

Leveraged Loans: Is High Leverage Risk Priced in?

David P. Newton

School of Management, University of Bath
dnp25@bath.ac.uk

Steven Ongena

*University of Zurich, Swiss Finance Institute, KU Leuven, NTNU Business School &
CEPR*
steven.ongena@bf.uzh.ch

Ru Xie

School of Management, University of Bath
r.xie@bath.ac.uk

Binru Zhao

School of Management, University of Bath
bz423@bath.ac.uk

February 22, 2022

We thank Mark Jeffrey Flannery, Simone Giansante, Jarrad Harford, Christoph Herpfer, Winifred Huang, Clive Lennox, William L. Megginson, Partha S. Mohanram, Philip Molyneux, Felix Noth, Neslihan Ozkan, Alessio Reghezza, Elizaveta Sizova, Junyang Yin, and participants at EFMA 2021, IYFSC 2021, and IFABS Oxford 2021 for helpful comments. We thank Froloshka Kornelia for excellent data assistance in constructing our data sample. Errors and omissions remain the responsibility of the authors. Steven Ongena acknowledges financial support from ERC ADG 2016 - GA 740272 lending.

Leveraged Loans: Is High Leverage Risk Priced in?

Abstract

We investigate the impact of the 2014 Interagency Clarification on the leverage risk premium for bank- and nonbank-originated loans. Using a novel dataset from 2011 to 2019, we show that leveraged loan spreads have declined rapidly for nonbank facilities relative to bank facilities since the introduction of the 2014 Interagency Clarification. The decline in leveraged loan spreads is significant for highly leveraged borrowers, especially when term loans are involved. We further demonstrate that a higher degree of information asymmetry, driven by an increase in covenant-lite loan issuance and weaker investor protection, is strongly associated with a narrower leverage risk premium.

JEL classification: G21, D82, G34

Keywords: Leverage Risk, Syndicated Loan Pricing, Leveraged Loan, Information Asymmetry

1. Introduction

The market for leveraged loans, a type of syndicated loan that is granted to borrowers with considerable amounts of debt or high credit risk, has grown significantly in recent years.¹ Prompted by an increase in the participation of unregulated investors and a deterioration in credit standards, the Office of the Comptroller of the Currency (OCC), the Board of Governors of the Federal Reserve (Fed), and the Federal Deposit Insurance Corporation (FDIC) issued the so-called Interagency Guidance on Leveraged Lending (“the Guidance”) in March 2013. Subsequently, in November 2014, the “frequently asked questions for implementing the March 2013 guidance” (“the Clarification”) was issued to clarify the regulators’ expectations regarding stronger risk management. Although the Guidance and its Clarification aim to ensure safe and sound leveraged lending and to achieve both macro- and micro-prudential objectives, the guidance applies only to banks that are regulated by the OCC, the Fed or the FDIC. Nonbank lenders have been the main beneficiaries of the regulation, with increased market shares in the leveraged loan market. Kim et al. (2018), for example, find that although the Guidance together with the Clarification were effective in reducing regulated bank-originated leveraged lending activity, they also triggered a migration of leveraged lending to unregulated nonbank lenders. Nonbanks (or shadow banks) do (usually) not have access to central bank liquidity and are denied access to the deposit guarantee scheme, which makes them more vulnerable to shocks and can accelerate a systemic crisis (Plantin 2014; Fahri and Tirole 2017; Chretien and Lyonnet 2018; Martinez-Miera and Repullo 2018). Recently, at the Open Session of the meeting of the Financial Stability Oversight Council, U.S. Secretary of the Treasury Janet L. Yellen raised concerns about vulnerabilities in nonbank

¹ In this article, we follow LPC and define a leveraged loan as a loan that is extended to borrowers rated BB+ or lower or is not rated or rated ‘BBB- or higher but has (1) a LIBOR spread of +125 or higher and (2) is secured by a first or second lien.

financial intermediation as one of the major challenges to financial stability.² Given these concerns, the increase in participation of unregulated nonbanks raises the question of whether the lack of supervision on unregulated lenders in the leveraged loan market leads to laxer lending standards for loans originating from nonbanks and eventually the financial system's possible instability.

Another striking development in the leveraged loan market is the surge of so-called covenant-lite loan issuance. In the U.S., the fraction of covenant-lite leveraged loans increased rapidly from 30% in 2012 to 55% in 2014. According to Abuzov et al. (2020), the strong competition between regulated banks and nonregulated banks in the leveraged loan market has contributed to increased covenant-lite structures with reduced investor protection. After the Clarification, unregulated nonbanks issued significantly more covenant-lite loans than regulated banks to attract borrowers switching from regulated bank lenders. Apparently, the different regulation attitudes toward banks and nonbanks lead to laxer lending standards on the nonprice terms and weaker investor protection. In addition, in the U.S., as of mid-2019, more than 50% of leveraged loans were securitized and distributed in the form of collateralized loan obligations (CLOs). The increasing number of unregulated nonbank lenders in the market following the Clarification, as well as the investor appetite for high yields in a low-interest rate environment, both contributed to the boom period of CLO issuance from 2014–2019. In this paper, we investigate the implications of the Clarification on leveraged loan spreads for bank- vs. nonbank-originated loans. We compare the all-in-spread-drawn (AISD) between bank- and nonbank-originated leveraged loans and examine whether leverage risk has been effectively priced into the AISD following the regulation.

Our primary empirical analysis compares the all-in-spread-drawn (AISD) between bank-

² March 31, 2021, <https://home.treasury.gov/news/press-releases/jy0092>

and nonbank-originated leveraged loans during 2011–2019³ and finds that the AISD between nonbanks and banks has been narrowing since the 2014 Clarification. From 2011–2013, the premium between bank- and nonbank-originated loans followed a clear parallel trend, with an average spread of 84 basis points. However, the premium for nonbank-originated loans distinctly narrowed after the regulation from 2014–2019, down to an average spread of 49 basis points (see Figure 1). The decline in leveraged loan spreads between banks and nonbanks raises concerns that nonbank lenders relax their lending policies to compete with banks and increase their leveraged loan market shares. While leverage risk premiums have decreased since 2014, overall borrower risk may have declined along with spreads. To address this concern, we estimate the relation between AISD and firm leverage risk accounting for loan and borrower characteristics. We then assess how borrower leverage, nonbank lenders, and the post-regulation period of November 2014 to December 2019 interact. The estimates robustly confirm that the nonbank-originated leveraged loan premium for a given level of leverage has declined since the issuance of the 2014 Clarification!

As a type of syndicated loan, a leveraged loan suffers from information asymmetry issues by design, which can lead to both adverse selection and moral hazard. Prior studies suggest that asymmetric information between lead and participant banks affects loan spreads because participants require higher premiums to account for this friction (Bosch, 2007; Sufi, 2007; Ivashina, 2009). To mitigate information asymmetry, financial covenants play a key role in monitoring borrower performance and provide lenders the right to renegotiate their loan contracts, which can significantly reduce adverse selection and moral hazard (Rajan and Winton, 1995; Bradley and Roberts, 2015; Griffin et al., 2019). However, the strong competition between banks and nonbanks

³ Our sample starts after the Global Financial Crisis (GFC) period and stops before the outbreak of the COVID-19 pandemic.

in nonprice terms after the regulation appears to have accelerated the issuance of covenant-lite leveraged loans. Since the introduction of the Clarification in 2014, covenant-lite loan issuance for unregulated nonbank lenders has started picking up speed. The fraction of leveraged loans issued by nonbank lenders that are covenant-lite rose from 54% in 2012 to 70% in 2019 (see Appendix Figure 2). When regulated banking institutions slowed the issuance of covenant-lite loans after the 2014 Clarification on the U.S. leveraged loan market (Abuzov et al., 2020), borrowers switched to unregulated nonbank loans with relatively fewer covenants (Schenck and Shi, 2017; Abuzov et al., 2020).

Relaxing investor protection in covenant-lite loans led by competition between banks and nonbanks can intensify information asymmetry issues associated with leveraged loan pricing. To investigate the role of information asymmetry on leveraged loan pricing, we conduct a subsample analysis by splitting the sample into multiple groups. In our first subsample analysis, we split the sample of leveraged loans into two groups: loans with covenant provisions and covenant-lite loans. The results show that the more severe information asymmetry associated with covenant-lite loans leads to a stronger and more significant decline in the nonbank-originated leverage risk premium. Our further subgroup analysis with groups with and without performance pricing confirms that leveraged loans without performance pricing are associated with a higher and more significant decline in loan spreads (than those with performance pricing), especially for nonbank-originated term loans. The results indicate that information asymmetry plays an important role in the underestimation of leverage risk.

In addition, after the introduction of the Guidance and the Clarification, a large portion of leveraged loans have been securitized and distributed in the form of CLOs. Since such securitization allows for the transfer of loan default risk to investors, it provides originating lenders

less incentive to maintain high lending standards before securitization and to monitor borrowers after securitization, which gives rise to both adverse selection and moral hazard. Prior literature suggests that a reduced share of the informed party's ownership of leveraged loans can aggravate the cost of asymmetric information (Leland and Pyle, 1977; Ivashina, 2009). Further studies show evidence that securitization activity leads to a lax screening of mortgages (Mian and Sufi, 2009; Keys et al., 2010; Purnanandam, 2011; Nadauld and Sherlund, 2013) and increases the risk appetite of the issuing bank (Haensel and Krahn, 2007). A recent study from Bord and Santos (2015) investigates the effects of the securitization of corporate loans and finds that institutional loans, which use lax standards to underwrite through CLOs, suffer higher risk than nonsecuritized loans originating from the same bank. Two closely related works to ours are Ivashina and Sun (2011) and Nadauld and Weisbach (2012). Ivashina and Sun (2011) find evidence that the institutional demand pressure for leveraged loans generated by collateralized debt obligations (CDOs) is negatively related to the spread of these loans. Nadauld and Weisbach (2012) suggest that the spread of loan facilities that are eventually securitized through CLOs is lower than the spread of loan facilities that are not securitized. To investigate the impact of CLO issuance on nonbank-originated leveraged loan pricing, we add an interaction term linking CLO issuance and the nonbank lender dummy variable. The estimated coefficients on this interaction term are negative and highly significant for highly leveraged borrowers, indicating that the information asymmetry issues are driven by a high level of CLO issuance post the 2014 Clarification that is strongly linked to the decline of leverage risk premium in nonbank-originated leveraged loans from 2014–2019.

Our paper contributes to the literature in several ways. Few papers have examined the pricing of leveraged loans (Angbazo et al., 1998; Lim et al., 2014). According to Lim et al. (2014), nonbank facilities are priced more than bank-only facilities in the same loan package, and the

nonbank premium is higher when borrowers suffer financial constraints. In this paper, we investigate the impact of the Clarification by comparing different responses of regulated banks and unregulated nonbanks in terms of loan pricing. Unlike previous studies focusing on the effect of the Clarification on banks' lending activities (Schenck and Shi, 2017; Kim et al., 2018; Calem et al., 2020) and nonprice terms (Abuzov et al., 2020), we directly investigate the pricing of leverage risk after the Guidance and the Clarification. We show that although the declining trend of bank-originated leveraged loan spreads has been reversed due to the 2014 Clarification, the risk premium between nonbank facilities and bank facilities has been narrowed. We identify two possible mechanisms associated with the decline of the highly leveraged loan spread. First, information asymmetry arises with non-performance linked pricing and covenant-lite issuance, leading to a decline in the leverage risk premium after the 2014 Clarification. Second, the high level of CLO issuance since 2014 has reduced the share of the informed party's ownership of leveraged loans, aggravating the cost of asymmetric information and leading to a further decline in the leverage risk premium of highly leveraged loans from 2014–2019.

The remainder of the paper is organized as follows. Section 2 presents the data and sample. Section 3 provides empirical evidence on whether the leveraged loan pricing mechanism effectively reflects borrowers' high leverage ratios and aggressive business expansion strategies in loan spreads. Section 4 provides the potential mechanisms to explain why borrowers' leverage risk is not reflected in loan spreads. Section 5 provides robustness checks to confirm our findings. Section 6 concludes the paper.

2. Data

2.1 Sample construction

We obtain our sample of leveraged loans from Refinitiv Eikon and WRDS-Reuters' DealScan, also known as the Loan Pricing Corporation DealScan (LPC), for the period 2011–2019. Leveraged loan coverage at Refinitiv Eikon also is provided by Refinitiv LPC, which features the most comprehensive and accurate real-time and historical syndicated loan data. We follow LPC and define a leveraged loan as a loan that is extended to borrowers rated BB+ or lower or that is not rated or rated 'BBB-' or higher but has (1) a LIBOR spread of +125 or higher and (2) is secured by a first or second lien. Focusing on leveraged loans allows us to investigate whether the loan pricing mechanism effectively reflects borrowers' high leverage ratios.

