Leveraged Loans: Is High Leverage Risk Priced in? [1]

David P.Newton

School of Management, University of Bath

dpn25@bath.ac.uk

Steven Ongena

University of Zurich, Swiss Finance Institute, KU Leuven and 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

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Abstract

The economic downturn caused by the Covid-19 pandemic accentuates extant concerns about the leveraged loan market. Using a novel dataset, we show that leveraged loan spreads have declined for nonbank-facilities since the introduction of the Interagency Guidance on Leveraged Lending (IGLL) and the ensuing "frequently asked questions for implementing the March 2013 guidance". The decline in leveraged loan spreads is significant for highly leveraged borrowers, especially when involving term loans. We further demonstrate that risk shifting issues associated with the high level of Collateralized Loan Obligations issuance strongly explain the decline of nonbank leveraged loan spreads. In addition, a higher degree of information asymmetry, driven by an increase in covenant-lite loan issuance and weaker investor protection, are strongly associated with the narrowed leverage risk premium.

JEL classification: G21, D82, G34

Key words: Leverage Risk, Syndicated Loan Pricing, Leveraged Loan, Risk Shifting

1. Introduction

The economic downturn caused by the Covid-19 pandemic has brought considerable uncertainty to the global credit markets. Much of the focus has been on the contraction in the leveraged loan market with growing concerns about a oncoming wave of credit-rating downgrades or defaults. According to S&P (2020), the U.S. leveraged loan default rate was expected to rise to 5.3% by year-end 2020, the highest level since the financial crisis, and surpass 6% in 2021. In the U.S., the non-investment-grade leveraged loan market grew to $1.2 trillion by the end of 2019. The Covid-19 outbreak may be the catalyst to pop an existing credit bubble of leveraged loans, but the market was already shaky before the shock.

Deteriorating credit quality and aggressive capital structures were always major concerns for investors. To ensure safe and sound leveraged lending and to achieve both microprudential and macroprudential objectives, 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 (IGLL) in March 2013. Subsequently, in November 2014, a "frequently asked questions for implementing the March 2013 guidance" (FAQ) was issued to clarify regulators' expectations regarding stronger risk management. Leveraged financing is normally provided both by bank and nonbank lenders. However, the guidance only applied to banks that are regulated by either the OCC, the Fed or the FDIC. Nonbank lenders have been the main beneficiaries of the IGLL with increased market shares in the leveraged finance market.

The current drop in the leveraged loan market highlights several important research questions. Why are leveraged loans more vulnerable to economic shocks? Did the leveraged loan pricing mechanism effectively reflect borrowers' high leverage ratios and aggressive business expansion strategies in loan spreads? Did the introduction of the 2013 IGLL and 2014 FAQ change lenders' leveraged loan pricing mechanism? Are the pricing mechanism vary

across nonbank and bank lenders after the introduction of the 2013 IGLL and the 2014 FAQ?

To address these questions, we use a novel dataset combined information from Refinitiv Eikon, WRDS Dealscan and CompStat to examine the effectiveness of the leveraged loan pricing mechanism. We show that the rapid declining trend of bank-originated leveraged loan spreads has been reversed after the 2014 FAQ, but nonbank-originated leveraged loan spreads sharply declined after 2014 (see Figure 1). The decline in leveraged loan spreads between banks and nonbanks increases concerns that the nonbank lenders relax their lending policies to compete with banks and increase their leveraged loan market shares. We compare the all-in-spread-drawn (AISD) between bank-originated leveraged loan and nonbank-originated leveraged loans during our sample period of 2007 – 2019 and find that AISD between nonbanks and banks have been narrowed since the 2014 FAQ. From January 2007 to November 2014 the average AISD for bank-originated leveraged loans was 71 basis points higher compared to nonbank-originated leveraged loans. During the period from November 2014 to December 2019 (and hence prior to the Covid – 19 crisis), the premium for nonbanks declined to 49 basis points. While the initial results show that leverage risk premiums have declined 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 after controlling for loan and borrower characteristics. We add an interaction term between borrower leverage, a dummy variable for nonbank lenders, and a dummy variable for the post IGLL-FAQ period of November 2014 to December 2019. The estimated coefficients on the interaction term are negative and highly significant confirming that the nonbank-originated leveraged loan premium for a given level of leverage has declined since the issuance of the 2014 FAQ. We identified two possible explanations for these findings.

First, a large portion of leveraged loans has been securitized and distributed in the form of collateralised loan obligations (CLOs), raising concerns about the impact of securitization

on the risk-shifting to another party and the role of securitization on loan pricing. The 2013 IGLL and its FAQ target regulated banking and financial institutions, but not nonbanks, which led regulated banks to reduce the number of leveraged loans. At the same time, nonbanks increased their leveraged lending activity (Schenck and Shi, 2017 and Kim et al., 2018) and regulated banks decreased their institution-specific share of speculative-grade term-loan originations (Calem et al., 2020). Different from revolving loans that are generally held by banks, nonbanks are more likely to hold riskier term loans, especially institutional loans (Marsh and Lee, 2019), which are more likely to be securitized through CLOs. Consequently, following the introduction of IGLL and its FAQ, the securitization market was energised by the growth in institutional investor participations in the leveraged loan market. Since such securitization allows for the transfer of loan default risk to investors, originating lenders have less incentive to maintain high lending standards before securitization and to monitor borrowers after securitization, which gives rise to adverse selection and moral hazard. The prior literature finds evidence that risk shifting from the securitization activity leads to lax screening of mortgages (Main and Sufi, 2009; Keys et al., 2010; Purnanandam, 2011, Nadauld and Sherlund, 2013) and increases the risk appetite of the issuing bank (Haensel and Krahnen, 2007). In recent years, researchers have studied the securitization of corporate loans as well. Bord and Santos (2015) for example investigate the effects of securitization of corporate loans and find that institutional loans, which use more lax standards to underwrite the loans that eventually sell to CLOs, suffering higher risk than non-securitized loans originated by the same banks. Some studies show that securitization leads to lower loan prices and lax lending standards. 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 CDOs is negatively related to spreads of these loans. Nadauld and Weisbach (2012) find that the spread of loan facilities that are eventually securitized

through CLOs is lower than the spread of loan facilities that are not securitized. Also, they find that the securitization frequencies of lower grade loan facilities are higher than those of other facilities. From 2007 to 2013, both the issuances and the outstanding amounts of CLOs experienced relatively low levels, with an almost halt between 2009 and 2010. From late 2012, CLO issuance returned strongly and exceeded pre-crisis levels in 2014. The high level of CLO issuance continued until early 2019. To investigate the impact of CLO issuance on nonbank-originated leveraged loan pricing, we add an interaction term linking CLO issuance, nonbank lenders and borrowers' leverage risk. The estimated coefficients on this interaction term are negative and highly significant, indicating that the risk shifting issues is associated with the high level of CLO issuance and that the CLO issuance since the 2014 FAQ is strongly linked to the decline of leverage risk premium in nonbank-originated leveraged loans from 2014 – 2019.

