as maintaining an interest coverage ratio or an amount of net worth above pre-specified minimums.

If a borrowing firm fails to satisfy a covenant, a technical default results. Lenders will often waive these covenant violations in return for renegotiating the loan's terms, such as raising the interest rate or requiring more collateral. Thus, by raising lenders' compensation or enhancing their recovery value, covenants are able to protect investors against default losses.

Previous research has proposed various measures of covenant intensity and strictness. The most commonly used covenant intensity index (Bradley and Roberts (2015)) is a weighted average of a seemingly arbitrary subset of covenants that primarily restrict borrower actions and put little weight on financial covenants. In contrast, several covenant strictness measures focus solely on financial covenants (Drucker and Puri (2009), Demiroglu and James (2010), Murfin (2012)). One contribution of the current paper is to determine the relative importance of covenants based on how they impact credit risk. Its estimates can guide the construction of a new covenant intensity measure that is directly linked to credit risk reduction.

The paper performs two sets of regression exercises. The first uses the difference between a loan's credit rating and the borrower's firm rating as the dependent variable, while in the second the dependent variable is the "CDS – loan basis," equal to the borrowing firm's senior, unsecured CDS spread minus its loan's all-in-drawn spread. The regression's explanatory variables are indicators for whether the loan is collateralized and whether it contains various types of covenants, as well as other variables controlling for the loan's characteristics.

One finding is that various covenant intensity measures and collateral are associated with an improvement in loan ratings and a reduction in loan spreads. As a group, financial covenants appear more important for raising a loan's credit rating while non-financial covenants are relatively more valuable for reducing a loan's credit spread. Overall, secured loans are rated  $\frac{1}{2}$

notch higher, and have about a 30 basis point lower credit spread, than unsecured loans.<sup>9</sup> This improvement is not unimportant since, on average, syndicated loans are rated only one whole notch higher than the issuing firm's rating.

Other findings relate to the effects of individual types of covenants. Two covenants are most important for improving loan credit ratings. One is a nonfinancial covenant that restricts dividend payments. The other is a financial covenant requiring a minimum interest coverage ratio. In terms of lowering credit spreads, dividend restrictions continue to be important, but so is the non-financial covenant that requires the loan be paid following an asset sale (asset sales sweep). Financial covenants that set a minimum fixed cost coverage ratio and a maximum on capital expenditures also significantly lower a loan's credit spread. It is intriguing that both the credit rating agency and investors view two covenants as actually *raising* loan risk: an excess cashflow sweep and an equity issuance sweep. A possible explanation is that excess cashflow and new equity tend to improve a loan's value, and covenants requiring pre-payment after these events may reduce firms' incentives to generate cashflow and issue new equity.

The impact of collateral and covenants can vary by loan type, and there appears to be disagreement among the credit rating agency and investors on this issue. Collateral is found to raise a loan's rating more if it is a credit line (0.64 of a notch) than a term loan (0.31 of a notch). However, the effect of collateral on lowering credit spreads is not significantly different for credit lines (25 basis points) versus term loans (35 basis points). Covenants tend to be relatively more important for improving a term loan's credit rating but, in contrast, investors believe that covenants lower the spreads on credit lines more than term loans.

The paper's last set of findings examine how the impacts of collateral and covenants differ by the level of the borrowing firm's risk, and here the credit rating agency and investors largely agree. Except for the most highly-rated firms, collateral improves a loan's credit rating

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<sup>9</sup> Credit ratings can take 21 levels, known as notches. For example using Moody's scale, Aaa is the highest and C is the lowest. A one notch difference is the difference between neighboring notches, such as Aaa versus Aa1 or Ba1 versus Ba2.

and reduces its credit spread, and the magnitude of the impact is larger the riskier is the borrowing firm. Covenants improve a loan's rating most when the firm has a sub-investment grade "B" firm rating. Similarly, covenants are most effective in reducing a loan's credit spread for firms with the highest risk as proxied by their CDS spreads.

The remainder of the paper is structured as follows. Section I provides information about the data, variables, and summary statistics for our analysis of credit ratings. Section II gives the credit rating results. Section III describes the credit spread data sample, and Section IV provides the results from analyzing these credit spreads. Section V concludes.

## **I. Credit Rating Data, Variables and Summary Statistics**

### *A. Data and Matching*

The credit rating data used in this study is a 1995 to 2012 sample of Moody's syndicated loan ratings at the time of each loan's origination, together with the contemporaneous firm issuer rating of each borrowing firm. Moody's credit ratings are ideal for the analysis because they reflect expected loss rates, equal to the product of a debt instrument's probability of default and loss given default.<sup>10</sup> Each rated loan has a Moody's unique loan identifier and a firm-level identifier which are used to match the loan rating with its firm's rating. Moody's actually uses three types of firm-level ratings: 1) a "long term issuer" rating that rates "long-term senior unsecured debt and debt-like obligations"; 2) a "long term unsecured" rating; and 3) a "long term corporate family" rating that relates to "the corporate family's debt and debt-like obligations." Type 1) is chosen when it is available (29% of the sample). If it is not, the closely-related rating type 2) is chosen if available (28% of the sample). The third type is used for the remaining cases (42% of the sample).<sup>11</sup>

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<sup>10</sup> As discussed earlier, covenants and collateral can affect both the default probabilities and losses given default (recoveries). In contrast, Standard & Poor's (2011) ratings reflect just default probabilities. In December 2003, S&P began issuing a separate rating reflecting loss given default.

<sup>11</sup> As a check to see whether the type 3) corporate family rating was comparable to the type 1 long term issuer rating, these ratings were compared for the cases of firms in which Moody's reported both ratings.



To find the firm rating contemporaneous to the loan rating at origination, a search was done for firm rating updates up to 365 days before the loan is rated. If an updated firm rating within this range was not found, then the search range is extended up to 60 days after the loan was issued, since a firm rating update immediately following the loan issue is likely a more accurate measure of the firm's condition when the loan was rated. If a firm rating does not fall within this time window, the loan rating observation is eliminated from the sample. This procedure generates 7,355 unique loans with both loan ratings and firm ratings.<sup>12</sup>

Next, this sample of rated loans was matched to the LPC Dealscan database which contains information on loan covenants, collateral, maturity, loan type (term loan or revolver), loan purpose, loan size, starting and ending date, and one-digit SIC industry code. Because there is no common identifier of loans between Dealscan and Moody's, loans were matched in two steps starting at the firm level. If a firm is publicly-traded and has a stock ticker symbol in both datasets, the firm is matched using the ticker. When a firm does not have a ticker, it is manually matched by the firm name, checking for name changes and names of subsidiaries. Once both datasets are matched at the firm level, loan matches are identified by the loan's starting date, ending date, and loan type. This procedure yields a final sample of 3,597 loans with both ratings and loan characteristics. Of these, 1,901 (53%) are term loans and 1,696 (47%) are credit lines.

### *B. Variables and Summary Statistics*

Almost 90% of the sample's observations are loans of firms that have a sub-investment grade firm rating, and only 2.6% of the observations are loans of firms that have a firm rating of A3 or higher. Figure 1 shows the sample's overall distribution of firm and loan ratings at the notch level, except that all ratings of A3 to Aaa are grouped into a single category due to the few observations in this range. The figure shows that loan ratings are more frequent than firm ratings

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The ratings were identical for more than 90% of these cases, and for the remaining 10% the average difference was less than one notch. Nevertheless, as a robustness check, the empirical results are similar when observations with corporate family ratings are excluded.

<sup>12</sup> Different window sizes including 180 days before and 30 day after, 90 days before and 15 days after, and only ratings before the loan issue were tried. The results are robust to choosing these different windows.

for ratings B1 and better while the opposite occurs for ratings B2 and worse. The average firm rating is B1 while the average loan rating is Ba3.

A numeric score is assigned to each of the 21 possible Moody's ratings, with the lowest rating, C, equal to 1 and the highest rating, Aaa, equal to 21. Since each loan observation has both a loan rating and a firm rating, it now has two numeric variables, *loan score* and *firm score*.

Taking each loan observation and subtracting the firm score from the loan score gives the *rating difference*, which is just the difference in ratings measured in notches. Figure 2 shows the distribution of rating differences. The average rating difference is 1.03; that is, loans are on average rated one notch higher than the borrowers' firms.

Based on each observation's Dealscan information, several indicator (dummy) variables were created. Appendix A gives detailed definitions of all the variables used in the paper. The indicator variable *secured* equals 1 if the loan is collateralized and equals zero otherwise. The variable *term* equals 1 if the loan is a term loan, and zero if it is a revolving line of credit.

Dealscan also includes information on 15 different types of financial covenants, though several are used infrequently. The six most common financial covenants were selected, accounting for more than 95% of all financial covenants in the sample. They are: debt to EBITDA, interest coverage, capex, fixed charge coverage, leverage ratio, and net worth. Dealscan also reports six non-financial covenants, all of which are included in the analysis: asset sales sweep, debt issuance sweep, equity issuance sweep, excess cash flow sweep, insurance proceeds sweep, and dividend restrictions. Indicator variables are created for each of the six financial covenants and six non-financial covenants, where each variable equals 1 if the covenant exists in the contract and 0 otherwise.

Another three variables are created that measure covenant intensity. *Total financial* is the sum of all financial covenant indicators while *Total non-financial* is the sum of all non-financial covenant indicators. Each of these variables ranges from 0 to 6. *Total covenant* is the sum of all covenants, ranging from 0 to 12. The analysis also considers the covenant intensity index (CII)

proposed by Bradley and Roberts (2015). The CII ranges from 0 to 6 and gains 1 point if one of the following exists: asset sales sweep, debt issuance sweep, equity issuance sweep, 2 or more financial covenants, dividend restrictions, and collateral.

Table I presents summary statistics on the sample's ratings, collateralization, the frequencies of different covenants, and other loan characteristics. As mentioned earlier, the average difference between a loan's rating and that of its firm is 1.03 notches. The table also shows that 87% of loans are secured. The single most common financial covenant is debt to EBITDA (47.5% of all loans) and the single most common non-financial covenant is dividend restrictions (46.5% of all loans). Summing these average covenant frequencies indicates that the average number of total covenants per loan is 3.5. In addition, the average loan amount is \$365 million, and the average maturity is 5.41 years.

Not revealed in Table 1 but shown in Figures 3 and 4 is that there exist significant differences in the main variables based on the risk of the borrowing firm as proxied by the firm's rating. Figure 3 shows that the average difference between loan and firm ratings is negligible for investment grade firms, but this average difference steadily increases as the firm's rating worsens. Figure 4 shows that collateral and covenant intensity also vary by firm rating. The figure stacks different colored rectangles reflecting collateral and various types of covenants. The height of each rectangle is the proportion of loans that are secured or the proportion of loans that contain the specific covenant in its contract. The overall height of the bar reflects the extent of collateralization and covenant intensity.