To construct the sample, we include all leveraged loan facilities that are denominated in U.S. dollars and made to U.S. public firms with primary syndication locations in the U.S. covered in Refinitiv Eikon between 2011 and the end of 2019. We include only loan facilities with floating-rate interest payments in the sample. We require that the data on the AISD be no missing. The AISD is calculated as the sum of the LIBOR spread plus the facility fee, and is provided by LPC directly. We additionally restrict the sample to the most common types of facilities, including term loan A, term loans B-F, revolvers, and others. Finally, we exclude facilities issued to financial firms (SIC Code 6000-6999). In the literature, WRDS-Reuters' DealScan has been widely used for syndicated loan studies. Although both Refinitiv Eikon and WRDS-Reuters' DealScan share the same data source, coverage is slightly different. To check data consistency and to extend data availability, we construct a link table connecting the two databases on leveraged loans of Refinitiv Eikon and WRDS-Reuters' DealScan with the unique identifier of the LPC tranche. Linking Refinitiv Eikon and WRDS-Reuters' DealScan provides us with broader and more accurate

coverage of leveraged loan facility characteristics, including size and maturity, loan purpose, arrangers, and facility type, as well as information on whether the facility is senior, secured, covenant-lite, or has performance-based pricing.

To obtain borrower-specific characteristics, we match the borrower or borrower's parent name to the Compustat firm, following Chava and Roberts (2008). The current DealScan Compustat link table contains only matches through the end of 2017. We extend the current version of the link table to the end of 2019 by using the six-digit CUSIP number provided by both Refinitiv Eikon and Compustat. We also manually confirm the matching between DealScan and Compustat. We exclude observations with missing borrowers' financial statement information data at the end of the fiscal year prior to the current loan issuance year. The final sample contains 5,455 leveraged loan facilities in 3,507 deals to 1,385 U.S. nonfinancial firms.

2.2 Definition of nonbank and bank lenders

Following Elliott et al. (2019), we identify a lender as a nonbank if it is categorized as "Insurance Company", "Corporation", "Finance Company", "Investment Bank", "Mutual Fund", "Trust Company", "Leasing Company", "Pension Fund", "Distressed (Vulture) Fund", "Prime Fund", "CDO", "Hedge Fund", and any other institutional investor. In addition, lead lenders normally act as managers of loans with primary responsibility for ex ante due diligence and for ex post monitoring of borrowers, which provides information for participant lenders (Ivashina, 2009). Therefore, we define a nonbank-originated leveraged loan facility if it has at least one U.S. nonbank lead arranger. We follow Bharath et al. (2011) to classify lead lenders for each loan. We classify a lender as a lead lender if the "LeadArrangerCredit" field in DealScan indicates "Yes" or if the "LenderRole" field in DealScan indicates one of the following: administrative agent, agent,

lead arranger, arranger, or lead bank. In our sample, nonbank-originated leveraged loans account for approximately 29% of the whole leveraged loan sample. This is because nonbanks are less likely to be lead arrangers than commercial banks.

2.3 Overview of sample

Table 1 presents the summary statistics for the key variables in our sample. To reduce the effects of outliers, all of our continuous variables are winsorized at the 1% and 99% levels. Panel A of Table 1 summarizes the facility type in our leveraged loan sample. Nonbanks are more likely to issue term loan facilities (61% vs. 35%), and banks are more likely to issue revolver facilities (54% vs. 43%). Panel B of Table 1 shows the summary statistics for leveraged loan facilities. The average AISD for leveraged loans originating from banks in our sample is 274.336 basis points, and the spread of leveraged loans originating from nonbanks is 338.638 basis points, which is much higher than bank-originated loan spreads due to borrowers' greater credit risk. Only 42.8% of the leveraged loan facilities include covenants in the loan agreements to monitor the risk and financial performance of borrowers and to avoid its deterioration over the life of the loan. 17.6% of the leveraged loan facilities in our sample have performance-related pricing provisions, in which case the spread is adjustable based on predefined financial criteria. Panel C of Table 1 presents the summary statistics on borrower characteristics of the year prior to the loan origination. Our main proxy of leverage risk is estimated as a firm's total liabilities net of cash divided by the book value of total assets, with an average value of 59.37% in our sample. The borrower of nonbank-originated loans has a larger average leverage risk than the borrower of bank-originated loans (65.37% vs. 56.92%). We experiment with two alternative measures of a firm's leverage ratio in the robustness check, following Lemmon et al. (2008) and DeAngelo and Roll (2015). In the first measure, we

take total debt divided by the book value of total assets. In the second measure, we use long-term debt relative to the book value of total assets as the proxy of the borrower’s leverage risk in the long run. In addition, we use the borrower’s interest expense divided by the EBITDA as our third alternative leverage risk measure.

Since time-varying covariates can change or be influenced by the post-Clarification period, leading to endogeneity problems, we provide statistical tests of mean differences for borrowers and loan characteristics pre- and post-Clarification in the bank and nonbank groups, respectively (Table OA2). As shown, the control variables are, on average, in most cases significantly different, both before and after the Clarification. In comparison to regulated banks, the unregulated nonbank loan group experienced a more pronounced contraction in AISD, from 372.911 to 312.276 basis points after the Clarification (60.634 basis points decline in total), while only 25.721 basis points were lost from the AISD of the regulated bank loan group.

< INSERT TABLE 1 HERE >

3. Empirical Results

3.1 Baseline results

While Figure 1 shows that the spread between bank- and nonbank-originated facilities has narrowed since the 2014 Clarification, overall borrower risk may have declined along with spreads. In this section, we conduct multivariate analysis to better understand whether the leveraged loan price effectively reflects borrowers’ high leverage ratios by investigating the following empirical model:

$$Y_{it} = \beta_1 \text{Leverage}_{it-1} * \text{Nonbank} * \text{Post} + \beta_2 \text{Leverage}_{it-1} * \text{Nonbank} + \beta_3 \text{Leverage}_{it-1} * \text{Post} + \beta_4 \text{Nonbank} * \text{Post} + \beta_5 \text{Nonbank} + \beta_6 \text{Leverage}_{it-1} + X_{it-1} + \alpha_i + \alpha_t + \epsilon_{it} \quad (1)$$

Y_{it} is the AISD of leveraged loan facility i in fiscal year t . $Leverage_{it-1}$ is the borrower's total liabilities net of cash divided by the book value of total assets prior to the loan issuance date. $Post$ is a dummy equal to one if the loan year is either at or after the issuance of the Clarification in November 2014. $Nonbank$ is a dummy variable that equals one if the facility has at least one U.S. nonbank lead arranger and zero otherwise. X_{it-1} is a set of control variables including natural log of loan amount (LN_amount); natural log of loan maturity (LN_Maturity); an indicator that takes the value of one if the facility is secured, and zero otherwise (Secured indicator); an indicator that takes the value of one if performance pricing provisions are included in the facility, and zero otherwise (Performance pricing indicator); an indicator that takes the value of one if the loan has covenants, and zero otherwise (Covenants indicator); the borrower's total liabilities net of cash divided by the book value of total assets (Leverage); natural log of borrower's total assets in the fiscal year prior to the loan issuance date (LN_TA); the market to book value ratio in the fiscal year prior to the loan issuance date (Mkt/Book); the ratio of net property, plant and equipment to the total assets at the end of the fiscal year prior to the loan issuance (Tangibility), and the industry-adjusted return on total assets at the end of the fiscal year prior to the loan issuance date (Ind_adj ROA).

Table 2 reports the baseline OLS regression results of Eq. (1) with double-clustered standard errors by firm and year to account for heteroscedasticity. We include purpose fixed effects, industry fixed effects, and year fixed effects in all regression models. Leveraged loans in our sample mainly include two categories of loan types: term loans and revolvers. Term loan spreads are expected to be higher than revolvers, reflecting longer maturities and greater credit risks (Angbazo et al., 1998; Harjoto et al., 2006). Accordingly, we estimate separate regression models

for revolvers and term loans to see if the impact of the Clarification observed in the aggregate sample differs between the two types of loans.

Earlier research suggests that leverage risk is positively priced in syndicated loan spreads (Angbazo et al., 1998; Lim et al., 2014). In this paper, we also find a positive relation between the borrower leverage ratio (Leverage) and the AISD. In Column (1), with the whole sample of leveraged loans, for a borrower with an average leverage ratio, a one-standard-deviation increase in the leverage ratio was associated with an increase of 25% in AISD in nonbank-originated facilities from 2011–2014. Our main interest is the size, sign, and statistical significance of the coefficients on the triple interaction term $Leverage_{it-1} * Nonbank * Post$, which captures the difference, in the pre- and post-November 2014 periods, on the leverage risk premium of nonbank-originated loans. We find that the coefficients on $Leverage_{it-1} * Nonbank * Post$ in the regression model are sizeable, negative, and statistically significant, indicating that the positive leverage risk premium for a given level of leverage has significantly declined since the issuance of the Clarification in 2014. The results also suggest a large economic magnitude of the coefficient on the triple interaction term of $Leverage_{it-1} * Nonbank * Post$ for a borrower with an average leverage ratio in our sample from November 2014–December 2019. A one-standard-deviation increase in the leverage ratio results in a 2.74% decrease in AISD ($12.66\% - 18.99\% + 2.89\% + 0.70\%$) driven by a strong leverage risk premium declining effect of 18.99%. The results indicate a significant drop in AISD for a given leverage risk from November 2014–December 2019. In Columns (2) and (3) of Table 3, we present estimates of Eq. (1) for the subsamples of term loans and revolvers, respectively. The results demonstrate a stronger underestimation of leverage risk from 2014–2019 in the subsample of term loans, with both higher significance and economic magnitude in Column (2). Specifically, a one-standard-deviation increase in leverage ratio is

associated with an increase of 18.54% in the AISD (9.25%+9.29%) for nonbank-originated term loans from 2011–November 2014. However, during the November 2014–December 2019 period, a one-standard-deviation increase in the leverage ratio is associated with a 3.1% (9.25%-17.14%-4.5%+9.29%) decrease in the AISD for nonbank-originated term loans.

To control for other potential effects on leveraged loan spread, we include variables on loan- and borrower-specific characteristics. In line with Dennis et al. (2000), we find that loan spreads decline with maturity. Prior studies show that loan spreads are higher on secured facilities because lenders require collateral on high-risk loans, and pledged assets do not diminish default and recovery risk sufficiently to result in lower spreads (Ivashina, 2009; Lim et al., 2014). A facility with a performance pricing provision and/or covenant protection tends to have a lower spread. On the firm characteristic side, a larger borrower with better profitability measured by industry-adjusted ROA (Ind_adj ROA) is associated with a lower loan spread, although the coefficients are insignificant. Our main results hold up well after including all the control variables, loan and year fixed effects. The coefficients on the interaction term of $Leverage_{it-1} * Nonbank * Post$ remain negative and significant at the 1% level in all estimates. Overall, our results suggest that although leverage risk is positively priced in AISD, the leverage risk premium of nonbank-originated loan facilities declined significantly from November 2014–2019 relative to bank-originated loan facilities. Furthermore, we find that the decline has been more pronounced in term loans compared with revolvers.

< INSERT TABLE 2 HERE >

To alleviate the endogeneity issues within our empirical setup, we follow Atanasov and

Black (2016) and present the treatment effects based on the coefficient plot from Eq. (1) in Figure 2. Following previous literature (e.g., Defusco, 2018; Hasan et al., 2020; O'Malley, 2021), we omit year -1 as the reference period. We find that before 2014, the coefficient plots are insignificant, indicating that the leverage risk premium for bank and nonbank loans follows parallel trends. However, from 2014–2019, the coefficient plots become significantly different from zero, indicating a clear discontinuity in approximately 2014. The effect is economically meaningful and persistent throughout our sample period. Overall, Figure 2 shows a clear discontinuity after 2014, suggesting a statistically significant and negative effect on the leverage risk premium between nonbanks and banks. This finding provides strong support for establishing causal identification through our difference-in-differences (diff-in-diff) setup.

<INSERT Figure 2 HERE>

3.2. *Diff-in-diff with propensity score matching (PSM)*

If the debt choice between borrowing from banks or nonbanks is not random, the diff-in-diff setup may suffer from endogeneity and selection bias. To further address this concern, we apply the PSM approach to improve the comparability between bank and nonbank loan spreads. Specifically, we choose a pair of borrowers with similar pre-loan financial characteristics, but one from the group of nonbanks and one from the group of banks. The predictive probability (propensity score) of borrowing from a nonbank lender is obtained from the probit model. To select the matching variables, we are motivated by previous literature (Lim et al., 2014 and Biswas et al., 2020) and use various borrowers' financial characteristics (*Leverage (%)*, *LN_Cash*, *LN_TA*, *LN_DLTT*, *Industry-adjusted ROA*, *Tangibility* and *Mkt/Book*). All the matching variables are

lagged to help alleviate endogeneity concerns. The propensity score matching model is estimated as follows:

$$\rho_i = \Pr(D_i = 1|X_{ijt-1}) = \delta(X'_{ijt-1}\beta + \varepsilon_i) \quad (2)$$

where D_i is a dummy variable that equals one if the lead lender is a nonbank and zero if the lead lender is a bank. X'_{ijt-1} is a vector of firm characteristics one year before the loan issuance date. δ is a standard normal cumulative distribution function. Specifically, we implement nearest neighbor matching to construct the counterfactual outcome. We match each nonbank borrower with the four nearest neighbors with replacement. Prior literature suggests that a lack of bank funding is the primary cause for companies to borrow from nonbanks. Lim et al. (2014) find that nonbank facilities are more expensive relative to bank-only facilities in the same loan package when borrowers face limited access to bank funding. Furthermore, Chernenko et al. (2020) confirm that nonbank loans carry interest rates that are 190 basis points higher than bank loans. Our estimation results from Eq. (2) are presented in Table 3. As displayed, most of the covariates are significant at 1%. A firm with a higher leverage ratio, more cash, and more long-term debt is more likely to borrow from a nonbank, and a firm with higher industry-adjusted ROA and tangibility is less likely to borrow from a nonbank. The results are in line with Lim et al. (2014) and Chernenko et al. (2020). Table 4 confirms that after matching, the bank and nonbank groups are well balanced, with no significant differences in terms of selected matching variables.

