Limits to Monetary Policy Transmission at the Zero Lower Bound and Beyond: The Role of Nonbanks

PRELIMINARY

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Abstract: We study monetary policy transmission during the zero lower bound (ZLB) period in the United States and the negative interest policy rate (NIPR) period in Europe in the markets for syndicated corporate term loans. A typical borrowing cost of such a loan is a sum of an index rate, a loan spread, and various fees. In anticipation of the ZLB and NIPR periods, binding interest rate floors on the index rate have been introduced en masse in loan contracts. Nonbank lenders, which tend to target nominal yields, appear to play a key role in contracting in these guaranteed returns with better-known, repeat borrowers. Because floors set an effective "zero" lower bound at 100 basis points, the relationship between monetary policy and borrowing costs has become more tenuous than in the past, in particular in the United States. In addition, as floors tend to be introduced in leveraged, covenant lite loans of larger sizes, financial stability risks may have increased. However, borrowers appear to be able to term out loans, pushing back potential rollover risk.

Keywords: Syndicated term loans, nonbank lenders, interest rate floors, zero lower bound, negative interest rates, monetary policy transmission, financial stability.

JEL Classifications: E43, E44, E52, E58, G21, G23.

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1 Introduction

This paper analyzes the growing prevalence of interest rate floors in the syndicated leveraged term loan market that has transformed if not limited the transmission of monetary policy and has likely increased financial stability risks in the zero lower bound (ZLB) period in the United States and the negative interest policy rate (NIPR) period in Europe.[1] Because we use contract terms in our analysis, to paraphrase the title of Kashyap and Stein (2000), we ask the question what do tens of thousands observations on loan contracts say about the transmission of monetary policy? To complement the literature, we pay particular attention to the importance of nonbank participation in the syndicated loan market and show how these institutions may have changed the cost and allocation of credit in response to monetary policy easings in the ZLB and NIPR periods.

Prior to the onset of the recent global financial crisis, monetary policy was primarily conducted through setting interest rates at very short tenors via open market operations.[2] After the crisis, central banks have relied on unconventional monetary policy tools, with zero or negative short-term interest rates providing the basis for the stance of monetary policy in Europe and the United States (Figures 1 and 2). Consequently, the effectiveness of keeping short-term rates around or below zero and the implications for financial stability of such policies are being debated more and more.

We consider the syndicated leveraged loan market in our analysis of effectiveness of monetary policy for three main reasons. First, in the United States in particular, the volume of syndicated leveraged loan originations is economically significant, dwarfing the issuance of high-yield corporate bonds. Leverage loans account for a very large portion of syndicated loan originations. Second, lenders in this market are very diverse and is more representative of the entire financial system than compared to just looking at loans originated and held by banks. Third, short-term policy interest rates are highly correlated with the short-tenor LIBOR and EURIBOR rates, which are typically used as benchmarks for pricing floating interest rate syndicated loans in the U.S. and in the euro area, respectively.[3] Expansionary monetary policy tends to push down these interest rates and should decrease firms' cost of borrowing. However, since the Global Financial Crisis, as the LIBOR and EURIBOR fell to the historical lows, syndicated lenders have replaced these benchmarks with interest rate floors, severely limiting the pass-through from the lower policy rates to the cost of

[1]In a companion paper, we explore in detail the reasons why borrowers opt into contracts with interest rate floors despite higher total borrowing costs that such contracts imply and why lenders offer such contracts despite higher ex ante credit risk that such contracts pose.

[2]The United States, for example, targets the Federal funds rate on overnight bank reserves; whereas, the European Central Bank determines the main refinancing operations rate with maturities of usually one week.

[3]Although prime rates that are used as benchmarks for bank loans also move with short-term interest rates, they adjust less frequently and with a lag compared to LIBOR or EURIBOR.

borrowing.[4]

We show that both the growing share of nonbank lenders in the syndicated term loan market and historically low short-term interest rates have played a crucial role in the en masse introduction of interest rate floors in loan contracts. The fraction of U.S. syndicated leveraged loans with LIBOR floors in the early 2000s, when interest rates were also low by then historical standards, was far lower than the prevalence of such floors over the past decade as nonbanks emerged as important participants in the leveraged loan market. In addition, the current fraction of euro-area syndicated leveraged loans with EURIBOR floors is also somewhat smaller than in the U.S. despite the 3-month EURIBOR falling to below zero, as nonbanks play a smaller role in the euro-area syndicated leveraged loan market than in the U.S. syndicated leveraged loan market. As a further indication that both nonbank participation and low short-term rates appear crucial, we show that floor clauses are extremely rate in contracts for lines of credit—a credit instruments provided that banks rather than nonbanks provide.

