

Corporate Loan Securitization and the Standardization of Financial Covenants*

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ABSTRACT

We examine whether syndicated loans securitized through Collateralized Loan Obligations (CLOs) have more standardized financial covenants. We proxy for the standardization of covenants using the textual similarity of their contractual definitions. We find that securitized loans are associated with higher covenant standardization than non-securitized institutional loans. In addition, we show that CLOs with more diverse or frequently rebalanced portfolios are more likely to purchase loans with standardized covenants, potentially because standardization alleviates information processing costs related to loan monitoring and screening. We also document that covenant standardization is associated with greater loan and CLO note rating agreement between credit rating agencies, further supporting the relation between lower information costs and covenant standardization. Overall, our study provides evidence that loan securitization is related to the design of standardized financial covenants.

Keywords: Securitization, Standardization, Collateralized Loan Obligations (CLO), Financial covenants, Syndicated loans.

JEL Classifications: G17, G21, G32, M41

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1. Introduction

The role of borrower-specific financial covenants in monitoring credit risk has been well-established in the accounting literature (e.g., Dichev and Skinner [2002], Christensen et al. [2016]). Prior studies show that lenders adjust the accounting definitions in covenants to alleviate agency costs and acquire timely signals of a borrower's financial performance (e.g., Leftwich [1983], Beatty et al. [2002], Li [2010], Dyring et al. [2016]). However, the extent to which the customization of covenant specifications varies across different types of lenders has received little attention in the literature. We investigate whether syndicated loans securitized through Collateralized Loan Obligations (CLOs) have more homogenous and comparable (standardized, hereafter) financial covenants.

CLOs are special purpose entities that purchase high-yield syndicated loans and use the principal and interest payments of these loans to issue new notes.¹ Over the past fifteen years, CLOs have become the dominant institutional investor in syndicated loans, reaching a 70% share in the high-yield loan market with an annual issuance of CLO notes that exceeds \$100 billion (Standard and Poor's [2014]). Certain characteristics inherent to CLOs make these entities different from other non-bank loan investors. CLOs invest in large and well-diversified loan portfolios to shield their performance from idiosyncratic credit risks (Jobst [2002], Ayotte and Bolton [2011]). For instance, the average CLO invests in about 200 loans that are issued by different borrowers in various industries and rebalances the loan portfolio on a monthly basis to improve its performance.² These characteristics suggest that while CLOs might engage in less

¹ High-yield loans are issued to highly leveraged companies and are usually rated non-investment grade. Banks typically invest in 10% to 15% of a high-yield syndicated loan with the remaining amount being purchased by non-bank institutional investors such as CLOs and hedge funds (S&P Leveraged Loan Market [2015]).

² The statistics on CLO portfolio size are derived from the CLO-i securitized portfolio database, which we also use in this study. To provide a comparison, based on the 2014 LSTA Trade Data Study, institutional loans were traded in the secondary market about 15 times per quarter in 2013, while the average securitized loan in the CLO-i loan trade database traded roughly 40 times per quarter in the same year. Also, based on descriptive statistics in Massoud

screening and monitoring on a per loan basis, they likely face greater total portfolio screening and monitoring costs than other institutional investors.

While CLOs can rely on a variety of mechanisms to lower screening and monitoring costs, we anticipate that the structure of loan covenant specifications is likely to provide one such mechanism. We hypothesize that securitized loans have more standardized financial covenants because, relative to customized borrower-specific covenants, such covenants are likely to help CLOs screen and monitor their portfolios in a more efficient way. Although standardized covenants do not provide the precise default signals that customized covenants do, we argue that CLOs are willing to trade-off this precision to balance their high information costs associated with the monitoring and screening of their loan portfolio.

First, as CLO portfolios include marginal loan investments covering a highly diversified set of borrowers and industries, portfolio performance exposure to borrower-specific credit risk is limited. Thus, collecting and processing information on customized covenants to assess loan quality is potentially more costly relative to the benefits of receiving precise default signals. Standardized covenants can help CLOs to alleviate the high information costs from portfolio diversification while still providing a default signal that supports monitoring activities. Second, as CLOs rebalance their portfolios on a monthly basis, investing in loans with customized covenants can increase CLO portfolio screening costs. Financial covenants with more standardized definitions require less data collection, which likely lowers information costs and thus overall transaction costs. Third, customized financial covenants can lead to more disagreements between the credit rating agencies that rate CLO loans and notes (e.g., Jobst [2002], Ayotte and Bolton [2011]). Greater rating disagreements increase CLOs' information

et al. [2011] and Paligorova and Santos [2015], the average hedge fund with a credit strategy is estimated to invest in about 60 to 70 loans.

costs, whereas standardized financial covenants with more similar specifications likely facilitate more comparable credit rating assessments.³

We test our hypothesis using a sample of 3,303 complete financial covenant definitions in 440 securitized and 703 non-securitized high-yield loan contracts issued over the 2000-2009 period. We obtain data on loan securitizations from CLO-i, a global platform that collects detailed information on CLO loan portfolios, and data on high-yield institutional loans from LPC DealScan. We match these databases with firms' SEC filings on EDGAR to retrieve the specific loan contracts and hand-collect their covenant definitions.

We employ a novel content analysis approach to proxy for the standardization of financial covenants by measuring the textual similarity of their contractual definitions. We compute the cosine textual similarity between covenant definitions using a vector space model applied by plagiarism algorithms (e.g., Salton et al. [1975]) and recently introduced in the accounting and finance literatures (e.g., Brown and Tucker [2011], Bozanic and Thevenot [2015], Hoberg et al. [2014]).⁴ We measure the covenant standardization of a loan by averaging the cosine similarities of its financial covenants with the same-type covenants of loans issued by other borrowers over the prior calendar year (*Covenant similarity score*). For loans with no financial covenants, we set the covenant similarity score to one (maximum cosine value), because the monitoring and screening costs related to the content of these covenant specifications are zero.⁵ We validate our covenant standardization proxy by showing that when loans and borrowers share similar

³ However, it is possible that CLOs do not heavily rely on covenants to monitor and screen their loan portfolios given that other CLO characteristics (e.g., reliance on credit ratings, diversification) and features of securitized loans might drive covenant standardization.

⁴ We use the complete definitions of same-type financial covenants from two loans of different borrowers. We create two vectors with the number of times each word is mentioned in the two covenant definitions (excluding "stop-words"). The cosine of the angle between these vectors is the covenant similarity score, with values ranging from zero (no textual similarity) to one (identical covenant definitions). More details on the computation of the variable are discussed in Section 4.1 and Appendix A.

⁵ Our results remain unchanged when excluding loans with no covenants (see Internet Appendix).

characteristics, financial covenants have higher similarity scores.

Consistent with our hypothesis, we find that securitized loans are associated with more standardized financial covenants relative to other institutional loans, controlling for borrower accounting performance and loan features such as the loan spread, collateralization requirement, and the presence of a loan rating that likely affect financial covenant standardization.⁶ In terms of economic magnitude, relative to non-securitized institutional loans, securitized loans have a covenant similarity score that is higher by about 20% of the variable's sample standard deviation. We also document that covenant standardization increases (decreases) with the extent of CLOs' (banks') loan ownership, and that loans securitized at the time of origination (i.e., when CLOs are members of the primary loan syndicate) have greater covenant similarity than loans securitized ex post (i.e., when CLOs buy these loans in the secondary market). Overall, our evidence shows a positive and robust relation between loan securitization and financial covenant standardization.

We next examine CLO portfolio characteristics associated with the covenant standardization of loans that CLOs purchase. We find that CLOs with more diversified loan portfolios are more likely to invest in loans with standardized covenants, suggesting that such CLOs are more likely to trade off the precision of customized covenants with covenant standardization that can offer some signal about loans' performance and also serves to alleviate the high information costs of diversified CLOs. Moreover, we document that CLOs that significantly rebalance their portfolios are more likely to invest in loans with greater covenant standardization, potentially because standardization contributes to lowering these CLO's high screening costs. Lastly, we find that standardization is related to greater agreement between S&P and Moody's credit ratings on CLO

⁶ Loan investors could trade off covenant customization with greater loan spreads and accept standardized covenants that provide less accurate default signals than customized covenants. Our results suggest that, controlling for loan spreads, loans purchased by CLOs have more standardized covenants relative to other institutional loans.

loans and notes. This evidence suggests that covenant standardization can facilitate more comparable credit risk assessments, further supporting the lower information costs of standardized covenants. Collectively, our findings lend support to anecdotal evidence collected from discussions with CLO managers that commonly-defined financial covenants help them to quickly read and assess familiar covenant definitions.

A few empirical caveats are in order. First, we acknowledge that our results document an association rather than a causal link between loan securitization and covenant standardization. Since we do not observe loan term sheets with covenant specifications before and after a CLO joins a loan syndicate, it is possible that an unobservable correlated omitted variable determines both CLO ownership of a loan and covenant standardization. While we attempt to address this issue in our sensitivity analyses, we cannot fully resolve it. Second, CLOs may rely on alternative loan-specific or third-party monitoring mechanisms to mitigate portfolio losses, which can also be correlated with covenant definitions. Thus, our empirical tests cannot completely rule out the possibility that CLO managers simply ignore debt covenants. Third, we cannot draw inferences on whether standardized covenants provide more or less credit protection to lenders relative to customized covenants, since our proxy only captures similarities in covenant specifications.

Our paper makes several contributions to the literature. First, we contribute to the growing research on the differences between securitized and institutional syndicated loans. While loans purchased by non-bank institutional investors include additional and more restrictive covenants (Drucker and Puri [2009]), more recent studies document a positive relation between CLO fund flows in the credit market and the issuance of loans with no financial covenants (i.e., “covenant-lite” loans) over the 2006-2007 period (e.g., Shivdasani and Wang [2011], Wang and Xia [2014],

Becker and Ivashina [2016]). We add to these studies by showing that securitized loans have more standardized covenants. Thus covenant-lite lending might simply reflect an extreme form of covenant standardization that is an inherent characteristic of securitized loans. We further provide evidence that high information collection and processing costs related to CLO portfolio monitoring and screening is associated with the presence of standardized covenants. Our findings contrast with prior evidence that other institutional loan investors, such as banks and insurance companies, prefer customized covenants (e.g., Leftwich [1983], El-Gazaar and Pastena [1990]), and support the theoretical arguments on the standardization of securitized loan contracts (e.g., Jobst [2002], Ayotte and Bolton [2011], Triantis [2013]). Our setting also allows us to provide new evidence that is consistent with the arguments in Skinner [2011] that loan investors' monitoring costs affect the design of accounting-based covenants.

Second, we contribute to the emerging literature that examines CLOs' loan investment decisions (e.g., Benmelech, Dlugosz and Ivashina [2012], Bord and Santos [2014], Loumioti and Vasvari [2016]). We show that, by purchasing loans whose covenant specifications are standardized, CLOs trade off loan features that facilitate better monitoring with features that decrease the high information costs which arise from their business model. Our findings are also relevant to studies documenting that CLO ownership influences loan contract terms such as the loan spread and size (e.g., Ivashina and Sun [2011], Nadauld and Weisbach [2012]).

Finally, we expand the well-established literature on the determinants of the structure of covenant packages that improve contracting efficiency. Prior studies document that the choice of different covenant types is driven by a cost-benefit analysis of how covenant mechanisms lower agency costs (e.g., Dichev and Skinner [2002], Christensen and Nikolaev [2012], Ball et al. [2015], Dey et al. [2015]). Also, the design of covenant packages and their specifications is

shown to be affected by the quality and reliability of the underlying accounting information (e.g., Demerjian [2011], Brown [2016], Demerjian et al. [2016]) as well as by loan- and borrower-specific characteristics (e.g., Beatty et al. [2002], Beatty et al. [2008], Li [2010], Costello and Wittenberg-Moerman [2011], Li [2015], Dyring et al. [2016]). We provide evidence consistent with efficient contracting by showing that covenant specifications vary across different types of lenders. We thus respond to the call for more empirical work on factors that explain covenant design choices (Armstrong et al. [2010], Christensen et al. [2016]).