< INSERT TABLE 3 HERE >

< INSERT TABLE 4 HERE >

After obtaining a closely matched sample, we present the PSM diff-in-diff estimations in Table 5. Specifically, we re-estimate Eq. (1) based on the newly matched sample in Table 3 and Table 4. As shown, the nonbank loan spread in all the regression specifications displays a sizeable and statistically significant decline after 2014. Specifically, a one standard deviation increase in the leverage ratio is associated with an 8.17% (8.89%-0.72%) increase in the AISD before the Clarification and a 5.92% (8.89%-22.03%-0.72%+7.94%) decrease in the AISD post the Clarification for the whole leveraged loan sample, respectively. In addition, the loan spread decline in the term loan subsample is more pronounced than that in revolvers, providing further evidence on the reliability of the baseline estimates. Specifically, a one standard deviation increase in the leverage ratio is associated with an 8.02% (6.35%-31.59%-6.07%+23.29%) decline in the AISD post the Clarification for term loan facilities, whereas a one standard deviation increase in the leverage ratio is only associated with 0.72% (1.87%-39.95%+28.35%+9.01%) decline in the AISD post the Clarification for revolvers.

< INSERT TABLE 5 HERE >

3.3. Predictive margin on nonbank vs. bank loans

To further investigate the dynamic change of AISD, we illustrate the predictive margins of loan spread for bank and nonbank groups in Figure 3. We find a declining trend of the predictive margins on leveraged loan spreads for both banks and nonbanks. However, the decline has been more pronounced for nonbanks after the 2014 Clarification, and the predictive margins of loan spread between nonbank and bank groups have been significantly narrowed since the 2014

Clarification. Economically, in 2019, the predictive margin for nonbank loan spread dropped 13% relative to 2014 but only slightly decreased by 5% for bank loans. It is interesting to note that the effect of the regulation has been persistent and increasing. This result provides further visual evidence on the treatment effects of the Clarification on nonbank vs. bank groups.

<INSERT Figure 3 HERE>

3.4. Leverage Risk Pricing: Highly vs. Lowly Leveraged Borrowers

While our results from Table 2 and Table 5 show that leverage risk premium of nonbank loan facilities has declined rapidly after the 2014 Clarification, we are still not clear how much exactly declined in the loan spreads of highly leveraged borrowers and whether the marginal decline of loan spreads diminishes along with the decline of borrowers' leverage risk. Hence, we further investigate the leverage risk pricing varies between highly leveraged borrowers and lowly leveraged borrowers by estimating the following model.

$$Y_{it} = \beta_1 HighLeverage_{it-1} * Nonbank * Post + \beta_2 HighLeverage_{it-1} * Nonbank + \beta_3 HighLeverage_{it-1} * Post + \beta_4 Nonbank * Post + \beta_5 Nonbank + \beta_6 HighLeverage_{it-1} + X_{it-1} + \alpha_i + \alpha_t + \epsilon_{it} \quad (3)$$

We construct a dummy variable *HighLeverage* that equals one if the borrower's leverage ratio is above 75th percentile value of leverage ratio after the 2014 Clarification in our sample⁴.

The coefficients of *HighLeverage*_{it-1} * *Nonbank* * *Post* indicate the magnitude of loan spread

⁴ The results are consistent and robust when we define the dummy variable *HighLeverag* that equals one if the borrower's leverage ratio is above the 50th percentile value of leverage ratio after the 2014 Clarification.

changes after the 2014 Clarification for highly leveraged borrowers issued by nonbank lenders. The estimation results are reported in Table 6. We find that the coefficients are negative and significant, indicating that loan spread issued by nonbank lenders for highly leveraged borrowers declined 50.377 basis points after the 2014 Clarification. The decline is pronounced in the term loans than revolvers. However, we do not find a significant decline in the lowly leveraged borrowers. These results further provide evidence that decline of leverage risk premium is stronger along with the increase of borrowers' leverage risk.

< INSERT TABLE 6 HERE >

4. Investigating the channels: information asymmetry

We provide both regression and visual evidence that nonbanks' leverage risk premium declined sharply after 2014 relative to the leverage risk premium of bank loans. This raises a further research question: what could be the underlying mechanism working behind the narrowed leverage risk premium? In this section, we identify and investigate the underlying channels that give rise to the narrowed AISD with respect to leverage risk.

4.1 Covenant-lite loans and loan spread

Syndicated loans suffer information asymmetry issues between lead banks and participants by design. Acting as the mandated manager for the loan, the lead bank is granted primary responsibility for ex ante due diligence and ex post monitoring of the borrower. Participants and investors rely on the lead bank for collecting borrower information. Financial covenants play a key

role in monitoring borrower performance and provide lenders the right to renegotiate their loan contracts (Wang and Xia et al., 2014; Griffin et al., 2019), which can significantly mitigate moral hazard. With growing concerns about the proliferation of covenant-lite loans in the aftermath of the global financial crisis, banking regulators issued the Guidance and 2014 Clarification to address the issues of "the absence of meaningful maintenance covenants in loan agreements" and "the participation of unregulated investors" (Berlin et al., 2020). However, the Guidance and its Clarification were not effective in controlling the absence of financial covenants in the leveraged loan agreements, with the average percentage of covenant-lite loans reaching 68% between 2014 and 2019. This is because the Clarification effectively affected only the lending standards of regulated banks, and unregulated nonbanks have a strong incentive to provide covenant-lite loan agreements to gain market share. As Abuzov et al. (2020) find, borrowers are more likely to switch to borrowing from unregulated nonbank lenders, and this switch is subsequently associated with less covenant protection. As a result of the heightened competition in the leveraged loan market, the share of covenant-lite loans increased dramatically following the Clarification. After the Clarification, the issuance of covenant-lite loans by unregulated nonbanks surged drastically from 55% in 2013 to 70% in 2019, whereas the average covenant-lite loan granted by regulated banks remained relatively stable from 2014 to 2019.⁵ Overall following the Clarification, the proportion of covenant-lite loans granted by banks is significantly lower than that granted by nonbanks.

The relaxation of investor protection in covenant-lite loans intensifies the information asymmetry associated with leveraged loan pricing. To investigate the issue of information asymmetry on leveraged loan pricing, we conduct a subsample analysis by splitting the sample

⁵ In the Appendix Figure 2, we compare the parallel trend of covenant-lite shares for banks and nonbanks from 2007 to 2019. The Figure clearly shows substantial post-trend divergence on covenant lite issuance between banks and nonbanks.

into facilities with covenant and covenant-lite groups. We show regression findings for the subsample of covenant-lite leveraged loans in Panel A of Table 7 based on the PSM. The results demonstrate a strong negative and significant relation between $HighLeverage_{it-1} * Nonbank * Post$ and AISD in all the estimations with respect to leveraged loans (Column (1)), term loans (Column (2)), and revolvers (Column (3)). However, in Panel B, the coefficients of the triple interaction term $HighLeverage_{it-1} * Nonbank * Post$ in all the estimations become insignificant, indicating that there is no clear evidence of the underestimation of leverage risk premium in the subgroup of loan facilities with covenant protections from 2014 to 2019. The results confirm that more severe information asymmetry associated with covenant-lite loans leads to a stronger and more significant decline in leverage risk premium.

< INSERT TABLE 7 HERE >

In addition to financial covenants, performance pricing also is a widely used clause in loan packages to align incentives between creditors and borrowing firms and to mitigate information asymmetry issues. Performance pricing provisions, which define performance levels based on certain criteria and their corresponding interest spreads, include both interest-increasing and interest-decreasing performance pricings. Although the performance pricing provision features some characteristics similar to financial covenants, earlier studies find that they protect creditors in different ways, contingent on the movement of borrower performance after loan syndication (Asquith et al., 2005; Roberts and Sufi 2009, and Manso et al., 2010). For example, Manso et al. (2010) argue that performance pricing features are employed as a screening mechanism to alleviate information asymmetry and demonstrate that enterprises that utilize performance pricing are more

likely to enhance their credit ratings in the future. In Table 8, we present the estimation results on two subgroups of leveraged loans, with and without performance pricing provisions. In Panel A, we present regression results on the subsample of leveraged loans without performance pricing provisions. The results show a strong negative and significant relation between $HighLeverage_{it-1} * Nonbank * Post$ and AISD in the estimations with respect to leveraged loans (Column (1)) and term loans (Column (2)). However, in the subgroup of leveraged loans with performance pricing provisions in Panel B, the coefficients of $HighLeverage_{it-1} * Nonbank * Post$ become insignificant in all estimations, indicating that there is no clear evidence of the underestimation of leverage risk premium for loan facilities with performance pricing. The results are in line with Table 7 and confirm that information asymmetry issues strongly contributed to the underestimation of nonbank facilities' leverage risk premium from 2014–2019.

< INSERT TABLE 8 HERE >

4.2 CLO issuance and loan spread

CLO issuance has expanded in the post-global financial crisis environment of persistently low interest rates, driven by growing investor demand for high yields. A large portion of leveraged loans are securitized and structured into tranches to accommodate different levels of risk appetite from investors, especially after 2014. From 2007–2013, the average annual CLO issuance in the U.S. was \$39.28 billion. However, the average annual CLO issuance from 2014–2019 reached \$110.42 billion.⁶ The rapid development in the CLO market makes it easier for originating lenders

⁶ Our data on annual CLO issuance and outstanding in the U.S. are obtained from U.S. Federal Reserve and S&P Global Market Intelligence

to securitize and sell these loans. As a result, a rising number of bank and nonbank lenders are joining the leveraged loan market. The substantial growth in CLO issuance since 2014, which accounts for more than half of the leveraged loan market, has considerably contributed to leveraged loan market expansion. Furthermore, although the Guidance and Clarification require banks to conduct leveraged lending in a safe and sound way, the supervision does not extend to the bank or nonbank securitization process. Although the Clarification effectively reduced banks' leveraged lending activity, it increased leveraged lending activity among nonbanks (Kim et al., 2018). Nonbanks, unlike banks, have a stronger incentive to hold riskier term loans, particularly institutional loans, which are more likely to be securitized through CLOs (Marsh and Lee, 2019). As a result, the increasing number of nonbank lenders in the leveraged loan market has contributed to the CLO boom since 2014. Overall, the CLO market experienced a boom period after 2014, with the size of the CLO outstanding from 2014–2019 doubling (see Appendix Figure 1).

Since securitization through CLO issuance effectively allows the transfer of loan default risk to investors, originating lenders have fewer incentives to maintain high lending criteria before securitization and to monitor borrowers after securitization, resulting in both adverse selection and moral hazard. Earlier literature provides evidence that securitization activity leads to lax screening for mortgages (e.g., Mian and Sufi, 2009; Keys et al., 2010; Purnanandam, 2011; Nadauld and Sherlund, 2013). More recently, Bord and Santos (2015) find that securitization activity leads to adverse selection in the quality of CLO collateral. Their findings reveal that the performance of loans sold to CLOs is worse than that of equivalent unsecuritized loans issued by the same bank. Furthermore, previous studies have documented a negative association between syndicated loan securitization and loan spread (e.g., Ivashina and Sun, 2011; Nadauld and Weisbach, 2012). To investigate the impact of CLO issuance on leveraged loan pricing, we add an interaction term

linking CLO issuance and a dummy variable for nonbank lead lenders. We present the estimation results on two subgroups of borrowers, highly leveraged borrowers and lowly leveraged borrowers⁷. In Panel A of Table 9, we present regression results on the subsample of highly leveraged borrowers. We find the estimated coefficient on the interaction term of *Nonbank * CLO* is negative and highly significant, indicating that the information asymmetry issues associated with the high level of CLO issuance since 2014 have strongly explained the decline in spreads of nonbank-originated loans from 2014–2019. For a given leverage level, a one-standard-deviation increase in CLO issuance results in a 32.24% decline in loan spreads of highly leveraged borrowers issued by nonbanks. In Columns (2) and (3), we estimate the subsamples of term loans and revolvers, respectively. The results demonstrate a strong negative relationship between the interaction term of *Nonbank * CLO* and AISD in both subsamples of term loans and revolvers. We find that the decline is more pronounced for term loans than revolvers because term loans are more likely to be securitized. The results are in line with Nadauld and Weisbach (2012). In addition, we present regression results on the subsample of lowly leveraged borrowers in Panel B. The estimation results show that most coefficients are insignificant. Our results confirm that the decline of leverage risk premium (the decline of highly leveraged borrowers' loan spreads) from 2014–2019 was associated with the CLO issuance boom that occurred after the issuance of the Clarification in 2014. Consistent with our results in Table 6, the effect of CLO issuance on AISD is stronger for term loans with larger coefficients than revolvers, because a considerable percentage of the institutional tranches of term loans are structured to be securitized and distributed to institutional investors.