Second, information asymmetry suffuses the leveraged loan market. Information asymmetry not only exists between the lenders and borrowers like other traditional bank loans, but also exists between the lead lender and participants. Prior literature shows that relationship lending between lenders and borrowers can overcome problems of asymmetric information by facilitating screening and monitoring of borrowers and thereby lowers loan rates (e.g. Boot, 2000; Bosch, 2007; Bharath et al., 2011; Ferreira and Matos, 2012; Engelberg et al., 2012). Bharath et al., (2011) for example, argue that repeated borrowing from the same lender lowers loan spreads. Similar results have been presented by Engelberg et al. (2012), who find that bank-firm's interpersonal linkages reduce lending rates. Furthermore, in contrast with traditional bank loans, syndicated loans are more likely to face information asymmetry between the lead bank, which originates the loan, and members of the lending syndication. Several papers have looked at this friction, including Bosch (2007), Sufi (2007) , and Ivashina (2009). Their common finding is that asymmetric information between lead and participant banks

impacts loans spreads because participants want to mitigate the friction by requiring higher premiums. In response, lenders use performance pricing terms to mitigate the risks of information asymmetries. Asquith et al. (2005) argue that interest-increasing performance pricing raises spreads if the credit quality of borrowers deteriorates, which helps lenders reduce the risk arising from information asymmetries. Their findings are confirmed by Cai et al., (2012). In addition, financial covenants in the loan agreement are shown to be effective in controlling the financial structure of the borrower and avoiding performance deterioration over the life of a loan. Covenants are widely used to offer lenders opportunities to renegotiate a loan contract with the borrower if a certain threshold is reached on a pre-defined financial metric. This can help lenders increase their incentive to monitor borrowers and protect themselves by reducing the impact of moral hazard (Rajani and Winton, 1995; Bradley and Roberts, 2015).

Since the introduction of the FAQ in 2014, the covenant-lite loan issuance has appeared to be "picking up speed". The fraction of outstanding leveraged loans that are covenant-lite rose from about 30% in 2012 to about 40% in 2013 and about 55% in 2014 (see Figure 2). Although regulated banking institutions slowed the issuance of covenant-lite loans after the 2014 FAQ on the U.S. leveraged loan market (Abuzov et al., 2020), borrowers switched to unregulated nonbanks loans with relatively fewer covenants and nonbanks (Schenck and Shi, 2017; Abuzov et al., 2020). In addition, the fierce competition between regulated banks and unregulated nonbanks on non-price terms after the 2014 FAQ impedes an increase in the origination of loan contracts with stronger covenant protection (Abuzov et al., 2020). In this way, the relaxation of investor protection in covenant-lite loans lead by the competition between banks and nonbanks intensifies information asymmetry issues associated with leveraged loan pricing.

To investigate the role of information asymmetry on leveraged loan pricing, we conduct a sub-sample analysis by splitting the sample into multiple groups. In our first sub-sample

analysis, we split the sample of leveraged loans into two groups: loans with covenant provisions and covenant-lite loans. The results show that more severe information asymmetry associated with covenant-lite loans leads to a stronger and more significant decline in nonbank-originated leverage risk premium. Our further sub-group analysis with groups of with and without performance pricing confirmed that leveraged loans without performance pricing are associated with a higher and significant decline in loan spreads (than those with performance pricing) especially for nonbank-originated and highly leveraged loans. The results indicate that information asymmetry plays an important role in the underestimation of leverage risk.

Our paper contributes to the literature in a number of ways. Few papers have examined the pricing of leveraged loans (Angbazo et al., 1998; Lim et al., 2014). For example, Lim et al., (2014) argue that nonbank facilities are priced with premiums relative to bank-only facilities in the same loan package and the nonbank premium is larger when borrowers face financial limits. In this paper, we investigate the importance of the IGLL together with its FAQ by comparing different responses of regulated bank and unregulated banks in terms of loan pricing. Unlike previous studies focusing on the effects of IGLL on banks' lending activities (Scheck and Shi, 2017; Kim et al., 2018; Calem et al., 2020) and non-price terms (Abuzov et al., 2020), we directly investigate the pricing of leverage risk after the IGLL and its FAQ. We show that although the declining trend of bank-originated leveraged loan spreads has been reversed due to the 2014 FAQ, risk premium for nonbank facilities has been narrowed. We identify two possible mechanisms associated to the decline of highly leveraged loan spread. First, risk shifting issues associated with the high level of CLO issuance since 2014 explain the decline in leverage risk premium of highly leveraged loans from 2014 – 2019. Second, information asymmetry arises with non-performance linked pricing and covenant-lite issuance leading to a decline in the leverage risk premium.

The remainder of the paper is organized as follows. Section 2 presents the data and

background. Section 3 provides empirical evidence on whether leveraged loan pricing mechanism effectively reflects borrowers' high leverage ratios and aggressive business expansion strategies in loan spreads. Section 4 provides two 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.

2. Data and Background

2.1 Institutional Background: IGLL

In response to the strong growth in leveraged lending and increasingly lax lending standards, especially in the segment of the high leverage risk borrowers, the IGLL was introduced in March 2013, which applies to all U.S. banks and U.S branches of non-US banks regulated by aforementioned agencies, and focuses on the following key areas: bank's risk management framework, underwriting standards, valuation standards, pipeline management, bank's risk-rating standards, participations purchased, and stress testing. Subsequently, for clarifying the questions about how the guidance is interpreted and implemented by agencies, agencies issued FAQ in November 2014, which includes clarifications that the issuance of "covenant-lite" leveraged loan does not automatically result in a non-pass rating under regulatory rating system (Q11) and that the guidance does not apply to an institution's investing activities in CLO securities (Q24). Although the aim of introduction of the IGLL is encouraging banks' prudent underwriting and facilitating banks' risk exposure, banks did not respond to the guidance immediately after the introduction of the IGLL. Kim et al., (2018) find that the IGLL together with its FAQ were effectively in reducing regulated bank-originated leveraged lending activity, but the IGLL together with its FAQ also triggered a migration of leveraged lending to unregulated nonbank lenders, which means unregulated banks absorbed a share of leveraged lending of regulated banks. In addition, there are some other unintended consequences of the

introduction of the IGLL and its FAQ, for example, the competition between regulated banks and non-regulated banks may have contributed to an increase in covenant-lite structures, reducing investor protection (Arbuzov et al., 2020). Meanwhile, The IGLL and its FAQ triggered a shift towards nonbank lender participation, leading to a rapid growth in leveraged loan securitization. A large portion of leveraged loans has been securitized and distributed in the form of collateralised loan obligations (CLOs), increasing the complexity of leveraged loan market. As prices of leveraged loans plunge after the Covid-19 outbreak with a foreseeable wave of credit-rating downgrades or defaults, a ripple effect is created on the CLO market and in the real economy.