2. Institutional background and hypothesis development

2.1 INSTITUTIONAL BACKGROUND

Over the past fifteen years, the advent of CLOs has been the most significant development in the syndicated loan market (Standard and Poor's [2014]). CLOs are set up by a bank and an independent investment management firm (typically called the CLO manager) to invest in small tranches of syndicated loans (typically called CLO loans or securitized loans).⁷ These loans are used as collateral to issue new senior and junior notes (typically called CLO notes) that are bought by banks and non-bank institutional investors (e.g., hedge funds, insurance firms). CLO loans and notes are rated by at least two credit rating agencies (i.e., Moody's, Standard and Poor's, or Fitch) to reduce information asymmetry between managers and investors.

Several structural features differentiate CLOs from other non-bank institutional loan investors. First, CLOs invest in large, well-diversified loan portfolios to mitigate individual borrowers' idiosyncratic credit risks. A typical CLO portfolio in our sample includes small tranches of about 200 loans issued by different borrowers in 15 to 25 industries. The average

⁷ Some of the biggest CLO managers in terms of CLO principal value under management are the Carlyle Group, GSO Capital Partners (part of the Blackstone Group), Alcentra, Ares Management, Highland Capital Management, and Credit Suisse Asset Management. As of mid-2013, these firms managed CLOs with a total par value of roughly \$100 billion (Creditflux CLO Manager Rankings).

CLO size is \$500-\$600 million, and the average loan tranche size held by a CLO is about \$2.5 million. Portfolio diversification thus reflects a variety of industries and borrowers.

Second, relative to some institutional loan investors that are passive (e.g., loan mutual funds), CLOs are actively managed, suggesting that CLO managers have the fiduciary duty to monitor their portfolio loan quality. To enhance portfolio performance, managers have the discretion to sell loans with deteriorating risk profiles or those that are expected to underperform in the future and replace them with new loans purchased in the primary or the secondary syndicated loan market. Peristiani and Santos [2015] document that, during the two year period after their origination, CLOs sell about 30.0% of their initial loan investments, while their monthly purchase activity is 5.5% of their portfolio balance.

Third, CLO managers are required to comply with portfolio performance tests that are reported to CLO investors on a monthly basis. These tests are determined at the CLO's origination and aim to impose certain standards on the portfolio's structure in terms of loan riskiness and quality. For example, CLO managers are required to maintain a minimum average loan rating or a maximum portfolio exposure to an industry. Most importantly, CLO managers must ensure that the value of the portfolio loans covers the principal value of the CLO notes. This so-called "overcollateralization test" captures a CLO's solvency by measuring whether the CLO has enough performing loans to repay its senior and junior notes. Portfolio loans that are in default or have a low rating are heavily discounted in the computation of the CLO portfolio's value, potentially leading to a violation of the overcollateralization test (Loumioti and Vasvari [2016]). Such a violation decreases CLO managers' compensation and could trigger their dismissal or the early liquidation of the CLO by its investors (e.g., Gapstow Report [2014]). Also, technical loan defaults could lead to the acceleration of loan principal and of other loans (if cross-default provisions are present), which might negatively affect a CLO's cash flows.

To pass the overcollateralization and other portfolio performance tests, CLO managers engage

in critical loan screening and monitoring activities. Discussions with several CLO managers indicate that when managers invest in a new loan, in addition to ratings information, they also rely on information from their own due diligence which includes details about the borrowing firm and the lending agreement as well as an evaluation of the financial covenants in the loan's term sheet. In particular, the CLO managers mentioned that they prefer term sheets with commonly defined financial covenants because such definitions help them to quickly assess the underlying covenant specifications and characteristics. Over the loan ownership period, CLO managers also rely on financial covenants to monitor the loans. These covenants provide early signals of credit risk deterioration that allows the managers to trade loans ahead of significant credit events. While CLOs could rely on loan ratings to mitigate portfolio losses, as alluded to previously, ratings might provide a less timely signal of credit problems relative to covenants.

2.2 HYPOTHESIS DEVELOPMENT

We hypothesize that securitized loans have more standardized financial covenants. We argue that, in contrast to customized borrower-specific definitions, standardized financial covenant definitions can be an effective mechanism that mitigates the information costs (i.e., the collection and processing costs of borrower-specific accounting data) pertaining to portfolio loans. Several factors specific to CLOs support our hypothesis. First, as noted above, CLO managers are required to monitor loan performance to meet regular portfolio performance tests. Given CLO portfolios' significant diversification, the presence of customized covenants in securitized loan contracts could amplify monitoring costs, since managers would need to collect and process a significant amount of borrower-specific information. Also, the collection and processing of information on customized covenants to assess loan quality is likely more costly relative to the benefits of receiving precise default signals. Hence, standardized financial covenants can potentially alleviate information costs in loan monitoring.

Second, the substantial rebalancing of CLO portfolios induces significant screening costs. These costs are higher when financial covenant specifications are customized as CLO managers must make a greater effort to analyze financial covenants with which they are unfamiliar and process the larger and more diverse set of accounting data associated with these covenant specifications. This can adversely impact the timeliness or even the execution of CLOs' portfolio rebalancing choices (e.g., Amihud and Medelson [1986]). Therefore, more standardized covenants are also likely to mitigate the information costs related to loan screening and thus reduce overall transaction costs.

Third, standardized financial covenants can potentially facilitate more homogenous loan and CLO note ratings, further contributing to a reduction in CLOs' information costs. Credit rating agencies follow a fairly standardized process in order to rate CLO loans and notes. Each loan in the portfolio is assigned an expected default probability based on the historical performance data of a large sample of similar and comparable loans and borrowers (Benmelech and Dlugosz [2009]). This makes it more difficult for loans with customized covenant definitions to be benchmarked and evaluated against other loans, exacerbating the information processing costs of credit rating agencies and likely contributing to greater disagreement in their rating assessments of CLO loans and notes. In turn, rating disagreements can magnify CLO managers' information costs when monitoring loan portfolios, trading loans, or selling CLO notes to investors.

Nevertheless, the securitization of syndicated loans might not necessarily be associated with more standardized financial covenant specifications. CLOs buy only a fraction of a high-yield syndicated loan (i.e., one or more CLOs will buy small-sized loan tranches). The remaining loan portion is bought by other syndicate lenders such as hedge funds or other institutional funds. The managers of these funds could prefer customized covenants in order to receive more precise

default signals, which allows them to trade in the equity market in a more timely manner (e.g., Massoud et al. [2011], Ivashina and Sun [2011]). Also, CLO managers are sophisticated loan investors and might not prefer to forego the more precise default signals that borrower-specific customized financial covenants offer; alternately, they could rely entirely on alternative mechanisms to alleviate high portfolio monitoring and rebalancing costs (e.g., credit rating agencies or other loan terms). Overall, these arguments suggest that the relation between loan securitization and covenant standardization is an open empirical question.

3. Sample selection

We obtain data on securitized syndicated loans from the CLO-i database provided by Creditflux, a global news platform that has covered CLO issuance and performance starting from January 2008. Creditflux retrieves data from monthly CLO reports, including loan-level data on CLOs' portfolio structure and trading activity (e.g., borrowers' name, loan types, ratings, face amounts, maturities, and defaults). To obtain contract terms and covenant definitions for the syndicated loans in CLO portfolios, we first hand-match the CLO-i data with DealScan and Compustat. We identify a sample of 1,075 unique securitized corporate loans issued by 605 unique public borrowers in 2000–2009.⁸ We then search borrowers' SEC filings on EDGAR following the search procedure outlined by Nini et al. [2009]. We are able to retrieve the complete contracts for 440 securitized loans.

To test whether securitized loans have more standardized covenant definitions, we compare them to a control sample of non-securitized institutional syndicated loans in DealScan that are purchased by other non-bank loan investors. Following Ivashina and Sun [2011], we classify a

⁸ Because CLO-i does not code unique portfolio loans, we hand-match loans in CLO-i and DealScan based on the borrower's name, industry, country, loan type (e.g., term loan B, etc.), and maturity. This matching method has also been used in prior studies that report a similar securitized loan sample size (Benmelech et al. [2012]). The securitized loan sample includes loans with CLOs in their original syndicate and loans purchased by CLOs in the secondary loan market.

loan as institutional if it includes at least one term loan tranche B-H (i.e., institutional investors typically purchase term loans B-H, while banks usually hold revolving or term loan A tranches), but does not include a CLO in its primary syndicate structure and is not identified in CLO-i.⁹ For term loans whose seniority is not identified in DealScan (i.e., the facility loan type is listed simply as “term loan”), we classify them as institutional if their average LIBOR spread is higher than 250 basis points or are sold in the institutional market. The “market segment” field for these loans in DealScan is classified as: “(highly) leveraged,” “institutional,” “LBO,” or “non-investment grade.” Based on these filters, the total number of non-securitized institutional loans issued by public US borrowers in DealScan is 4,595 in 2000-2009. We eliminate institutional loans with a small institutional tranche that are distributed mainly to banks by requiring that more than half of the loan amount is sold to institutional investors. This results in 2,599 loans with high institutional ownership. We are able to retrieve the contracts of 703 of these institutional loans from the SEC filings in EDGAR. Therefore, our final sample includes 1,143 unique loans (440 securitized and 703 non-securitized institutional loans) issued by 806 borrowers.

Next, we hand-collect the complete definitions of financial covenants from the loan contracts in the final sample. We focus on financial covenants since they include less legal boilerplate relative to other covenant types.¹⁰ We identify 3,303 unique financial loan covenants in 987 loan agreements (1,355 and 1,948 covenants in securitized and non-securitized loans, respectively). We also find 156 loan contracts with no financial covenants (55 securitized and 101 non-securitized loans, or 12.5% and 14.4% of securitized and non-securitized sample loans,

⁹ It is likely that we misclassify some institutional loans as non-securitized. This is because we can only observe CLO portfolios since January 2008. To alleviate misclassification bias, we follow Benmelech et al. [2012] and limit our sample to loans originated after January 2005 or 2006. Our results continue to hold (untabulated).

¹⁰ Specifically, the S&P Loan Guide [2011] suggests that financial covenants are “highly structured and customized to a borrower’s specific condition” (pg. 23).

respectively). These descriptive statistics are consistent with the fact that only 8% of CLO portfolio loans are covenant-lite based on the merged CLO-i/DealScan dataset (untabulated summary statistics). We include in the definition of a financial covenant all the text in the contract that relates to that covenant. For example, when the “Interest Coverage Ratio” is defined as “EBITDA to Interest Expenses,” we collect the accounting definition for “EBITDA” and “Interest Expenses” as described in the contract, as well as the definitions of all accounting terms within the definitions of “EBITDA” and “Interest Expenses” (e.g., net income, leases, etc.). We categorize covenants into 12 types based on the DealScan classification.¹¹

Table 1 provides details on loan characteristics by year and covenant type for the 440 securitized and 703 non-securitized loans in our sample. Panel A reports the total number of loans and the percentage of securitized loans by year. Consistent with the growth in securitized loan issuance, the number of securitized loans in our sample increases during 2000–2007 and then sharply drops. Panel B reports the number of financial covenants by type. While we find that certain financial covenants are more commonly used in securitized loans (e.g., maximum capital expenditures or leverage) or in non-securitized loans (e.g., minimum net worth), we show that covenant types are generally equally distributed across both loan groups. This implies that our results are unlikely to be driven by a specific covenant category.¹²

4. Variable definitions and summary statistics

¹¹ DealScan categorizes financial covenants in: “Max. Capex,” “Max. Debt,” “Max. Debt-to-EBITDA,” “Max. Debt-to-Equity,” “Max. Debt-to-Net Worth,” “Max. Leverage,” “Min. Debt Service Coverage,” “Min. EBITDA,” “Min. Fixed Charge Coverage,” “Min. Interest Coverage,” “Min. Liquidity,” and “Min. Net Worth.” We acknowledge that the DealScan covenant classifications could overlap. We expect this potential misclassification to induce higher noise, biasing against finding statistically significant results. In a untabulated tests, we exclude from our analysis debt-related covenants that are likely coarsely defined by DealScan (i.e., “Max. Debt-to-EBITDA”, “Max. Debt-to-Net Worth”, etc.), and our results are robust to this specification.