The right-most bar in Figure 4 reflects the overall frequencies of collateral and covenants given in Table I's summary statistics. The left-most bar shows the same frequencies for the loans of firms with an investment grade firm rating. Consistent with Figure 3 that showed no average difference between loan and firm ratings for investment grade firms, Figure 4 shows that less than 6% of the loans of investment grade firms are collateralized and, on average, these loans have relatively few covenants. Also consistent with Figure 3 that shows the difference between loan

and firm ratings rise as firm ratings worsen, Figure 4 shows that the likelihood of a loan being secured tends to rise as the firm's rating declines. 86% of loans given to Ba-rated firms are secured but over 99% of loans given to firms rated B or worse are secured.

Interestingly, unlike collateral, covenant intensity is non-monotonic. The average number of covenants in the loans of firms rated investment-grade, Ba, B, and Caa and worse equals 1.6, 4.8, 3.5, and 3.4, respectively. So, for sub-investment grade firms, covenant intensity declines as ratings worsen. Perhaps some Ba-rated firm substitute more covenants in their loans because they are somewhat less likely to be collateralized than worse-rated firms. Because rating differences and the likelihood of covenants appear to vary across low and high risk firms, the analysis to follow will include tests that control for possible differences in firm ratings.

## **II. Credit Rating Empirical Design and Results**

The premise of this paper's empirical tests is that measures of the credit risk of a firm's debt reflect both the underlying financial condition of the issuing firm and the terms of the debt contract. If two credit risk measures can be observed where one is for a firm's unsecured, covenant-free debt and the other is for its syndicated loan, then the difference in these credit risk measures accounts for the collateral status and covenants contained in the syndicated loan contract.

The logic of this test design can also be justified by the process that Moody's states it uses to rate debt, in particular, syndicated loans:

Moody's bank loan ratings are measures of expected credit loss rates and use the same ratings scale as Moody's bond ratings....Moody's rates bank loans individually, not according to any simple rule of thumb, but based on a careful analysis of structure and collateral. Typically, loans are rated anywhere from on par with an issuer's senior-implied rating to up to three alpha-numeric rating categories higher. (Moody's (2004b, page 2)).

With this motivation, the paper's baseline empirical specification is:

$$\Delta rating_{i,t} = \beta_0 + \beta_1 \times covenants_{i,t} + \beta_2 \times secured_{i,t} + \beta_3 \times controls_{i,t} + \varepsilon_{i,t} \quad (1)$$

where  $\Delta rating_{i,t} = rating\ difference_{i,t} = loan\ score_{i,t} - firm\ score_{i,t}$  is the difference in notches between firm  $i$ 's syndicated loan rating at its loan issuance date  $t$  and its firm (issuer) rating at date  $t$ . A series of indicator variables,  $covenants_{i,t}$ , designates the presence of individual types of covenants or a measure of covenant intensity for firm  $i$ 's syndicated loan while  $secured_{i,t}$  denotes whether the loan is collateralized. Positive signs for  $\beta_1$  and  $\beta_2$  would indicate that covenants and collateral improve a loan's rating relative to that of the borrower's firm.

A series of variables  $controls_{i,t}$  includes the natural logs of the loan amount (size) and of the loan's number of months until maturity. It also includes the indicator variable *term* that equals 1 for a term loan and 0 for a revolving line of credit. Other variables in  $controls_{i,t}$  are indicators for different fixed effects, including the year of the loan's origination, the firm's one-digit SIC code, the loan's purpose, and the firm's (issuer) rating. Firms issue loans for different purposes including general corporate purpose, debt refinancing, recapitalization, and LBO or merger and acquisition. Loans with different purposes may have different credit risks, and the firm's rating may be an important determinant of the rating difference, as was suggested by Figure 3. Moreover, firm rating fixed effects may control for the possibility that a difference of one notch at different firm rating levels may represent different magnitudes of credit risks.

#### *Collateral and Covenant Intensity Measures*

The first set of tests analyze four different summary measures of covenant intensity for  $covenants_{i,t}$  in equation (1). Table II column (1) reports the results of setting  $covenants_{i,t}$  to *total covenants*, which takes a value from 0 to 12. Its coefficient is statistically significant and indicates that each additional covenant increases the syndicated loan rating by 3.2% of one notch. Since the average number of covenants per loan is around 3.5, this implies that the contribution of covenants to increasing loan ratings is about 11.2% of a notch. Columns (2) and (3) report similar regressions but proxy covenant intensity by either *total non-financial covenants* or *total financial*

covenants. The impact of each covenant on the loan's rating appears greater for financial ones (8.7% of a notch) compared to non-financial ones (3.6% of a notch).<sup>13</sup> Finally, Columns (4) and (5) report results using the covenant intensity index (CII) of Bradley and Roberts (2015). Since this index includes collateral, column (5) reports a regression without the variable *secured* in the regression. The results are similar in that each unit increase in the index improves the loan rating by 6.4% to 6.8% of a notch.

In each of Table II's regression specifications, the coefficient on *secured* is around 0.5 and highly significant, indicating that secured loans are rated  $\frac{1}{2}$  notch greater than unsecured loans. Recall that previous studies such as Berger and Udell (1990) and John, Lynch, and Puri (2003) that find collateralization is associated with higher loan or bond risk. In contrast, Table II's results show that once proper account of firm risk is taken, the independent effect of collateral is to lower credit risk; that is, improve the loan's rating.

Table II also shows that, all else equal, term loans are on average rated 0.25 notches lower than credit lines. Even when term loans and credit lines are of the same loan package so that they are covered by the same covenants, they have different characteristics. In particular, most term loan contracts give borrowers the option of cancelling the loan before maturity by paying a cancellation fee (Berg, Saunders, and Steffen (2015)), and lenders may cancel credit lines if a borrower's credit condition worsens, due to the common "materially adverse change" clause. The regressions also consistently show that loan size has a positive effect on ratings, perhaps because it proxies for firm size. Finally, the negative sign on maturity indicates that, all else equal, longer maturity loans are rated worse than shorter maturity ones.

### *Individual Covenants*

The next set of tests examines individual covenants as a preliminary step to determining their relative importance. Twelve different regressions in the form of equation (1) were run where the variable *covenants<sub>it</sub>* was set to one of the 12 covenants. Five covenants were not statistically

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<sup>13</sup> On average, loans have 1.4 financial covenants and 2.1 non-financial covenants.

significant in individually improving the loan rating. Three of the five were the three least common financial covenants: fixed charge coverage, net worth, and leverage ratio covenants that were used in only 19%, 6%, and 5% of loans, respectively. The other two were the non-financial covenants; excess cashflow sweep and equity sweep covenants used in 36% and 24% of loans, respectively.<sup>14</sup> The results for the seven covenants that did significantly improve the loan's rating are reported in Table III. All seven coefficients have similar magnitudes. On average, the presence of one of these covenants improves the rating of a loan by 0.25 notches, which is around half of the impact associated with required collateral.

Now let us consider jointly including multiple covenants for  $covenants_{i,t}$  in regression equation (1). Column (1) of Table IV reports the results of including all seven of the covenants that were shown to be individually statistically significant in improving the loan's rating.<sup>15</sup> Interestingly, the coefficients on each of the covenants are not all positive or significant. Clearly, this may be due to correlation in the likelihood that particular covenants jointly appear in a loan contract. Appendix B gives the correlation matrix of the appearance of these covenants in individual loans, indicating that the non-financial covenants have particularly high correlations. The regression indicates that only two out of the seven covenants drive most of the positive significant effect. One is the financial covenant 'interest coverage' and the other is the non-financial covenant 'dividend restrictions.'

Column 2 of Table IV shows the joint effect of including only the financial covenants. Consistent with the first regression, only the interest coverage covenant is significantly positive. Column 3 of Table IV shows the joint effect of including only non-financial covenants. Again,

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<sup>14</sup> Excess cashflow and equity issuance sweeps may be relatively unimportant compared to the other three sweep covenants associated with events could create more risk for the loan. A debt issuance sweep coincides with an increase in the firm's other debts that could compete with the loan for the firm's payments. Asset sales and insurance sweeps may coincide with a change in the firm's normal business or a loss event that could imperil the loan and require prepayment.

<sup>15</sup> An alternative Lasso selection method (Tibshirani (1996)) was used to choose which of the 12 covenants best predict a change in loan ratings. The result was selection of 6 of the 7 covenants reported in column 1 of Table IV, leaving out the insurance sweep covenant.

only the dividend restriction covenant is positive at a significance level better than 5%. Finally, column 4 of Table IV reports a regression including all 12 covenants. Interest coverage and dividend restrictions continue to be the only significantly positive covenants. Interestingly, the results indicate that equity issuance and excess cashflow sweeps reduce the loan's rating. The logic may be that since equity issuance and excess cashflow should reduce a loan's default risk, requiring repayment of the loan following these good events could be counter-productive, especially if these covenants incentivize the firm to avoid issuing equity or having excess cashflow.

#### *Effects of Covenants and Collateral on Term Loans versus Credit Lines*

The previous results suggest that when collateral and covenants have equal effects on term loans and credit lines, term loans tend to be rated about 1/4 of a notch lower than revolving lines of credit. This section allows the effects of covenants and collateral to differ across loan types. Equation (1) is extended to take the form

$$\begin{aligned} \Delta rating_{i,t} = & \beta_0 + \beta_1 \times covenants_{i,t} + \beta_2 \times secured_{i,t} + \beta_3 \times controls_{i,t} \\ & + \beta_4 \times term_{i,t} + \beta_5 \times covenants_{i,t} \times term_{i,t} + \beta_6 \times secured_{i,t} \times term_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where  $term_{i,t}$  is an indicator variable that equals 1 if the loan is a term loan and 0 if the loan is a credit line.

Table V shows that covenants are more important for improving the ratings of term loans but collateral is more important for raising the ratings of credit lines. Now the coefficient of  $term_{i,t}$  is insignificant, but the coefficients of  $covenants_{i,t}$  and the interaction variable  $covenants_{i,t} \times term_{i,t}$  indicate that covenants have small, if any, effects on credit lines but much larger impacts on term loans, raising ratings by around 1/4 to 1/3 of a notch. Moreover, the *total covenants* intensity variable is only significant for term loans. In contrast, based on the coefficients of  $secured_{i,t}$  and the interaction variable  $secured_{i,t} \times term_{i,t}$ , the average effect across the 8 regression



specifications shows that collateral raises loan ratings by 0.64 notches for credit lines but only 0.31 notches for term loans.

Perhaps because credit lines include “material adverse change” clauses that in severe circumstances may allow lenders to not advance new funds, there is less need for them to include covenants. On the other hand, covenants may be important for renegotiating the contractual provisions of term loans, including the possibility of requiring collateral in cases where the loan was not initially secured, which could make initially requiring collateral less important.