2.2 Sample Construction

We obtain our sample of leveraged loans from Refinitiv Eikon and WRDS-Thomson Reuters DealScan LPC for the period 2007-2019. Leveraged loan coverage at Refinitiv Eikon is provided by Refinitiv Loan Pricing Corporation (LPC), which features the most comprehensive and accurate real-time and historical syndicated loans data. Leveraged loans are typically made to non-investment grade borrowers that are highly indebted. 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 location in the U.S. covered in Refinitiv Eikon between 2007 and end of 2019, a total of 12,875 facilities. We only include loan facilities with floating-rate interest payments in the sample. We require that the data on AISD be non-missing. The AISD is calculated as the sum of the spread over LIBOR, upfront fee, and annual fee, and is provided by LPC directly. We additionally restrict the sample to the most common types of facilities, including term loan A, term loan B-F, revolvers and

others. Finally, we exclude facilities issued to financial firms (SIC Code 6000-6999). In the literature, WRDS Dealscan has been widely used for syndicated loan studies. Although both Refinitiv Eikon and Dealscan share the same data source, coverage is slightly different. In order 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 Dealscan with the unique identifier of LPC tranche. Linking Refinitiv Eikon and Dealscan provides us with a broader and more accurate coverage of leveraged loan facility characteristics including: size and maturity, loan purpose, arrangers, type of facilities as well as information on whether the facility is senior, secured, covenant-lite and has performance-based pricing.

To obtain borrower-specific characteristics, we match the borrower and/or borrower's parent name to the Compustat firm following Chava and Roberts (2008). The current Dealscan Compustat link table only contains matches through the end of 2017. We extend the current version of the link table to the end of 2019 by using the 6-digit CUSIP number provided from 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 on the end of fiscal year prior to the current loan issuance year. Furthermore, we refine the sample by dropping all the non-positive equity observations. The final sample contains 6,944 leveraged loan facilities in 4,459 deals to 1,631 U.S. nonfinancial firms.

2.3 Definition of Leveraged Loans

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

2.4 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 the manager for the loan with primary responsibility for ex ante due diligence and for ex post monitoring of the borrowers, which provide 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 the Dealscan indicates "Yes" or if the "LenderRole" field in the Dealscan indicates one of the following: administrative agent, agent, lead arranger, arranger, or lead bank. In our sample, the nonbank-originated leveraged loans account for about 29% of all leveraged loan sample. This is because nonbanks are less likely to be lead arrangers relative to commercial banks.

2.5 Overview of Sample

Table 1 presents summary statistics for the key variables in our sample. To reduce the effects of outliers, all 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. Nonbank facilities are more likely to be term loans than bank facilities (59% vs. 41%) and bank facilities are more likely to be revolvers than nonbank facilities (54% vs. 36%). Panel B of Table 1 shows the summary statistics for leveraged loan facilities. The average AISD for the leveraged loans originated by banks in our sample is 284.15 basis points and the spread of leveraged loans originated by nonbank is 345.05 basis points, which is much higher than bank-originated loan

spreads due to borrowers' greater credit risk. Only 46% of the leveraged loan facilities include covenants in the loan agreements to control the leverage risk and financial performance of the borrower and to avoid its deterioration over the life of the loan. 21% of the leveraged loan facilities in our sample are with performance-related pricing provisions, in which case, the spread is adjustable based on pre-defined financial criteria.

Panel C of Table 1 presents summary statistics on borrower characteristics of the year prior to the loan transaction. 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 the average value of 59.50% in our sample. The borrower of nonbank-originated loans has larger average leverage risk than the borrower of bank-originated loans (65.25% vs. 57.21%). 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 and, in the second measure, we use long term debt relative to the book value of total assets as a measure of the borrower's leverage risk in the long run.

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Table 2 provides statistics on the annual AISD of leverage loan facilities originated by nonbanks from 2007 – 2019 in comparison with bank-originated facilities. We find the AISD between nonbank-originated facilities and bank-originated facilities have been narrowed since the FAQ in 2014 with the average leveraged loan premium reduced from 71.22 to 49.16 basis points. This narrowing is mainly driven by the more pronounced decline in nonbank-originated facilities.

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3. Pricing of Leverage Risk in Leveraged Loan

While Table 2 shows that both the spread in nonbank-originated facilities and the spread in bank-originated facilities has narrowed since the 2014 FAQ, overall borrower risk may have declined along with spreads. To address this concern, we examine whether leveraged loan pricing mechanism effectively reflect borrowers' high leverage ratios by investigating the following empirical model:

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

Y_{it} is the AISD of leveraged loan facility i in fiscal year t. $Leverage_{it}$ is the borrower's total liabilities net of cash divided by the book value of total assets. *Post* is a dummy equal to one if the loan year is either at or after the issuance of the FAQ in Nov 2014. $Nonbank$ is a dummy variable that equals to one if a facility has at least one U.S. nonbanks lead arranger, and zero otherwise. X_{it-1} is a set of control variables including: the logarithm of loan amount (LN_Amount), the logarithm of loan maturity (LN_Maturity), an indicator that takes the value of one if the facility is secured (Secured indicator), an indicator that takes the value of one if performance pricing provisions are included in the facility (Performance Pricing), an indicator that takes the value one if the loan has covenants and zero otherwise (Covenant), the logarithm of borrower's total assets in the fiscal year prior to loan transaction (LN_TA), and the industry adjusted return on total assets at the end of the fiscal year.

Table 3 reports the OLS regression results of Eq (1) with double-clustered standard errors by firm and year to account for heteroskedasticity. We include facility-purpose fixed effects, industry fixed effects and year fixed effects in all the regression models. Leveraged loan in our sample includes mainly two categories of loan types: revolver and term loan. Term loan spreads are expected to be higher than revolver reflecting longer maturities and greater credit risk (Angbazo et al., 1998; Harjoto et al., 2006). Accordingly, we estimate separate

regression models for revolvers and term loans to identify whether any of the differences we observe in pricing in the aggregate sample varies between the two types of loans.