We relate nonbank participation to the emergence (and prevalence) of interest rate floors. While Hanson and Stein (2015) discuss the importance of investors that target nominal yields in the fixed income high-quality securities space, we take a closer look at institutional investors that target nominal yields in the high credit risk securities space. Certain types of nonbank lenders—for example, investment funds—target nominal yields. They invest in securities which produce coupon cash flow rather than capital gains. And they tend to invest heavily in syndicated loans, especially those—institutional term loans—that somewhat replicate a cash flow of fixed income securities.[5] In addition, we relate the prevalence of loans with interest rate floors to the fact that nonbank lenders have less flexible liability structures than banks. For instance, some types of nonbank lenders do not borrow in the short-term wholesale funding markets, and, therefore, cannot take advantage of low short-term funding rates.

We note that interest rate floors appear to have been introduced in loan contracts to the riskiest segment of the market, as the spreads on loans with floors are generally higher than the spreads on loans without floors. In addition, original issue discounts (OIDs)—the discount from the amount of a loan—as a tool to attract nonbank lender participants are also highly correlated with the existence of floors in loan contracts.[6] Interest rate floors, higher spreads, and OIDs, all together, have resulted in a significantly higher cost of borrowing for

[4]The presence of interest rate floors introduced nonlinearity in the pass-through. When LIBOR is above the floor, the cost of borrowing is sensitive to changes in policy rates; when LIBOR is below the floor, the cost of borrowing is determined by the floor and, therefore, it is not sensitive to changes in policy rates.

[5]Banks tend to originate such loans and then sell them to institutional investors, see Aramonte, Lee, and Stebunovs (2015).

[6]If a loan is issued at 99 cents on the dollar to pay par, the OID is said to be 100 bps, or 1 point. In effect, the borrower pays one percent of the loan amount to the lenders, so the lenders have to fund only 99 percent of the loan amount. This is in effect an upfront fee on the loan.

firms compared to those without floors in their loan contracts.

We study loan syndication in the United States and the European Union over the last two decades or so. We break the sample period into two periods—before and after 2006—because interest rate floors emerged in anticipation of the ZLB in the United States and the NIPR in the European Union. Our main empirical analysis shows the responsiveness of cost of funds for a given loan to a given U.S. borrower in the past decade (2006-15), which includes the rapidly falling interest rate environment at the onset of the financial crisis and the zero lower bound period, has been far more tenuous than in the previous decade (1996-2005). We also look at the euro area in the past decade (2006-15), where nonbank lender participants appear to play a smaller role in the syndicated leveraged loan market than in the United States, and find that the responsiveness of cost of funds to different short-term interest rates is less tenuous than in the United States.[7] In other words, the market structure of the leveraged loan market in the euro area has put less restraints on the transmission of monetary policy, though the recent introduction of negative rates has spurred the emergency of interest rate floors in loan contracts there as well. We also find that, for a given loan, a floor clause implies a substantially higher credit risk even controlling for the inherent riskiness of the borrower.

We look at the effectiveness of monetary policy transmission more broadly than just in terms of the pass-through from policy rates to borrowing cost. We show, for example, that nonbank participation and the presence of interest rate floors is associated with larger loan sizes and longer loan maturities. Therefore, taken together, it appears that borrowers are trading off costlier loans—both in terms of the benchmark rates and loan spreads—for more favorable nonprice terms. However, it appears that only a certain subset of borrowers can take advantage of access to credit that is backed by nonbanks. We show that nonbanks tend to support better-known, repeat borrowers rather than lesser-known, first-time borrowers. This finding is something that central bank should take into account while designing their policies and evaluating their effects.

We also look into financial stability issues of nonbank participation and contract terms that it brings. We show that not only nonbank participation is associated with floor clauses but also that floor clauses are associated with loans being leveraged, having cancelation fees, and, more worryingly, being covenant lite. In other words, riskier borrowers get locked in (because of cancelation fees) into costlier loans (because of the presence of floors and higher loan spreads associated with it) with very few if any restrictions on their ability to dispose of their assets or leverage up. While a monetary policy easing is meant to encourage credit risk taking, it is not meant to encourage lenders to relinquish credit risk controls. We see signs here of a potential conflict of monetary policy and financial stability goals.[8]

[7] We do not exclude the possibility that some legal restrictions or fear of regulatory pressures may impede a fast, wide-spread introduction of interest rate floors in Europe.

[8] Coincidentally, the U.S. federal regulators issued leveraged lending guidelines—in a way, activated a new prudential tool towards the end of our sample period. For details, see Calem, Correa, and Lee (2016).

To sum up, our results have significant monetary and financial stability policy implications. Central banks should expect effectiveness of monetary policy to differ based on the market structure of different segments of loan markets. A corollary to our results is that economies where financial intermediation is relatively more bank-based may benefit relatively more from expansionary monetary policy around or below the zero lower bound. Indeed, the bank lending channel of monetary policy has been far better understood and researched in the literature. In contrast, as the nonbank sector provides more credit to the private sector, the lending channel may be severely constrained in the ZLB and NIPR period. In addition, in so far as the riskiest borrowers are burdened with added costs to their borrowing through interest rate floors, and so on, expansionary monetary policy may not lead to easing financial conditions for the segment of borrowers most in need of relief of funding costs during a downturn. In any case, because of the potential for monetary and financial stability conflicts, central banks should be mindful of nonbank lenders' capacity to absorb possible credit losses and contagion channels from risky lending that may have been encouraged by a monetary policy easing in ZLB or NIRP episodes.