¹² Christensen and Nikolaev [2012] report that the median syndicated loan contract has 1.53 (1.02) performance (capital) financial covenants. Our sample loans have, on average, 1.49 (1.38) performance (capital) financial covenants.

4.1 THE COVENANT SIMILARITY SCORE

We proxy for covenant standardization by the degree to which two covenants of the same type are defined using the same words. Specifically, we calculate the pairwise cosine textual similarity for the covenant definitions of the sample loans using a vector space model employed in computational linguistics (e.g., Salton et al. [1975]) and recently introduced in the accounting and finance literatures (e.g., Brown and Tucker [2011], Bozanic and Thevenot [2015], Hoberg et al.[2014]). Greater linguistic similarity should increase lenders' familiarity with covenant definitions, thus potentially reducing the information collection and processing costs related to loan monitoring and screening.

To calculate our proxy for covenant standardization, the text of each financial covenant is converted into a $W \times 1$ vector, where W is the number of unique words in a financial covenant definition. We remove all stop-words (e.g., "and," "a," "the," and "of") from the covenant definitions. Each financial covenant vector is then matched to a same-type covenant vector from a loan issued by a different borrower in the prior calendar year. The previous year's loan covenant definitions provide a natural benchmark since recent contracts are likely the starting point for new loan contracts.¹³ The angle between the word vectors ($W \times 1$) of same-type covenants is the cosine textual similarity score for that same-type covenant pair. The cosine textual similarity score is a continuous variable with possible values ranging from zero (if two covenants share no common words) to one (if the definitions of two same-type covenants are identical).

Each covenant generates T covenant similarity scores, where T is the number of same-type

¹³ In untabulated tests, we use as a benchmark the same-type covenants in (i) loans issued to different borrowers during the prior two and three calendar years, (ii) securitized loans issued to different borrowers over the prior calendar year and, (iii) loans issued to different borrowers and loan arrangers over the prior calendar year. The results remain robust to these specifications.

covenants in loans issued during the previous calendar year. If a loan has two covenants, A and B, it will have $T(A) + T(B)$ same-type covenant cosine textual similarity scores, where $T(A)$ and $T(B)$ represent the number of loans issued during the prior calendar year with same-type covenants to A and B. We average the cosine similarity values of financial covenants at the loan level to estimate the covenant similarity proxy, the *Covenant similarity score*. For loans with no financial covenants, we code the covenant similarity score as one (i.e., the maximum value for cosine similarity), since these loans are perfectly comparable in terms of their covenant structure and thus the information collection and processing costs are zero. Excluding loans with no covenants leaves our results unchanged (see Internet Appendix). Appendix A provides a detailed discussion on the computation of the cosine textual similarity score and an example of how contractual specifications differ among covenants with higher and lower similarity.¹⁴

Table 2 reports univariate statistics for the covenant similarity score. The mean covenant similarity score is 0.49. When we exclude loans with no financial covenants (covenant similarity score = 1), the mean (maximum) score drops to 0.37 (0.58), which is consistent with financial covenants' not being boilerplate, i.e., identical across loans. Figure 1 shows the average covenant similarity score for our sample loans increases in 2000–2007 and drops over the 2008–2009 period.¹⁵

4.2 LOAN AND CLO VARIABLES

4.2.1 Variables for loan characteristics

¹⁴ To alleviate the concern that our proxy captures textual complexity rather than standardization, we further control for the number of words in a loan's financial covenants and our results remain unchanged (see Internet Appendix).

¹⁵ The trend in covenant standardization is similar when we exclude loans with no covenants. Hence, this trend relates to, but is not identical with, the overall trend in the usage of covenants over time documented in prior studies (e.g., Christensen and Nikolaev [2012]). Consistent with Christensen and Nikolaev [2012], we find that the frequency of capital structure covenants in securitized loans is higher compared to that in non-securitized loans, and drops over the period 2000–2007 by a similar percentage, whereas the frequency of performance covenants in securitized and non-securitized loans is similar and stays relatively flat over time.

We proxy for loan securitization using an indicator variable of whether a loan is purchased by a CLO in the primary or secondary loan market (*Securitized loan*). We employ in our analyses loan characteristics that previous studies have shown to affect covenant design (e.g., Dichev and Skinner [2002]). First, we control for alternative mechanisms that lenders employ to assess loan quality and alleviate high monitoring costs by employing two indicator variables that reflect whether the loan is secured by the borrower's assets (*Secured*) or rated by a credit rating agency (*Rated*). We obtain loans' secured status and ratings data for the sample loans from DealScan's LoanConnector online interface. We control for the loan LIBOR spread (*LIBOR spread*) as lenders could ask for higher spreads to forego the benefits of precise default signals. Second, we control for the loan arranger's access to a borrower's private information that likely affects the accounting specifications used in covenant design, using the ratio of the loan amount that a borrower raised from a loan arranger over the past five years to the total loan size raised by the borrower over the same period (*Lending relationship*). Third, we further control for coordination costs among syndicate participants that likely affect covenant heterogeneity by using the natural logarithm of the number of lenders in the primary loan syndicate (*Syndicates*). Relatedly, we control for whether a loan includes a revolving tranche (*Revolving tranche*), which is usually bought by banks that prefer more borrower-specific covenant designs (e.g., Sufi [2009]). Lastly, we control for the natural logarithm of loan maturity in months (*Loan maturity*), the natural logarithm of loan size (*Deal amount*), and the number of financial loan covenants (*Number of covenants*). We also control for several proxies for borrower accounting performance described in Appendix B.

Table 2 reports summary statistics for the variables used in our primary analyses. Thirty-eight percent of our sample loans are purchased by CLOs. The mean LIBOR spread is 254 basis points

(log-transformed values are shown) and the mean number of financial loan covenants is about 3, while 85% of our sample loans are rated and 76% of the loans are secured. The mean loan amount is \$663 million, the mean maturity is about 5 years (log-transformed values are tabulated), and 57% of our sample loans include a revolving tranche. These descriptive statistics are consistent with those reported in prior studies using high-yield loan samples (e.g., Ivashina and Sun [2011], Benmelech et al. [2012]). In addition, sample loans are sold to about 9 syndicate lenders (log-transformed values are shown), and the mean lending relationship intensity is 0.23, consistent with the fact that institutional loans are issued to non-relationship borrowers and are largely distributed across investors (e.g., Li et al. [2015]).

We report differences in the means of loan and borrower characteristics for securitized and non-securitized loans in Panel A of Table 3. The univariate results suggest that securitized loans have a statistically significantly higher covenant similarity scores (0.51) relative to other institutional loans (0.48). Securitized loans have a higher spread, more covenants, a larger syndicate size and are more likely to be secured. Also, borrowers with securitized loans are smaller and more levered. In Panel B of Table 3, we show that securitized loans have greater covenant similarity scores than non-securitized loans do across most financial covenant categories.

4.2.2 Variables for CLO characteristics

We employ several proxies for CLO portfolio features in our analyses. We use two proxies for CLO quarterly portfolio diversity: (i) the ratio of a loan balance in a CLO portfolio to the total CLO principal balance, averaged at the CLO-quarter level (*CLO average loan holding amount*) and (ii) the CLO's portfolio diversification across different borrower industries (*CLO industry diversification*). Following Lamont and Polk [2002], we define *CLO industry*

diversification as the standard deviation of industry investment ratios (i.e., the number of loans in a Moody's industry to the total number of loans in the CLO portfolio), averaged at the CLO-quarter level. We use Moody's industry classification as this is typically disclosed in CLO investor reports. In Table 2, we show that the mean industry diversification of CLO portfolios is about 5%, while the average securitized loan balance in a CLO portfolio is 2% of the CLO portfolio's principal value. Moreover, we proxy for quarterly portfolio rebalancing using the ratio of the total loan face amount traded by the CLO to its portfolio's principal value, averaged at the CLO-quarter level (*CLO portfolio turnover*). The mean *CLO portfolio turnover* is 18% of its principal value.

We measure the disagreement of CLO portfolio loan ratings among credit rating agencies using: (i) the probability that a securitized loan's quarterly S&P and Moody's ratings are the same, averaged at the loan-year level (*Same loan rating*) and (ii) the absolute value of the differences in S&P and Moody's securitized loan ratings, averaged at the loan-year level (*Loan rating difference*). We average securitized loan ratings at the loan-year level because ratings at the loan level are highly stable over time. We proxy for credit rating agencies' agreement with respect to CLO notes' ratings using: (i) the probability of a CLO note receiving the same rating from S&P and Moody's, averaged at the CLO-quarter level (*Same CLO note rating*) and (ii) the absolute value of the differences in S&P and Moody's CLO note ratings averaged at the CLO-quarter level (*CLO note rating difference*). We average CLO note ratings at the CLO-quarter level to better match the CLO reporting frequency (in untabulated tests, averaging CLO note ratings at the CLO-year level leaves our results unchanged). We define credit ratings as a scale variable with values from 1 to 22, where 1 = AAA, 2 = AA+ (or Aa1)..., and 22 = D. The mean probability of a securitized loan (CLO note) having the same rating from S&P and Moody's is

43% (28%), while the mean difference in the securitized loan ratings (CLO note ratings) between the two credit rating agencies is about 1 notch (1.37 notches). Lastly, we employ in our analyses the CLO portfolio performance characteristics described in Appendix B.

4.3 VALIDATION TEST

Recall from Section 4.1 that our covenant standardization proxy is measured based on the underlying assumption that standardized covenants share more common words with other covenants in the same covenant category. We validate this proxy by examining its relation to borrower characteristics and loan terms. We expect a higher covenant similarity score if loans share similar terms and their borrowers have comparable characteristics.

In Table 4, we report the results of the validation test. We find that loans share more similar covenant definitions when they are underwritten by the same loan arranger; have the same loan purpose and are rated by a credit rating agency; and when the LIBOR spread, the number of loan covenants, loan maturity, loan collateralization, and lending relationships are more similar, relative to other sample loans issued during the prior calendar year. Further, loans have more similarly defined covenants when their borrowers have comparable liquidity levels and are in the same industry. Importantly, loan covenant standardization is primarily driven by similarities in the underlying loan structure rather than in borrowers' characteristics (i.e., when we control for differences in borrowers' characteristics, the explanatory power of our test increases by only 2%). This finding suggests that covenant standardization is likely driven by lenders' concerns about generating more comparable and homogenous loan contracts. Overall, this validation test suggests that our proxy for covenant standardization captures similarities in loan contract terms and borrower characteristics that are reflected in similar covenant specifications.