#### *Effects of Covenants and Collateral by Firm Credit Rating*

Figures 3 and 4 indicate that the difference between loan and firm ratings, as well as covenant intensity, varies by a firm’s rating. This section explores whether there is a different impact of covenants based on a firm’s risk as proxied by its firm credit rating. Accordingly, the specification in equation (1) is extended as follows:

$$\begin{aligned} \Delta rating_{i,t} = & \beta_0 + \beta_1 \times covenants_{i,t} + \beta_2 \times secured_{i,t} + \beta_3 \times controls_{i,t} \\ & + \sum_{j=1}^3 \beta_{3+j} \times frating_j + \sum_{j=1}^3 \beta_{6+j} \times covenants_{i,t} \times frating_j \\ & + \sum_{j=1}^3 \beta_{9+j} \times secured_{i,t} \times frating_j + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where  $frating_1$  equals 1 if the firm is Caa and below-rated, zero otherwise,  $frating_2$  equals 1 if the firm is Ba-rated, zero otherwise, and  $frating_3$  equals 1 if the firm is investment-grade-rated, zero otherwise. The specification in (3) allows differences in the levels of loan improvement and the impacts of covenants and collateral based on differences in firm ratings in the range of a whole letter rating. The left-out rating letter is a single ‘B’ rating.

The results of running regression (3) for each covenant and *total covenants* are reported in Table VI. The impacts of all seven covenants are positive and statistically significant when the firm is B rated. The average impact across the seven different covenants is to improve the loan rating of a B-rated firm by 0.31 of a notch. The effects of covenants for each of the other rated firms is the sum of the coefficients for the terms  $covenants_{i,t}$  and  $covenants_{i,t} \times frating_j$ . Note that

in every case, the coefficients on the terms  $covenants_{i,t} \times frating_j$  are negative, indicating that covenants have a smaller impact on loan ratings compared to B-rated firms. The average impact of across the seven covenants for Caa and below-rated, Ba-rated, and investment-grade rated firms are 0.01, -0.02, and -0.46 of a notch. Consequently, covenants have almost no effect on the loan ratings of Caa and Ba-rated firms, and a negative impact on investment-grade firms. The latter result might explain why the loans of investment-grade firms tend to have relatively few covenants, as shown in Figure 4.

While covenants appear to have little effect on the lowest-rated firms, collateral is paramount for raising these firms' loan ratings. Looking at the sum of the coefficients on the terms  $secured_{i,t}$  and  $secured_{i,t} \times frating_j$  across the 8 regression specifications indicate that collateral improves the loan ratings of firms rated investment grade, B, Ba, and Caa and lower by an average of 0.19, 0.15, 0.75, and 3.4 notches, respectively. Because a firm rated Caa and worse is already in a treacherous condition, the trip-wire effects of covenants may be less important and the loan's risk may depend almost exclusively on its collateral.

#### *Robustness: Firm Ratings*

Recall that there are three types of firm (issuer) ratings: a long term issuer rating; a long term senior unsecured rating; and a long term corporate family rating. Regression tests based on these three firm-type subsamples produce similar qualitative results. An additional robustness test compares the Moody's syndicated loan rating to a consistent S&P firm ratings obtained from Compustat database. This S&P rating is obtained by merging the dataset to Compustat using the link provide by Chava and Roberts (2008). Using the most recent (2012) version of the link generates a sample of 3,130 observations with both Moody's loan ratings and S&P firm ratings. Regression results generally are similar in coefficient signs and significance.

#### *Robustness: Loan Types, and Financial Firms*

Tests are repeated on two separate datasets, one with only terms loans and one with only credit lines. Overall, the results are qualitatively unchanged. Financial firms make up 8% of the total firms in the data sample. Previous research often excludes financial firms due to their unique firm-level characteristics. Because the previous tests use differences in loan versus firm ratings, they may already control for firm characteristics and argue for keeping these firms in the sample. Nonetheless, regression tests on a sample that excludes financial firms find similar results.

#### *Robustness: Time Window for Matching Firm Ratings to Loan Ratings*

Firm (issuer) ratings are not updated frequently, so it is sometimes difficult to find a fresh firm rating that is close enough, and prior to, the loan rating date. The paper's procedure is to start by searching for firm ratings 365 days before a loan's rating date. If a firm rating is not found during that time window, then a search is performed that includes up to 60 days after the loan is rated. For robustness, several alternative time windows are tried. New samples are generated using windows such as 180 days and 90 days before loan rating dates, and 30 days, 15 days and 0 day after loan rating dates. Using the smallest window of 90 days before and 0 days after reduces the original 3,597 observation sample down to 2,950, a reduction of only 18%. The paper's main results are quite similar across the samples that use different windows.

### **III. Credit Spread Data, Variables and Summary Statistics**

#### *A. Data and Matching*

Data on individual loans in Dealscan, including each loan's all-in-drawn spread, were matched to Bloomberg data on credit default swap (CDS) spreads. When available, the borrowing firm's stock ticker in Dealscan was used to search Bloomberg for the firm's senior, unsecured CDS spread corresponding to the day the loan was originated and to a maturity closest to that of the loan.<sup>16</sup> Matching on stock tickers resulted in 3,780 loans with complete Dealscan and Bloomberg data. The sample covers the period from 2002 to 2015.

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<sup>16</sup> CDS spreads for contracts with the standard document clause "ex-restructuring" (XR) were obtained.

## B. Variables and Summary Statistics

The summary statistics in Table VII show that the borrowing firms' average senior, unsecured CDS spread is 141 basis points while their all-in-drawn loan spreads averaged 139 basis points. The relatively small 2 basis point difference in spreads might be partly due to the tendency of CDS contracts to be more liquid than a firm's debt.<sup>17</sup> Figure 5 shows the sample distribution of individual firms' differences in CDS – loan spreads, i.e., their CDS – loan basis. The distribution is positively skewed, indicated that there are relatively more firms with large positive spreads than large negative spreads.

Other summary statistics in Table VII reveal differences in this CDS – loan spread sample compared to credit rating sample summarized in Table I. Fewer loans are secured (62% versus 87%), and there are relatively less term loans (25% versus 53%). The average number of covenants per loan is also less (1.7 versus 3.5), and the loans are larger (\$1,182 million versus \$365 million) and have a shorter maturity (4.0 years versus 5.4 years). Apparently, the requirement that the borrowing firm have traded CDS contracts results in a sample of larger and less-covenant intensive loans.

## IV. Credit Spread Empirical Design and Results

To facilitate comparisons, the analysis of credit spreads closely follows that of credit ratings reported in Section II. The baseline regression specification (1) is used, except now the dependent variable is not the difference in loan rating – firm rating but, rather, the difference in the firm's CDS spread – the firm's syndicated loan spread:

$$\Delta spread_{i,t} = \beta_0 + \beta_1 \times covenants_{i,t} + \beta_2 \times secured_{i,t} + \beta_3 \times controls_{i,t} + \varepsilon_{i,t} \quad (4)$$

where  $\Delta spread_{i,t} = CDS\ spread_{i,t} - loan\ spread_{i,t}$  is the CDS – loan basis, equal to the basis point difference between firm  $i$ 's equivalent-maturity senior, unsecured CDS spread and its syndicated

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<sup>17</sup> The CDS – bond basis, equal to a firm's CDS spread – the spread on the firm's bond, tends to be negative. Oehmke and Zawadowski (2016) link the magnitude of this negative basis to measures of bond illiquidity and CDS liquidity as proxied by the volume of CDS trading.

loan spread at the origination date  $t$ . If covenants and collateral reduce loan risk by decreasing the relative spread on loans, the one would expect  $\beta_1$  and  $\beta_2$  to be positive.

#### *Collateral and Covenant Intensity Measures*

Similar to Table II, Table VIII examines the effects of covenant intensity and collateral on credit spreads. Consistent with the results using credit ratings, each of the covenant intensity measures is associated with a decline in loan credit spreads. One difference is that while financial covenants were more important for improving a loan's credit rating, non-financial covenants appear to be relatively better for reducing a loan's credit spread.

Table VIII also confirms the risk-reducing property of collateral: *ceteris paribus*, secured loans have about a 30 basis point lower spread than unsecured loans. Also consistent with the credit rating results, larger loans are associated with lower loan credit spreads. In contrast, the table shows that longer-maturity loans have lower relative spreads, a reversal of the previous finding that a longer maturity worsened a loan's credit rating.

#### *Individual Covenants*

Next, a series of regressions are run with  $covenants_{i,t}$  set equal to each of the 12 individual covenants. Table IX reports the results of the 7 covenants that have a significantly positive relationship to  $\Delta spread_{i,t}$ . The same non-financial covenants that were significant for improving loan credit ratings (asset sales sweep, debt issuance sweep, insurance proceeds sweep, dividend restrictions) are also found to lower loan credit spreads, as well as one additional non-financial covenant, excess cashflow sweep. In terms of financial covenants, the maximum capital expenditures covenant also both improves loan ratings and reduces loan spreads. Yet, while interest coverage and debt to EBITDA covenants improved loan ratings, they do not significantly lower credit spreads. Rather, the fixed cost coverage covenant, which is similar to the interest

coverage covenant, significantly lowers loan credit spreads.<sup>18</sup> In each of the regressions, collateral continues to significantly lower loan spreads, and the average reduction is 26 basis points.

Table X column (1) reports the results of setting  $covenants_{i,t}$  in regression (4) to all of the 7 covenants that were individually statistically significant. It shows that both of the two financial covenants, capital expenditures and fixed cost coverage, continue to be significant in lowering loan spreads. However, only 2 of the 5 non-financial covenants, asset sales sweep and dividend restrictions, remain significant in lowering loan risk. As shown in column (4), when all 12 covenants are included in the regression, the same four covenants continue to significantly lower loan spreads and, in addition, the net worth and debt issuance sweep covenants do so as well. Interestingly, the equity issuance and excess cashflow sweeps are shown to significantly *raise* loan credit spreads. These were same two covenants that were also shown to worsen a loan's credit rating, suggesting that both investors and credit raters view these covenants to be detrimental to loan quality.

#### *Effects of Covenants and Collateral on Term Loans versus Credit Lines*

The next investigation compares the effects of covenants and collateral on the credit spreads of term loans versus the credit spreads of revolving lines of credit. The regression specification (2) is run but with the dependent variable being  $\Delta spread_{i,t}$ . Recall that the evidence in Table V indicates that covenants are more important for improving the credit ratings of term loans relative to credit lines. In contrast, Table XI shows a seemingly opposite result: investors appear to believe that covenants are more important for reducing the spreads of credit lines than of term loans. The average reduction in loan spreads across the 7 different covenants is 59 basis points for credit lines but only 30 basis points for term loans. A possible reconciliation is that credit lines are more likely to be drawn during economic downturns, making them systematically risky (Pennacchi (2006)). Since evidence finds that loan and bond credit spreads contain

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<sup>18</sup> The interest coverage ratio equals  $EBIT/(\text{interest expense})$  while the fixed charge coverage ratio equals  $(EBIT + \text{fixed charges before taxes})/(\text{fixed charges before taxes} + \text{interest expense})$ , where fixed charges include lease expense.

systematic risk premium while credit ratings do not (Iannotta et al. (2015)), covenants may have a larger impact on the spreads of credit lines relative to their ratings.

Also recall that collateral appeared more important for improving the credit ratings of revolving credit lines. Here, Table XI shows that credit spread reduction from collateral is not significantly different across the two loan types. While, on average, collateral reduces credit line spreads by 25 basis points and term loan spreads by 35 basis points, the difference is not significant in any of the 8 different regressions.