⁷ We define a borrower is a highly leveraged borrower if its leverage ratio is above the 75th percentile value of leverage ratio post Clarification. In addition, we also replace 75th percentile value by the median value. The results remain consistent and robust.

< INSERT TABLE 8 HERE >

5. Robustness checks

This subsection provides several robustness checks for the baseline results from estimating Eq. (1). To conserve space, we provide the tables in the Online Appendix. All the results are estimated based on the PSM sample.

5.1 Is the decline driven by low interest rate expectations?

A potential concern with our results is whether the recent decline in the leveraged loan spread is driven by low interest rate expectations. Since the 2009 recession, the Federal Reserve (Fed) has maintained an accommodative monetary policy with historically low interest rates. From late 2013, the Fed began normalizing the stance of monetary policy and gradually increased the pace of tightening. The rising expectation of interest rate hikes coupled with improving economic fundamentals boosts investor demand for high-yield leveraged loans. In Table OA4, we present the regression results with the additional control variable of projected short-term interest rate (*Interest Rate Forecast*) to identify the effect of interest rate expectations on leveraged loan spread. We find a negative effect of interest rate expectation on leveraged loan spread, while the coefficients are insignificant. The results on the interaction term of $Leverage_{it-1} * Nonbank * Post$ remain negative and significant after including the control variable of projected interest rate. This confirms that the narrowing spread of high leverage risk from 2014 to 2019 was not driven by lower interest rate forecasts. Instead, interest rate expectations have strengthened since late 2013 as a result of better economic fundamentals and monetary policy normalization.

5.2 Is the decline driven by borrower high growth potential?

A further potential concern with our results is whether the narrowed spread of leverage risk is caused by the high growth potential of the borrowers. To address this issue, in Panel A of Table OA5, we present estimation results based on the subsample of high growth potential borrowers measured by borrowers' enterprise value relative to EBIT. A high multiple of a firm's enterprise value relative to EBIT represents high prospects for future revenues and growth. The estimation results in Panel A of Table OA5 show no evidence that a borrower's growth potential is linked with the narrowed spread of nonbank-originated leveraged loans. We also present estimation results with the subsample of low growth potential borrowers. The estimation results in Panel B of Table OA5 suggest that the decline in leverage risk premium is statistically significant. Overall, our results confirm that the narrowing leverage risk premium is not driven by high growth potential.

5.3 Alternative leverage risk proxies

In addition, we apply two alternative leverage risk measures, defined as a borrower's total debt relative to total assets, a borrower's total long-term debt relative to total assets and a borrower's interest expense relative to EBITDA. The estimation results in Table OA6 with the whole leveraged loan sample and the term loan and revolver subsamples are in line with our baseline results in Table 2 and the PSM diff-in-diff results in Table 5. The results confirm our baseline findings that nonbank facilities' leverage risk premium narrowed compared with bank facilities from 2014–2019.

5.4 Short term effect

Finally, we construct a sample with shorter time period that includes three years before the 2014 Clarification and three years after the 2014 Clarification. The estimation results are reported in Table OA 7. We find that the coefficients of *Leverage* Nonbank*Post* are negative and significant. The decline is more pronounced in the term loans subsample than revolvers. The results are consistent with our baseline results in Table 2 and Table 5.⁸ Overall, shortening the time period does not impact our estimation results.

6. Conclusion

The introduction of the 2013 Guidance and its 2014 Clarification attempted to mitigate the growing concerns about the phenomenal expansion in the amount of leveraged loans, especially in the absence of meaningful maintenance covenants in loan agreements and regulated investors. However, the regulation resulted in increasing competition between banks and nonbanks and shifting risky loans from traditional banks to nonbank lenders. Following the 2014 Clarification, covenant-lite loan issuance appeared to be picking up speed, as borrowers switched to unregulated nonbank loans with relatively fewer covenants and weaker investor protections. Furthermore, leveraged loan securitization is energized by the growth in institutional investor participation in the leveraged loan market, which leads to moral hazard and adverse selection issues. In this paper, we investigate the impact of the 2014 Clarification on the leveraged lending market from a different angle compared with previous literature (e.g., Kim et al., 2018; Calem et al., 2020 Abuzov

⁸ We replace the continuous variable *Leverage* by dummy variable *HighLeverage*. *HighLeverage* equals one if a borrower' leverage ratio is higher than the 75th percentile value of leverage ratio post Clarification. We find the results are still negative and significant, which is consistent with Table 6.

et al., 2020). We directly focus on leveraged loan pricing after the Clarification and show that a higher degree of information asymmetry driven by an increase in covenant-lite loans and weaker investor protections is strongly associated with the narrowed leverage risk premium in the period of 2014–2019. In addition, the adverse selection and moral hazard associated with the high level of CLO issuance strongly explain the decline of nonbank leveraged loan spreads.

Our sample ends before the outbreak of the COVID-19 pandemic. The results viewed in the context of the leveraged loan market before the COVID-19 pandemic help us to understand why leveraged loans are vulnerable to the economic downturn and help us to rethink the pricing mechanism of leveraged loans in the absence of enough regulations, especially for nonbank financial institutions. Currently, nonbank financial institutions are subject to very limited regulatory restrictions on leveraged loan issuance. On July 17, 2020, at the conference of “A Decade of Dodd-Frank,” Yellen stated that “We need to change the structure of the Financial Stability Oversight Council (FSOC) and build up its powers to be able to deal more effectively with all the problems that exist in the shadow banking sector.” In this context, we believe our paper provides an important policy indication on the prudential regulation of the leveraged loan market and how to increase the safety and soundness of financial institutions. Our paper also opens several avenues for future research in the post-COVID-19 era. One question is the extent to which the link between adverse selection associated with leveraged loan securitization and the decline in the loan spread is detrimental to financial stability, especially after the shock of the COVID-19 pandemic. Additionally, it is important to identify whether reduced investor protections, increased information asymmetry, and the larger presence of nonbanks increase the complexity of the leveraged loan market and impede the healthy development of the financial system.

References

- Abuzov, R., Henpeck and Steri, R., 2020. Do banks compete on non-price terms? Evidence from loan covenants. In *EFA 2020 Annual Conference Working Paper*.
- Angbazo, L.A., Mei, J. and Saunders, A., 1998. Credit spreads in the market for highly leveraged transaction loans. *Journal of Banking & Finance*, 22(10-11), pp.1249-1282.
- Asquith, P., Beatty, A. and Weber, J., 2005. Performance pricing in bank debt contracts. *Journal of Accounting and Economics*, 40(1-3), pp.101-128.
- Atanasov, V.A. and Black, B.S., 2016. Shock-based causal inference in corporate finance and accounting research. *Critical Finance Review*, 5, pp.207-304.
- Berlin, M., Nini, G. and Edison, G.Y., 2020. Concentration of control rights in leveraged loan syndicates. *Journal of Financial Economics*, 137(1), pp.249-271.
- Bharath, S.T., Dahiya, S., Saunders, A. and Srinivasan, A., 2011. Lending relationships and loan contract terms. *Review of Financial Studies*, 24(4), pp.1141-1203.
- Biswas, S., Ozkan, N. and Yin, J., 2020. Non-bank loans, corporate investment, and firm performance. Available at SSRN 3327539.
- Bord, V.M. and Santos, J.A., 2015. Does securitization of corporate loans lead to riskier lending? *Journal of Money, Credit and Banking*, 47(2-3), pp.415-444.
- Bosch, O., 2007, December. Information asymmetry and the pricing of private debt-evidence from European syndicated loans. In *EFA 2007 Ljubljana Meetings Paper*.
- Bradley, M. and Roberts, M.R., 2015. The structure and pricing of corporate debt covenants. *Quarterly Journal of Finance*, 5(02), pp.1-37.
- Calem, P., Correa, R. and Lee, S.J., 2020. Prudential policies and their impact on credit in the United States. *Journal of Financial Intermediation*, 42, p.100826.
- Chava, S. and Roberts, M.R., 2008. How does financing impact investment? The role of debt covenants. *Journal of Finance*, 63(5), pp.2085-2121.
- Chernenko, S., Erel, I. and Prilmeier, R., 2020. Nonbank lending. *Fisher College of Business Working Paper*, (2018-03), p.013.
- Chretien, E., and V. Lyonnet. 2018. Traditional and shadow banks. Working Paper, Ohio State University.

- DeAngelo, H. and Roll, R., 2015. How stable are corporate capital structures? *Journal of Finance*, 70(1), pp.373-418.
- DeFusco, A.A., 2018. Homeowner borrowing and housing collateral: New evidence from expiring price controls. *Journal of Finance*, 73(2), pp.523-573.
- Dennis, S., Nandy, D., & Sharpe, I. (2000). The determinants of contract terms in bank revolving credit agreements. *Journal of Financial and Quantitative Analysis*, 35(1), pp.87-110.
- Elliott, D., Meisenzahl, R.R., Peydró, J.L. and Turner, B.C., 2019. Nonbanks, banks, and monetary policy: US loan-level evidence since the 1990s. *Available at SSRN 3475427*.
- Fahri, E., and J. Tirole. 2017. Shadow banking and the four pillars of traditional financial intermediation. Working Paper, Harvard University.
- Griffin, T.P., Nini, G. and Smith, D.C., 2019. Losing control? The 20-year decline in loan covenant restrictions. *Available at SSRN 3277570*.
- Haensel, Dennis and Krahn, Jan Pieter., 2007. Does credit securitization reduce bank risk? Evidence from the European CDO market. *Available at SSRN 967430*.
- Harjoto, M., Mullineaux, D.J. and Yi, H.C., 2006. A comparison of syndicated loan pricing at investment and commercial banks. *Financial Management*, 35(4), pp.49-70.
- Hasan, I., Manfredonia, S. and Noth, F., 2021. Cultural resilience, religion, and economic recovery: Evidence from the 2005 hurricane season (No. 9/2021). *IWH Discussion Papers*.
- Ivashina, V. and Sun, Z., 2011. Institutional demand pressure and the cost of corporate loans. *Journal of Financial Economics*, 99(3), pp.500-522.
- Ivashina, V., 2009. Asymmetric information effects on loan spreads. *Journal of Financial Economics*, 92(2), pp.300-319
- Keys, B.J., Mukherjee, T., Seru, A. and Vig, V., 2010. Did securitization lead to lax screening? Evidence from subprime loans. *Quarterly Journal of Economics*, 125(1), pp.307-362.
- Kim, S., Plosser, M.C. and Santos, J.A., 2018. Macroprudential policy and the revolving door of risk: Lessons from leveraged lending guidance. *Journal of Financial Intermediation*, 34, pp.17-31.
- Lemmon, M.L., Roberts, M.R., Zender, J.F., 2008. Back to the beginning: persistence and the cross-section of corporate capital structure. *Journal of Finance* 63 (4), 1575–1608.
- Leland, E., Pyle, D., 1977. Information asymmetries, financial structure, and financial intermediation. *Journal of Finance* 32, 371–387.

- Lim, J., Minton, B.A. and Weisbach, M.S., 2014. Syndicated loan spreads and the composition of the syndicate. *Journal of Financial Economics*, 111(1), pp.45-69.
- Manso, G., Strulovici, B. and Tchisty, A., 2010. Performance-sensitive debt. *Review of Financial Studies*, 23(5), pp.1819-1854.
- Marsh, W.B. and Lee, S.J., 2019. What's Driving Leveraged Loan Spreads?. *Macro Bulletin*, pp.1-5.
- Martinez-Miera, D., and R. Repullo. 2018. Markets, banks and shadow banks. Working Paper, CEMFI.
- Mian, A. and Sufi, A., 2009. The consequences of mortgage credit expansion: Evidence from the US mortgage default crisis. *Quarterly Journal of Economics*, 124(4), pp.1449-1496.
- Nadauld, T.D. and Sherlund, S.M., 2013. The impact of securitization on the expansion of subprime credit. *Journal of Financial Economics*, 107(2), pp.454-476.
- Nadauld, T.D. and Weisbach, M.S., 2012. Did securitization affect the cost of corporate debt? *Journal of Financial Economics*, 105(2), pp.332-352.
- O'Malley, T., 2021. The impact of repossession risk on mortgage default. *Journal of Finance*, 76(2), pp.623-650.
- Plantin, G. 2014. Shadow banking and bank capital regulation. *Review of Financial Studies* 28:146–75.
- Purnanandam, A., 2011. Originate-to-distribute model and the subprime mortgage crisis. *Review of Financial Studies*, 24(6), pp.1881-1915.
- Rajan, R. and Winton, A., 1995. Covenants and collateral as incentives to monitor. *Journal of Finance*, 50(4), pp.1113-1146.
- Roberts, M.R. and Sufi, A., 2009. Renegotiation of financial contracts: Evidence from private credit agreements. *Journal of Financial Economics*, 93(2), pp.159-184.
- Schenck, N. and Shi, L., 2017. Leveraged lending regulation and loan syndicate structure: a shift to shadow banking? Unpublished manuscript.
- Sufi, A., 2007. Information asymmetry and financing arrangements: Evidence from syndicated loans. *Journal of Finance*, 62(2), pp.629-668.
- Wang, Y. and Xia, H., 2014. Do lenders still monitor when they can securitize loans? *Review of Financial Studies*, 27(8), pp.2354-2391.