5. Research design and empirical results

5.1 SECURITIZATION AND COVENANT STANDARDIZATION

We examine the relation between loan securitization and financial covenant standardization by using an ordinary least squares (OLS) model, where the dependent variable is our proxy for covenant standardization, the *Covenant similarity score*.

$$\begin{aligned}
 \text{Covenant similarity score} = & \alpha + \beta_1 \text{Securitized loan} + \beta_2 \text{Number of covenants} \\
 & + \beta_3 \text{LIBOR spread} + \beta_4 \text{Loan amount} + \beta_5 \text{Loan maturity} \\
 & + \beta_6 \text{Rated} + \beta_7 \text{Secured} + \beta_8 \text{Revolving tranche} + \beta_9 \text{Syndicates} \\
 & + \beta_{10} \text{Lending relationship} + \beta_{11} \text{Liquidity} \\
 & + \beta_{12} \text{ROA} + \beta_{13} \text{Leverage} + \beta_{14} \text{Cash flow volatility} + \beta_{15} \text{Size} \\
 & + \text{Fixed effects.}
 \end{aligned} \tag{1}$$

The primary independent variable of interest in equation 1 is an indicator for whether the loan is securitized (*Securitized loan*). Based on our arguments above, β_1 should be positive. We control for loan contract terms and borrower financial characteristics that influence covenant design choices, as well as loan purpose (operating, investing, financing, other), year of loan origination, borrower industry (Fama and French 12 industry portfolios) and loan arranging bank fixed effects (57 unique lead banks) to capture differences in covenant standardization over time and across industries and loan arrangers.

We report the results of this test in Panel A of Table 5. We find a positive and significant coefficient on the *Securitized loan* variable when controlling for loan characteristics (model (I)) as well as loan and borrower characteristics (model (II)), suggesting that securitized loans have more standardized covenant definitions compared to other non-securitized institutional loans. Specifically, in model (II), securitized loans are associated with a 0.04 higher covenant similarity score than institutional non-securitized loans, which represents about 8.16% of the mean covenant similarity score of the sample loans, or about 18% of its standard deviation.¹⁶

¹⁶ Our results are robust to the inclusion of legal counsel fixed effects, legal counsel-loan arranger fixed effects, loan arranger-year and borrower fixed effects, and when we exclude covenant-lite loans. Moreover, our results hold when

Given that the positive relation between loan securitization and covenant standardization might reflect covenant package choices rather than the underlying financial covenant definitions, in model (III), we further control for the extent to which the types of financial covenants used in a loan compare to the financial covenants of other sample loans issued during the prior calendar year (*Pct. of same covenants*). For each loan pair, the variable is calculated as the number of common financial covenants between the current loan and loans issued during the prior calendar year. We then average the number of same-type financial covenants across loan pairs at the current loan level and divide by the total number of financial covenants specified in the current loan. We continue to find a positive relation (marginally significant at the 10% level) between standardization and loan securitization.

In terms of our control variables, we find that borrower performance and characteristics are largely unrelated to the covenant similarity score, suggesting that covenant standardization is primarily explained by loan contractual features. Secured loans have a higher covenant similarity score, indicating that lenders substitute the lack of borrower-specific idiosyncratic loan covenant designs with collateral requirements (e.g., Rajan and Winton [1995]). Related, loans with greater covenant standardization have a higher LIBOR spread (though this effect holds in only some of our models), suggesting that lenders are generally compensated for trading off the precise default signals that customized covenants provide. In addition, we present some evidence that loans from relationship lenders and with a larger syndicate exhibit lower covenant standardization, suggesting that access to the borrower's private information and lenders' coordination costs increase heterogeneity in covenant definitions. Also, loans with fewer covenants have higher

we match our sample of securitized loans on borrower and loan characteristics using a propensity score matching methodology, and when we use alternative approaches to measuring covenant similarity (see Internet Appendix). In untabulated tests, we find that our results hold when we solely focus on loans issued over the credit boom (2000-2007) or the credit contraction period (2008-2009).

covenant similarity, consistent with information collection and processing costs increasing with the number of financial loan covenants.

To mitigate potential correlated omitted variable bias and concerns related to our choices for the control loan sample driving our results, we perform a battery of sensitivity tests reported in Panels B and C of Table 5. First, in Panel B of Table 5, we re-estimate equation 1 using our control group of institutional non-securitized loans and the treatment sample of: (i) highly securitized loans (model I) and (ii) low securitized loans (model II). We measure the intensity of loan securitization using the ratio of the loan amount owned by CLOs to total loan size. We calculate the loan amount held in CLO portfolios by first estimating the total loan amount held across all CLO portfolios in a month and then averaging these amounts across time to smooth the monthly variations of CLO managers' investments in an individual loan. The median CLO ownership is 61%, suggesting that loans, when securitized, are largely purchased by CLOs. We then split the sample of securitized loans into loans with above and below median securitized amounts.

While we find that securitized loans exhibit higher covenant standardization relative to non-securitized loans regardless of the intensity of CLO ownership, securitized loans largely sold to CLOs have significantly higher covenant similarity scores. Economically, highly securitized loans have covenant similarity scores that are 0.06 higher relative to non-securitized loans, which is about 15% of the sample mean covenant similarity score or 27% of its standard deviation. By comparison, loans that are not largely sold to CLOs have covenant similarity scores that are only 0.03 higher relative to the non-securitized loans, representing about 7% of the mean covenant similarity score or 14% of its standard deviation (model II). The difference between the coefficients on *Securitized loan* in these two columns is statistically significant at the 5% level.

We also examine the relation between high loan securitization intensity and covenant standardization by restricting our sample to securitized loans only to mitigate any influence from the control loan sample (model III). While our sample size significantly drops, we continue to find results that are similar, but of weaker statistical significance (at the 10% level).¹⁷

Second, we examine whether covenant standardization in securitized loans differs based on bank ownership in these loans. Given their experience in underwriting loans and participating in loan syndicates as well as their other business activities, banks have access to borrowers' private information, which allows them to evaluate borrower-specific covenant specifications with lower information costs. Consequently, we anticipate that securitized loans with many bank-owned tranches will have less standardized covenants.

We estimate the ratio of the size of the revolving loan and term A tranches (as reported in DealScan) to the total loan amount, which are largely retained by banks. We use the tranche's "market segment" or LIBOR spread to identify whether the tranche is sold to a bank when the loan type is unobservable. Specifically, if the market segment reported in DealScan is "middle market" or "investment grade," we define the tranche as a "term loan tranche A." If the market segment is unidentified and the LIBOR spread is below 180 basis points, we define the tranche as a "term loan tranche A." Our independent variable of interest is an indicator variable for whether the securitized loan has above median bank ownership. In model (IV) of Table 5, Panel B, we re-estimate equation 1 within the securitized loan sample. We find that securitized loans with high bank ownership are associated with lower covenant similarity scores. Overall, the

¹⁷ In robustness tests, we examine the influence of loan arranger's share on covenant standardization. We fail to find evidence that securitized loans with above-median loan arranger's share have less standardized covenants. When we focus on loans with below-median loan arranger's share, we continue to find a positive relation between covenants standardization and securitization. Overall, our evidence suggests that loan arranger's share is unlikely to drive our results (see Internet Appendix).

results reported in Panel B of Table 5 provide additional evidence on the positive relation between financial covenant standardization and loan securitization intensity.

Lastly, we examine whether our findings hold for both loans securitized upon origination (i.e., when CLOs participate in the primary loan syndicate and potentially have a say on the covenant structure) and loans securitized ex post (i.e., securitized loans purchased by CLOs in the secondary market). In Panel C of Table 5, we re-estimate equation 1 using our control group of non-securitized institutional loans and a treatment group of (i) loans securitized at origination (model I) and (ii) loans securitized ex post (model II). We find that at-origination securitized loans have a 0.06 higher covenant similarity score, while loans securitized after their origination have a 0.03 higher covenant similarity score. The difference between the coefficients across the columns is statistically significant (at the 1% level). Our results remain unchanged when we re-estimate equation 1 while restricting our sample to securitized loans only and compare at-origination securitized loans with loans securitized ex post (model III).¹⁸ Overall, the results in panels B and C of Table 5 lend further support to our hypothesis that securitized loans contain more standardized covenants compared to other institutional loans.

5.2 COVENANT STANDARDIZATION AND INFORMATION COSTS

5.2.1 CLO portfolio characteristics and information costs

We next examine CLO portfolio characteristics that vary information collection costs and might affect the covenant standardization of securitized loans purchased by CLOs. Specifically, we focus on two features embedded in CLOs that likely influence information costs related to CLOs' monitoring and screening activities: CLO quarterly portfolio diversification and turnover

¹⁸ Time to securitization likely affects the results of this test. If a loan is sold to a CLO shortly after issuance, the bank likely originated the loan to securitize it. However, if a CLO buys a loan long after its origination, then the relation between securitization and covenant standardization becomes weaker. Unfortunately, we do not have data on the time to loan securitization.

(see also Section 2.1). We anticipate that CLOs with more diversified portfolios and greater portfolio turnover will purchase loans with greater covenant standardization. We use an OLS model where the dependent variable is the average *Covenant similarity score* across all loans purchased by a CLO in a quarter (*Covenant similarity score of purchased loans*):¹⁹

Covenant similarity score

$$\begin{aligned} \text{of purchased loans}_q = & \alpha + \beta_1 \text{CLO average loan holding amount}_{q-1} \\ & + \beta_2 \text{CLO industry diversification}_{q-1} + \beta_3 \text{CLO portfolio turnover}_{q-1} \\ & + \beta_4 \text{CLO overcollateralization}_{q-1} + \beta_5 \text{CLO portfolio rating}_{q-1} \\ & + \beta_6 \text{CLO portfolio defaults}_{q-1} + \beta_7 \text{CLO balance}_{q-1} + \text{Fixed effects.} \end{aligned} \quad (2)$$

The independent variables of interest are *CLO average loan holding amount*, *CLO industry diversification*, and *CLO portfolio turnover* (variables are described in Section 4.2). To alleviate the concern that CLO portfolio features and the average covenant standardization of portfolio loans are simultaneously determined, we measure the average covenant similarity score of loan purchases (rather than at the CLO portfolio level) in the current quarter, while we measure the CLO's average investment in individual loans, portfolio diversification, and turnover in the previous quarter. We expect β_1 to be negative and β_2 and β_3 to be positive. We control for CLO portfolio riskiness (*CLO portfolio rating* and *CLO portfolio defaults*), performance (*CLO overcollateralization*), and size (*CLO balance*) over the previous quarter. We further include fixed effects for year, CLO manager, and arranging bank to control for the different trading styles across CLO managers or arrangers and over time.

We report the results in Table 6. We find negative (positive) and significant coefficients on *CLO average loan holding amount* (*CLO industry diversification* and *CLO portfolio turnover*).

¹⁹ Although the covenant data in our sample is hand-collected through 2009, we are able to expand the CLO-quarter level analysis to 2013 because most loans issued before 2009 continue to be in CLOs' portfolios through 2013, i.e. the last year of CLO data available to us (375 loans, representing 85% of our total securitized loan sample).

Consistent with our expectations, we show that CLOs with portfolios that include small loan investments, that are largely diversified, or that are significantly rebalanced are more likely to purchase securitized loans with greater covenant standardization. Economically, a one standard deviation increase in CLO portfolio industry diversification and turnover increases the covenant similarity score of purchased loans by about 0.03 and 0.01 respectively, which represents 4.33% and 2.04% of the mean value for the average covenant similarity score of a CLO's loan purchases (or 21.43% and 7.14% of its standard deviation). Also, a one standard deviation increase in the CLO average loan holding amount decreases the covenant similarity score of purchased loans by about 0.04, which economically represents 7.27% of its mean value or 28.57% of its standard deviation. Overall, our evidence suggests that CLOs with more diversified, actively rebalanced portfolios purchase loans with more standardized covenants, potentially because standardization helps them alleviate high information costs in loan screening and monitoring. Our evidence further suggests that for these CLOs the benefits of receiving precise default signals could be lower than the information costs related to loan monitoring and screening.²⁰

5.2.2 Credit rating agency disagreements and information costs

In our final set of tests, we explore whether financial covenant standardization assists credit rating agencies in their interpretation of financial covenants. Namely, we examine whether covenant standardization increases the likelihood of reaching similar credit risk assessments for CLO loans and notes. We test whether financial covenant standardization is associated with greater agreement between Standard and Poor's (S&P) and Moody's CLO loan ratings using an

²⁰ We use the introduction of CLO 2.0 in the first quarter of 2009 as an exogenous shock that likely amplified CLOs' information costs. We find that "CLO 2.0" CLOs are more likely to purchase loans with more standardized covenants than CLOs originated in the pre-CLO 2.0 regime. We also find that CLOs sell loans within a two month period prior to entering technical default, suggesting that they are unlikely to be inattentive to loan covenant (see Internet Appendix).