#### *Effects of Covenants and Collateral by Firm CDS Spreads*

Evidence discussed in Section II and reported in Table VI showed that the impact of covenants and collateral on loan ratings differed by a firm's risk as proxied by its firm credit rating. This section provides similar analysis for loan spreads by proxying a firm's risk by its CDS spread. Specifically, the following regression specification is proposed:

$$\begin{aligned} \Delta spread_{i,t} = & \beta_0 + \beta_1 \times covenants_{i,t} + \beta_2 \times covenants_{i,t} \times CDS\ spread_{i,t} \\ & + \beta_3 \times secured_{i,t} + \beta_4 \times secured_{i,t} \times CDS\ spread_{i,t} + \beta_5 \times controls_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (5)$$

If covenants and collateral have a larger impact on reducing loan spreads for riskier firms, one would expect that the coefficients on  $\beta_2$  and  $\beta_4$  will be positive.

Indeed, Table XII reports evidence for such effects. For each of the individual covenants, the coefficient of  $covenants_{i,t}$  is significantly negative while the coefficient of  $covenants_{i,t} \times CDS\ spread_{i,t}$  is significantly positive. One can calculate the level of  $CDS\ spread_{i,t}$  for which the effect of the covenant on reducing loan spreads becomes positive.<sup>19</sup> For the four covenants that were shown to be significantly positive in the joint regression reported in Table X (Capex, Fixed Cost Coverage, Asset Sales Sweep, and Dividend Restrictions), the average CDS spread at which the covenants begin reducing spreads is 333 basis points, which is roughly a typical CDS spread for a Ba to B rated firm over the sample period. However, individual covenants vary regarding when

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<sup>19</sup> This is simply  $-\beta_1/\beta_2$  for the case of covenants and  $-\beta_3/\beta_4$  for the case of collateral.

they begin to have a positive impact. For example, the breakeven CDS spread where the Fixed Cost Coverage covenant become effective is 163 basis points, which is roughly the CDS spread for a Baa to Ba rated firm. In general, these results are consistent with those for credit ratings reported in Table VI: covenants are effective mainly for higher-risk, sub-investment grade firms.

Similar results are found for collateral. Table XII shows that in each of the regressions the coefficient of  $secured_{i,t}$  is significantly negative while the coefficient of  $secured_{i,t} \times CDS\ spread_{i,t}$  is significantly positive. Again, the level of CDS at which the loan risk-reducing effect of collateral begins to be positive can be calculated, and it averages 101 basis points across the 8 regressions. This CDS level might be typical of a Baa rated firm and is consistent with the previous credit rating results suggesting that the risk-reducing characteristics of collateral begin to be effective with somewhat lower risk firms.

## V. Conclusion

This paper presents a new approach for quantifying the impact that collateral and covenants have in reducing the risk of syndicated loans. It examined how these contract terms are viewed both from a credit rating agency's (Moody's) and investors' perspectives. Its methodology takes advantage of the existence of risk measures for both the firm's unsecured, covenant-free debt as well as its syndicated loan that may be secured and contain various covenants. First, it analyzed how a loan's covenants and collateral affect the difference between a loan's credit rating and the senior, unsecured credit rating of the borrowing firm. Second, it examined how a loan's covenants and collateral affect the difference between the borrowing firm's senior, unsecured credit default swap (CDS) spread and its loan's credit spread.

The credit rating agency and investors agree that collateral and particular types of covenants (interest or fixed charge coverage and dividend restrictions) are particularly important for reducing loan risk, and the impacts of these loan provisions are greater the riskier is the borrowing firm. They also agree that other covenants (excess cashflow and equity issuance



sweeps) are actually detrimental to a loan's credit quality, possibly because the covenants require loan prepayment following loan-favorable events. Some disagreement between the rating agency and investors is found on the relative importance of collateral and covenants for term loans versus revolving lines of credit. A possible reason for the differing views is that credit spreads can embed a systematic risk premium while credit ratings may not, and credit lines may be more systematically risky since they tend to be drawn down during crises.

Overall, these findings quantify the importance of collateral and particular types of covenants in improving syndicated loan ratings. They might be applied to construct a covenant intensity index that best measures covenants' improvement on credit quality. The results also can guide loan contract design for the purpose of targeting a given credit rating or a given credit spread.

### Appendix A Variable Definition

Variable	Source	Description
Firm ratings	Moody's	Aaa to C, 21 notches. Moody's long term issuer rating. Long term unsecured rating and long term corporate family ratings are used when not available
Loan rating	Moody's	Aaa to C, 21 notches. Moody's syndicated loan rating at origination
Firm score	Calculated	Number of notches of firm rating, ranging from 21(Aaa) to 1 (C)
Loan score	Calculated	Number of notches of loan rating, ranging from 21(Aaa) to 1 (C)
Rating difference	Calculated	Dependent variable equal to loan score minus firm score
Size	Dealscan	ln(Facility amount)
Maturity	Dealscan	ln(months until maturity)
Term	Dealscan	Indicator variable equals 1 if term loan
Secured	Dealscan	Indicator variable equals 1 if loan is secured (has collateral)
Asset sales sweep	Dealscan	Indicator variable equals 1 if asset sales sweep covenant exists
Debt issuance sweep	Dealscan	Indicator variable equals 1 if debt issuance sweep covenant exists
Equity issuance sweep	Dealscan	Indicator variable equals 1 if equity issuance sweep covenant exists
Excess CF sweep	Dealscan	Indicator variable equals 1 if excess cash flow sweep covenant exists
Insurance sweep	Dealscan	Indicator variable equals 1 if insurance proceeds sweep covenant exists
Dividend restrictions	Dealscan	Indicator variable equals 1 if dividend restrictions covenant exists
Debt to EBITDA	Dealscan	Indicator variable equals 1 if debt to EBITDA covenant exists
Interest coverage	Dealscan	Indicator variable equals 1 if interest coverage covenant exists
Capex	Dealscan	Indicator variable equals 1 if capex covenant exists
Fixed charge coverage	Dealscan	Indicator variable equals 1 if fixed charge coverage covenant exists
Leverage ratio	Dealscan	Indicator variable equals 1 if leverage ratio covenant exists
Net worth	Dealscan	Indicator variable equals 1 if net worth covenant exists
SIC	Dealscan	One digit SIC code
Year	Dealscan	The year the loan is issued
Purpose	Dealscan	Primary purpose field in the Facility table of Dealscan database
I-Grade	Moody's	Indicator variable equals 1 if firm rating is investment grade, i.e., $\geq$ Baa3
Ba-rated	Moody's	Indicator variable equals 1 if firm rating is between Ba1 and Ba3
B-rated	Moody's	Indicator variable equals 1 if firm rating is between B1 and B3
C-rated	Moody's	Indicator variable equals 1 if firm rating is equal or below Caa1
Loan spread	Dealscan	All-in-drawn spread, in basis points
CDS spread	Bloomberg	CDS spread for contract maturity closest to loan maturity
Spread difference	Calculated	Dependent variable equal to CDS spread minus Loan spread

### Appendix B Correlations Between Covenants

	<i>Debt to EBITDA</i>	<i>Interest Cov.</i>	<i>CapEx</i>	<i>Fixed Cost Cov.</i>	<i>Leverage</i>	<i>Net Worth</i>	<i>Asset Sales Sweep</i>	<i>Debt Issue Sweep</i>	<i>Equity Issue Sweep</i>	<i>Excess Cashflow Sweep</i>	<i>Insurance Sweep</i>	<i>Dividend Restrict</i>
<i>Debt to EBITDA</i>	1.000	0.649	0.534	0.377	-0.140	0.130	0.684	0.657	0.500	0.571	0.617	0.668
<i>Interest Cov.</i>	0.538	1.000	0.476	0.082	0.049	0.069	0.505	0.478	0.369	0.436	0.444	0.506
<i>CapEx</i>	0.248	0.211	1.000	0.269	-0.074	0.064	0.638	0.633	0.603	0.568	0.582	0.571
<i>Fixed Cost Cov.</i>	0.121	-0.058	0.069	1.000	0.048	0.201	0.372	0.338	0.417	0.304	0.319	0.385
<i>Leverage</i>	-0.280	-0.024	-0.099	0.011	1.000	0.081	-0.102	-0.094	-0.041	-0.112	-0.082	0.030
<i>Net Worth</i>	-0.075	0.019	0.033	0.116	0.290	1.000	0.089	0.052	0.094	-0.020	0.033	0.180
<i>Asset Sales Swp</i>	0.344	0.257	0.341	0.155	-0.108	-0.030	1.000	0.878	0.663	0.728	0.832	0.796
<i>Debt Issue Swp</i>	0.307	0.209	0.347	0.138	-0.078	-0.009	0.770	1.000	0.675	0.727	0.800	0.724
<i>Equity Issue Swp</i>	0.177	0.106	0.203	0.153	-0.018	0.055	0.501	0.610	1.000	0.565	0.593	0.560
<i>Excess Cash Swp</i>	0.277	0.161	0.366	0.086	-0.124	-0.050	0.545	0.565	0.217	1.000	0.675	0.618
<i>Insurance Swp</i>	0.362	0.269	0.330	0.146	-0.149	-0.024	0.778	0.685	0.394	0.606	1.000	0.691
<i>Dividend Restrict</i>	0.402	0.332	0.257	0.217	0.060	0.084	0.410	0.348	0.197	0.292	0.433	1.000

The correlations in the upper triangle of the table are covenant correlations for the 3,597 sample of loans used in the analysis of credit ratings. The correlations in the lower triangle of the table are the covenant correlations for the 3,780 sample of loans used in the analysis of credit spreads.

## References

- Begley, J., 1994, Restrictive Covenants Included in Public Debt Agreements: An Empirical Investigation, University of British Columbia working paper.
- Berg, T., A. Saunders, and S. Steffen, 2016, The Total Cost of Corporate Borrowing in the Loan Market: Don't Ignore the Fees, *Journal of Finance* 71, 1357-1392.
- Berger, A. N. and G. F. Udell, 1990, Collateral, Loan Quality, and Bank Risk, *Journal of Monetary Economics* 25, 21-42.
- Berger, A. N., and Udell, G. F. 1995, Relationship Lending and Lines of Credit in Small Firm Finance, *Journal of Business* 68, 351-381.
- Berlin, M., and L. Mester, 1992, Debt Covenants and Renegotiation, *Journal of Financial Intermediation* 2, 95-133.
- Besanko, D. and A. Thakor, 1987, Collateral and Rationing: Sorting Equilibria in Monopolistic and Competitive Credit Markets, *International Economic Review* 28, 671-689.
- Bester, H., 1985, Screening versus Rationing in Credit Markets with Imperfect Information, *American Economic Review* 75:850-55.
- Bester, H., 1994, The Role of Collateral in a Model of Debt Renegotiation, *Journal of Money, Credit and Banking* 26, 72-86.
- Billett, M., T-H. King, and D. Mauer, 2007, Growth Opportunities and the Choice of Leverage, Debt Maturity, and Covenants, *Journal of Finance* 62, 697-730.
- Bomfim, A., 2016, *Understanding Credit Derivatives and Related Instruments*, 2<sup>nd</sup> Ed., Academic Press, Waltham, MA.
- Boot, A, A. Thakor, and G. Udell, 1991, Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications, and Empirical Results, *Economic Journal* 101:458-72.
- Booth, J. R. 1992, Contract Costs, Bank Loans, and the Cross-monitoring Hypothesis, *Journal of Financial Economics* 31:25-41.