Figure 1: Loan Spreads Trend

This figure presents the average AISD of nonbank-originated loans (red line) and bank-originated banks (blue line).

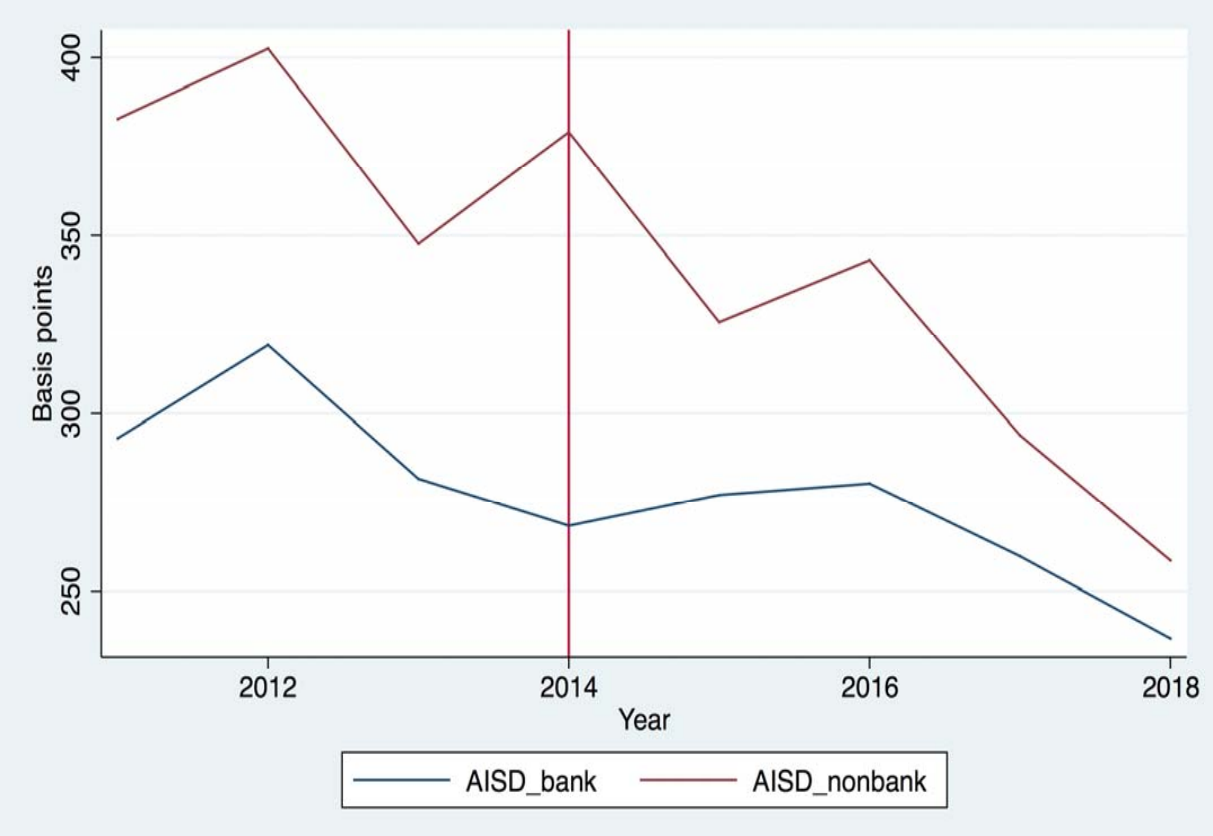


Figure 2: Coefficient Plot

This figure reports the coefficient plots and the 95% confidence intervals on the triple interaction among leverage, nonbank (=1 for loan facilities issued by nonbank lead arrangers), and year dummies. We also include purpose, industry fixed, and year fixed effects in our regressions. The vertical line separates the pre-Clarification period and post-Clarification in 2014. We drop pre_1 time as the reference period in our analysis by following previous literature (e.g., Defusco, 2018; Hasan et al., 2020; O'Malley, 2021).

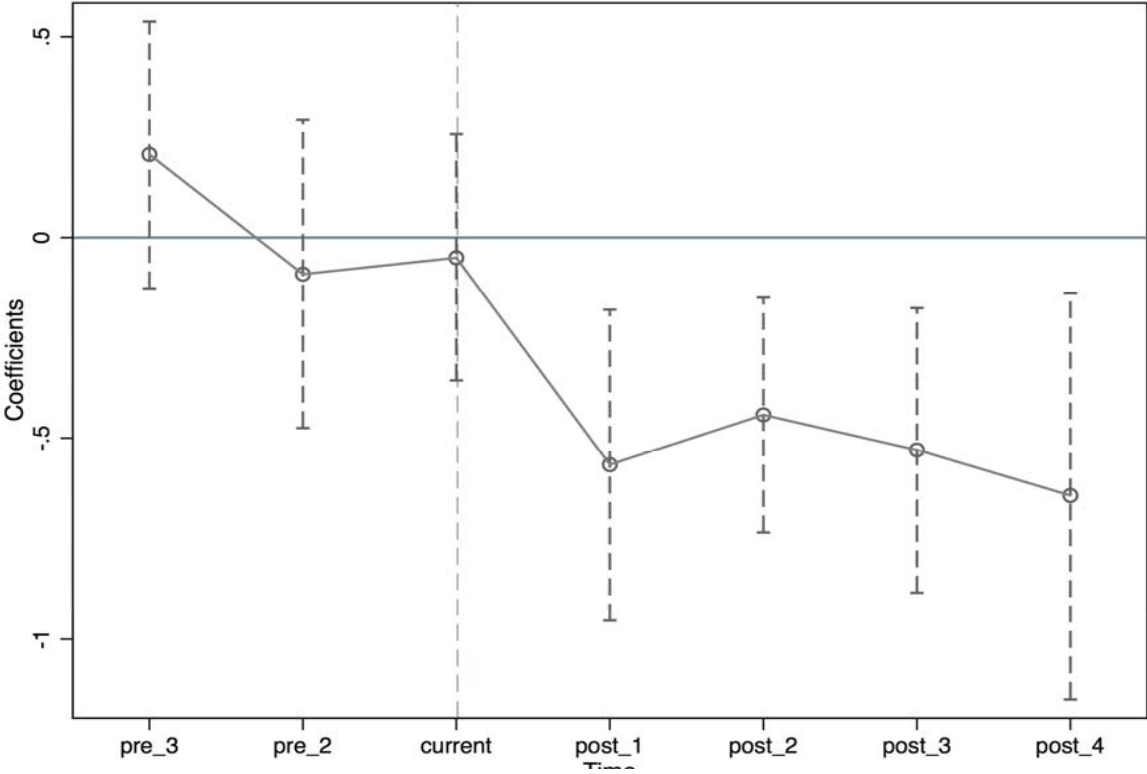


Figure 3: Predictive Margins

This figure reports the predictive margins of loan spread for bank and nonbank groups and the 95% confidence intervals. The vertical line separates the pre-Clarification period and post-Clarification in 2014.

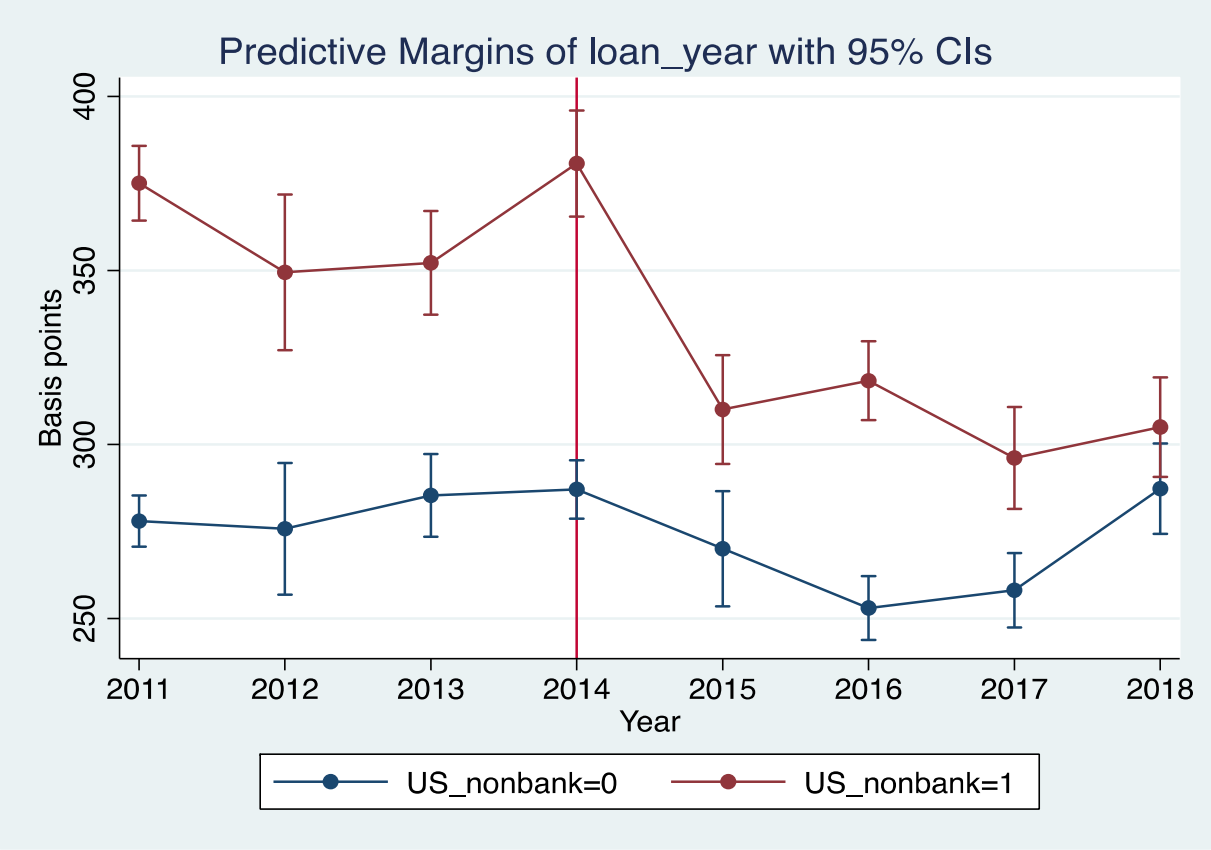


Table 1: Summary statistics

This table presents the summary statistics for facility types (Panel A), loan facility characteristics (Panel B) and borrower characteristics (Panel C). Mean values are reported for the full sample of leveraged loan facilities, for the subsample of bank and nonbank-originated facilities. Panel B includes selected borrowing firm characteristics, which are computed as of the year prior to the loan transaction. The sample of loan facilities is from the DealScan and Refinitiv Eikon, which originated between 2011 and 2019 to US-based non-financial firms. All-in-drawn spread (bps) is the basis point spread over LIBOR plus the facility fee; Amount is the size of facility in \$ millions; Maturity is the maturity of the facility in months; Secured indicator is an indicator that takes the value of one if the facility is secured, and zero otherwise; Performance pricing indicator is an indicator that takes the value of one if performance pricing provisions are included in the facility, and zero otherwise; Covenants indicator is an indicator that takes the value of one if the loan has covenants, and zero otherwise; Total asset is the total assets of the borrower at the end of the fiscal year prior to the current loan in \$ millions; Total debt is the total debt of the borrower at the end of the fiscal year prior to the current loan in \$ millions; Long-term debt is the long term debt of the borrower at the end of the fiscal year prior to the current loan in \$ millions; Leverage is the borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as total liabilities net of cash divided by the book value of total assets; Leverage_2 is the borrower's book leverage ratio at the end of the fiscal year prior to the current loan, calculated as total debts divided by the book value of total assets; Leverage_3 is the borrower's long term leverage ratio at the end of fiscal year prior to the current loan, calculated as long term debt relative to the book value of total assets. Leverage_4 measures the risk that the borrower pays back interest expense, calculated as borrower's interest expense divided by the earnings before interests, taxes, depreciation and amortization (EBITDA). All continuous variables are winsorized at the 1% and 99% levels.