OLS model where the dependent variables are *Loan rating difference* and *Same rating* (both variables are defined in Section 4.2):

$$\begin{aligned}
 \text{Loan rating agreement} = & \alpha + \beta_1 \text{Covenant similarity score} + \beta_2 \text{Number of covenants} \\
 & + \beta_3 \text{LIBOR spread} + \beta_4 \text{Loan amount} + \beta_5 \text{Loan maturity} \\
 & + \beta_6 \text{Secured} + \beta_7 \text{CCC-rated and below} \\
 & + \beta_8 \text{Revolving tranche} + \beta_9 \text{Liquidity} + \beta_{10} \text{ROA} \\
 & + \beta_{11} \text{Leverage} + \beta_{12} \text{Cash Flow Volatility} + \beta_{13} \text{Size} + \text{Fixed effects}.
 \end{aligned} \tag{3}$$

We expect β_1 to be negative (positive) when the dependent variable is *Loan rating difference* (*Same rating*). Similar to equation 1, in equation 3 we control for loan characteristics and borrower financial performance upon loan origination and add year, industry, loan purpose, and arranger fixed effects. We also include an indicator for whether a securitized loan is rated CCC+ and below by at least one credit rating agency in a year (*CCC-rated and below*).

We report the results of these tests in Panel A of Table 7. Consistent with our expectations, we find that securitized loans with more standardized covenants are associated with more similar ratings. A one standard deviation increase in our covenant similarity score increases the probability that S&P and Moody's issue the same loan rating by 4.40% and decreases the notch difference between S&P and Moody's ratings by 0.17 notches. These effects represent 10.23% and 18.25% of the mean values for *Same loan rating* and *Loan rating difference*, respectively.

We further test whether financial covenant standardization is associated with greater agreement between S&P and Moody's CLO note ratings. We use an OLS model where the dependent variable are the proxies for CLO note rating agreement at the CLO-quarter level, and the independent variable of interest is the average covenant similarity score of the loans in the CLO portfolio one quarter before (*CLO covenant similarity score*_{q-1}):

$$\begin{aligned}
 \text{CLO note rating agreement}_q = & \alpha + \beta_1 \text{CLO covenant similarity score}_{q-1} \\
 & + \beta_2 \text{CLO overcollateralization}_{q-1} + \beta_3 \text{CLO portfolio rating}_{q-1} \\
 & + \beta_4 \text{CLO portfolio defaults}_{q-1} + \beta_5 \text{CLO balance}_{q-1} \\
 & + \text{Fixed effects}.
 \end{aligned}$$

(4)

As above, we expect β_1 to be negative (positive) when the dependent variable is *CLO note rating difference* (*Same CLO note rating*). The control variables are similar to the ones used in equation 2. In Panel B of Table 7, we report the results of these tests. While we do not find a statistically significant effect when we use *Same CLO note rating* as the dependent variable, we find similar results to Panel A for *CLO note rating difference*. An increase by one standard deviation in *CLO covenant similarity score* decreases the difference between S&P and Moody's loan ratings by 0.17 notches, which represents approximately 12.41% of the *CLO note rating difference* mean value. Overall, this evidence suggests that covenant standardization in securitized loans is associated with rating agreements and, in turn, to lower CLO information costs.

6. Conclusion

Using a hand-collected set of financial covenant definitions, we study whether loans securitized through CLOs are associated with more standardized financial covenant specifications. We expect that covenant standardization is one of the possible mechanisms that CLOs likely employ to alleviate the high information costs related to the monitoring and screening of their portfolio loans. Borrowing from the field of computational linguistics, we apply a vector space model to proxy for covenant standardization using the textual similarity of financial covenant definitions.

We find that, relative to a benchmark group of non-securitized institutional loans, securitized loans exhibit greater financial covenant standardization. We also find that covenant standardization increases (decreases) with the extent of CLOs' (banks') loan ownership, and that loans securitized at the time of origination have greater covenant similarity scores than loans

securitized after their origination. We note that our results only document an association between securitization and covenant standardization, and we cannot rule out the possibility that CLOs also rely on alternative mechanisms to mitigate portfolio losses. In terms of CLO portfolio characteristics, we document that CLOs with portfolios that are more diversified or are actively rebalanced are more likely to invest in loans with standardized covenant specifications. This evidence suggests that CLOs are potentially willing to trade off the precise default signals that customized covenants provide with covenant standardization, which can offer a general distress signal and alleviate the high information costs in CLO portfolios. We also find that securitized loans with more standardized covenants and the CLO notes backed by such loans have more similar credit ratings, lending further support to the relation between lower information costs and covenant standardization.

Our study provides evidence consistent with efficient contracting by documenting that loan contract terms are related to loan investor characteristics. Although our loan sample period ends in 2009, we expect our results to hold after 2009 given that the CLO market recovered to pre-crisis levels by 2015, and recent regulations did not focus on the structure of covenants that CLOs should hold. However, a potentially interesting research avenue is to investigate the relation between securitization and covenant standardization as well as the effect of standardization on securitized loan liquidity during periods of credit distress or high regulatory scrutiny (i.e., when the trade-off between CLOs' monitoring costs and benefits likely changes). We leave these directions for future research.

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APPENDIX A

Measuring cosine textual similarity

We measure covenant standardization by assessing the degree of overlap in the vector of unique words used to define covenants. To do so, we first remove from the covenant definition all stop-words (e.g., “and,” “a,” “the,” “of”). Next, we estimate the extent to which two covenant definitions are similar by calculating the pairwise cosine textual similarity for all pairs of reduced-form (i.e., stop-words removed) financial covenant definitions based on a vector space model used in plagiarism software and search engine algorithms (see Salton, Wong, and Yang [1975]) as follows:

- We count how many times each word is used in each covenant definition. This process creates two vectors with the number of times each word is used in the two covenants. To illustrate, assume we have two covenant texts, CT_1 and CT_2 , with three words (W_1 , W_2 , W_3) each. W_1 occurs in CT_1 2 times, W_1 occurs in CT_2 3 times, and so forth:

$$CT_1 = (2W_1, 3W_2, 5W_3).$$

$$CT_2 = (3W_1, 7W_2, W_3).$$

- The cosine similarity of the two vectors above is a mathematical measure of how similar the two vectors are on a scale of [0, 1], with 1 being the outcome if the vectors are identical. For cosine similarities resulting in a value of 0, the covenant definitions do not share any words because the angle between the word vectors is 90 degrees. The cosine similarity is computed as:

$$\cos \Theta = CT_1 \cdot CT_2 / \|CT_1\| * \|CT_2\| = 0.6758,$$

where the vector product is $CT_1 \cdot CT_2 = 2*3 + 3*7 + 5*1$ and the normalized vectors are computed as $\|CT_1\| = \sqrt{2^2 + 3^2 + 5^2}$ and $\|CT_2\| = \sqrt{3^2 + 7^2 + 1^2}$.

After computing all same-type pairwise cosine textual similarity scores across all covenant types in a loan compared to loans issued during the prior calendar year, we obtain a loan-specific covenant similarity measure by taking the average of the covenant similarity in a given loan.

To provide some intuition for the measure, using a Maximum Capital Expenditure covenant as an example, we visually compare a benchmark covenant specification to another covenant in our sample that exhibits i) *high* textual cosine similarity (around our sample mean) to the benchmark and ii) *low* textual cosine similarity (below sample mean) to the benchmark. Words shared in common between the covenant and benchmark are highlighted.

Benchmark	Covenant with <i>high</i> textual cosine similarity to benchmark
"Capital Expenditures" means, for any period, without duplication, (a) the additions to property, plant and equipment and other capital assets of the Borrower and the Subsidiaries that are (or would be) set forth in a consolidated statement of cash flows of the Borrower for such period prepared in accordance with GAAP and (b) Capitalized Lease Obligations incurred by the Borrower and the Subsidiaries during such period. "Capitalized Lease Obligations" of any Person means the obligations of such Person to pay any lease of real or personal property, or a combination thereof, which obligations are required to be classified and accounted for as capital leases on a balance sheet of such Person under GAAP, and the amount of such obligations shall be the capitalized amount thereof determined in accordance with GAAP.	"Capital Expenditures" means, for any period, the aggregate of all cash expenditures (including in all events all amounts borrowed for the acquisition, repair, improvement, substitution or replacement of any capital asset and all amounts expended under Capitalized Lease Obligations but excluding any amount representing capitalized interest) by the Group and its Subsidiaries during that period that, in conformity with GAAP, are or are required to be capitalized or otherwise included in the property, plant or equipment reflected in the consolidated balance sheet of the Group and its Subsidiaries; provided that Capital Expenditures shall in any event exclude amounts expended with insurance proceeds from the loss of or damage to property, plant or equipment or other capitalized assets reflected in the balance sheet of the Group and its Subsidiaries. "Capitalized Lease Obligations" as applied to any Person shall mean any lease of any property (whether real, personal or mixed) by that Person as lessee which, in conformity with GAAP, is accounted for as a capital lease on the balance sheet of that Person.
"Capital Expenditures" means, for any period, without duplication, (a) the additions to property, plant and equipment and other capital assets of the Borrower and the Subsidiaries that are (or would be) set forth in a consolidated statement of cash flows of the Borrower for such period prepared in accordance with GAAP and (b) Capitalized Lease Obligations incurred by the Borrower and the Subsidiaries during such period. "Capitalized Lease Obligations" of any Person means the obligations of such Person to pay any lease of real or personal property, or a combination thereof, which obligations are required to be classified and accounted for as capital leases on a balance sheet of such Person under GAAP, and the amount of such obligations shall be the capitalized amount thereof determined in accordance with GAAP.	"Capital Expenditures" means, with respect to any Person for any period, any expenditure in respect of the purchase or other acquisition of any fixed or capital asset (excluding normal replacements and maintenance which are properly charged to current operations and any transfer of inventory to leased gaming equipment consistent with the Borrower's historical practices as set forth in the Audited Financial Statements) to the extent classified as a capital expenditure in such Person's cash flow statement in accordance with GAAP. For purposes hereof, the purchase price of equipment that is purchased simultaneously with the trade-in of existing equipment shall be included in Capital Expenditures only to the extent the gross amount of such purchase price exceeds the credit granted by the seller of such equipment for the equipment being traded in at such time. Capital Expenditures shall exclude any such expenditure made to restore, replace or rebuild property to the condition of such property immediately prior to any damage, loss, destruction or condemnation of such property, to the extent such expenditure is made with insurance proceeds or condemnation awards relating to any such damage, loss, destruction or condemnation. Capital Expenditures shall exclude any expenditure made in connection with the closing of an acquisition pursuant to Section 7.03(g) hereof.