Like any other empirical work, ours comes with a caveat. We do not observe a counterfactual: That is, whether corporates would have access to term loans if it were not for nonbank participation in the syndicated market in the ZLB and NIPR periods. But we can speculate. We show that nonbanks may ease access to credit albeit at a higher cost to better-known borrowers—that is, borrowers that are more likely to have access to capital markets, not just syndicated credit—leaving lesser-known, first time borrowers behind. Therefore, it is plausible that the counterfactual may not be as bad as first imagined: Better-known borrowers could have had access to credit in other than capital markets if it were not for nonbank participation in the syndicated term loan market.

Our paper is organized as follows. In section 2, we review some literature related to the effectiveness of monetary policy during the zero lower bound period and, more broadly, to the various lending channels of monetary policy. In section 3, we describe the data used in our analysis and the syndicated leveraged loan market in the U.S. and in the euro area. In section 4, we document how the current U.S. market differs in terms of the role played by nonbank financial intermediaries compared to the past and also currently in Europe. Section 5 provides our main empirical analysis. It evaluates the likelihood of interest rate rates floors in loan contracts and the likelihood of other loan contract features that may be detrimental to financial stability; estimates expected duration of interest rate floors which undermines the importance of the floating rate channel of monetary policy; estimates the pass-through from monetary policy rates to the total borrowing cost and its components including the price of ex ante credit risk and discusses the relation of our work to Brunnermeier and Koby (2016)'s reversal interest rate theory; shows that loans with floor clauses tend to be larger in size and longer in maturity; and shows that monetary policy easing in the ZLB mainly reaches better-known, repeat borrowers. In other words, broad themes of this section are: Limits to monetary policy transmission that are attributable to nonbank participation in lending; pecuniary and non-pecuniary trade-offs that borrowers appear to face while obtaining nonbank loans; and, finally, potential conflicts of monetary policy and financial stability goals. Section 6 discusses additional points and mention some robustness checks. Section 7 concludes and provides some caveats.

2 Literature

Our paper primarily contributes to three literature strands: First, to the literature on monetary policy transmission and, second, to the literature on monetary policy and financial stability goals. In particular, we bring new perspectives on monetary policy transmission in the financial system that is increasingly dominated by nonbank financial institutions and in an environment with very low or negative short-term interest rates that serve as benchmarks in pricing corporate loans. Third, we contribute to the literature that studies pricing of syndicated loans—comprised of a complete menu of fees and loan spreads.

The literature that studies the interest-rate pass-through mechanisms underlying the lending channel of monetary policy has been rich. However, most papers have been based on examining banks' balance sheets (Bernanke and Blinder (1992) and Kashyap and Stein (2000)). Empirical evidence is also sector-based or based on aggregate time-series of macro-financial variables; Gaiotti and Secchi (2006) looks at the cost channel of monetary policy at Italian manufacturing firms; whereas, Gertler and Karadi (2015) provide evidence on how even modest movements in short-term rates lead to large movements in credit costs. Our paper contributes to the literature in that it is the first to examine specific features of the bank-nonbank market structure of credit markets to gauge the effectiveness of monetary policy transmission using loan level data.

In addition, the low interest-rate environment has enabled us to examine what happens to the interest-rate pass through of monetary policy during the ZLB and NIPR periods. The nascent literature includes Gilchrist, Lopez-Salido, and Zakrajsek (2015) that compares the effects of conventional monetary policy on real borrowing costs with those of the unconventional measures employed after the target federal funds rate hit the ZLB.

As for pricing of loans, we contribute to the literature's new found interest in fees and cost structures that play an important role in pricing syndicated loans. Strahan (1999) looks at the 1980s and 1990s—a period when nonbank participation in the syndicated loan market was marginal—and shows that both the price and non-price terms of bank loans reflect observable components of borrower risk. As expected, riskier borrowers—smaller borrowers, borrowers with less cash, and borrowers that are harder for outside investors to value—pay more for their loans. In addition, the non-price terms of loans are systematically related to pricing; small loans, loans that are secured, and loans with relatively short maturity carry higher interest rates than other loans, even after controlling for publicly available measures of risk. This suggests that banks use both the price and non-price terms of loans as complements in dealing with borrower risk. He also shows that observably riskier firms face tighter non-price terms in their loan contracts. Loans to small firms, firms with low ratings, and firms with little cash available to service debt, for example, are more likely to be small, to be secured by collateral, and to have a short contractual maturity. Larger and more profitable firms are able to borrow on better terms across all three of these non-price dimensions. We, in turn, will look at the last two decades when nonbank participation in the syndicated loan market grew drastically and nonbanks came to dominate the supply of credit. We show that some of Strahan (1999)'s findings may not hold anymore, in part, because of nonbank participation and low interest rates.