- Bradley, M., and M. R. Roberts, 2015, The Structure and Pricing of Corporate Debt Covenants, *Quarterly Journal of Finance* 5, 1-37.
- Chan, Y., and Kanatas, G. 1985, Asymmetric Valuation and the Role of Collateral in Loan Agreements, *Journal of Money, Credit and Banking* 17:85–95.
- Coffey, M., 2005, Opportunity Knocks... and Borrowers Answer, *LSTA Loan Market Chronicle*, 39-44.
- Demiroglu, C., and James, C., 2010, The Information Content of Bank Loan Covenants, *Review of Financial Studies* 23, 3700–3737.
- Gârleanu, N. and J. Zwiebel, 2009, Design and Renegotiation of Debt Covenants, *Review of Financial Studies* 22, 749-781.
- Heckman, J., 1979, Sample Selection Bias as a Specification Error, *Econometrica* 47, 153-161.
- Iannotta, G., G. Pennacchi, and J. Santos, 2016, Ratings-Based Regulation and Systematic Risk Incentives, University of Illinois working paper.
- John, K., A. Lynch, and M. Puri, 2003, Credit Ratings, Collateral and Loan Characteristics: Implications for Yield, *Journal of Business* 76, 371-410.
- Khieu, H., D. Mullineaux, and H-C. Yi, 2012, The Determinants of Bank Loan Recovery Rates, *Journal of Banking & Finance* 36, 923-933.
- Malitz, I., 1986, On Financial Contracting: The Determinants of Bond Covenants, *Financial Management* (Summer), 18-25.
- Moody's Investor Service, 2003, Relative Default Rates on Corporate Loans and Bonds, *Special Comment* (September).
- Moody's Investor Service, 2004a, Characteristics and Performance of Moody's-Rated U.S. Syndicated Bank Loans, *Special Comment* (March).
- Moody's Investor Service, 2004b, Recent Bank Loan Research: Implications for Moody's Bank Loan Rating Practices, *Special Comment* (December).

Murfin, J. ,2012, The Supply-Side Determinants of Loan Contract Strictness, *Journal of Finance* 67, 1565–1601.

Oehmke, M. and A. Zawadowski, 2016, The Anatomy of the CDS Market, *Review of Financial Studies* (forthcoming).

Park, C., 2000, Monitoring and Debt Seniority Structure, *Journal of Finance* 55, 2157–2195.

Pennacchi, G., 2006, Deposit Insurance, Bank Regulation, and Financial System Risks, *Journal of Monetary Economics* 53, 1-30.

Rajan, R. and A. Winton, 1995, Covenants and Collateral as Incentives to Monitor, *Journal of Finance* 50, 1113–1146.

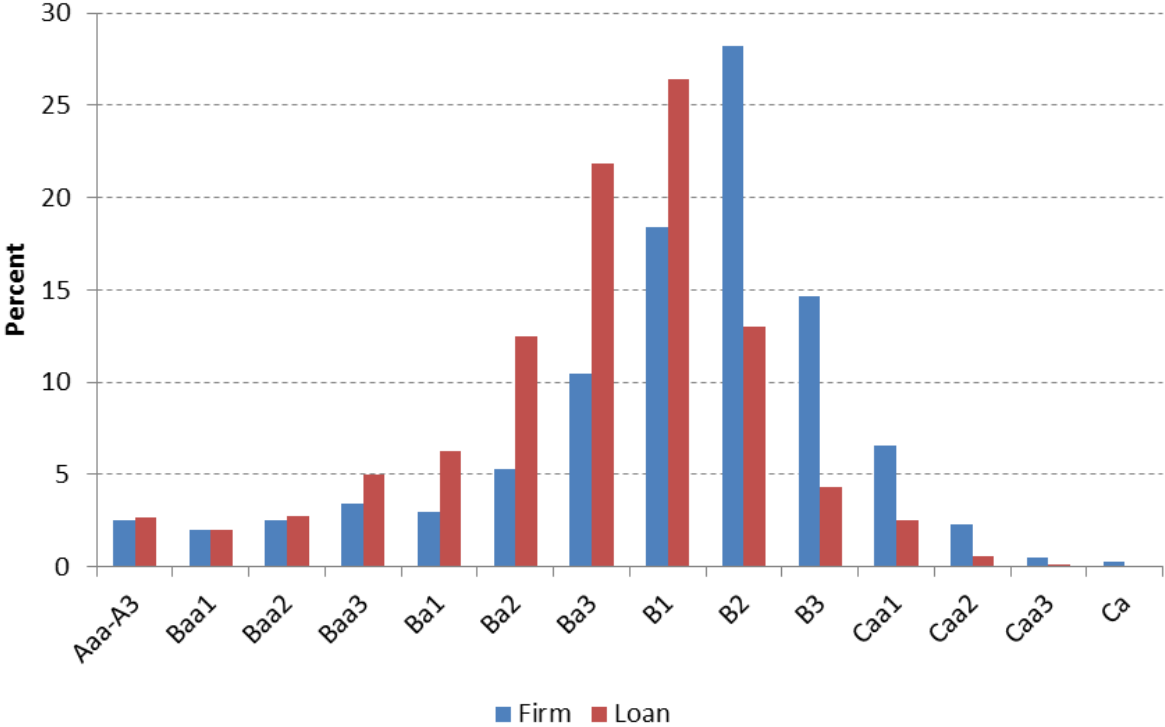
Standard & Poor's, 2011, A Guide to the Loan Market, available at <https://www.lcdcomps.com/d/pdf/LoanMarketguide.pdf>.

Standard & Poor's Financial Services, 2013, *Primer*, available at [www.leveragedloan.com/primer](http://www.leveragedloan.com/primer).

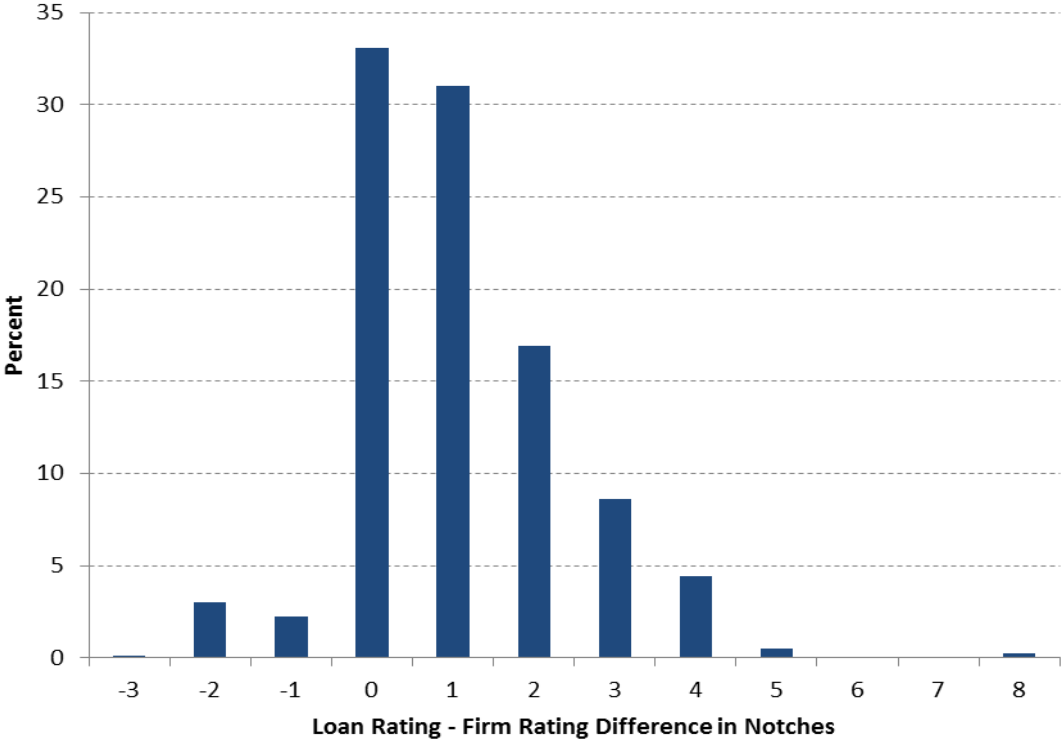
Stulz, R. and H. Johnson, 1985, An Analysis of Secured Debt, *Journal of Financial Economics* 14, 501-521.

Tibshirani, R., 1996, Regression Shrinkage and Selection via the Lasso, *Journal of the Royal Statistical Society. Series B (Methodological)* 58, 267-288.

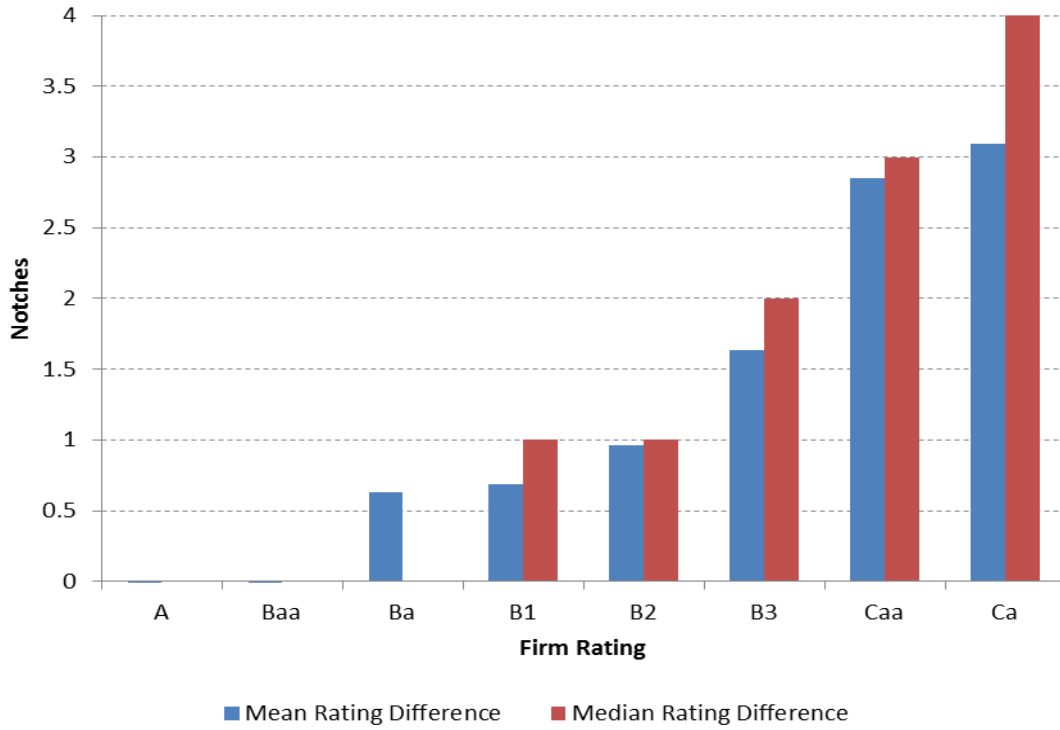
**Figure 1 Sample Distribution of Firm and Loan Ratings**