APPENDIX B

Variable definitions

Variable	Definition
Loan Characteristics	
<i>Covenant similarity score</i>	The average similarity score at the loan level of covenant i in loan k with covenant j in loan m only if i and j are of the same covenant type and loan m is issued during the last calendar year prior to loan k . See Section 4.1 and Appendix A for further details.
<i>Securitized loan</i>	Binary variable that equals one if the loan includes at least one securitized tranche and zero otherwise.
<i>Highly securitized loan</i>	Binary variable that equals one if the securitized loan has an above median CLO ownership (defined as the total monthly holdings of a securitized loan by CLOs averaged at the loan level to total loan amount), and zero otherwise.
<i>Securitized loan with high bank ownership</i>	Binary variable that equals one if the securitized loan has an above median bank ownership (defined as term loan A and revolving loan amount to total loan amount), and zero otherwise.
<i>Number of covenants</i>	The number of financial loan covenants, including net worth covenants.
<i>LIBOR spread</i>	The natural logarithm of all-in-drawn LIBOR spread (average across loan tranches, excluding fees).
<i>Loan amount</i>	The natural logarithm of the loan amount.
<i>Loan maturity</i>	The natural logarithm of loan maturity (in months).
<i>Rated</i>	Binary variable that equals one if the loan is rated, and zero otherwise.
<i>Secured</i>	Binary variable that equals one if the loan is collateralized, and zero otherwise.
<i>Revolving tranche</i>	Binary variable that equals one if the loan includes a revolving tranche, and zero otherwise.
<i>Lending relationship</i>	The ratio of total loan size a borrower took from the loan arranger over the past five years to the total size of the loans the borrower raised over the same period.
<i>Syndicates</i>	The natural logarithm of the number of participants in the loan syndicate.
<i>Pct. of same covenants</i>	The average number of the same financial covenants with other loans originated over the last calendar year to the number of financial covenants in the current loan.
<i>Same loan rating</i>	The probability that a securitized loan's S&P and Moody's ratings are the same, averaged at the loan-year level.
<i>Loan rating difference</i>	The absolute value of the differences in loan ratings that Moody's and S&P issue for a securitized loan, averaged at the loan-year level.
Borrower Characteristics	
<i>Liquidity</i>	Current assets to current liabilities.
<i>ROA</i>	Operating income to total assets.
<i>Leverage</i>	Long-term debt to total assets.
<i>Cash flow volatility</i>	The standard deviation of borrower's operating cash flows over the last five years, deflated by total assets (in \$million).

<i>Size</i>	The natural logarithm of borrower's total assets (in \$million).
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APPENDIX B (Continued)

Variable	Definition
CLO Characteristics	
<i>CLO covenant similarity score</i>	The covenant similarity score of securitized loans in a CLO's portfolio, averaged at the CLO-quarter level.
<i>CLO industry diversification</i>	The standard deviation of the industry investment ratios (i.e., the number of loans in a Moody's industry to the total number of loans in the CLO portfolio), averaged at the CLO-quarter level.
<i>CLO average loan holding amount</i>	The ratio of the loan amount held by a CLO to CLO portfolio balance, averaged at the CLO-quarter level.
<i>CLO portfolio turnover</i>	The ratio of the total loan face amount purchased and sold at the CLO-quarter level to CLO's portfolio balance.
<i>Same CLO note rating</i>	The probability of a CLO note receiving the same rating from S&P and Moody's, averaged at the CLO-quarter level.
<i>CLO note rating difference</i>	The absolute value of the differences in CLO note ratings that S&P and Moody's issue for a CLO's notes, averaged at the CLO-quarter level.
<i>CLO portfolio rating</i>	The average portfolio loan ratings at the CLO-quarter level. Loan rating is a scale variable equal to 1 if the loan rating is "AAA," 2 if "AA+", (...), and 22 for "D."
<i>CLO portfolio defaults</i>	The ratio of the number of defaulted loans in a CLO portfolio to the total number of loans in a CLO portfolio, averaged at the CLO-quarter level.
<i>CLO overcollateralization</i>	The natural logarithm of a CLO's overcollateralization test score, averaged at the CLO-quarter level.
<i>CLO balance</i>	The natural logarithm of the principal value of a CLO portfolio outstanding, averaged at the CLO-quarter level.

FIGURE 1
Covenant similarity score

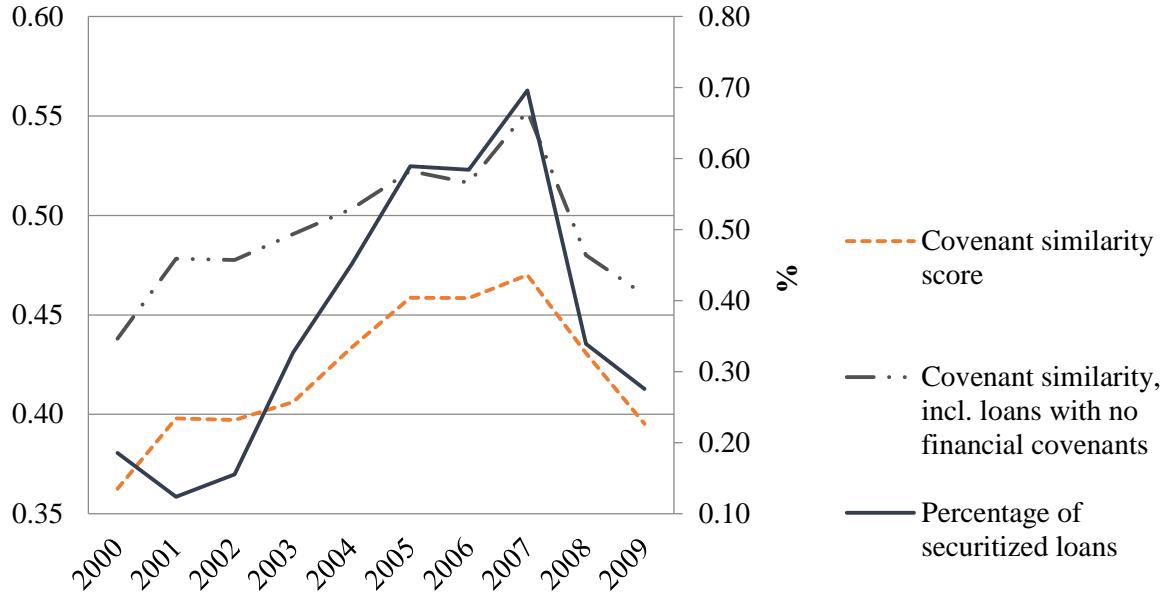


Figure 1 presents the average covenant similarity score for our sample of 703 institutional non-securitized and 440 securitized loans over the 2000–2009 period (primary axis) which includes loans with no financial covenants (covenant similarity score=1). The pattern looks similar for the subsample of 608 institutional non-securitized and 385 securitized loans in 2000–2009, excluding loans with no financial covenants (primary axis). The figure also plots the percentage of securitized loans over time, which is estimated as the total number of securitized loans issued in a year divided by the annual total loan issuance (secondary axis).

TABLE 1
Sample composition by year and covenant type

Panel A: Loans and financial covenants by year		
Year	Number of loans	Percentage of securitized loans
2000	93	15.05%
2001	135	8.15%
2002	90	20.00%
2003	109	31.19%
2004	120	42.50%
2005	110	48.18%
2006	139	53.96%
2007	194	68.56%
2008	96	23.96%
2009	57	49.12%
Total	1,143	38.49%

Panel B: Financial covenant types			
Covenant type	Number of covenants	Securitized loans	Non-securitized loans
<i>Max. Capex</i>	387	232	155
<i>Max. Debt</i>	69	27	42
<i>Max. Debt-to-EBITDA</i>	212	74	138
<i>Max. Debt-to-Equity</i>	99	12	87
<i>Max. Debt-to-Net Worth</i>	69	15	54
<i>Max. Leverage</i>	891	430	461
<i>Min. Debt Service Coverage</i>	51	12	39
<i>Min. EBITDA</i>	137	56	81
<i>Min. Fixed Charge Coverage</i>	413	161	252
<i>Min. Interest Coverage</i>	612	259	353
<i>Min. Liquidity</i>	87	20	67
<i>Min. Net Worth</i>	271	57	214
<i>Other</i>	5	0	5
Total	3,303	1,355	1,948

This table reports sample composition by year and covenant type. We obtain data on loan securitizations from CLO-i, a global platform that collects detailed information on CLO loan portfolios, and data on high-yield institutional loans from LPC DealScan. We match these databases with firms' SEC filings on EDGAR to retrieve the specific loan contracts and hand-collect their covenant definitions. There are 3,303 complete financial covenant definitions over our sample period (2000-2009). Panel A reports the number of loans and the annual securitized loan issuance (defined as the ratio of the number of securitized loans issued during a calendar year to the total number of institutional and securitized loans issued during the same period. Panel B reports the number of covenants by covenant category for the securitized and non-securitized loans.

TABLE 2
Summary statistics

Variable	Obs.	Mean	S.D.	Q1	Median	Q3
Loan Characteristics						
<i>Covenant similarity score</i>	1,143	0.49	0.22	0.37	0.44	0.51
<i>Securitized loan</i>	1,143	0.38	0.49	0.00	0.00	1.00
<i>Number of covenants</i>	1,143	2.87	1.60	2.00	3.00	4.00
<i>LIBOR spread</i>	1,143	5.36	0.50	5.01	5.30	5.70
<i>Loan amount</i>	1,143	19.83	1.11	19.11	19.76	20.53
<i>Loan maturity</i>	1,143	4.02	0.38	3.74	4.07	4.33
<i>Rated</i>	1,143	0.85	0.36	1.00	1.00	1.00
<i>Secured</i>	1,143	0.76	0.43	1.00	1.00	1.00
<i>Revolving tranche</i>	1,143	0.57	0.49	0.00	1.00	1.00
<i>Lending relationship</i>	1,143	0.23	0.37	0.00	0.00	0.44
<i>Syndicates</i>	1,143	1.81	0.91	1.10	1.95	2.48
<i>Pct. of same covenants</i>	1,143	0.40	0.28	0.20	0.36	0.48
<i>Same loan rating</i>	1,098	0.43	0.41	0.00	0.33	1.00
<i>Loan rating difference</i>	1,098	0.96	0.90	0.00	1.00	1.00
Borrower Characteristics						
<i>Liquidity</i>	1,143	1.58	0.64	1.14	1.66	1.69
<i>ROA</i>	1,143	0.06	0.05	0.04	0.06	0.09
<i>Leverage</i>	1,143	0.39	0.21	0.24	0.40	0.49
<i>Cash flow volatility</i>	1,143	0.03	0.02	0.01	0.03	0.03
<i>Size</i>	1,143	7.79	1.11	7.05	7.80	8.39
CLO Characteristics (at the CLO-quarter level)						
<i>CLO covenant similarity score</i>	3,792	0.49	0.14	0.42	0.49	0.60
<i>CLO average loan holding amount</i>	3,792	0.02	0.01	0.00	0.01	0.02
<i>CLO industry diversification</i>	3,792	0.05	0.02	0.03	0.04	0.06
<i>CLO portfolio turnover</i>	3,792	0.18	0.22	0.03	0.07	0.25
<i>CLO overcollateralization</i>	3,792	2.45	0.52	2.23	2.44	2.64
<i>CLO portfolio rating</i>	3,792	14.99	0.79	14.52	14.82	15.28
<i>CLO portfolio defaults</i>	3,792	0.03	0.04	0.01	0.02	0.04
<i>CLO balance</i>	3,792	20.36	0.62	20.06	20.45	20.74
<i>Same CLO note rating</i>	3,792	0.28	0.25	0.00	0.25	0.43
<i>CLO note rating difference</i>	3,792	1.37	1.18	0.43	1.06	2.13

This table reports the summary statistics of the variables for borrower, loan, and CLO characteristics used in our primary analyses. All variables are defined in Appendix B. Continuous variables are winsorized at the 1% and 99% levels.