Sample Variable:	All leveraged loan facilities			Bank			Non-Bank		
	N	Mean	Std. dev.	N	Mean	Std. dev.	N	Mean	Std. dev.
Panel A: Facility type									
% Revolver	5,455	0.487	0.500	3,874	0.541	0.498	1,581	0.352	0.478
% Term loan	5,455	0.481	0.500	3,874	0.426	0.495	1,581	0.615	0.487
% Other	5,455	0.033	0.18	3,874	0.033	0.178	1,581	0.035	0.183
Panel B: Facility Characteristics									
All-in-drawn spread (bps)	5,360	292.906	146.966	3,812	274.336	134.357	1,548	338.638	165.556
Amount (\$ million)	5,455	494.974	616.017	3,874	439.593	549.258	1,581	630.678	737.877
Maturity (months)	5,421	58.144	16.771	3,854	56.519	16.269	1,567	62.142	17.314
Secured indicator	5,455	0.698	0.459	3,874	0.652	0.476	1,581	0.811	0.392
Performance pricing indicator	5,455	0.176	0.381	3,874	0.182	0.386	1,581	0.160	0.367
Covenants indicator	5,455	0.428	0.495	3,874	0.446	0.497	1,581	0.386	0.487
Panel C: Borrower Characteristics									
Total asset (\$M)	5,378	5439.099	14253.940	3,817	4274.568	11819.710	1,561	8286.641	18631.400
Total debt (\$M)	5,295	2172.701	5244.947	3,757	1605.981	4019.700	1,538	3557.073	7250.133
Long-term debt (\$M)	5,421	2068.565	4849.552	3,848	1527.396	3733.869	1,573	3392.416	6670.670
Leverage (%)	5,332	59.367	25.304	3,787	56.918	24.563	1,545	65.371	26.088
Leverage_2(%)	5,250	38.925	22.704	3,724	36.693	22.028	1,526	44.372	23.403
Leverage_3(%)	5,376	36.440	22.212	3,815	34.182	21.457	1,561	41.957	23.052
Leverage_4(%)	5,357	24.420	33.682	3,802	22.321	32.497	1,555	29.553	35.914

Table 2: Pricing of Leverage Risk in Leveraged Loans

This table presents the regression results of Equation (1). The sample of loan facilities is from the DealScan and Eikon database, originated between 2011 and 2019 to US-based non-financial firms. The dependent variable is the AISD (all-in-spread-drawn), and the analysis is conducted at the loan facility level. The coefficient of the interaction term linking Leverage, Nonbank and Post suggests that leverage risk premium of nonbank facilities is underestimated after 2014 and the underestimation is highly significant for both term loan and revolving credit facilities. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Leverage* Nonbank*Post	-0.979** (0.33)	-0.900** (0.38)	-0.889** (0.34)
Leverage*Post	0.030 (0.12)	0.439* (0.23)	-0.160* (0.07)
Nonbank*Post	37.311 (32.72)	32.084 (34.14)	31.641 (31.18)
Leverage* Nonbank	0.131 (0.16)	-0.213 (0.25)	0.498 (0.27)
Leverage	0.736*** (0.12)	0.609** (0.23)	0.422*** (0.08)
Nonbank	68.360*** (16.50)	79.950*** (20.95)	21.740 (26.26)
LN_TA	-15.984*** (3.83)	-28.114*** (5.65)	-2.472 (2.60)
Ind_adj ROA	0.055 (0.20)	-0.143 (0.33)	0.210* (0.09)
Tangibility	24.315* (12.79)	53.974* (27.67)	21.534*** (5.72)
Mkt/Book	0.032 (0.02)	0.036 (0.03)	0.022*** (0.01)
LN_Amount	-16.545*** (3.56)	-18.832** (6.79)	-29.447*** (3.42)
LN_Maturity	-29.250** (8.87)	-17.847 (13.63)	-44.977*** (9.72)
Performance pricing indicator	-56.987*** (7.10)	-81.209*** (10.44)	-8.061 (4.85)
Secured	53.224*** (6.03)	103.385*** (11.76)	6.400 (4.49)
Covenants indicator	-16.215** (5.80)	-19.148** (7.64)	2.035 (3.88)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	4786	2276	2386
Adj R ²	0.251	0.298	0.323

Table 3: Propensity Score Estimation: Probit Model

This table presents the regression results of the probit model based on propensity score estimation. We use a probit model to estimate the propensity that a borrower will borrow from non-bank lead arrangers. Leverage is the borrower's book leverage ratio at the end of the fiscal year prior to the current loan, estimated as total liabilities net of cash divided by the book value of total assets; Industry-adjusted ROA is the borrower's ROA in excess of the median of the corresponding two-digit SIC industry ROA at the end of the fiscal year prior to the current loan. LN_Cash is the natural logarithm borrower's cash at the end of the fiscal year prior to the current loan; LN_TA is the natural logarithm borrowers' total assets at the end of the fiscal year prior to the current loan. LN_DLTT is the natural logarithm borrowers' long-term debt at the end of the fiscal year prior to the current loan. Tangibility is the borrowers' ratio of net property, plant and equipment to the total assets. Mkt/Book is the market value scaled by the book value. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent Variable: US_nonbank	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)	Coefficient (z-statistic)
Leverage (%)	0.008*** (10.96)							0.007*** (5.90)
LN_Cash		0.105*** (11.79)						0.091*** (5.99)
LN_TA			0.143*** (11.45)					-0.008 (-0.22)
LN_DLTT				0.157*** (14.52)				0.107*** (4.07)
Tangibility					-0.349*** (-5.35)			-0.440*** (-5.73)
Mkt/Book						-0.0001 (-0.90)		-0.0001 (-0.76)
Industry-adjusted ROA							0.018 (1.36)	-0.255** (-2.55)
Obs.	5332	5420	5378	5144	5368	4770	5348	4473
Log Likelihood	-3148.6876	-3190.0914	-3172.1325	-2978.3996	-3219.0645	-2808.3063	-3217.8271	-2449.7836

Table 4 Test of Sample Balance

This table presents the test of balance property before and after matching in the sample of leveraged loan borrowers. For each observation in the treatment group, we find a control observation using the nearest neighbor method. Leverage is the borrower's book leverage ratio at the end of the fiscal year prior to the current loan, estimated as total liabilities net of cash divided by the book value of total assets; Industry-adjusted ROA is the borrower's ROA in excess of the median of the corresponding two-digit SIC industry ROA at the end of the fiscal year prior to the current loan. LN_Cash is the natural logarithm borrower's cash at the end of the fiscal year prior to the current loan; LN_TA is the natural logarithm borrowers' total assets at the end of the fiscal year prior to the current loan. LN_DLTT is the natural logarithm borrowers' long-term debt at the end of the fiscal year prior to the current loan. Tangibility is the borrowers' ratio of net property, plant and equipment to the total assets. Mkt/Book is the market value scaled by the book value. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Variable:	Unmatched Sample			Matched Sample		
	Nonbank	Bank	Pre-Match (% bias)	Nonbank	Bank	After-Match (%bias)
Leverage	65.045	57.124	34.60***	64.985	64.771	0.90
Tangibility	0.282	0.330	-17.20***	0.282	0.276	2.20
LN_Cash	4.935	4.043	45.20***	4.9328	4.956	-1.20
LN_TA	8.033	7.378	49.3***	8.0324	8.012	1.60
LN_DLTT	7.008	6.038	54.5***	7.006	6.976	1.70
Mkt/Book	2.781	4.605	-2.40	2.787	3.421	-0.80
Industry-adjusted ROA	-0.070	-0.071	0.80	-0.07	-0.075	3.40

Table 5: Difference-in-Differences - Propensity Score Matching Results

This table presents the regression results of Equation (1) based on the matched sample through PSM. The dependent variable is the AISD (all-in-spread-drawn), and the analysis is conducted at the loan facility level. The coefficient of the interaction term linking Leverage, Nonbank and Post suggest that leverage risk premium of nonbank facilities is underestimated after 2014. The underestimation is highly significant for both term loan and revolving credit facilities. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Leverage* Nonbank*Post	-1.021*** (0.30)	-1.522** (0.46)	-1.396** (0.53)
Leverage*Post	0.348 (0.21)	1.122** (0.40)	0.269 (0.24)
Nonbank*Post	40.097 (29.54)	75.294* (33.01)	59.276 (46.88)
Leverage* Nonbank	-0.030 (0.13)	-0.269 (0.16)	0.865 (0.47)
Leverage	0.568*** (0.10)	0.452** (0.17)	0.081 (0.22)
Nonbank	78.642*** (17.50)	80.588*** (11.22)	-0.653 (44.09)
LN_TA	-22.423*** (4.78)	-32.825*** (7.50)	-4.815* (2.59)
Ind_adj ROA	-136.802** (46.51)	-204.608** (64.20)	-35.702 (28.35)
Tangibility	19.646 (14.94)	58.836* (28.94)	16.879 (9.45)
Mkt/Book	0.021 (0.02)	-0.088 (0.09)	0.020*** (0.00)
LN_Amount	-14.877** (4.74)	-22.062* (10.15)	-31.150*** (4.24)
LN_Maturity	-31.663* (14.55)	-14.745 (23.12)	-48.306*** (10.87)
Performance pricing indicator	-59.784*** (8.12)	-68.485*** (10.69)	-11.313* (5.60)
Secured	48.795*** (6.68)	92.299*** (13.57)	4.628 (4.19)
Covenants indicator	-9.408 (8.25)	-13.797 (8.85)	10.936 (6.13)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	2617	1370	1172
Adj R ²	0.290	0.352	0.360

Table 6: Pricing of Leverage Risk in Highly Leveraged Borrowers

This table presents the regression results of Equation (1) based on the matched sample through PSM. The sample of loan facilities from the DealsScan and Eikon database originated between 2011 and 2019 to US-based non-financial firms. The dependent variable is the AISD (all-in-drawn), and the analysis is conducted at the loan facility level. The coefficient of the interaction term linking HighLeverage, Nonbank, and Post suggests that the nonbank-originated loan spreads for highly leveraged borrowers is underestimated after 2014, and the underestimation is highly significant for both term loan and revolving credit facilities. HighLeverage is a dummy variable that equals one if the borrower's leverage ratio is higher than the 75th percentile value of leverage ratio post Clarification. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample:	Leveraged Loans	Term Loans	Revolvers
Dependent variable=AISD	(1)	(2)	(3)
HighLeverage* Nonbank*Post	-50.377** (15.99)	-80.630*** (21.51)	-53.656** (17.35)
HighLeverage*Post	23.169 (15.22)	71.575** (22.32)	24.323* (12.57)
Nonbank*Post	-9.968 (18.94)	2.669 (16.41)	-15.940 (21.09)
HighLeverage* Nonbank	10.021 (9.04)	23.607* (11.37)	38.425** (14.67)
HighLeverage	19.794 (10.72)	-8.642 (18.36)	-2.995 (10.21)
Nonbank	72.723*** (14.88)	53.142*** (12.47)	45.263** (19.61)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	2617	1370	1172
Adj R ²	0.288	0.347	0.359

Table 7: Covenant-lite loans and Leverage risk premium

This table presents the regression results with subsamples of covenant-lite leveraged loans and loans with covenant provision based on the matched sample through PSM. The dependent variable is AISD. Panel A reports the coefficient estimates for the subsample of covenant-lite leveraged loans, and Panel B reports the estimation results for the subsample of leveraged loans with covenant provision. We also controlled loan facility characteristics (LN_Amount, Performance pricing indicator, Secured) and borrower characteristics (Leverage, LN_TA, Ind_adj ROA, Mkt/Book, Tangibility). All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Panel A: covenant-lite sample			
HighLeverage* Nonbank*Post	-80.123** (32.41)	-99.652*** (26.48)	-76.048* (39.21)
HighLeverage*Post	46.077 (30.99)	72.096* (36.98)	33.160 (27.60)
Nonbank*Post	16.895 (15.00)	59.272** (21.42)	-15.206 (18.55)
HighLeverage* Nonbank	44.082* (22.76)	39.582* (17.89)	74.483* (33.83)
HighLeverage	3.105 (23.85)	-5.474 (24.58)	-17.238 (25.60)
Nonbank	48.819*** (7.88)	8.230 (17.32)	47.161** (17.30)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	1130	560	560
Adj R ²	0.337	0.391	0.371
Panel B: with covenant			
HighLeverage* Nonbank*Post	-24.661 (32.92)	-67.973 (54.46)	-8.301 (38.44)
HighLeverage*Post	4.075 (24.34)	68.639 (42.17)	14.635 (15.30)
Nonbank*Post	-30.033 (22.56)	-37.567 (25.28)	-17.878 (29.91)
HighLeverage* Nonbank	-15.048 (29.66)	13.616 (46.57)	-20.337 (38.62)
HighLeverage	33.553 (22.91)	-8.360 (37.58)	12.014 (10.07)
Nonbank	85.403*** (21.00)	84.364*** (22.03)	46.012 (28.22)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	1487	810	612
Adj R ²	0.270	0.329	0.356