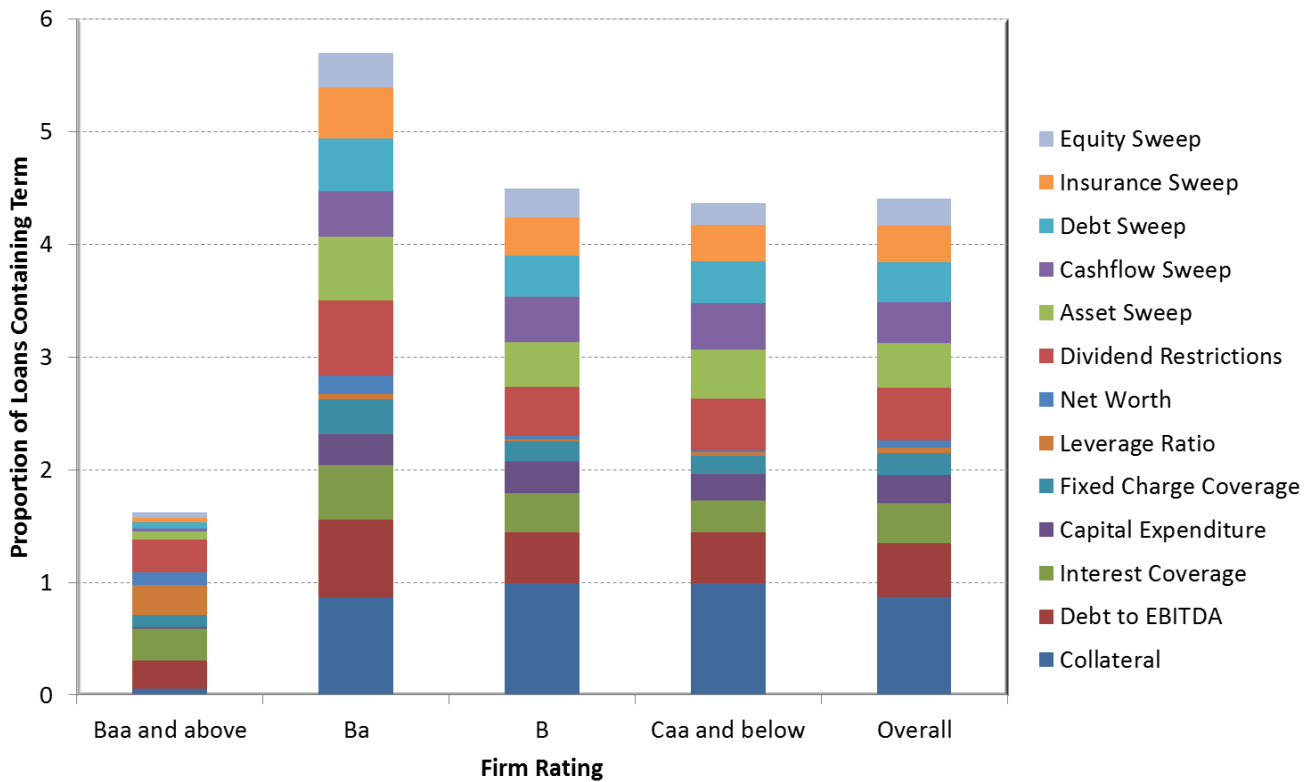
**Figure 2 Distribution of Rating Differences (Loan Rating - Firm Rating, in Notches)**



**Figure 3 Difference in Loan – Firm Ratings by Firm Rating**

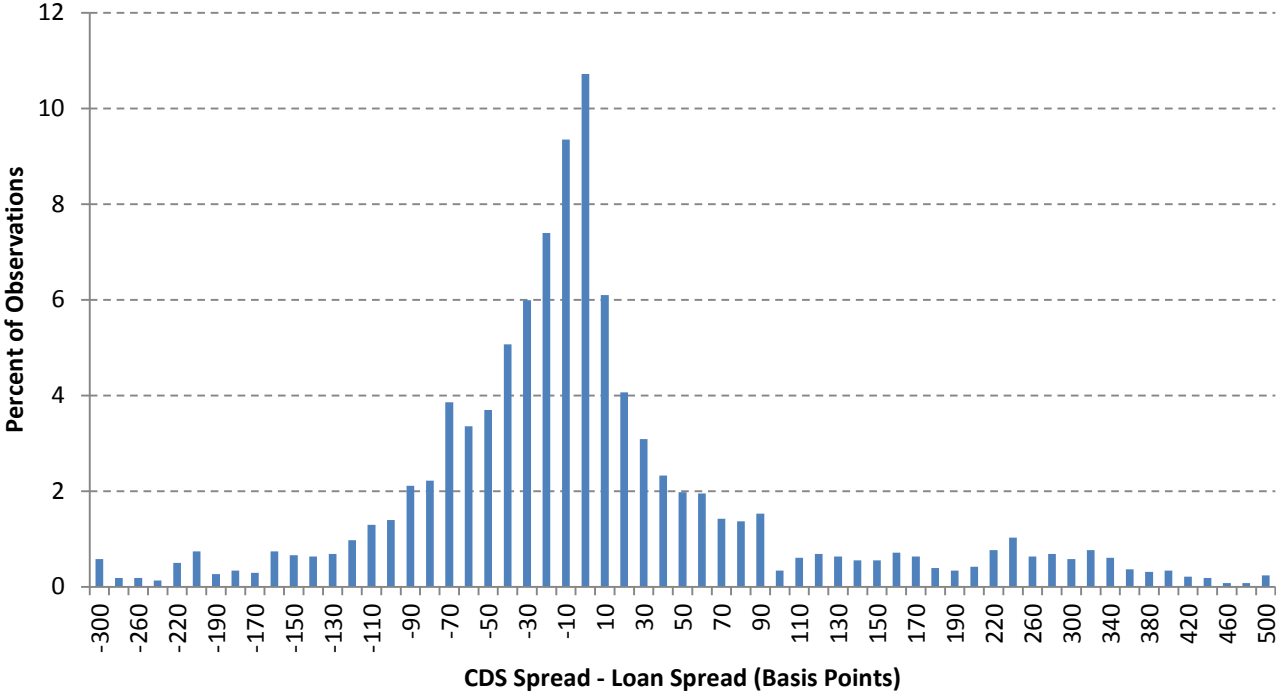


**Figure 4 Proportions of Loans with Collateral and Various Covenants By Firm Rating**





**Figure 5 Distribution of Spread Differences (CDS Spread – Loan Spread, in Basis Points)**



**Table I Summary Statistics of Credit Rating Sample**

This table provides summary statistics for ratings scores, collateral, covenants, and other loan characteristics. For indicator variables, mean values in column 2 show the prevalence of this characteristic in the dataset. The sample is based on syndicated loan market from 1995 to 2012. Variables are defined in Appendix A.

	(1) N	(2) mean	(3) std. dev	(4) min	(5) max
<i>loan score</i>	3,597	9.011	2.219	3	21
<i>firm score</i>	3,597	7.984	2.506	2	21
<i>rating difference</i>	3,597	1.027	1.316	-3	8
<i>Secured</i>	3,597	0.870	0.336	0	1
<i>Term</i>	3,597	0.528	0.499	0	1
<i>debt to EBITDA</i>	3,597	0.475	0.499	0	1
<i>interest coverage</i>	3,597	0.360	0.480	0	1
<i>Capex</i>	3,597	0.249	0.432	0	1
<i>fixed charge coverage</i>	3,597	0.193	0.394	0	1
<i>leverage ratio</i>	3,597	0.0520	0.222	0	1
<i>net worth</i>	3,597	0.0614	0.240	0	1
<i>asset sales sweep</i>	3,597	0.400	0.490	0	1
<i>debt issuance sweep</i>	3,597	0.352	0.478	0	1
<i>equity issuance sweep</i>	3,597	0.241	0.428	0	1
<i>excess CF sweep</i>	3,597	0.363	0.481	0	1
<i>insurance proceeds sweep</i>	3,597	0.325	0.468	0	1
<i>dividend restrictions</i>	3,597	0.465	0.499	0	1
<i>loan amount (\$ millions)</i>	3,597	365.1	585.4	1	10,700
<i>maturity (years)</i>	3,597	5.41	1.52	0.25	15
<i>I-Grade</i>	3,597	0.105	0.306	0	1
<i>Ba-rated</i>	3,597	0.187	0.390	0	1
<i>B-rated</i>	3,597	0.612	0.487	0	1
<i>C-rated</i>	3,597	0.096	0.295	0	1

**Table II Effects of Covenant Intensity and Collateral on Credit Ratings**

This table provides results of a linear regression of the rating difference on four covenant strictness measures, collateral status, and other control variables. Columns (1) to (3) use total covenants, total non-financial covenants, and total financial covenants as measures. Columns (4) and (5) provide results using the Bradley and Roberts (2015) covenant intensity index (CII) as the measure, with and without collateral. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Total covenants	Total non- financial covenants	Total financial covenants	Covenant intensity index	Covenant intensity index
Measure	0.0316*** (3.675)	0.0362*** (2.820)	0.0870*** (4.251)	0.0636*** (4.035)	0.0681*** (4.343)
Secured	0.498*** (2.616)	0.513*** (2.690)	0.492*** (2.589)	0.451** (2.360)	
Term	-0.255*** (-6.721)	-0.257*** (-6.765)	-0.253*** (-6.669)	-0.255*** (-6.715)	-0.254*** (-6.684)
Size	0.291*** (10.52)	0.294*** (10.61)	0.292*** (10.61)	0.289*** (10.47)	0.289*** (10.45)
Maturity	-0.210*** (-2.695)	-0.211*** (-2.702)	-0.205*** (-2.634)	-0.212*** (-2.710)	-0.200** (-2.566)
Issuer Rating FE	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES
Observations	3,597	3,597	3,597	3,597	3,597
Adjusted R <sup>2</sup>	0.567	0.565	0.568	0.567	0.566