Earlier research suggests that leverage risk is positively priced in syndicated loan spread (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 model (i) with the whole sample of leveraged loans, for a borrower with average leverage ratio, a 1-standard-deviation increase in leverage ratio is associated with an increase of 29.8% of the AISD. Our main interest is the size, sign and statistical significance of the coefficients on the interaction term $Leverage_{it} \times Nonbank \times Post$, which captures the difference, in the pre- and post-Nov 2014 periods, on the leverage risk premium of nonbank-originated loans. We find the coefficients on $Leverage_{it} \times Nonbank \times Post$ in the regression model is 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 FAQ in 2014. The results also suggest a large economic magnitude of the coefficient on the interaction term of $Leverage_{it} \times Nonbank \times Post$. A borrower with average leverage ratio in our sample in the period from November 2014 – December 2019 with 1-standard-deviation increase in leverage ratio only results in a 11.6% increase in AISD (=29.8%-18.2%) driven by a strong declining effect of 18.2%. The results indicate a significant drop in AISD for a given leverage risk from November 2014 – December 2019. In models (ii) and (iii) of Table 3, we present estimates of Equation (1) for the subsamples of term loans and revolvers, respectively. The results demonstrate a stronger underestimation of leverage risk from 2014 - 2019 of leverage risk in the subsample of term loans with both higher significance and economic magnitude in model (ii). Specifically, a 1-standard-deviation increase in leverage ratio is associated with an increase of 21.4% of AISD for nonbank-originated term loans. However, during November 2014 – December 2019 period, a 1-standard-deviation increase in leverage ratio is only associated with a 10% increase in the AISD

for nonbank-originated term loans (=21.4%-12.4%).

To control for other potential effects on the 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 the pledged assets do not diminish default and recovery risk sufficiently to result in lower spreads (Ivashina, 2009; Lim et al., 2011). A facility with performance pricing provision and/or covenant protection tends to have lower spreads. On the firm characteristic side, larger borrowers with better profitability measured by industry adjusted ROA (Ind_adj ROA) are associated with lower loan spreads, 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 $Leverage_{it} \times Nonbank \times Post$ remain negative and significant at the 1% level in all estimates. Overall, our results suggest that although leverage risk is positively priced in the AISD, the leverage risk premium of nonbank-originated facilities declined significantly the issuance of the FAQ in 2014. Furthermore, we find that the decline has been more pronounced in term loans compared with revolvers.

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4. Investigating the Channels: Risk Shifting and Information Asymmetry

The decline in nonbanks' leverage risk premiums from 2014 to 2019 raises a research question: what could be the underlying mechanism working behind the narrowed leverage risk premium? In this section we identify and investigate two underlying channels that give rise to the narrowed AISD with respect to leverage risk.

4.1 Risk Shifting

A large portion of leveraged loans are securitized and structured into tranches to accommodate different levels of risk appetite from both banks and institutional investors. Since the FAQ in 2014, CLO issuance has surged in an environment of continuing very low interest rates driven by increased investor demand for higher yields. From 2007 – 2013 the average annual CLO issuance in the US was $39.28 billion. However, the average annual CLO issuance between 2014 and 2019 reached $110.42 billion.[2] The substantial growth in CLO issuance from 2014 onwards, which accounts for approximately half of the leveraged loan market, significantly contributed to the boom of the leverage loan market. In addition, the total amount of CLOs outstanding during the period 2014-2019 is almost twice as large than the amount during the period 2007-2013. Overall, the CLOs market experienced a boom period after 2014. Since securitization through CLO issuance effectively allows the transfer of loan default risk to investors, originating lenders have fewer incentives to maintain high lending standards before securitization and to monitor borrowers after securitization, which gives rise to both adverse selection and moral hazard. Earlier research has found evidence that risk shifting from the securitization activity leads to lax screening for mortgages (Mian and Sufi, 2009; Keys et al., 2010; Purnanandam, 2011, Nadauld and Sherlund, 2013) and increases the risk appetite of issuing banks (Haensel and Krahnen, 2007). In addition, prior studies documented a negative relationship between syndicated loan securitization and the loan spread (Ivashina and Sun, 2011; Nadauld and Weisbach, 2012). To investigate the impact of CLO issuance on leveraged loan pricing, we add a interaction term linking CLO issuance, a dummy variable for nonbank lead lenders and borrowers' leverage risk. Table 4 reports the estimation results on leverage risk, nonbank, CLO issuance and loan spread (AISD). In column 1, we present the results with

[2] Our data on annual CLOs issuance and outstanding in the US are obtained from U.S. Federal Reserve & S&P Global Market Intelligence.

the whole sample of leveraged loan. The estimated coefficient on the interaction term of $Leverage_{it} \times Nonbank \times CLO$ is negative and highly significant, indicating that the risk shifting issues associated with the high level of CLO issuance since 2014 has strongly explained the decline in spreads of nonbank-originated highly leveraged loans in the 2014 – 2019 period. For a given leverage level a 1-standard-deviation increase in CLO issuance results in a decline in the leverage premium for nonbank facilities by 32%. 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 $Leverage_{it} \times Nonbank \times CLO$ and AISD in both subsamples of term loans and revolvers. Specifically, for a given leverage level a 1-standard-deviation increase in CLO issuance will result in a decline in AISD of 32.5% for term loans and 26.8% for revolvers, respectively.

The results confirm that the decline in AISD during the 2014 - 2019 period has been strongly driven by the boom of CLO issuance since the issuance of the FAQ in 2014. In line with our results in Table 3, the effect of CLO issuance on AISD is stronger for term loans with larger coefficients and significance compared with revolvers. This is due to the high proportion of institutional tranches, which are designed to be securitized and distributed to institutional investors, including in the term loan facilities.

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4.2 Information Asymmetry

Syndicated loans suffer information asymmetry issues between lead bank and participants, by design. Acting as a mandated manager for the loan, the lead bank is granted the 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. However,

securitization effectively allows the transfer of default risk to investors, and the lead bank has incentives to syndicate highly risky loans. In addition, there is a moral hazard problem because after selling a large portion of the loan to investors, the lead bank has less incentive to monitor borrowers after securitization. In response, financial covenants and performance pricing provisions are inserted in syndicated loan packages to protect creditors' rights and to mitigate information asymmetry issues. Following the global financial crisis with very low interest rates, investors use loan markets to "search for yield" in response to low interest rates, which is accompanied by increased risk taking and lax lending standards (Kurtzman et al., 2018; Aramonte et al., 2019). In this case, the demand for high yield investment climbed and leveraged loans became popular among institutional investors. The increase in leveraged loan demand has been accompanied by some relaxation of the contractual covenants, with a surge in the issuance of covenant-lite loans. From 2007 to 2013, the average percentage of covenant-lite of leveraged loans outstanding was about 20%. However, the average percentage of covenant-lite of leveraged loans outstanding reached about 68% during the 2014 – 2019 period. In addition, the competition between nonbanks and banks on non-price terms after the issuance of FQA in 2014 appears to have accelerated the issuance of covenant-lite leveraged loans. Specifically, the fraction of outstanding leveraged loans that are covenant-lite jumped from about 30% in 2012 to about 40% in 2013 and rose further to about 55%, more than half of the leveraged loans outstanding in 2014. The relaxation of investor protection in covenant-lite loans intensified information asymmetry issues associated with leveraged loan pricing. To investigate the role of information asymmetry on leveraged loan pricing, we conduct sub-sample analysis by splitting the sample into multiple groups. Table 5 presents sub-group analysis with estimation results on groups of both with covenant provisions and covenant-lite leveraged loans. In Panel A, we present regression results on the subsample of covenant – lite leveraged loans. The results demonstrate a strong negative and significant relation between

$Leverage_{it} \times Nonbank \times Post$ and AISD in all the estimations with respect to leveraged loan (Column (1)), term loans (Column (2)) and revolvers (Column (3)). However, in Panel B, the coefficients of interaction term $Leverage_{it} \times Nonbank \times Post$ in all estimations become insignificant, indicating that there is no clear evidence of underestimation of leverage risk premium in nonbank-originated leveraged loan facilities in the period 2014-2019. The results confirm that more severe information asymmetry that associated with covenant-lite loans leads to stronger and more significant decline in leverage risk premium.