TABLE 3

Loan, borrower, and covenant characteristics: securitized and non-securitized loans

Variables	Securitized loans	Non-securitized Loans	t-stat.
<i>Covenant similarity score</i>	0.51 (0.20)	0.48 (0.23)	-2.03**
<i>Number of covenants</i>	3.10 (2.20)	2.70 (1.96)	-3.37***
<i>LIBOR spread</i>	5.51 (0.46)	5.26 (0.50)	-8.31***
<i>Loan amount</i>	20.10 (1.15)	19.65 (1.06)	-6.74***
<i>Loan maturity</i>	4.10 (0.26)	3.97 (0.42)	-5.66***
<i>Rated</i>	1.00 (0.00)	0.75 (0.44)	-12.16***
<i>Secured</i>	0.94 (0.25)	0.65 (0.47)	-11.28***
<i>Revolving tranche</i>	0.70 (0.46)	0.49 (0.50)	-7.27***
<i>Lending relationship</i>	0.19 (0.35)	0.25 (0.37)	2.92***
<i>Syndicates</i>	1.91 (0.79)	1.74 (0.97)	-2.97***
<i>Pct. of same covenants</i>	0.41 (0.26)	0.39 (0.28)	-0.99
<i>Liquidity</i>	1.59 (0.63)	1.58 (0.64)	-0.38
<i>ROA</i>	0.07 (0.05)	0.06 (0.05)	-1.29
<i>Leverage</i>	0.45 (0.22)	0.34 (0.19)	-8.87***
<i>Cash flow volatility</i>	0.03 (0.02)	0.03 (0.02)	-0.09
<i>Size</i>	7.62 (1.14)	7.90 (1.08)	4.05***

TABLE 3 (Continued)**Panel B: Covenant similarity score by covenant type**

Variables	<i>Covenant similarity score</i>		
	Securitized loans	Non-securitized loans	<i>t</i> -stat
<i>Max. Capex</i>	0.35 (0.12)	0.33 (0.13)	-1.99**
<i>Max. Debt</i>	0.32 (0.11)	0.39 (0.07)	1.97**
<i>Max. Debt-to-EBITDA</i>	0.41 (0.06)	0.40 (0.07)	-0.65
<i>Max. Debt-to-Equity</i>	0.34 (0.14)	0.33 (0.14)	-0.77
<i>Max. Debt-to-Net Worth</i>	0.26 (0.09)	0.27 (0.07)	0.69
<i>Max. Leverage</i>	0.47 (0.07)	0.44 (0.09)	-5.43***
<i>Min. Debt Service Coverage</i>	0.30 (0.07)	0.27 (0.09)	-0.86
<i>Min. EBITDA</i>	0.42 (0.12)	0.39 (0.14)	-1.99**
<i>Min. Fixed Charge Coverage</i>	0.49 (0.07)	0.46 (0.08)	-2.74***
<i>Min. Interest Coverage</i>	0.48 (0.07)	0.46 (0.07)	-5.07***
<i>Min. Liquidity</i>	0.38 (0.06)	0.35 (0.06)	-2.02**
<i>Min. Net Worth</i>	0.25 (0.08)	0.23 (0.06)	-2.08**

This table reports descriptive statistics for the variables and covenants examined in our analyses by securitized and non-securitized loan samples. Panel A reports the mean values (standard deviation in parentheses) of borrower and loan characteristics. Panel B provides the mean values (standard deviation in parentheses) for the covenant similarity scores by covenant type. The last column in each panel provides t-statistics for the difference in means. All variables are defined in Appendix B. Continuous variables are winsorized at the 1% and 99% levels. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests.

TABLE 4
Validation test: determinants of covenant similarity score

Variables	Prediction	Dep. Var. = <i>Covenant similarity score</i>	
		(I)	(II)
<i>D</i> (Number of covenants)	-	-0.13*** (-14.50)	-0.13*** (-14.79)
<i>D</i> (LIBOR spread)	-	-0.02** (-2.13)	-0.02** (-2.10)
<i>D</i> (Loan amount)	-	-0.01 (-0.73)	-0.01 (-0.47)
<i>D</i> (Maturity)	-	-0.06*** (-3.42)	-0.05*** (-3.21)
<i>Same loan arranger</i>	+	0.16* (1.90)	0.11* (1.75)
<i>Same loan purpose</i>	+	0.09* (1.68)	0.10* (1.67)
<i>Rated</i>	+	0.09*** (4.22)	0.08*** (3.76)
<i>Secured</i>	+	0.07*** (3.08)	0.06*** (2.56)
<i>D</i> (Syndicates)	-	0.01 (0.71)	0.01 (0.33)
<i>D</i> (Lending relationship)	-	-0.22*** (-8.96)	-0.21*** (-8.75)
<i>Same industry</i>	+		0.30*** (3.26)
<i>D</i> (Liquidity)	-		-0.07*** (-4.16)
<i>D</i> (ROA)	-		0.21 (0.97)
<i>D</i> (Leverage)	-		0.01 (0.17)
<i>D</i> (Cash flow volatility)	-		0.47 (1.18)
<i>D</i> (Size)	-		-0.01 (-0.27)
Fixed effects		Yes	Yes
Adj. R ²		56.76%	58.17%
Obs.		1,143	1,143

This table reports the results of the tests that examine the relation between covenant similarity and differences in loan contract and borrower characteristics. The dependent variable is the *Covenant similarity score* defined as the average textual cosine similarity of loan financial covenants compared to same-type covenants in loans to different borrowers originated in the prior calendar year. Differences, denoted by *D*(.), are estimated as the absolute difference between a loan or a borrower characteristic and the relevant average loan and borrower characteristics associated with other sample loans issued during the prior calendar year. *Same loan arranger* is defined as the proportion of loans that were arranged by the same loan arranger but were issued by different borrowers over the prior calendar year and have at least one same-type covenant compared to the current loan. *Same loan purpose* is defined as the proportion of loans issued by different borrowers over the prior calendar year that have same purpose (“operating,” “investing,” “financing,” “other”) and at least one same-type covenant compared to the current loan. *Rated* and *Secured* are defined as the proportion of loans issued by different borrowers over the prior calendar year that have similar rating status (i.e., rated or not) or collateralization status (i.e., secured or not) and at least one same-type covenant compared to the current loan. *Same Industry* is defined as the proportion of loans issued by different borrowers in the same industry (12 Fama and French industry portfolios) over the prior calendar year that have at least one same-type covenant compared to the current loan. All other variables are defined in Appendix B. OLS regressions are used to estimate the models. Coefficient *t*-statistics are in parentheses. Fixed effects for year, industry, loan purpose, and loan arranger are included but not tabulated. Continuous variables are winsorized at the 1% and 99% levels. Standard errors are corrected for heteroskedasticity and are clustered at the borrower level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests.

TABLE 5
Securitization and covenant standardization

Panel A: Loan securitization and financial covenant standardization

Variables	Dep. Var. = <i>Covenant similarity score</i>		
	(I)	(II)	(III)
<i>Securitized loan</i>	0.04*** (2.87)	0.04** (2.44)	0.02* (1.83)
<i>Number of covenants</i>	-0.05*** (-12.53)	-0.05*** (-11.93)	0.01*** (2.66)
<i>LIBOR spread</i>	0.04** (2.33)	0.03* (1.66)	0.01 (0.62)
<i>Loan amount</i>	0.01* (1.86)	0.01 (1.00)	0.01* (1.85)
<i>Loan maturity</i>	0.04*** (3.71)	0.03*** (2.80)	0.01 (1.32)
<i>Rated</i>	-0.03* (-1.95)	-0.04** (-2.05)	-0.01 (-1.29)
<i>Secured</i>	0.06*** (3.55)	0.06*** (3.73)	0.02** (2.10)
<i>Revolving tranche</i>	-0.05*** (-3.59)	-0.04** (-2.38)	-0.01 (-0.87)
<i>Syndicates</i>	-0.03*** (-4.29)	-0.03*** (-4.08)	-0.02*** (-3.72)
<i>Lending relationship</i>	-0.04*** (-2.84)	-0.04*** (-2.85)	-0.03* (-1.61)
<i>Liquidity</i>	-0.00 (-0.17)	-0.00 (-0.17)	-0.00 (-0.57)
<i>ROA</i>	-0.03 (-0.25)	0.04 (0.53)	
<i>Leverage</i>	0.09*** (2.53)	0.01 (0.54)	
<i>Cash flow volatility</i>	0.15 (0.56)	-0.00 (-0.01)	
<i>Size</i>	0.01 (0.92)	0.01 (1.31)	
<i>Pct. of same covenants</i>		0.67*** (34.61)	
Fixed effects	Yes	Yes	Yes
Adj. R ²	41.63%	45.63%	75.57%
Obs.	1,143	1,143	1,143

TABLE 5 (Continued)

Panel B: Loan securitization and financial covenant standardization in loans with high CLO and bank ownership

Variables	Dep. Var. = <i>Covenant similarity score</i>			
	Highly securitized and non- securitized loans	Low securitized and non- securitized loans	Securitized loan sample	
	(I)	(II)	(III)	(IV)
Securitized loan	0.06*** (2.92)	0.03* (1.81)		
<i>Highly securitized loan</i>			0.04* (1.86)	
<i>Securitized loan with high bank ownership</i>				-0.05** (-2.34)
<i>Number of covenants</i>	-0.05*** (-11.18)	-0.06*** (-10.82)	-0.04*** (-6.88)	-0.04*** (-7.64)
<i>LIBOR spread</i>	0.03* (1.62)	0.03* (1.66)	0.09*** (2.84)	-0.01 (-0.14)
<i>Loan amount</i>	0.01 (0.62)	0.02 (1.58)	-0.00 (-0.07)	-0.01 (-0.91)
<i>Loan maturity</i>	0.06*** (2.93)	0.06*** (2.76)	0.05 (1.34)	0.04 (0.99)
<i>Rated</i>	-0.03* (-1.83)	-0.04* (-1.90)		
<i>Secured</i>	0.06*** (3.38)	0.06*** (3.47)	0.02 (0.36)	0.09** (1.99)
<i>Revolving tranche</i>	-0.03 (-1.48)	-0.04** (-2.42)	-0.04 (-1.44)	-0.02 (-0.54)
<i>Syndicates</i>	-0.03*** (-3.01)	-0.03*** (-3.12)	-0.00 (-0.69)	-0.03* (-1.64)
<i>Lending relationship</i>	-0.03* (-1.73)	-0.02 (-1.14)	-0.11*** (-4.70)	-0.12*** (-5.37)
<i>Liquidity</i>	0.00 (0.27)	0.00 (0.06)	-0.02 (-1.47)	-0.02 (-1.10)
<i>ROA</i>	-0.06 (-0.43)	0.06 (0.45)	0.080 (0.36)	-0.14 (-0.64)
<i>Leverage</i>	0.09** (2.18)	0.06 (1.56)	-0.011 (-0.52)	0.09 (1.35)
<i>Cash flow volatility</i>	0.28 (0.91)	0.16 (0.56)	-0.403 (-1.01)	-0.10 (-0.23)
<i>Size</i>	0.01 (0.70)	0.01 (0.19)	0.017 (1.24)	0.03** (2.18)
Fixed effects	Yes	Yes	Yes	Yes
Statistical difference of coefficients:	$\chi^2 = 4.88$, Prob.> $\chi^2 = 0.04$			
Adj. R ²	47.92%	49.08%	43.07%	45.20%
Obs.	923	923	440	440

TABLE 5 (Continued)
Panel C: Covenant standardization in at-originination and ex-post securitized loans