**Table III Effects of Individual Covenants on Credit Ratings**

This table provides results of a linear regression of the rating difference on covenants individually, collateral, loan type and control variables. Columns (1) to (7) report the 7 out of 12 covenants that show significant effects. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Min. Interest Coverage	Max. Debt to EBITDA	Max. Capex	Insurance Proceeds Sweep	Asset Sales Sweep	Debt Issuance Sweep	Dividend Restrictions
Covenant	0.313*** (4.855)	0.274*** (3.786)	0.257*** (4.090)	0.255*** (3.907)	0.224*** (3.471)	0.168*** (2.609)	0.304*** (4.858)
Secured	0.498*** (2.627)	0.509*** (2.677)	0.506*** (2.664)	0.477** (2.501)	0.537*** (2.827)	0.514*** (2.696)	0.545*** (2.876)
Term	-0.252*** (-6.664)	-0.253*** (-6.680)	-0.251*** (-6.608)	-0.257*** (-6.767)	-0.255*** (-6.730)	-0.258*** (-6.778)	-0.252*** (-6.665)
Size	0.285*** (10.33)	0.305*** (11.13)	0.287*** (10.37)	0.292*** (10.59)	0.292*** (10.55)	0.295*** (10.67)	0.286*** (10.36)
Maturity	-0.207*** (-2.652)	-0.209*** (-2.676)	-0.223*** (-2.857)	-0.212*** (-2.710)	-0.219*** (-2.798)	-0.213*** (-2.716)	-0.210*** (-2.691)
Issuer Rating FE	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES
Observations	3,597	3,597	3,597	3,597	3,597	3,597	3,597
Adjusted R <sup>2</sup>	0.569	0.567	0.567	0.567	0.566	0.565	0.569

**Table IV Joint Effect of Covenants on Credit Ratings**

This table provides results of a linear regression of the rating difference on covenants jointly, collateral, loan type and control variables. Column (1) provides results of the joint effect of the 7 relevant covenants. Column (2) provides results of the joint effect of 3 financial covenants. Column (3) provides results of the joint effect of 4 non-financial covenants. Column (4) provides results of the joint effect of the two most important covenants. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	All Significant	Significant Financial	Significant Non-Financial	All
Interest Coverage	0.214** (2.513)	0.216** (2.527)		0.219** (2.492)
Debt to EBITDA	0.0419 (0.443)	0.0764 (0.905)		0.0545 (0.555)
Capex	0.0799 (0.828)	0.111 (1.285)		0.150 (1.537)
Dividend Restrictions	0.303*** (2.780)		0.368*** (3.445)	0.373*** (3.405)
Asset Sales Sweep	-0.0577 (-0.339)		-0.0363 (-0.214)	0.139 (0.802)
Debt Issuance Sweep	-0.310** (-2.195)		-0.224 (-1.617)	-0.152 (-1.057)
Insurance Proceeds Sweep	0.176 (1.546)		0.189* (1.659)	0.173 (1.514)
Fixed Cost Coverage				0.0697 (0.699)
Leverage Ratio				-0.0220 (-0.123)
Net Worth				-0.210 (-1.221)
Excess Cashflow Sweep				-0.449*** (-4.937)
Equity Issuance Sweep				-0.246** (-2.382)
Secured	0.508*** (2.645)	0.487** (2.569)	0.536*** (2.788)	0.611*** (3.185)
Term	-0.247*** (-6.526)	-0.250*** (-6.593)	-0.252*** (-6.648)	-0.238*** (-6.340)
Size	0.282*** (10.07)	0.286*** (10.28)	0.287*** (10.40)	0.287*** (10.29)
Maturity	-0.202*** (-2.592)	-0.213*** (-2.725)	-0.204*** (-2.611)	-0.213*** (-2.742)
Issuer Rating FE	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES
Observations	3,597	3,597	3,597	3,597
Adjusted R <sup>2</sup>	0.571	0.569	0.569	0.578

**Table V Credit Ratings: Term Loans versus Revolvers**

This table provides results of a linear regression of the rating difference on individual covenants, loan type, collateral, interactions of covenants and collateral with loan type, and control variables. Columns (1) to (7) provide results with 7 relevant covenants and column (8) is results with total covenant intensity. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Min. Interest Coverage	Max. Debt to EBITDA	Max. Capex	Insurance Proceeds Sweep	Asset Sales Sweep	Debt Issuance Sweep	Dividend Restrictions	Total Covenants
Covenant	0.167** (2.230)	0.0935 (1.267)	0.153* (1.805)	0.0897 (1.172)	0.0399 (0.529)	-0.0246 (-0.324)	0.149** (2.037)	0.00779 (0.787)
Term	-0.0711 (-0.405)	-0.142 (-0.795)	0.0247 (0.142)	0.00808 (0.0465)	-0.0538 (-0.308)	-0.0288 (-0.165)	-0.0999 (-0.566)	-0.101 (-0.575)
Covenant×Term	0.267*** (3.745)	0.287*** (4.130)	0.213*** (2.700)	0.294*** (4.036)	0.327*** (4.641)	0.341*** (4.745)	0.282*** (4.057)	0.0409*** (4.710)
Secured	0.604*** (3.024)	0.631*** (3.155)	0.652*** (3.245)	0.631*** (3.144)	0.685*** (3.427)	0.667*** (3.328)	0.651*** (3.267)	0.636*** (3.177)
Secured×Term	-0.298* (-1.675)	-0.272 (-1.528)	-0.355** (-1.979)	-0.393** (-2.191)	-0.364** (-2.038)	-0.383** (-2.142)	-0.299* (-1.682)	-0.335* (-1.881)
Size	0.283*** (10.27)	0.285*** (10.32)	0.305*** (11.16)	0.290*** (10.57)	0.292*** (10.63)	0.296*** (10.77)	0.283*** (10.29)	0.290*** (10.56)
Maturity	-0.196** (-2.507)	-0.203*** (-2.599)	-0.193** (-2.463)	-0.191** (-2.447)	- 0.202*** (-2.579)	-0.195** (-2.488)	-0.200** (-2.566)	-0.200** (-2.564)
Firm Rating FE	YES	YES	YES	YES	YES	YES	YES	YES
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,597	3,597	3,597	3,597	3,597	3,597	3,597	3,597
Adjusted R <sup>2</sup>	0.572	0.571	0.569	0.571	0.571	0.570	0.572	0.571

**Table VI Credit Ratings: Differences in Covenants and Collateral by Firm Ratings**

Firms are divided into 4 groups based on firm ratings. Investment-grade firms are indicated as I-Grade. Ba1- to Ba3-rated firms are indicated as Ba-rated. B1- to B3-rated firms are indicated as B-rated. Caa1 and below are indicated at C-rated. Using B-rated as the baseline, firm rating level and interactions with covenants and collateral are added to the regression. This table provides results of a linear regression of the rating difference on individual covenants, firm rating indicators, collateral, interactions of covenants and collateral with firm rating indicators, loan type, and control variables. Columns (1) to (7) provide results with 7 relevant covenants and column (8) are results with total covenant intensity. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Min. Interest Coverage	Max. Debt to EBITDA	Max. Capex	Insurance Proceeds Sweep	Asset Sales Sweep	Debt Issuance Sweep	Dividend Restrictions	Total Covenants
Covenant	0.333*** (5.522)	0.285*** (4.925)	0.289*** (4.519)	0.341*** (5.688)	0.306*** (5.173)	0.299*** (5.010)	0.348*** (6.030)	0.0378*** (5.124)
C-rated	-1.500** (-2.213)	-1.470** (-2.161)	-1.540** (-2.266)	-1.537** (-2.266)	-1.425** (-2.083)	-1.542** (-2.256)	-1.436** (-2.098)	-1.454** (-2.135)
Covenant×C-rated	-0.436*** (-2.830)	-0.201 (-1.430)	-0.375** (-2.207)	-0.325** (-2.198)	-0.310** (-2.181)	-0.288** (-1.974)	-0.175 (-1.253)	-0.0423** (-2.201)
Ba-rated	-1.249*** (-3.370)	-1.258*** (-3.358)	-1.249*** (-3.378)	-1.276*** (-3.466)	-1.145*** (-3.087)	-1.250*** (-3.389)	-1.053*** (-2.795)	-1.134*** (-3.047)
Covenant×Ba-rated	-0.230** (-1.998)	-0.175 (-1.442)	-0.339*** (-2.642)	-0.388*** (-3.228)	-0.367*** (-3.157)	-0.509*** (-4.356)	-0.309*** (-2.627)	-0.0524*** (-3.369)
I-Grade	-1.318*** (-3.771)	-1.350*** (-3.853)	-1.448*** (-4.166)	-1.451*** (-4.192)	-1.334*** (-3.837)	-1.438*** (-4.148)	-1.194*** (-3.391)	-1.298*** (-3.679)
Covenant×I-Grade	-0.566*** (-3.491)	-0.396** (-2.345)	-0.162 (-0.275)	-1.589*** (-4.146)	-1.084*** (-3.328)	-1.137*** (-3.234)	-0.474*** (-2.886)	-0.0904** (-2.229)
Secured	0.141 (0.419)	0.151 (0.446)	0.148 (0.437)	0.0742 (0.220)	0.172 (0.509)	0.0897 (0.266)	0.257 (0.763)	0.137 (0.405)
Secured×C-rated	3.314*** (4.859)	3.231*** (4.735)	3.306*** (4.839)	3.313*** (4.872)	3.216*** (4.717)	3.313*** (4.857)	3.183*** (4.671)	3.276*** (4.807)
Secured×Ba-rated	0.587 (1.585)	0.583 (1.570)	0.606 (1.628)	0.676* (1.815)	0.576 (1.551)	0.720* (1.934)	0.464 (1.254)	0.621* (1.672)
Secured×I-Grade	-0.0388 (-0.0925)	-0.0706 (-0.168)	-0.0748 (-0.178)	0.304 (0.709)	0.0798 (0.187)	0.270 (0.617)	-0.169 (-0.403)	0.0183 (0.0431)
Term	-0.297*** (-7.617)	-0.297*** (-7.603)	-0.302*** (-7.741)	-0.300*** (-7.728)	-0.300*** (-7.695)	-0.300*** (-7.720)	-0.296*** (-7.600)	-0.298*** (-7.656)
Size	0.265*** (12.39)	0.263*** (12.19)	0.277*** (13.04)	0.267*** (12.52)	0.267*** (12.47)	0.272*** (12.75)	0.260*** (12.16)	0.266*** (12.48)
Maturity	-0.165** (-2.545)	-0.176*** (-2.705)	-0.158** (-2.429)	-0.165** (-2.557)	-0.168*** (-2.593)	-0.160** (-2.463)	-0.167*** (-2.585)	-0.167** (-2.577)

Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,597	3,597	3,597	3,597	3,597	3,597	3,597	3,597
Adjusted R <sup>2</sup>	0.442	0.441	0.440	0.444	0.442	0.443	0.443	0.442

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**Table VII Summary Statistics of Credit Spread Sample**

This table provides summary statistics for spreads (in basis points), collateral, covenants, and other loan characteristics. For indicator variables, mean values in column 2 show the prevalence of this characteristic in the dataset. The sample is based on syndicated loan market from 2002 to 2015. Variables are defined in Appendix A.