< INSERT TABLE 5 HERE >

In addition to financial covenants, performance pricing is also a widely used clause in loan packages to align incentive between creditors and borrowing firms and to mitigate information asymmetry issues. Performance pricing provisions, which defines performance levels based on certain criteria and their corresponding interest spreads, include both interest – increasing and interest – decreasing performance pricings. Although performance pricing provision features some characteristics similar to financial covenant, 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)). Manso et al., (2010) argue that performance pricing features are used as a screening device to mitigate information asymmetry and show that firms using performance pricing are more likely to improve their credit ratings subsequently. In Table 6, 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 $Leverage_{it} \times Nonbank \times Post$ and AISD in all the estimations with respect to leveraged loan

(Column (1)), term loans (Column (2)) and revolvers (Column (3)). However, in the subgroup of leveraged loans with performance pricing provisions in Panel B, the coefficients of $Leverage_{it} \times Nonbank \times Post$ become insignificant in all estimations, indicating that there is no clear evidence of underestimation of leverage risk premium in nonbank-originated leveraged loan facilities . The results are in line with Table 5 and confirmed that information asymmetry issues strongly contributed to the underestimation of nonbank facilities' leverage risk premium from 2014 - 2019.

< INSERT TABLE 6 HERE >

5. Robustness Checks

We provide evidence (Table 3) that the leverage premium of nonbank-originated leveraged loans has declined after the FAQ in 2014. Now, we further test the robustness of this result by constructing a control sample using propensity score matching (PSM) proposed by Rosenbaum and Rubin (1983). Specifically, we use loan facility variables and borrowers' characteristics to match leveraged loan facilities involving either banks or nonbanks. Furthermore, we construct an interaction term *Nonbank*×*Post*×*High leverage* to capture the changes in leverage premium of nonbanks after the FAQ in 2014, where the *High leverage* is a dummy variable indicating if the borrower's leverage risk is higher than the mean value of leverage risk in all borrowers. Constructing this interaction term help us to match leveraged loan facilities borrowed by high borrowers' leverage risk from nonbanks and banks. The results from the PSM matching difference-in-differences estimations in Table 7 are consistent with our previous findings. As shown, the loan spread in the treated group has declined after the FAQ in 2014, and the decline is more pronounced for borrowers with a higher leverage risk.

< INSERT TABLE 7 HERE >

Our results demonstrate a narrowed leverage risk premium of nonbank facilities from 2014 to 2019 driven by the risk-shifting associated with loan securitizations through CLO issuance and information asymmetry. A potential concern with our results is whether the recent decline in the leveraged loan spread is driven by the low interest rate expectations. In Table 8 we present the regression results with an additional control variable of projected short-term interest rate (*Interest rate forecast*) to identify the effect of interest rate expectations on the leveraged loan spread. We find a strong negative effect of interest rate expectation on leveraged loan spreads. The results also suggest that the narrowed spread of high leverage risk in nonbank-originated loan facilities in the 2014 – 2019 period has not been driven by low interest rate expectations. The main results on the interaction term of $Leverage_{it} \times Nonbank \times Post$ remain negative and significant after including the control variable of projected interest rate. Since the 2009 recession, the Federal Reserve (the Fed) has maintained an accommodative monetary policy with historically low interest rates and quantitative easing. From late 2013, the Fed began normalizing the stance of monetary policy and has gradually increased the pace of tightening. The rising expectation of interest rate hikes coupled with improving economic fundamentals, which improves investor demand for high yield leveraged loan. The increase in leveraged loan demand has been accompanied by a surge in CLO issuance, which strongly explained the decline in leveraged loan from 2014- 2019. The regression results in Table 8 confirmed that the decline in leveraged loan spreads has not been driven by low interest rate expectations. Instead, since late 2013 due to improving economic fundamentals and monetary policy normalisations interest rate expectations have been improved.

< INSERT TABLE 8 HERE >

A 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 Table 8 we present estimation results with the subsample of high growth potential borrowers measured by borrowers' enterprise value relative to EBIT. A high multiple of firm's enterprise value relative to EBIT represents high prospects for future revenues and growth. The estimation results in Table 9 show no evidence that a borrower's growth potential is linked with the narrowed spread of nonbank-originated leveraged loan.

< INSERT TABLE 9 HERE >

Finally, we apply two alternative leverage risk measures defined as: a borrower's total debt relative to total assets and a borrower's total long-term debt relative to total assets, respectively. The estimation results in Table 10 with full leveraged loan sample, and the subsamples of term loans and revolvers are in line with our baseline results in Table 3. The results confirm our main findings that the nonbank facilities' leverage risk premium has narrowed during the 2014 – 2019 period.

< INSERT TABLE 10 HERE >

6. Conclusion

The introduction of the 2013 IGLL and the subsequent 2014 FAQ attempts to mitigate credit risk in the leveraged loan market. However, the regulation also results in increasing competition between bank and nonbanks and shifting risky loans from traditional banks to nonbank lenders. Following the 2014 FAQ, the leveraged loan securitisation is energised by

the growth in institutional investor participation in the leveraged loan market. Furthermore, the covenant-lite loan issuance has appeared to be picking up speed because borrowers switched to unregulated nonbank loans with relatively fewer covenants and weaker investor protection. In this paper, we show that risk shifting issues associated with the high level of CLO issuance from 2014 strongly explained the decline in the high leverage risk premium in nonbank-originated facilities. In addition, a higher degree of information asymmetry driven by an increase in covenant-lite loans and weaker investor protections are strongly associated with the narrowed leverage risk premium in the period 2014 – 2019.