Most recently, Berg, Saunders, and Steffen (2016) argue that more than 80 percent of U.S. syndicated loans contain at least one fee type and contracts typically specify a menu of spreads and fee types, that fees are used to price options embedded in loan contracts such as the drawdown option for credit lines and the cancelation option in term loans, and that fees are used to screen borrowers based on the likelihood of exercising these options. They also propose a new total-cost-of-borrowing measure that includes various fees charged by lenders. While focusing on pricing of term loans only, we emphasize the pricing features such as interest rate floors and original issue discounts which we associate with nonbank participation in the syndicated loan market and which Berg, Saunders, and Steffen (2016) do not analyze. We show, for example, that interest rate floors bind at loan origination and substantially increase the total cost of borrowing through a couple of channels for the majority of syndicated term loan borrowers.

3 Syndicated loan data and interest rate floors

We focus our analysis on the limitations of monetary policy transmission on the syndicated leveraged term loan markets. We have three main reasons for looking at this market to assess the effectiveness of monetary policy. First, in the U.S. in particular, the volume of leveraged term loan originations is economically significant dwarfing the issuance of high-yield corporate bonds. Originations of these leveraged loans has been more than double the origination of high-yield bond issuance since the financial crisis (Figure 3). In Europe, originations of syndicated leveraged term loans are still material, about in line with issuance of high-yield bonds, though both markets are somewhat smaller than in the U.S. (Figure 4). We do not consider credit lines due to the low drawdown rate of these revolvers.[9] Second, lenders in this term loan market are very diverse and is more representative of the entire fi-

[9]See, for example, Berrospide, Meisenzahl, and Sullivan (2012).

nancial system than compared to just banks. Third, short-term interest rates determined by monetary policy are highly correlated with LIBOR and EURIBOR rates, which are typically used as benchmarks for pricing floating interest rate syndicated loans in the United States and in the euro area, respectively. Although prime rates that are used as benchmarks for bank loans also move with short-term interest rates, they adjust less frequently and with a lag compared to LIBOR or EURIBOR. Expansionary monetary policy tends to push down these interest rates and would ideally decrease firms' cost of borrowing.

3.1 Data

Our primary data source is the Thomson Reuters LPC DealScan database downloaded from the LoanConnector web-based platform. This database includes variables associated with the borrower, lenders in the syndication, and various loan characteristics associated with the loan contract in the global syndicated loan market. The particular feature of the loan contract we are primarily interested in, interest rate floors, is available as a variable item beginning in 2005 (though not many floors are present in data until 2007). We restrict out analysis to LIBOR-based term loans syndicated in the United States and EURIBOR-based term loans syndicated in Europe. LIBOR-based European loans are usually syndicated in the United Kingdom and volumes are smaller, so we omit these loans from our analysis.

The source of most of the data in Thomson Reuters LPC DealScan is largely composed of data from SEC filings, League Tables, "NY LC stories" from industry reports, and "Reporting" that is submitted directly from banks. Tables 1 and 2 provide the breakdown for data sources for all syndicated term loans and term loans with floors, respectively. We can see that a much higher percentages of loans are reported through League Tables generally than those with interest rate floors, perhaps indicating that the League Tables do not have interest rate floor information readily available. Indeed our findings may be a lower bound on the prevalence of interest rate floors in loan contracts.[10] For the EURIBOR-based European market, we find similar patterns (not shown).

Our sample period for the United States runs from 1996 to 2015 and, therefore, encompasses the early 2000s when the country flirted with a ZLB and loans with interest rate clauses first appeared. The sample, therefore, also covers the two years post the leveraged lending guidelines which have been show by Calem, Correa, and Lee (2016) to temper banks' willingness to originate leveraged loans. Of note, our results hold in the post crisis period despite the guidance being in effect. Our sample for Europe runs for the 2006-15 period only.

[10] Dropping loans from league tables does not change our results.

3.2 Interest Rate Floors

We first check the validity of the interest floor information in the data set (see Appendix). After comparing a random sample of loans and looking up their information on available SEC reports, we are relatively confident that the interest rate floor information from Dealscan accurately reflects the floor data from SEC filings.

In the U.S. LIBOR-based syndicated term loan market, we find that LIBOR floors began to reappear in 2008, when the Federal funds rate fell below three percent (Figure 5) . The fraction of loans with LIBOR floors then jumped to more than half of all loan amounts originated in 2010 when policy expectations (one-month OIS rates two years ahead) plummeted to below 1 percent. Restricting the sample to leveraged loans (defined as being associated with spreads greater or equal to 250 basis points), the fraction of loans with LIBOR floors stayed very elevated at around 80 percent in the 2012-2013 period when the federal funds rate, policy expectations, and LIBOR were all very close to or at the zero lower bound (Figure 6).