Table 8: Performance Pricing and Leverage Risk Premium

This table presents the regression results with subsamples of leveraged loans without performance pricing provision and loans with performance pricing provision based on the matched sample through PSM. The dependent variable is AISD. Panel A reports the coefficient estimates for the subsample of leveraged loans without performance pricing provision, and Panel B reports the estimation results for the subsample of leveraged loans with performance pricing provision. We also controlled loan facility characteristics (LN_Amount, Secured, Covenant) and borrower characteristics (Leverage, LN_TA, Ind_adj ROA, Mkt/Book, Tangibility). All specifications include purpose fixed effects, industry fixed effects, and year fixed effects and are reported in parentheses. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Panel A: without performance pricing sample			
HighLeverage* Nonbank*Post	-43.439* (24.88)	-82.474** (26.05)	-41.787 (41.25)
HighLeverage*Post	24.885 (14.59)	87.715** (28.66)	16.700 (15.24)
Nonbank*Post	-11.891 (21.23)	-4.190 (23.60)	-7.722 (18.82)
HighLeverage* Nonbank	-3.411 (20.69)	19.725 (16.42)	23.129 (41.39)
HighLeverage	25.597** (10.96)	-13.910 (26.06)	4.068 (13.94)
Nonbank	78.402*** (18.18)	61.147** (19.98)	41.335** (16.80)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	2151	1178	905
Adj R ²	0.291	0.357	0.354
Panel B: with performance pricing sample			
HighLeverage* Nonbank*Post	-54.865 (42.90)	-72.473 (60.71)	-56.385 (52.28)
HighLeverage*Post	-1.968 (24.34)	-24.808 (42.17)	38.835** (14.44)
Nonbank*Post	-20.513 (20.90)	23.449 (26.74)	-44.375 (30.98)
HighLeverage* Nonbank	38.151 (34.89)	11.305 (40.19)	58.980 (46.13)
HighLeverage	9.494 (13.72)	26.440 (20.91)	-12.689 (9.22)
Nonbank	48.223** (14.81)	15.117 (19.57)	50.043 (27.92)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	466	192	267
Adj R ²	0.257	0.231	0.368

Table 9: CLO Issuance and Leverage Risk Premium

This table presents coefficient estimates from OLS regressions linking nonbank dummy, and CLO issuance based on the matched sample through PSM. Definitions of all variables are provided in Table OA1. The dependent variable is AISD. Panel A reports the coefficient estimates for the subsample of highly leveraged borrowers. Panel B reports the coefficient estimates for the subsample of lowly leveraged borrowers. The coefficient of interaction term Nonbank*CLO denotes if the loan spreads of nonbank facilities is impacted by CLO annual issuance. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
Panel A: Highly Leveraged borrowers			
	(1)	(2)	(3)
Nonbank*CLO	-0.946*** (0.26)	-1.210*** (0.34)	-1.060*** (0.20)
Nonbank	130.699*** (19.26)	141.205*** (26.39)	140.353*** (23.38)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	695	392	282
Adj R ²	0.263	0.337	0.403
Panel B: Lowly Leveraged borrowers			
Nonbank*CLO	-0.270 (0.30)	-0.188 (0.32)	-0.429* (0.22)
Nonbank	90.397*** (26.25)	71.300** (29.48)	75.090** (24.69)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	1922	978	890
Adj R ²	0.296	0.358	0.335

Online Appendix for "Leveraged Loans: Is High Leverage Risk Priced in?"

Figures

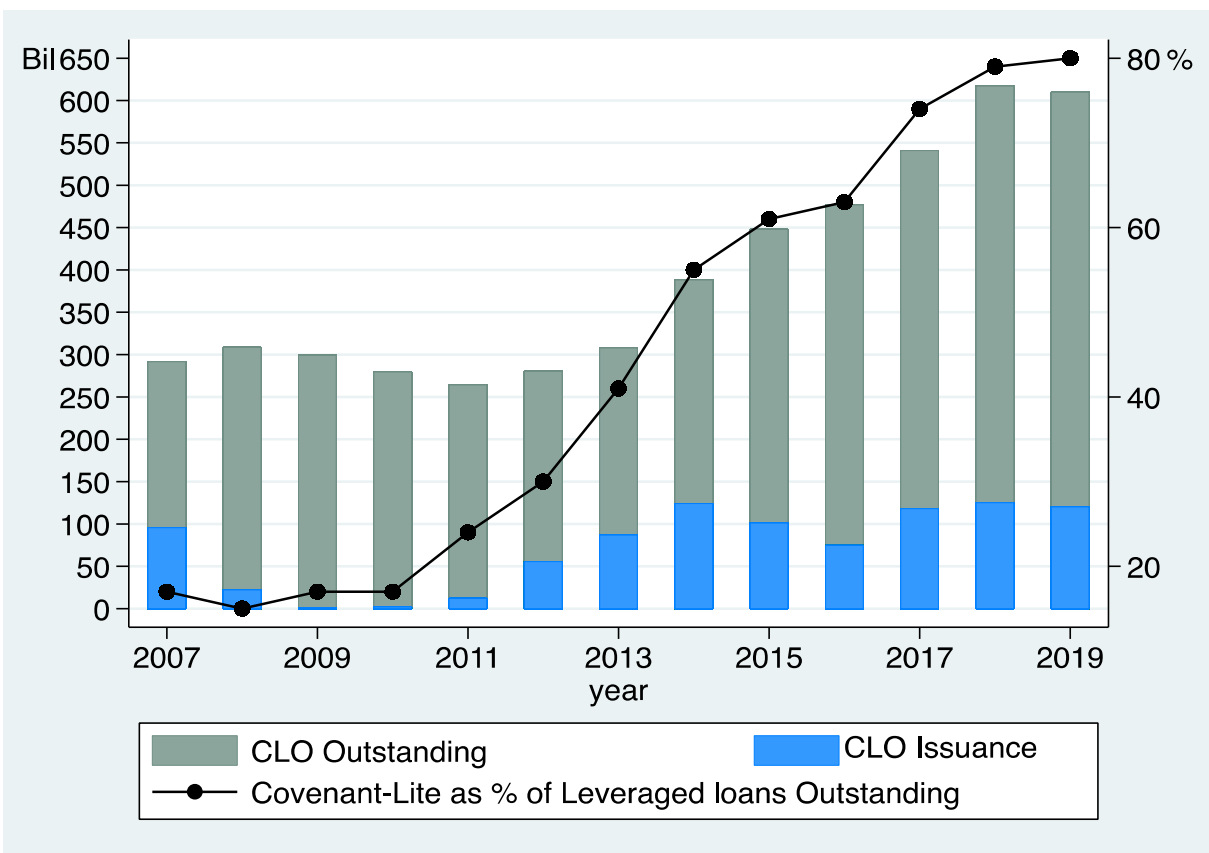
- 1 U.S. CLOs outstanding & issuance and covenant-lite share of outstanding.
- 2 Trends in the fraction of covenant-lite lending: nonbank lenders versus bank lenders.

Tables

- 1 Variable definitions and data sources.
 - 2 Descriptive statistics prior to and after the introduction of Clarification.
 - 3 A list of bank regulation events.
 - 4 Robustness check: is the decline in leverage risk premium driven by low interest rate expectation?
 - 5 Robustness check: is the decline of leverage risk driven by borrower high growth potential?
 - 6 Robustness check: alternative proxies on leverage risk.
 - 7 Robustness check: short term effect.
-

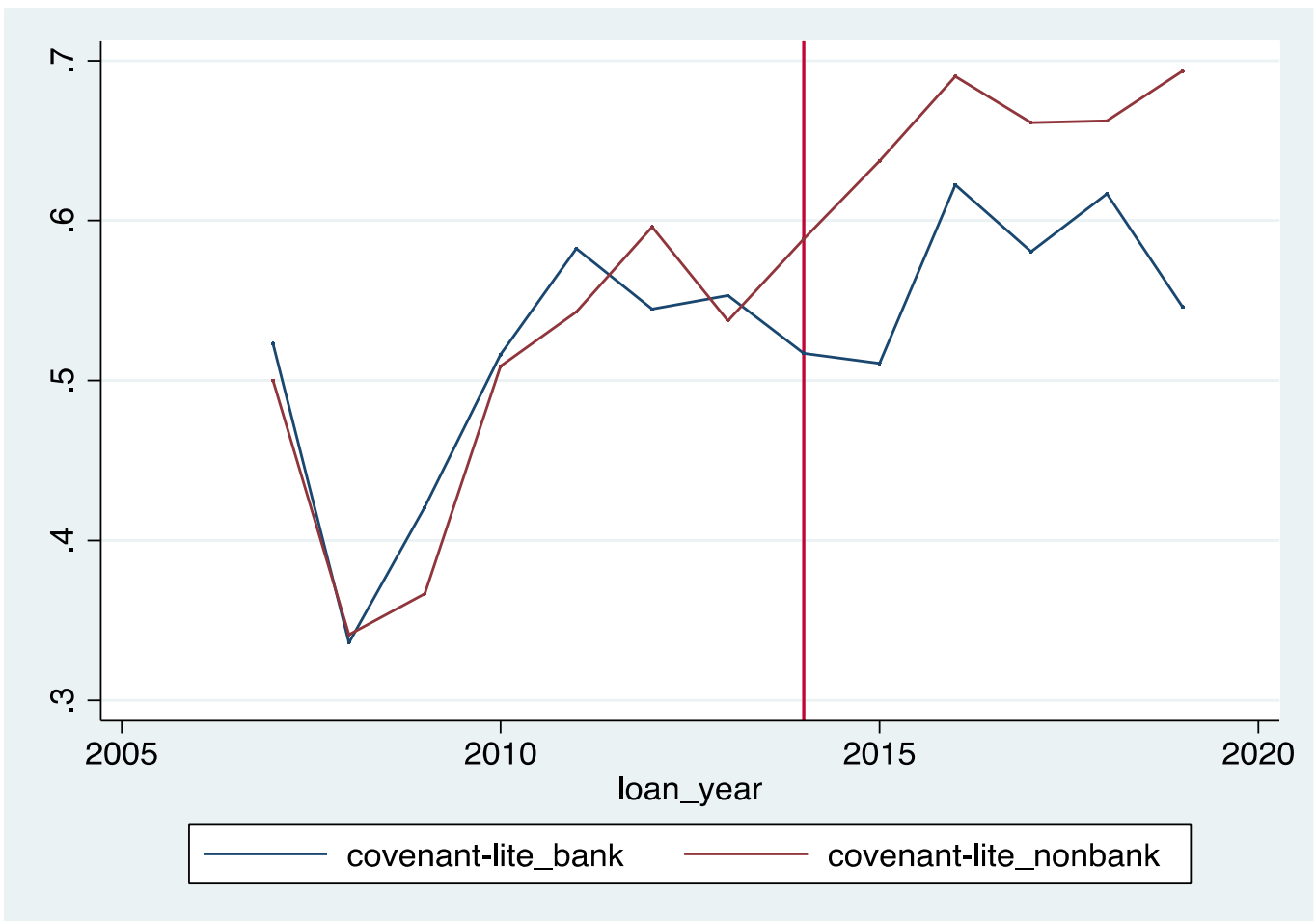
Appendix Figure 1: CLO Annual Issuance and Covenant-lite Loans Issuance

This figure shows the U.S. CLOs outstanding & issuance (in \$B) and covenant-lite share of outstanding, U.S. leveraged loans from 2007-2019.



Appendix Figure 2: Trends in the Fraction of Covenant-lite Lending: Nonbank Lenders versus Bank Lenders

This figure plots the average fraction of covenant-lite lending among nonbank (red line) and bank groups (blue line) from 2007 – 2019.