The Covid-19 pandemic amplifies concerns about an upcoming default wave of leveraged loans and its impact on financial stability. 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 an economic downturn and help us to rethink the pricing mechanism of leveraged loans. We believe our paper opens several avenues for future research in the post-Covid-19 era. One question is the extent, to which, the link between risk shifting associated from leveraged loan securitization and decline in the loan spread is detrimental to financial stability especially after the shock of the Covid-19 pandemic. Also, it is important to identify whether the reduced investor protection, increased information asymmetry and larger presence of nonbanks increase the complexity of the leveraged loan market and impede the healthy development.

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Figure 1.

Average AISD among nonbank-originated loans(red line) and bank-originated banks (blue line) from 2007-2019.

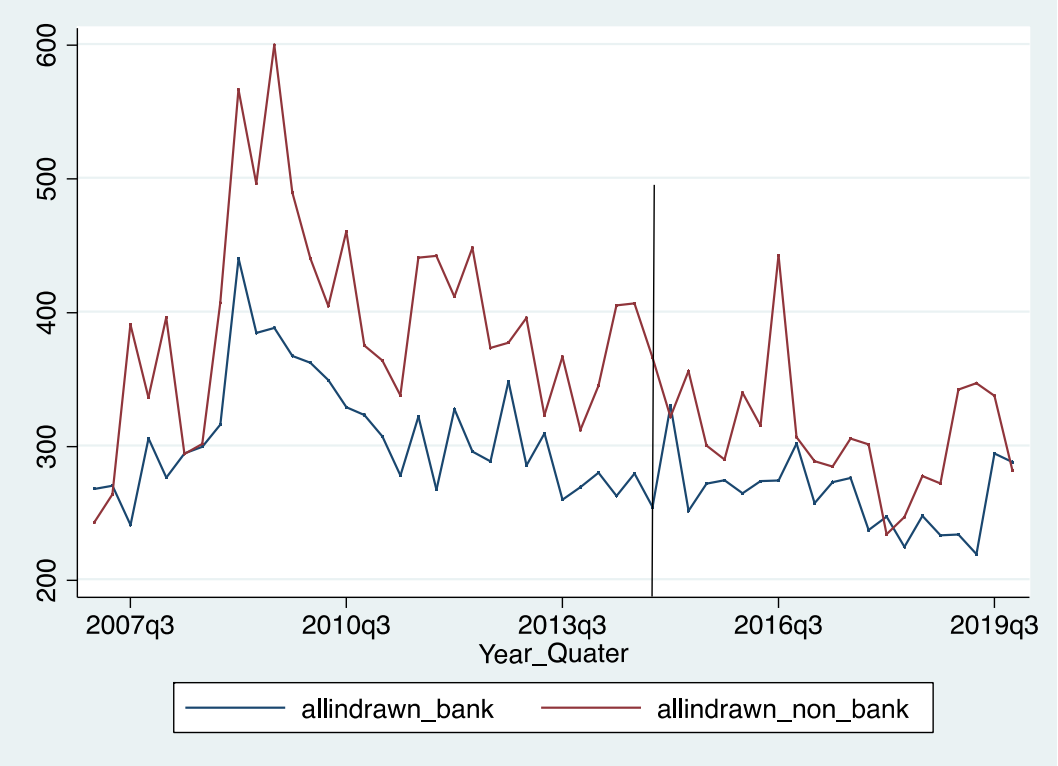

Figure 2.

U.S. CLOs Outstanding and issuance (in $B) and Covenant-lite share of outstanding, U.S. leveraged loans from 2007-2019.

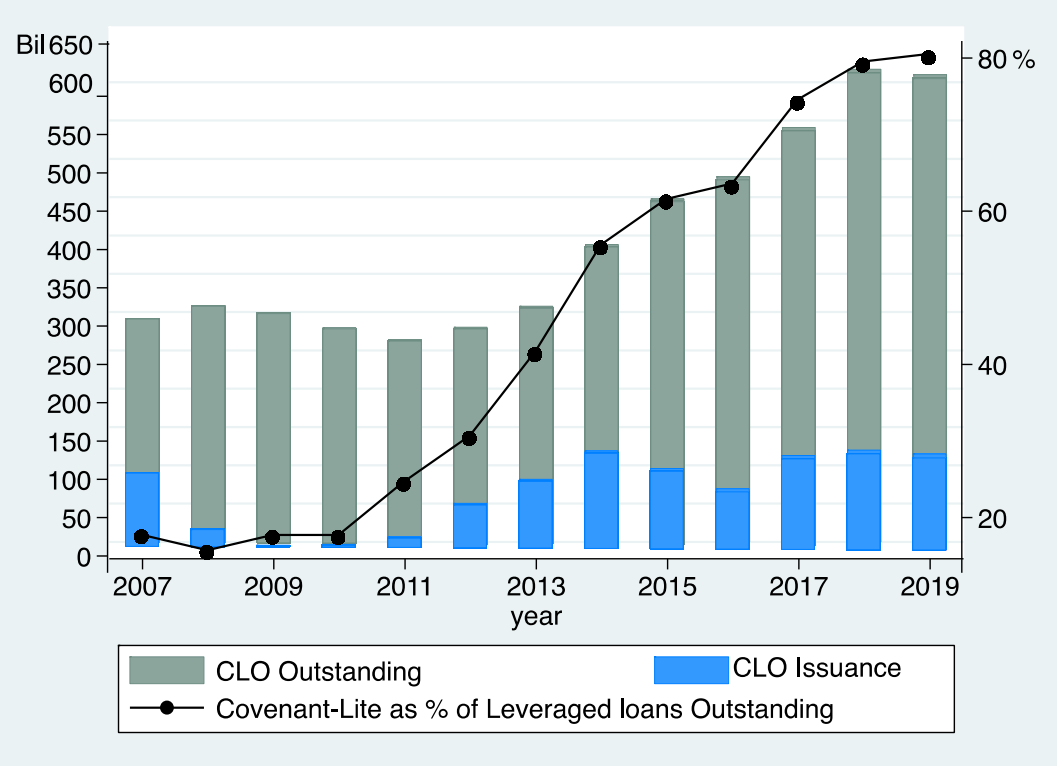

Table 1: Summary statistics

This table presents sample facility types (Panel A), averages of selected 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-originated loan facilities 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 Dealscan and Refinitiv Eikon, originated between 2007 and 2019 to US-based non-financial firms. 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 int the facility, and zero otherwise Covenant is an indicator that takes the value of one if the loan has covenants, and zero otherwise; institutional loan is an indicator that takes a value of one if the facility is an institutional tranche, and zero otherwise; AISD is the basis point spread over LIBOR plus the annual fee and the up-front fee spread; 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, estimated 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 fiscal year prior to the current loan, estimated as total debts divided by the book value of total assets; Leverage_3 is the borrower's book leverage ratio at the end of fiscal year prior to the current loan, estimated as long term debt relative to the book value of total assets. All variables are winsorized at 1% and 99% levels.