We can compare the prevalence of floors both in the past using a string search algorithm in the comments field in the Thomson Reuters LPC DealScan database prior to 2005 (see Appendix for details). In particular, between 2002 and 2004, both the Federal funds rate and the 3-month LIBOR were both between one and two percent, still very low by historical standards. However, the prevalence of LIBOR floors during the period was much more muted with only a handful of loans having such floors in their contracts.

We can also compare the prevalence of floors using the web-based LoanConnector data since 2005. Although the prevalence of EURIBOR floors have increased dramatically since 2012, when euro area policy expectations fell below one percent, less than half of loan contracts, both on a count basis and on a loan amount basis, had EURIBOR floors as of the end of 2015. The fraction is significant, but is far less prevalent than compared to the large fractions observed during the past decade in the United States, especially given the fact that both policy expectations and 3-month EURIBOR have fallen below the zero lower bound.

When looking at the level of floors, we observe that almost all floors in the loan contracts are binding at origination both for the U.S. and in Europe. In the U.S., the level of LIBOR floors has gradually fallen to one percent as of the end of 2015, while in Europe, some floors have even fallen to zero percent (Figures 8 and 9). In both instances, the floors are higher than the LIBOR and EURIBOR rates. To provide an idea of how large both the prevalence and the levels of LIBOR floors potentially had an effect on the cost of borrowing, Figures 10 and 11 show the base rate (LIBOR) plus the spread of the loan aggregated by loan amount assuming no floors are present in the loan contracts (the black line) vs. the actual base rate (the maximum between the LIBOR floor and the actual LIBOR rate) plus the spread (the red line). In the U.S., especially during the 2010 to 2014 period, the wedge between the median actual interest rate and the interest rate assuming no floors has been relatively large, in many instances exceeding 50 basis points. This wedge grows larger when there are more loans with interest rate floors and when the interest rate floors diverge greatly from the reference interest rate (LIBOR, in the U.S.). In the euro area, the wedge has only recently began to be more meaningful as the ECB has gone below the zero lower bound.

4 Nonbank participants in the syndicated term loan market

In this section, we further investigate some possible reasons for the increasing number of interest rate floors in loan contracts in both the U.S. and the euro area seen over the past decade. One obvious reason alluded to above is that short-term interest rates fell to historically low levels and, most recently, even turned negative in Europe. In this low-rate environment, lenders in general would have incentive to have interest rate floors to guarantee a certain level of returns to account for fixed overhead cost or less flexible funding costs.

However, looking at syndicated commitment lines, which are credit lines extended mainly by banks, we see hardly any interest rate floors in loan contracts (Figure 12). This suggest that nonbank participants may play a large role in the introduction of floor features in floating interest rate loan contracts. Indeed, one key feature of the syndicated term loan market is that many nonbank lenders are active participants in the deals. In contrast to the syndicated commitment lines, a significant fraction of lenders are nonbank financial intermediaries. These nonbank financial institutions are even more active in the secondary term loan market. Lee, Liu, and Stebunovs (2016) show, for example, that the majority of the loans are sold off by banks to nonbanks in the secondary market within a month after the origination of the syndicates in the primary market.

Figure 13 shows the nonbank share at originations of syndicated leveraged loans in the primary market. This share is calculated by taking the share of the number of nonbanks in the syndicate at origination relative to all lenders, both banks and nonbanks. In the U.S., there has been an upward trend in the nonbank share recently, and is generally higher than in the early 2000s when interest rates were also low by historical standards. In the secondary market, nonbank participants have been purchasing larger and larger volumes of these loans and, therefore, the shares on outstandings of loans are much more elevated, reaching to about 60 percent, according to Lee, Liu, and Stebunovs (2016) (Figure 14)[11]. In European EURIBOR-based syndicated term loan leveraged market, the nonbank share at origination has only been about half of the share in the U.S. The less prevalent number of nonbanks in the primary market helps explain why the fraction of leveraged term loans with interest rate floors are so much lower in European markets than in the U.S. market.

[11] The data source the authors use is Shared National Credit.

Finally, another recent development with respect to loan contracts in the syndicated leveraged term loan market has been the growing prevalence of original issue discounts (OIDs). These terms have been introduced to entice lenders to invest in these loans such that they could be sold off easily, usually to nonbank investors in the secondary market. Figures 15 and 16 show that their prevalence in loan contracts is highly correlated with the prevalence of interest rate floors.