Appendix Table 1: Variable Definitions and Data Sources

Variable	Definition	Source
AISD (bps)	Basis point spread over LIBOR plus the facility fee	DealScan and Eikon
Nonbank	Nonbank is a dummy variable that equals to one if one facility has at least one U.S nonbanks lead arranger, and zero otherwise.	DealScan
LN_Amount	Natural log of the facility size.	DealScan and Eikon
LN_Maturity	Natural log of the maturity of the facility in months	DealScan and Eikon
Secured indicator	An indicator variable that takes a value of one if the facility is secured, and zero otherwise.	DealScan and Eikon
Performance pricing indicator	An indicator variable that takes a value of one if the facility has performance pricing features, and zero otherwise.	DealScan and Eikon
Covenants indicator	An indicator variable that takes a value of one if the loan has covenants, and zero otherwise.	DealScan and Eikon
Nr.Covenants	The number of financial covenants in the loan package.	DealScan and Eikon
Interest Rate Forecast	Short-term interest rates forecast refers to projected values of three-month money market rates in percentage.	OECD Economic Outlook
LN_TA	Natural log of the total assets of the borrower at the end of fiscal year prior to the current loan.	Compustat
Leverage	The borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as the borrower's liability net of cash divided by the total assets.	Compustat
Leverage_2	The borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as the borrower's total debt scaled by the total assets.	Compustat
Leverage_3	The borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as the borrower's long term debt scaled by the total assets.	Compustat
Leverage_4	The borrower's leverage risk at the end of fiscal year prior to the current loan, calculated as the interest expense scaled by EBITDA.	Compustat
Industry-adjusted ROA	The borrower's ROA in excess of the median of the corresponding two-digit SIC industry ROA at the end of fiscal year prior to the current loan.	Compustat
Enterprise value multiple	The borrower's enterprise value to EBITDA at the end of fiscal year prior to the current loan.	Compustat
Long-term debt	The borrower's long-term debt at the end of fiscal year prior to the current loan.	Compustat
Total debt	The borrower's total debt at the end of fiscal year prior to the current loan.	Compustat
Total asset	The borrower's total asset at the end of fiscal year prior to the current loan.	Compustat
Mkt/Book	The borrower's market value divided by the book value at the end of fiscal year prior to the current loan.	Compustat
Tangibility	The borrower's net property, plant and equipment to the total assets at the year prior to the current loan.	Compustat

Appendix Table 2: Descriptive Statistics of Nonbank and Bank Groups Prior to and after the Introduction of Clarification

This table presents the descriptive statistics of the nonbank and bank groups prior to and after the introduction of the Clarification. Panel A compares the constitute of facility types in nonbank and bank groups prior to and after the introduction of the Clarification (% Revolver and %Term loan). Panel B reports the difference of facility characteristics before and after the introduction of the Clarification (AISD, Loan Amount, Maturity, Secured indicator, Performance pricing indicator, Covenants indicator). Panel C reports the borrower characteristics at the end of the fiscal year prior to the current loan (Total asset, Total debt, Long-term debt, Leverage, Leverage_2, Leverage_3, Leverage_4). T-test difference in means prior and after Clarification in both groups is also reported. ***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

Sample:	Nonbank				Bank			
	Pre 2014	After 2014	Diff (After-Pre)		Pre 2014	After 2014	Diff (After-Pre)	
Variables	Mean	Mean	Mean	t-statistics	Mean	Mean	Mean	t-statistics
Panel A: Facility Type								
% Revolver	0.367	0.341	-0.026	-1.06	0.559	0.528	-0.031	-1.86
% Term loan	0.595	0.630	0.035	1.39	0.415	0.436	0.021	1.29
Panel B: Facility Characteristics								
AISD	372.911	312.276	-60.634***	-7.26	288.836	263.115	-25.721***	-5.89
Loan Amount (\$ million)	468.019	755.673	287.654***	7.83	366.392	495.763	129.37***	-7.31
Maturity	61.232	62.841	1.609*	1.82	56.473	56.555	0.082	0.15
Secured indicator	0.844	0.785	-0.059***	-2.98	0.679	0.630	-0.049***	-3.18
Performance pricing indicator	0.217	0.116	-0.101***	-5.45	0.245	0.135	-0.11***	8.90
Covenants indicator	0.447	0.340	-0.107***	-4.35	0.462	0.433	-0.029*	-1.8
Panel C: Borrower Characteristics								
Total asset (\$M)	5510.758	10395.940	4885.178***	5.17	3098.354	5158.752	2060.398***	5.35
Total debt (\$M)	2338.483	4495.206	2156.723***	5.85	1219.065	1896.439	677.373***	5.13
Long-term debt (\$M)	2305.021	4226.901	1921.879***	5.72	1204.652	1772.517	567.865***	4.69
Leverage (%)	67.021	64.104	-2.916**	2.18	57.648	56.365	1.280	1.59
Leverage_2(%)	45.007	43.887	1.120	0.93	37.338	36.214	1.123	1.54
Leverage_3(%)	0.425	0.415	0.010	0.88	0.346	0.339	0.007	1.03
Leverage_4(%)	0.330	0.269	0.062	3.37	0.245	0.206	0.039	3.68

Appendix Table 3: A List of Contemporaneous Bank Regulation Events

Year	Name	Description
03/22/2013	Leveraged Lending: Guidance on Leveraged Lending	A supervisory guidance on leveraged lending, which applies to all national banks, federal savings associations, and federal branches and agencies of foreign banks (collectively, banks). This guidance was published in the Federal Register on March 22, 2013, and replaces similar guidance issued in April 2001 (2001 guidance).
05/10/2013	Market Risk Capital Rule: Clarification of the Treatment of Certain Sovereign and Securitization Positions	A bulletin to clarify certain provisions of the market risk capital rule. ¹ This clarification is applicable only to those institutions supervised by the OCC that are subject to that rule.
10/24/2013	Troubled Debt Restructurings: Guidance on Certain Issues Related to Troubled Debt Restructurings	A supervisory guidance on certain issues related to commercial and residential real estate loans that have undergone troubled debt restructurings (TDRs).
10/29/2013	Classification of Securities: Interagency Guidance	This guidance replaces the previously issued OCC Bulletin 2004-25, "Uniform Agreement on the Classification of Securities" (2004 Agreement) by applying the agencies' revised investment grade standards of creditworthiness, in place of credit ratings, as the basis for classifying investment securities.
10/30/2013	Third-Party Relationships: Risk Management Guidance	This bulletin provides guidance to national banks and federal savings associations (collectively, banks) for assessing and managing risks associated with third-party relationships. A third-party relationship is any business arrangement between a bank and another entity, by contract or otherwise.
11/12/2013	Use and Review of Independent Consultants in Enforcement Actions: Guidance for Bankers	A guidance that the Office of the Comptroller of the Currency (OCC) uses when it requires national banks, federal savings associations, or federal branches or agencies (collectively, banks) to employ independent consultants as part of an enforcement action to address significant violations of law, fraud, or harm to consumers.
12/17/2013	Social Media - Consumer Compliance Risk Management Guidance: Final Supervisory Guidance	This guidance helps financial institutions identify potential risks in the social media to ensure they are aware of their responsibilities to address these risks within their overall risk management program.
07/01/2014	Risk Management of Home Equity Lines of Credit Approaching the End-of-Draw Periods: Interagency Guidance	A supervisory guidance on risk management practices for home equity lines of credit (HELOC) approaching the end-of-draw (EOD) period.
08/04/2014	Consumer Debt Sales: Risk Management Guidance	A guidance from the Office of the Comptroller of the Currency (OCC) to national banks and federal savings associations (collectively, banks) on the application of consumer protection requirements and safe and sound banking practices to consumer debt-sale arrangements with third parties (e.g., debt buyers) that intend to pursue collection of the underlying obligations.
11/07/2014	Leveraged Lending: Frequently Asked Questions for Implementing March 2013 Interagency Guidance on Leveraged Lending	FAQ is designed to foster industry and examiner understanding of the 2013 guidance and to promote consistent application of the guidance in policy formulation, implementation, and regulatory supervisory assessments.

Source: Office of the Comptroller of the Currency (OCC) website

Appendix Table 4: Robustness Check: Is the Decline in Leverage Risk Premium Driven by Low Interest Rate Expectation?

This table presents the regression results with an additional control variable (projected short-term interest rate) based on the matched sample through PSM. We also controlled loan facility characteristics (LN_Amount, Performance, Secured, Covenant) and borrower characteristics (Leverage, LN_TA, Ind_adj ROA, Mkt/Book, Tangibility). The dependent variable is AISD. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Leverage* Nonbank*Post	-1.035*** (0.29)	-1.531*** (0.45)	-1.414** (0.53)
Leverage*Post	0.348 (0.21)	1.124** (0.40)	0.266 (0.24)
Nonbank*Post	40.732 (29.28)	75.711** (32.52)	60.002 (46.72)
Leverage* Nonbank	-0.032 (0.13)	-0.274 (0.17)	0.869 (0.47)
Leverage	0.570*** (0.10)	0.457** (0.18)	0.075 (0.22)
Nonbank	78.989*** (17.43)	81.057*** (12.16)	-0.587 (43.93)
Short-term interest rates	-25.326 (29.83)	-14.525 (48.89)	-32.631 (18.42)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	2617	1370	1172
Adj R ²	0.291	0.352	0.362

Appendix Table 5: Robustness Check: Is the Decline of Leverage Risk Driven by Borrower High Growth Potential?

This table presents the regression results on coefficient estimates with subsamples of leveraged loans for borrowers with high growth potential (Panel A) and leveraged loans for borrowers with low growth potential (Panel B) based on the matched sample through PSM. The dependent variable is AISD. We also controlled loan facility characteristics (LN_Amount, Performance, Secured, Covenant) and borrower characteristics (Leverage, LN_TA, Ind_adj ROA, Mkt/Book, Tangibility). All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
Panel A: Loan Borrowers with high growth potential	(1)	(2)	(3)
Leverage* Nonbank*Post	0.066 (0.39)	-0.348 (0.72)	-0.560 (0.65)
Leverage*Post	0.799* (0.36)	1.082** (0.47)	0.577 (0.49)
Nonbank*Post	-25.138 (45.65)	-5.202 (76.47)	14.290 (61.99)
Leverage* Nonbank	-0.662** (0.22)	-1.033** (0.39)	-0.667** (0.24)
Leverage	0.148 (0.34)	0.368 (0.30)	0.671 (0.44)
Nonbank	112.129*** (24.48)	138.410** (53.51)	102.243** (36.22)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	1200	608	787
Adj R ²	0.287	0.354	0.338
Panel A: Loan Borrowers with low growth potential			
Leverage* Nonbank*Post	-2.030** (0.61)	-2.890*** (0.82)	-2.888*** (0.82)
Leverage*Post	0.222 (0.27)	0.237 (0.26)	0.146 (0.32)
Nonbank*Post	104.618 (60.56)	128.134 (70.10)	120.186 (71.88)
Leverage* Nonbank	0.667 (0.44)	1.323* (0.61)	1.363* (0.63)
Leverage	0.665*** (0.17)	0.181 (0.20)	0.214 (0.21)
Nonbank	41.036 (51.06)	-10.470 (56.42)	-4.102 (60.51)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	1366	714	593
Adj R ²	0.307	0.366	0.351

Appendix Table 6: Robustness Check: Alternative Proxies of Leverage Risk

This table presents the regression results on coefficient estimates with subsamples of leveraged loans based on two alternative leverage risk measures. The dependent variable is AISD. Numbers in parentheses are t-stats. We also controlled loan facility characteristics (LN_Amount, Performance pricing indicator, Secured, Covenants indicator) and borrower characteristics (Leverage, LN_TA, Ind_adj ROA, Mkt/Book, Tangibility). In addition, we controlled the dummy variable Nonbank. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans			Term Loans			Revolvers		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Leverage_2* Nonbank*Post	-1.060*			-2.100**			-0.925**		
	(0.47)			(0.72)			(0.37)		
Leverage_2*Nonbank	-0.175			0.012			0.672***		
	(0.19)			(0.33)			(0.16)		
Leverage_2*Post	0.658**			1.854***			0.281*		
	(0.20)			(0.47)			(0.13)		
Leverage_3* Nonbank*Post		-1.200**			-2.266**			-0.892*	
		(0.51)			(0.80)			(0.44)	
Leverage_3* Nonbank		-0.066			0.187			0.620**	
		(0.22)			(0.40)			(0.19)	
Leverage_3*Post		0.607*			1.808**			0.191	
		(0.27)			(0.57)			(0.12)	
Leverage_4* Nonbank*Post			-0.183*			-0.249**			-0.201***
			(0.09)			(0.10)			(0.03)
Leverage_4* Nonbank			0.240***			0.266***			0.244***
			(0.02)			(0.05)			(0.01)
Leverage_4*Post			0.011			0.116			-0.052*
			(0.06)			(0.12)			(0.02)
Nonbank*Post	22.299	25.041	-16.539	73.526*	73.673*	-8.678	11.423	7.170	-21.137
	(28.77)	(28.36)	(16.96)	(34.63)	(33.47)	(12.68)	(21.20)	(23.52)	(18.88)
Control	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Purpose FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Obs	2566	2617	2595	1347	1370	1356	1147	1172	1164
Adj R^2	0.292	0.289	0.284	0.355	0.349	0.345	0.358	0.356	0.376

Appendix Table 7: Robust check: short term effect

This table presents the regression results of Equation (1) based on the matched sample through PSM. we shorten the sample to three years before the 2014 Clarification and three years after the 2014 Clarification. The dependent variable is the AISD (all-in-spread-drawn), and the analysis is conducted at the loan facility level. The coefficient of the interaction term linking Leverage, Nonbank and Post suggest that leverage risk premium of nonbank facilities is underestimated after 2014. The underestimation is highly significant for both term loan and revolving credit facilities. All specifications include purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year and are reported in parentheses. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample: Dependent variable=AISD	Leveraged Loans	Term Loans	Revolvers
	(1)	(2)	(3)
Leverage* Nonbank*Post	-1.081** (0.38)	-1.589** (0.60)	-1.233* (0.55)
Leverage*Post	0.270 (0.30)	0.921* (0.47)	0.216 (0.29)
Nonbank*Post	50.328 (36.51)	83.883 (47.31)	57.114 (49.21)
Leverage* Nonbank	-0.009 (0.15)	-0.156 (0.17)	0.910 (0.50)
Leverage	0.519*** (0.12)	0.290* (0.14)	0.025 (0.23)
Nonbank	75.161*** (18.13)	72.132*** (10.42)	-7.158 (45.35)
Control	YES	YES	YES
Year FE	YES	YES	YES
Industry FE	YES	YES	YES
Purpose FE	YES	YES	YES
Obs	2077	1094	922
Adj R ²	0.295	0.370	0.373