	All leveraged loan facilities			Bank			Nonbank		
Variable	N	Mean	Std. dev.	N	Mean	Std. dev.	N	Mean	Std. dev.
Panel A: Facility type									
% Revolver	6,944	0.49	0.50	4,954	0.54	0.50	1,990	0.36	0.48
% Term loan	6,944	0.47	0.50	4,954	0.42	0.49	1,990	0.59	0.49
% Other	6,944	0.04	0.19	4,954	0.04	0.18	1,990	0.04	0.20
Panel B: Facility Characteristics									
All-in-spread-drawn (bps)	6,782	301.52	149.03	4,848	284.15	137.12	1,934	345.05	167.66
Amount ($ million)	6,944	470.86	676.94	4,954	417.92	603.72	1,990	602.65	817.10
Maturity (months)	6,882	57.20	19.36	4,920	55.35	19.22	1,962	61.84	18.95
Secured indicator	6,944	0.72	0.45	4,954	0.68	0.47	1,990	0.81	0.39
Performance pricing indicator	6,944	0.21	0.41	4,954	0.22	0.41	1,990	0.19	0.39
Covenants indicator	6,944	0.46	0.50	4,954	0.47	0.50	1,990	0.42	0.49
Panel C: Borrower Characteristics									
Total asset ($M)	6,795	5131.27	13747.56	4,859	4196.95	12065.37	1,936	7476.25	17041.56
Total debt ($M)	6,700	2061.81	5384.01	4,777	1555.88	4100.30	1,923	3318.61	7552.50
Long-term debt ($M)	6,876	1964.01	5078.49	4,905	1482.073	3846.66	1,971	3163.38	7152.28
Leverage(%)	6,744	59.50	26.68	4,825	57.21	26.34	1,919	65.25	26.70
Leverage_2(%)	6,618	38.74	23.62	4,730	36.57	22.96	1,888	44.19	24.36
Leverage_3(%)	6,792	36.03	23.14	4,856	33.92	22.47	1,936	41.33	23.92

Table 2: The AISD gap between leveraged loans and investment grade loans.

This table presents the trends in the distribution of all-in-drawn spreads for bank-originated leveraged loans and nonbank-originated leveraged loans during 2007-2019 (Panel A), and the all-in-drawn spread gap for bank facilities and nonbank facilities pre and post Nov 2014 FAQ (Panel B). In panel A, columns (i) present the mean value of annual distribution of bank facilities spread in our sample and columns (ii) reports the mean value of annual distribution of nonbank facilities spread in our sample. Columns (ii) – (i) report annual gaps between the bank facility and nonbank facility spread from 2007 to 2019. In the panel B, columns (i) report the mean value of bank-originated facility spreads before and after 2014, respectively, in our sample, columns (ii) report the mean value of nonbank-originated facility spreads before and after 2014, respectively, in our sample and columns (ii) – (i) report the gap of all-in-drawn spreads between nonbank facilities and bank facilities before 2014 and the gap of all-in-drawn spread between leveraged and investment grade loans after 2014. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Year	Bank (i)		Non-Bank (ii)		Difference (ii) – (i)	
	N	Mean	N	Mean	Diff	t-statistic
Panel (A) the All-in-drawn spread gaps of each year						
2007	296	272.19	168	295.87	-23.68*	-1.84
2008	207	294.81	64	358.84	-64.03***	-3.00
2009	209	386.57	54	517.94	-131.37***	-5.31
2010	324	337.75	100	424.77	-87.02***	-5.93
2011	367	293.06	131	382.76	-89.70***	-6.47
2012	361	319.28	126	402.5	-83.22***	-4.97
2013	475	281.65	209	347.63	-65.98***	-5.91
2014	549	268.39	231	379.04	-110.65***	-9.34
2015	451	277.07	172	325.81	-48.74***	-3.62
2016	452	280.29	175	343.14	-62.85***	-5.04
2017	437	259.77	234	293.92	-34.15***	-3.28
2018	430	236.70	146	258.59	-21.89*	-1.88
2019	290	258.15	124	326.77	-68.62***	-4.27
Panel (B) the All-in-drawn spread pre and post - 2014						
Pre - 2014 FAQ	2,699	300.91	1,059	372.13	-71.22***	-13.22
Post - 2014 FAQ	2,149	263.11	875	312.28	-49.16***	-8.76

Table 3: Pricing of Leverage Risk in Leveraged Loan

This table presents the regression results of Eq (1). The sample of loan facilities is from the DealScan and Eikon database, originated between 2007 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_1, 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 facility-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Leverage×Nonbank×Post	-1.279***	-1.321***	-0.748**
	(-4.23)	(-3.39)	(-2.23)
Leverage×Nonbank	0.776***	0.529***	0.589***
	(7.45)	(3.87)	(6.06)
Leverage×Post	-0.010	0.354	-0.238**
	(-0.06)	(1.36)	(-2.04)
Nonbank×Post	77.71***	89.43***	35.76*
	(4.09)	(3.75)	(1.73)
Leverage	0.669***	0.607***	0.474***
	(5.79)	(3.43)	(5.29)
LN_Amount	-14.82***	-15.39***	-29.49***
	(-7.03)	(-4.02)	(-17.00)
LN_Maturity	-31.35***	-25.25**	-45.40***
	(-5.45)	(-2.52)	(-6.09)
Performance	-63.02***	-81.26***	-13.80***
	(-12.83)	(-11.30)	(-3.28)
Secured	52.98***	99.65***	10.99***
	(11.58)	(13.64)	(3.14)
Covenant	-16.94***	-20.02***	-1.88
	(-3.74)	(-3.09)	(-0.50)
LN_TA	-12.79***	-24.85***	0.758
	(-5.78)	(-7.13)	(0.48)
Ind_adj ROA	-0.053	-0.227	0.124*
	(-0.26)	(-0.65)	(1.81)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	6495	3094	3227
Adj R^2	0.257	0.281	0.368

Table 4: CLO issuance, leverage risk and AISD.