 Dep. Var. = *Covenant Similarity Score*

Variables	Securitized loans at origination and non- securitized loans	Securitized loans after origination and non- securitized loans	Securitized loan subsample
	(I)	(II)	(III)
Securitized loan	0.06*** (2.70)	0.03** (2.11)	
At-originination securitized loan			0.05** (1.96)
<i>Number of covenants</i>	-0.06*** (-10.92)	-0.05*** (-11.12)	-0.04*** (-7.36)
<i>LIBOR spread</i>	0.05** (2.16)	0.03 (1.40)	-0.01 (-0.27)
<i>Loan amount</i>	0.01 (1.31)	0.01 (0.72)	-0.01 (-0.62)
<i>Loan maturity</i>	0.06*** (2.89)	0.06*** (3.01)	0.04 (1.07)
<i>Rated</i>	-0.03* (-1.79)	-0.04* (-1.85)	
<i>Secured</i>	0.05*** (2.91)	0.06*** (3.61)	0.09* (1.86)
<i>Revolving tranche</i>	-0.02 (-1.22)	-0.04** (-2.30)	-0.04 (-1.42)
<i>Syndicates</i>	-0.03*** (-2.71)	-0.03*** (-3.57)	-0.04** (-2.46)
<i>Lending relationship</i>	-0.01 (-0.75)	-0.04** (-2.22)	-0.12*** (-5.36)
<i>Liquidity</i>	0.01 (0.64)	-0.00 (-0.40)	-0.02 (-1.15)
<i>ROA</i>	0.11 (0.81)	-0.09 (-0.60)	-0.19 (-0.80)
<i>Leverage</i>	0.10** (2.32)	0.07* (1.68)	0.11* (1.68)
<i>Cash flow volatility</i>	0.28 (0.90)	0.12 (0.40)	-0.16 (-0.35)
<i>Size</i>	-0.00 (-0.24)	0.01 (1.17)	0.03* (1.83)
Statistical difference of coefficients:	$\chi^2 = 18.98$, Prob.> $\chi^2 = 0.00$		
Fixed effects	Yes	Yes	Yes
Adj. R ²	51.90%	46.22%	44.81%
Obs.	828	1,018	440

This table reports the results of the tests on the relation between securitization and financial covenant standardization. In both panels, the dependent variable is *Covenant similarity score*, defined as the average textual cosine similarity of the financial covenants in a loan compared to same-type covenants in loans to different borrowers originated in the prior calendar year.

In Panel A, we report the results on the relation between loan securitization and financial covenant standardization controlling for (i) loan characteristics, year of loan origination, loan purpose (“financing,” “operating,” “investing,” and “other”) and loan arranger fixed effects (column I); (ii) the variables in column (I) and borrower characteristics and borrower’s industry fixed effects (i.e., 12 Fama and French industry portfolios) (column II); and (iii) the variables in column (II) and *Pct. of same covenants*, defined as the average number of the same financial covenants with other loans originated in the past calendar year to the number of the loan’s financial covenants (column III). All other variables are defined in Appendix B.

In Panel B, to alleviate the concern that our findings are driven by an omitted loan characteristic, not securitization, we compare non-securitized loans with securitized loans with above median (column I) and below median (column II) CLO ownership. The statistical significance of the difference in the coefficients on *Securitized loan* is reported. In columns (III) and (IV), we restrict our sample to securitized loans only. In specification (III), the independent variable of interest is *Highly securitized loan*, which equals one if the securitized loan has an above median CLO ownership (defined as the total monthly holdings of a securitized loan by CLOs averaged at the loan level to total loan amount), and zero otherwise. In column (IV), the independent variable of interest is *Securitized loan with high bank ownership*, defined as one if the securitized loan has an above median bank ownership (defined as term loan A and revolving loan amount to total loan amount), and zero otherwise. All other variables are defined in Appendix B. Fixed effects for year of loan origination, Fama and French’s 12 industry portfolios, loan purpose (“financing,” “operating,” “investing,” and “other”) and loan arranger are included but not tabulated.

In Panel C, we report the results for the tests on the effect of the timing of loan securitization on covenant standardization. We compare at-origination securitized loans (i.e., loans that CLOs participate in their primary syndicate) and loans securitized in the secondary market (i.e., ex post). The dependent variable is *Covenant similarity score*, defined as the average textual cosine similarity of the financial covenants in a loan compared to same-type covenants in loans to different borrowers originated in the prior calendar year. We compare non-securitized loans with at-origination (column I) and ex-post securitized loans (column II). The statistical significance of the difference in the coefficients on *Securitized loan* is reported. In column (III), we restrict our sample to securitized loans only, and the independent variable of interest is *At-origination securitized loan*, defined as one if the loan is securitized in the primary market (upon origination), and zero otherwise. All other independent variables are defined in Appendix B. Fixed effects for year of loan origination, Fama and French’s 12 industry portfolios, loan purpose (“financing,” “operating,” “investing,” and “other”) and loan arranger are included but not tabulated.

In all panels we estimate OLS regressions. Coefficient *t*-statistics are in parentheses. Continuous variables are winsorized at the 1% and 99% levels. Standard errors are corrected for heteroskedasticity and clustered at the borrower level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests. Coefficients of interest are in boldfaced format.

TABLE 6
Covenant standardization and CLO portfolio characteristics

Variables	Dep. Var.= <i>Covenant similarity score of purchased loans_q</i>		
	(I)	(III)	(IV)
<i>CLO average loan holding amount_{q-1}</i>	-5.50*** (-3.23)		-3.36*** (-2.71)
<i>CLO industry diversification_{q-1}</i>	1.06** (2.12)		0.73*** (2.64)
<i>CLO portfolio turnover_{q-1}</i>		0.05*** (3.25)	0.05** (2.47)
<i>CLO overcollateralization_{q-1}</i>	-0.01 (-1.01)	-0.02*** (-4.21)	-0.01* (-1.79)
<i>CLO portfolio rating_{q-1}</i>	0.00 (0.10)	0.00 (0.06)	-0.00 (-0.14)
<i>CLO portfolio defaults_{q-1}</i>	0.11 (1.50)	0.08 (1.24)	0.19** (2.22)
<i>CLO balance_{q-1}</i>	-0.04*** (-7.24)	-0.02*** (-3.92)	-0.04*** (-6.20)
Fixed effects:			
Year	Yes	Yes	Yes
CLO manager	Yes	Yes	Yes
CLO arranger	Yes	Yes	Yes
Adj. R ²	21.87%	11.51%	22.89%
Obs.	3,792	3,792	3,792

This table reports the results of the tests on the relation between CLO portfolio characteristics and the covenant standardization of the loans that CLOs purchase. We use as the dependent variable the average covenant similarity of securitized loans purchased in a quarter (*Covenant similarity of purchased loans_q*). We use as proxies for CLO portfolio structure the ratio of a loan balance in a CLO portfolio to the total CLO balance averaged at the CLO-quarter level (*CLO average loan holding amount_{q-1}*) and the within CLO standard deviation of industry investment ratios (i.e., the number of loans in a Moody's industry to the total number of loans in the CLO portfolio) averaged at the CLO-quarter level (*CLO industry diversification_{q-1}*). We use as proxy for CLO screening costs the ratio of the total loan face amount purchased and sold to CLO balance at the CLO-quarter level (*CLO portfolio turnover_{q-1}*). The sample includes CLO investments in 2008-2013. All other variables are defined in Appendix B. OLS regressions are used to estimate the models. Coefficient *t*-statistics are in parentheses. Fixed effects for year, CLO manager, and CLO arranger are also included but not tabulated. Continuous variables are winsorized at the 1% and 99% levels. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests. Coefficients of interest are in boldfaced format.

TABLE 7
Covenant standardization and credit rating agencies' risk assessments

Panel A: Credit rating agencies issue similar ratings for securitized loans with standardized financial covenants

Variables	Dep. Var. =	Dep. Var. =
	<i>Same loan rating</i>	<i>Loan rating difference</i>
<i>Covenant similarity score</i>	0.20** (2.21)	-0.78** (-2.44)
<i>Number of covenants</i>	0.01 (1.13)	-0.06** (-2.18)
<i>LIBOR spread</i>	-0.02 (-0.20)	0.06 (0.48)
<i>Loan amount</i>	0.05*** (2.50)	-0.13** (-2.16)
<i>Loan maturity</i>	0.20*** (2.54)	-0.51** (-2.00)
<i>Secured</i>	-0.04 (-0.53)	-0.15 (-0.49)
<i>CCC-rated and below</i>	-0.22*** (-5.42)	1.02*** (7.78)
<i>Revolving tranche</i>	0.01 (0.28)	0.05 (0.45)
<i>Liquidity</i>	0.02 (0.76)	0.02 (0.24)
<i>ROA</i>	0.39** (1.99)	-0.88** (-2.09)
<i>Leverage</i>	-0.10 (-1.06)	0.12 (0.46)
<i>Cash flow volatility</i>	1.35 (1.41)	0.05*** (3.08)
<i>Size</i>	-0.00 (-0.20)	0.60 (0.28)
Fixed effects	Yes	Yes
Adj. R ²	18.21%	33.37%
Obs.	1,098	1,098

Panel A reports the results of the tests on the relation between financial covenant standardization and S&P and Moody's rating consensus for securitized loans. In column (I), the dependent variable is the probability that S&P and Moody's issued the same loan rating for a securitized loan in 2008-2013, averaged at the loan-year level (*Same loan rating*). In column (II), the dependent variable is the absolute value of the average difference in loan ratings issued by S&P and Moody's in 2008-2013, averaged at the loan-year level (*Loan rating difference*). *CCC-rated and below* is one if a securitized loan is rated CCC+ and below by at least one credit rating agency in a year, and zero otherwise. All other variables are defined in Appendix B. OLS regressions are used to estimate the models. Coefficient *t*-statistics are in parentheses. Fixed effects for year of loan origination, Fama and French's 12 industry portfolios, loan purpose ("financing," "operating," "investing," and "other") and loan arranger are also included but not tabulated. Continuous variables are winsorized at the 1% and 99% levels. Standard errors are corrected for heteroskedasticity and are clustered at the borrower level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests. Coefficients of interest are in boldfaced format.

TABLE 7 (Continued)

Panel B: Credit rating agencies issue more similar note ratings of CLOs with more standardized loan covenants

Variables	Dep. Var. = <i>CLO same note rating</i> _q	Dep. Var. = <i>CLO note rating difference</i> _q
	(I)	(II)
<i>CLO covenant similarity score</i> _{q-1}	-0.10 (-1.28)	-1.10** (-2.32)
<i>CLO overcollateralization</i> _{q-1}	0.04** (2.29)	-0.40*** (-4.73)
<i>CLO portfolio rating</i> _{q-1}	-0.01 (-0.43)	0.02 (0.75)
<i>CLO portfolio defaults</i> _{q-1}	0.01 (0.17)	2.40*** (2.68)
<i>CLO balance</i> _{q-1}	-0.02*** (-3.62)	-0.07** (-2.15)
Fixed effects:		
Year	Yes	Yes
CLO manager	Yes	Yes
CLO arranger	Yes	Yes
Adj. R ²	34.69%	29.21%
Obs.	5,341	5,341

Panel B reports the results of the tests on the relation between CLO portfolio covenant standardization and S&P and Moody's rating consensus for CLO notes. In column (I), the dependent variable is the average probability of a CLO note receiving the same ratings by S&P and Moody's in 2008-2013, averaged at the CLO-quarter level (*Same CLO note rating*). In column (II), the dependent variable is the absolute value of the average difference in CLO note ratings issued by S&P and Moody's in 2008-2013, averaged at the CLO-quarter level (*CLO note rating difference*). All other variables are defined in Appendix B. OLS regressions are used to estimate the models. Coefficient *t*-statistics are in parentheses. Fixed effects for year, CLO manager, and CLO arranger are also included but not tabulated. Continuous variables are winsorized at the 1% and 99% levels. Standard errors are corrected for heteroskedasticity and are clustered at the CLO level. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level using two-tailed tests. Coefficients of interest are in boldfaced format.