	(1) N	(2) mean	(3) std. dev	(4) min	(5) max
<i>CDS spread</i>	3,780	141	164	1.530	1160
<i>loan spread (all-in-drawn)</i>	3,780	139	105	1.750	850
<i>spread difference</i>	3,780	1.65	112	-487.6	491.5
<i>secured</i>	3,780	0.621	0.485	0	1
<i>term loan</i>	3,780	0.249	0.432	0	1
<i>debt to EBITDA</i>	3,780	0.284	0.451	0	1
<i>interest coverage</i>	3,780	0.246	0.431	0	1
<i>capex</i>	3,780	0.039	0.194	0	1
<i>fixed charge coverage</i>	3,780	0.100	0.300	0	1
<i>leverage ratio</i>	3,780	0.226	0.418	0	1
<i>net worth</i>	3,780	0.089	0.284	0	1
<i>asset sales sweep</i>	3,780	0.134	0.341	0	1
<i>debt issuance sweep</i>	3,780	0.117	0.321	0	1
<i>equity issuance sweep</i>	3,780	0.064	0.245	0	1
<i>excess CF sweep</i>	3,780	0.054	0.227	0	1
<i>insurance proceeds sweep</i>	3,780	0.091	0.287	0	1
<i>dividend restrictions</i>	3,780	0.292	0.455	0	1
<i>loan amount (\$ millions)</i>	3,780	1,182	1,686	8.9	30,000
<i>maturity (years)</i>	3,780	4.02	1.79	0.083	18

**Table VIII Effects of Covenant Intensity and Collateral on Credit Spreads**

This table provides results of a linear regression of the difference in the CDS spread - loan spread on four covenant strictness measures, collateral status, and other control variables. Columns (1) to (3) use total covenants, total non-financial covenants, and total financial covenants as measures. Columns (4) and (5) provide results using Bradley and Roberts (2015) covenant intensity index (CII) as the measure, with and without collateral. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)
	Total covenants	Total non-financial covenants	Total financial covenants	Covenant intensity index	Covenant intensity index
Measure	6.894*** (7.229)	11.45*** (7.699)	7.795*** (4.317)	11.57*** (7.439)	14.01*** (9.445)
Secured	31.58*** (8.899)	26.22*** (7.507)	32.77*** (8.740)	18.61*** (5.066)	
Term	19.36*** (4.429)	18.19*** (4.149)	23.27*** (5.361)	18.82*** (4.298)	20.67*** (4.722)
Size	9.507*** (5.558)	8.869*** (5.187)	9.867*** (5.727)	9.402*** (5.499)	9.486*** (5.528)
Maturity	34.01*** (11.95)	34.85*** (12.33)	35.07*** (12.24)	34.71*** (12.26)	34.55*** (12.16)
Loan Purpose FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES
Observations	3,780	3,780	3,780	3,780	3,780
Adjusted R <sup>2</sup>	0.336	0.337	0.329	0.336	0.331

**Table IX Effects of Individual Covenants on Credit Spreads**

This table provides results of a linear regression of the difference in the CDS spread - loan spread on covenants individually, collateral, loan type and control variables. Columns (1) to (7) report the 7 out of 12 covenants that show significant effects. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Max. Capex	Min. Fixed Cost Coverage	Asset Sales Sweep	Debt Issuance Sweep	Excess Cashflow Sweep	Insurance Proceeds Sweep	Dividend Restrictions
Covenant	85.55*** (8.342)	33.28*** (5.661)	49.34*** (8.221)	46.62*** (6.964)	25.19*** (2.587)	51.04*** (7.061)	26.63*** (6.399)
Secured	24.03*** (6.855)	27.68*** (7.895)	24.43*** (6.977)	26.54*** (7.590)	26.01*** (7.342)	23.50*** (6.652)	29.56*** (8.395)
Term	24.41*** (5.692)	23.87*** (5.530)	17.59*** (4.011)	19.03*** (4.338)	23.47*** (5.369)	20.26*** (4.653)	22.55*** (5.215)
Size	10.09*** (5.904)	9.595*** (5.591)	8.527*** (4.987)	8.359*** (4.867)	9.106*** (5.278)	8.959*** (5.233)	9.860*** (5.749)
Maturity	35.28*** (12.52)	36.02*** (12.73)	35.09*** (12.44)	36.84*** (13.07)	36.10*** (12.64)	34.69*** (12.23)	34.57*** (12.15)
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES
Observations	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Adjusted R <sup>2</sup>	0.339	0.331	0.338	0.335	0.326	0.335	0.333

**Table X Joint Effect of Covenants on Credit Spreads**

This table provides results of a linear regression of the difference in the CDS spread - loan spread on covenants jointly, collateral, loan type and control variables. Column (1) provides results of the joint effect of the 7 relevant covenants. Column (2) provides results of the joint effect of 3 financial covenants. Column (3) provides results of the joint effect of 4 non-financial covenants. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)
	All Significant	Significant Financial	Significant Non-Financial	All
Capex	72.68*** (6.717)	86.36*** (8.462)		73.63*** (6.836)
Fixed Cost Coverage	27.66*** (4.692)	33.95*** (5.835)		27.71*** (4.644)
Asset Sales Sweep	27.03*** (2.723)		29.28*** (2.924)	33.15*** (3.345)
Debt Issuance Sweep	12.91 (1.333)		17.99* (1.845)	43.49*** (4.053)
Excess Cashflow Sweep	-42.34*** (-3.527)		-30.71** (-2.561)	-55.58*** (-4.582)
Insurance Proceeds Sweep	11.86 (1.029)		15.85 (1.364)	19.54* (1.688)
Dividend Restrictions	9.385** (2.062)		15.31*** (3.381)	11.28** (2.405)
Debt to EBITDA				-9.460* (-1.805)
Interest Coverage				-4.882 (-0.984)
Leverage Ratio				-7.451 (-1.526)
Net Worth				13.48** (2.094)
Equity Issuance Sweep				-66.97*** (-6.649)
Secured	25.21*** (7.063)	24.59*** (7.048)	26.92*** (7.503)	20.77*** (5.129)
Term	18.44*** (4.238)	23.22*** (5.435)	17.29*** (3.943)	19.47*** (4.498)
Size	9.945*** (5.839)	10.32*** (6.070)	8.957*** (5.226)	9.326*** (5.484)
Maturity	33.76*** (11.92)	34.29*** (12.21)	34.77*** (12.18)	32.40*** (11.43)
Loan Purpose FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES
Observations	3,780	3,780	3,780	3,780
Adjusted R <sup>2</sup>	0.354	0.345	0.342	0.363

**Table XI Credit Spreads: Term Loans versus Revolvers**

This table provides results of a linear regression of the difference in the CDS spread - loan spread on individual covenants, loan type, collateral, interactions of covenants and collateral with loan type, and control variables. Columns (1) to (7) provide results with 7 relevant covenants and column (8) is results with total covenant intensity. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Max. Capex	Min. Fixed Cost Coverage	Asset Sales Sweep	Debt Issuance Sweep	Excess Cashflow Sweep	Insurance Proceeds Sweep	Dividend Restrictions	Total Covenants
Covenant	96.37*** (8.038)	36.35*** (5.473)	62.16*** (8.178)	69.65*** (8.011)	46.48*** (3.523)	75.70*** (8.104)	27.75*** (6.076)	8.979*** (7.853)
Term	19.59** (2.356)	18.84** (2.198)	14.42* (1.693)	16.23* (1.881)	18.73** (2.233)	17.97** (2.150)	20.22** (2.283)	26.52*** (2.872)
Covenant×Term	-30.78* (-1.771)	-12.04 (-0.979)	-27.79*** (-2.722)	-44.17*** (-4.031)	-37.39** (-2.455)	-49.93*** (-4.180)	-5.623 (-0.665)	-5.274*** (-3.311)
Secured	22.61*** (5.986)	26.41*** (6.988)	21.89*** (5.778)	23.22*** (6.148)	24.03*** (6.285)	20.48*** (5.365)	28.82*** (7.577)	31.49*** (8.227)
Secured×Term	8.727 (0.923)	8.611 (0.911)	12.13 (1.288)	14.09 (1.495)	10.69 (1.111)	13.28 (1.394)	5.717 (0.605)	6.030 (0.640)
Size	10.17*** (5.949)	9.578*** (5.578)	8.855*** (5.165)	8.914*** (5.177)	9.283*** (5.376)	9.438*** (5.509)	9.926*** (5.762)	10.09*** (5.869)
Maturity	35.19*** (12.39)	35.74*** (12.52)	34.86*** (12.27)	36.45*** (12.86)	35.82*** (12.47)	34.41*** (12.07)	34.48*** (12.01)	34.05*** (11.88)
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Adjusted R <sup>2</sup>	0.339	0.331	0.340	0.338	0.327	0.338	0.333	0.337

**Table XII Credit Spreads: Differences in Covenants and Collateral by Firm CDS**

This table provides results of a linear regression of the difference in the CDS spread - loan spread on individual covenants, loan type, collateral, interactions of covenants and collateral with the CDS spread, and control variables. Columns (1) to (7) provide results with 7 relevant covenants and column (8) is results with total covenant intensity. Variables are defined in Appendix A. t-statistics are in parentheses. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Max. Capex	Min. Fixed Cost Coverage	Asset Sales Sweep	Debt Issuance Sweep	Excess Cashflow Sweep	Insurance Proceeds Sweep	Dividend Restrictions	Total Covenants
Covenant	-34.22*** (-2.620)	-39.85*** (-7.154)	-48.92*** (-7.567)	-39.80*** (-5.871)	-69.64*** (-5.875)	-48.44*** (-5.832)	-34.47*** (-9.294)	-12.30*** (-13.32)
Covenant×CDS	0.0666** (2.014)	0.244*** (11.41)	0.120*** (6.239)	0.118*** (5.868)	0.0999*** (3.162)	0.129*** (5.540)	0.140*** (9.548)	0.0390*** (14.10)
Secured	-55.89*** (-20.32)	-55.58*** (-20.61)	-54.85*** (-20.03)	-55.93*** (-20.44)	-54.69*** (-19.90)	-53.97*** (-19.59)	-57.26*** (-20.78)	-60.83*** (-22.07)
Secured×CDS	0.576*** (58.43)	0.548*** (57.72)	0.562*** (53.72)	0.563*** (56.33)	0.578*** (59.24)	0.563*** (55.83)	0.532*** (48.60)	0.517*** (48.93)
Term	-25.63*** (-8.391)	-24.72*** (-8.259)	-22.54*** (-7.363)	-23.14*** (-7.524)	-23.31*** (-7.636)	-23.46*** (-7.662)	-25.20*** (-8.390)	-22.20*** (-7.457)
Size	9.078*** (7.748)	9.305*** (8.109)	9.091*** (7.803)	9.012*** (7.699)	9.271*** (7.909)	8.884*** (7.608)	8.352*** (7.232)	7.675*** (6.744)
Maturity	8.395*** (4.243)	7.700*** (3.962)	8.047*** (4.095)	7.215*** (3.650)	9.561*** (4.840)	8.981*** (4.549)	9.090*** (4.650)	8.461*** (4.395)
Loan Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
One Digit SIC FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	3,780	3,780	3,780	3,780	3,780	3,780	3,780	3,780
Adjusted R <sup>2</sup>	0.690	0.701	0.694	0.693	0.693	0.692	0.699	0.709