This table presents coefficient estimates from OLS regressions linking the leverage risk, nonbank and CLO issuance. Definitions of all variables are provided in Appendix A. The dependent variable is AISD (bps). The coefficient of interaction term *Leverage×nonbank×CLO* denotes if the leverage risk premium of nonbank facilities is impacted by CLO issuance. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Leverage × Nonbank × CLO	-0.0153***	-0.0155***	-0.0106***
	(-6.27)	(-5.25)	(-3.58)
Nonbank×CLO	0.926***	0.993***	0.435***
	(5.78)	(5.25)	(2.58)
Leverage × CLO	-0.000962	0.000335	-0.00299
	(-0.41)	(0.11)	(-1.46)
Leverage × Nonbank	0.930***	0.694***	0.860***
	(5.83)	(3.78)	(5.20)
CLO	-1.128***	-1.470***	-0.730***
	(-7.61)	(-7.39)	(-5.98)
Leverage	0.889***	0.913***	0.644***
	(3.94)	(3.52)	(3.23)
LN_Amount	-14.51***	-15.87***	-28.99***
	(-5.49)	(-2.63)	(-10.35)
LN_Maturity	-32.00***	-25.14**	-45.83***
	(-4.63)	(-2.33)	(-6.41)
Performance	-62.22***	-80.39***	-13.36***
	(-12.77)	(-9.43)	(-3.28)
Secured	51.20***	97.02***	10.38**
	(10.55)	(8.94)	(2.36)
Covenant	-17.19***	-20.69***	-2.003
	(-3.14)	(-2.99)	(-0.45)
LN_TA	-13.74***	-25.21***	0.0475
	(-4.77)	(-5.65)	(0.02)
Ind_adj ROA	0.0543	-0.125	0.191**
	(0.34)	(-0.44)	(2.02)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	6495	3094	3227
Adj R^2	0.27	0.29	0.38

Table 5: Covenant – lite loans and information asymmetry.

This table presents the regression results on coefficient estimates with subsamples of covenant – lite leveraged loans and loans with covenant provision. The dependent variable is AISD; numbers in parentheses are t-stats. 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 loan with covenant provision. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
A. Covenant-lite			
Leverage×Nonbank×Post	-1.572***	-1.449***	-1.087**
	(-4.15)	(-2.99)	(-2.51)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	3454	1770	1549
Adj R^2	0.2528	0.2856	0.3874
B. with Covenant			
Leverage×Nonbank×Post	-0.426	-0.748	0.149
	(-0.79)	(-1.10)	(-0.3)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	3041	1322	1676
Adj R^2	0.2747	0.3077	0.3742

Table 6: Performance pricing and information asymmetry。

This table presents the regression results on coefficient estimates with subsamples of covenant-lite leveraged loans and loans with covenant provision. The dependent variable is AISD; numbers in parentheses are t-stats. 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 loan with performance pricing provision. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Panel A. without Performance Pricing Provision			
Leverage×Nonbank×Post	-1.300***	-1.284***	-0.755*
	(-3.86)	(-3.05)	(-1.91)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	5079	2611	2313
Adj R^2	0.2512	0.2740	0.3822
Panel B. with Performance Pricing Provision			
Leverage×Nonbank×Post	-0.867	-1.361	-0.472
	(-1.60)	(-1.57)	(-0.97)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	1416	481	912
Adj R^2	0.2718	0.2528	0.3649

Table 7 Robustness check: Propensity Score Matching

This table presents the PSM matching difference-in-differences estimations. We use propensity socre matching and match nonbank facilities with bank facilities according to facility and borrower's characteristics. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)
Nonbank × Post	-29.788***	
	(2.60)	
Nonbank × Post × High Leverage		-31.18**
		(2.40)
Year FE	Yes	Yes
Industry FE	Yes	Yes
Purpose FE	Yes	Yes
Obs	5340	5144
R^2	0.21	0.22

Table 8: Robustness check: is the decline in leverage risk premium driven by low interest rate expectation?

This table presents the regression results on coefficient estimates with an addition control variable of projected short-term interest rate. The dependent variable is AISD; numbers in parentheses are t-stats. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Leverage×Nonbank×Post	-1.279***	-1.321***	-0.748**
	(-5.21)	(-4.19)	(-2.19)
Leverage×Nonbank	0.776***	0.529***	0.589***
	(5.81)	(4.12)	(4.76)
Leverage×Post	-0.0101	0.354	-0.238*
	(-0.08)	(1.63)	(-1.95)
Nonbank×Post	77.71***	89.43***	35.76*
	(4.60)	(4.01)	(1.71)
Interest rate forecast	-21.23***	-18.22***	-11.19***
	(-271.96)	(-27.88)	(-34.80)
Leverage	0.669***	0.607***	0.474***
	(4.97)	(3.74)	(3.92)
LN_Amount	-14.82***	-15.39**	-29.49***
	(-5.58)	(-2.53)	(-10.90)
LN_Maturity	-31.35***	-25.25**	-45.40***
	(-4.43)	(-2.26)	(-6.19)
Performance	-63.02***	-81.26***	-13.80***
	(-12.57)	(-9.30)	(-3.28)
Secured	52.98***	99.65***	10.99**
	(10.12)	(8.93)	(2.44)
Covenant	-16.94***	-20.02***	-1.884
	(-3.13)	(-2.94)	(-0.42)
LN_TA	-12.79***	-24.85***	0.758
	(-4.17)	(-5.27)	(0.31)
Ind_adj ROA	-0.053	-0.227	0.124
	(-0.24)	(-0.66)	(1.47)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	6495	3094	3227
Adj R^2	0.2607	0.2885	0.3742

Table 9: 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. The dependent variable is AISD; numbers in parentheses are t-stats. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans	Term Loans	Revolvers
Dependent var.=AISD	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Loan Borrowers with high growth potential			
Leverage×Nonbank×Post	-0.975	-0.800	-0.095
	(-1.63)	(-1.22)	(-0.19)
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Purpose FE	Yes	Yes	Yes
Obs	2264	1137	1268
Adj R^2	0.2772	0.3281	0.4022

Table 10: Robustness check: alternative proxies on leverage risk

This table presents the main 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. All specifications include tranche-purpose fixed effects, industry fixed effects, and year fixed effects. Standard errors are double-clustered by both firm and year. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Sample	Leveraged Loans		Term Loans		Revolvers	
Dependent var.=AISD	Coefficient (t-statistic)		Coefficient (t-statistic)		Coefficient (t-statistic)	
Leverage_2×Nonbank×Post	-1.926***		-1.832***		-1.125***	
	(-6.86)		(-3.93)		(-2.84)	
Leverage_3×Nonbank×Post		-2.226***		-2.112***		-1.447**
		(-5.89)		(-2.98)		(-2.53)
Year FE	Yes		Yes		Yes	
Industry FE	Yes		Yes		Yes	
Purpose FE	Yes		Yes		Yes	
Obs	6379	6536	3045	3108	3163	3251
Adj R^2	0.2526	0.2489	0.281	0.2791	0.3723	0.3653

Appendix A: Variable definitions and data sources.

Variable	Definition	Source
AISD (bps)	Basis point spread over LIBOR plus the annual fee and the up-front fee spread	Dealscan and Eikon
Nonbank	Nonbank is a dummy variable that euqals 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
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 (Total Liability-Cash)/Toal Asset	Compustat
Leverage_2	The borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as Total debt/Total Asset	Compustat
Leverage_3	The borrower's book leverage ratio at the end of fiscal year prior to the current loan, calculated as Long-term debt/Total Asset	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
Total liability	The borrower's total liability at the end of fiscal year prior to the current loan.	Compustat