In sum, it appears that nonbanks have played a key role in the introduction of interest rate floors. This is likely due to the fact that nonbank lenders' liability structures are less flexible than banks. For example, whereas banks can shift funding from or to wholesale short-term funding markets or deposits pretty easily as interest rises or falls, nonbanks, depending on the nature of their businesses, have limited freedom to adjust their liability structures. For example, various funds may only be able to rely on deposits; whereas, finance firms may have to rely on solely equity for financing investments. When floating rate interest returns fall below a certain threshold, nonbanks have incentive to act more like nominal yield investors to alleviate any mismatches between returns and the ability to adjust funding costs. In a relatively more bank-based financial intermediary market structure, as in Europe, these strains would be less severe and the transmission of monetary policy to credit markets would be less disrupted.

Hanson and Stein (2015) points out the role of banks as yield-oriented investors in affecting the term premia, as large fractions of their balance sheets support interest income. However, in the syndicated term loan market, banks usually originate to distribute, and a significant portion of income from this activity comes from fees. As with most of the credit risk, the role of acting as nominal yield-investors is, in essence, transferred to the nonbanks in this market as well.

Nini (2012) examines the effect of the growth of non-bank institutional investors, primarily collateralized loan obligations, in the market for corporate loans. There is considerable evidence that the growth of new investors generated an increase in the supply of loans, and he examines the effect on corporate financing decisions. The evidence suggests that institutional loans are a close substitute for bank-funded term loans, so the supply shock largely resulted in fewer bank loans on firms' balance sheets. There is modest evidence that firms increased their use of total debt. There is no evidence that institutional loans are a substitute for other types of financing, including bonds and revolving credit. Finally, there is considerable heterogeneity across borrowers, with the supply shock being largest for borrowers with higher credit risk and a near non-event for other borrowers. He concludes that loans are special in firms' capital structures but that banks have no advantage vis-a-vis non-banks in funding term loans.

5 Limits to monetary policy transmission channel

This section investigates the limits to the transmission of monetary policy due to the introduction of interest rate floors in the current low-interest rate environment. The fact that interest rate floors may have monetary policy implications in addition to financial stability implications may mean that traditional monetary policy may not be the best tool to deal with the tradeoffs between inflation expectations and employment at the zero lower bound and below. *Critically, the market structure of credit markets may be an important source of information when it comes to considering the tradeoffs between monetary policy and financial stability goals.* Therefore, we address the monetary policy implications a bit more through empirical analysis.

We will show that the two ingredients that give a rise to the limits are nonbank participation in loan syndication and very low, near zero short-term interest rates. Of note, nonbank participation has been on a trend increase which has accelerated, likely in part, because of the ZLB. We will show that nonbank participation is associated with the introduction of interest rate floors and original issue discounts. These two loan features in turn are associated with riskier borrowers, higher borrowing costs, and financing that is given with limited restrictions on the debt-service capabilities of the borrower.

5.1 Likelihood of Interest Rate Floors

5.1.1 Empirical Methodology

A series of main probit regression results reinforces the idea that nonbank participants have played a major role in the introduction of interest rate floors. Specifically, we assume that the model takes the form:

$$
\begin{aligned}
Pr(\Lambda_{l,b,t} = 1|...) = \Phi(\alpha + \beta R_t \\
+\theta_{NB} R_t \times Nonbank\ lender_{l,b,t} + \theta_{IL} R_t \times Inst.\ type_{l,b,t} \\
+\gamma_{NB} Nonbank\ lender_{l,b,t} + \gamma_{IL} Inst.\ type_{l,b,t} \\
+\eta_{PB} Public_{l,b,t} \\
+\eta_{NR} Debt\ nonrated_{l,b,t} + \eta_{IG} Debt\ IG-rated_{l,b,t} \\
+\psi Amended\ or\ Refinanced_{l,b,t}),
\end{aligned}
\tag{1}
$$

where $Pr(\Lambda_{l,b,t} = 1)$ denotes the probability of having an interest rate floor in a loan contract in some regressions and an OID in other regressions; Φ is the CDF of the standard normal distribution; R_t is the base interest rate; $Debt\ nonrated_{l,b,t}$ is an indicator variable for an unrated borrower b, for loan l; $Debt\ IG-rated_{l,b,t}$ is an indicator variable for an investment-grade borrower; $Nonbank\ lender_{l,b,t}$ is the dummy for at least one nonbank participating in a loan i's origination (typically, there are many lenders originating a given loan); $Inst.\ type_{l,b,t}$ is an indicator variable for an institutional loan when it can be distinguished as a term loan that is not a "Term Loan A," which are mainly sold to nonbanks after origination. We also control for publicly available measures of risk: $Public_{l,b,t}$ is an indicator for a publicly traded borrower; $Debt\ nonrated_{l,b,t}$ is a dummy for the borrower's debt being unrated; and $IG - rated_{l,b,t}$ is a dummy for the borrower's debt being IG-rated. Being mindful of an econometric faux pas, we do not include borrower fixed effects and estimate a pooled model.[12] The estimation results are shown in Tables 3 and 4.

In subsequent, auxiliary probits, we replace the dependent variable with the following: An indicator for a leveraged loan, an indicator for the presence of a cancelation fee in a loan contract, and an indicator for a covenant lite loan (a type of loan whereby financing is given with limited restrictions on the debt-service capabilities of the borrower). We also include the dummy for an interest rate floor in a loan as a regressor. These probits in Tables 6 and 7 show that nonbank participation and floor clauses in particular are associated with riskier borrowing (leveraged, covenant lite loans) which are costly for borrowers to prepay (because of cancelation fees). These results suggest a trade-off that borrowers may face: Floors and higher cancellation fees versus free hand to leverage up.

5.1.2 Results

Table 3 shows results from the floors and OIDs probits for the United States (1996-2005 and 2006-15) and Table 4 for the euro area (2006-15).[13] In all the results, low policy interest rates are associated with a higher likelihood of floors in loan contracts.[14] Next, nonbank participation—either at origination ($Nonbank\ lender$) or after ($Inst.\ loan$)—increase the probability of a loan having an interest rate floor or an OID or both. This is consistent with nonbanks playing a major role in the existence of interest rate floors on loan contracts regardless of period and geographical location of the syndication. The interaction terms of nonbank participation and the policy rates indicates that conditional on nonbank participation lower policy rates increase the likelihood of interest rate floors or OIDs or both. Compared to loans to nonrated or investment grade borrowers, loans to speculative-grade

[12] Greene (2004) points at the incidental parameters problem that raises questions about the statistical properties of the estimator; he shows that the probit estimator is not well behaved. Assuming that the fixed effects model is appropriate, there are (at least) three alternatives: Use the fixed effects estimator in spite of the incidental parameters issue, use the random effects estimator, even though it is, at least in principle, inconsistent, or ignore the heterogeneity and use the pooled estimator. It is unclear which should be preferred. All three estimators are biased and inconsistent. The random effects estimator is overwhelmingly the worst of the three. It is ambiguous whether one should use the fixed effects estimator or pool the data and ignore the heterogeneity. The interesting result is that, when T is very small, while the fixed effects estimator is biased upward, the pooled estimator is biased downward. Because the borrowers show up in the data a few times, our T is small.

[13] The results are robust to inclusion of firm-specific controls, which may appear less exhaustive than those in other studies that rely on Compustat and, therefore, only study large, public borrowers.

[14] This and subsequent findings hold true for expected policy rates (not shown).

borrowers have a higher likelihood of having interest rate floors as well.[15] Finally, a loan being amended or refinanced increases the probability of having a floor clause in the loan's contract. This may indicate that lenders realize that floor clauses may increase credit risk of loans. Therefore, in introducing floor clauses to loan contracts, lenders target borrowers that they are familiar with from their previous lending interactions. We will explore this further in the subsequent regressions.

The interaction of policy rates and nonbank participation explains a large fraction in variation the dependent variables: Pseudo R-squares are 40 percent or higher for the 2006-15 period when both low short-term rates prevailed and nonbank participation was widespread. The addition of firm-specific factors boosts pseudo R-squares by just a few to several percentage points.

Figure 19 illustrates predicted probabilities of interest rate floors in U.S. loans conditional on a loan being a bank loan or an institutional loan and other variables being at their means. This figure is based on on the results in column (4) of Table 3. Predicted probabilities for floors in institutional loans at low, near zero federal funds rates at over 70 percent are very high. These calculations highlight the importance of the two ingredients for the limits of monetary policy transmission: **Nonbank participation and low interest rates**.

Moving to the results for the auxiliary probits shown in Tables 6 and 7, floor clauses are associated with higher likelihoods of leveraged loans, cancelation fees, and covenant lite characteristics.[16] Note again the importance of the interaction of the macro factor and nonbank participation in explaining the likelihood of riskier borrowing that is costlier to repay.

Note also that neither the nonbank lender dummy nor the institutional loan dummy perfectly capture nonbank participation—this is relevant for both the main and auxiliary probit regressions. The nonbank lender dummy captures nonbank participation at loan origination and indicates that other nonbanks may buy parts of the loan at a later stage, possibly in a private transaction. The institutional loan dummy captures nonbanks' potential interest in the loan because its characteristics are tailored towards nonbank investor preferences. Such loans are more likely to be traded in the secondary market. Overall, we think that the institutional loan dummy is a stronger indicator of nonbank participation than the nonbank lender at origination dummy and, therefore, we place more emphasis on the former and pay more attention to its interaction with the macro factor.

[15] Many institutional lenders specialize in sub investment grade debt and loans. Therefore, this is another piece of indirect evidence that nonbank lenders play a major role in the introduction of interest rate floors in loan contracts.

[16] Cancellation fees are charged for finishing paying the loan before the maturity date, expressed in dollar amounts or percentages of the loan amounts. Some loans have additional provisions that if there is a prepayment, then the lenders will charge a fee of certain percentage and then will renegotiate terms of the loans.

5.2 Expected duration of binding floors

Having established which factors drive the presence of interest rate floors (and OIDs) in loan contracts, we establish next how long at origination these floors are expected to bind.[17] We compare floors with one-month OIS rates at various horizons—at 12, 24, and 36 months ahead—at loan origination.[18] We construct a statistic which shows the minimum number of years that an interest rate floor is expected to be binding for a given loan. We focus on the 2006-15 sample period for the United States because of the prevalence of floors in this particular data cut.

The results in Table 5 suggest that both the mean and median number of years that interest rate floors are expected to be binding is 2 years, while both the mean and median of the underlying loans' maturity is 6 years. Therefore, interest rate floors of the underlying loans are expected to bind, on average, a third of loan maturity. Therefore, interest rate floors of the underlying loans are expected to bind, on average, a third of loan maturity, negating any benefits from monetary policy easing and shutting off the balance sheet channel of monetary policy.

The results also show that some borrowers are affected more than others. A large fraction of borrowers—particularly risky, leveraged borrowers which tend to have expensive liabilities—will be negated the benefits of monetary policy easings on their outstanding loans for a very long time. Of course, some of them may have opted to refinance their loans with floors, but the benefits of refinancing may be limited because pre-paying an outstanding loan likely requires paying penalties (as demonstrated in Tables 6, for example). In addition, because nonbank lenders are less willing to offer loans without floors to risky, leveraged borrowers, refinancing into a floor-free loan may less likely for those borrowers.

To shed a bit more light on changes in the distribution of the minimum number of years that an interest rate floor is expected to be binding, we overlay histograms for expected durations of binding floors for 2007 and 2010. In particular, we want to see how the distribution changed with declines in the policy rate. As Figure 18 shows, the majority of loans with floors in 2007 had duration spells of less than a year, while about 40 percent of floors in 2010 were expected to bind at least 3 years since loan origination. As markets began to expect the benchmark rates to stay lower for longer, lenders responded by introducing more restrictive floor levels into new loan contracts. Again, this finding shows that the balance sheet channel of monetary policy (that is, a policy easing driving down the cost of existing liabilities of corporates) was not expected to be effective for a lot of borrowers over a long

[17] As the data suggest, in 99 percent of cases floors are binding at loan origination, therefore, this dummy may stand for the presence of a binding floor too.

[18] An Overnight Index Swap (OIS) is an interest rate swap agreement where a fixed rate is swapped against a pre-determined published index of a daily overnight reference rate—for example, the federal funds rate for an agreed period. We focus on these horizons, because OIS rates at longer than 36-month horizons became available only beginning 2013.

period—in fact, over half of the average duration of syndicated term loans.

This is a good place to discuss a related but separate issue—borrowers hedging interest risk from floating rate liabilities. Per Ippolito, Ozdagli, and Perez (2015)'s finding, among public companies, larger borrowers tend to hedge fluctuations in the cost of floating rate liabilities. As for loans with floors, we think that borrowers have no incentive to hedge interest rate risk, in part, because such risk tends to be very limited over the loan duration. As shown earlier, in later years of the ZLB, interest rate floors were expected at loan origination to bind over the majority of the loan duration. In addition, because we do not merge Compustat to our data, our sample contains a very large number of smaller, private firms that are unlikely to engage in interest rate hedging of any sort.

5.3 Loans' Total Costs, Amounts, and Maturities

5.3.1 Interest rate floors and other loan characteristics

This section investigates the trade-offs borrowers and lenders face when introducing interest rate floors in loan contracts. We note differences in other loan characteristics of loans with and without interest rate floors. For the U.S. in the past ten years, where the data is more abundant, we notice a few patterns.

We look at how loans with floors differ with those without floors. We look at from 2011 onwards only because prior to 2011 many loans still did not have interest rate floors and the 2008-09 financial crisis was the period when many terms and conditions were adjusting with markets. Therefore, we may be picking up spurious correlation between interest rate floors and the level of spreads, for example.

First, from the borrower's perspective, the interest rate floor does not seem to bring forth any benefits along many terms and conditions in the loan contract. For example, loans with floors are associated with higher spreads, more OIDs, and upfront fees. For about 4600 term loans with LIBOR floors, the median and average spread is 450 and 490 basis points, respectively. This is in contrast to a median spread of 290 basis points and mean of 325 basis points for 7200 loans without interest floors during the past five years in the U.S.. Also, about 3800 of the 4600 loans with floors have OIDs; whereas, only about 160 of the 7200 loans without floors have OIDs. Similarly, about 3300 of the 4600 loans with floors have upfront fees; whereas, only about 460 of the 7200 loans without floors have them.

However, loans with floors appear to be associated with longer maturities - the one term that can be seen as a substitute for the existence of interest rate floors. Essentially, lenders appear to allow for longer maturities when negotiating with the arrangers in the syndication such that borrowers have something in return for introducing interest rate floors in the loan contract. The median and average maturity for loans with floors is 366 and 506 days greater than those for loans without floors in the past five years.

To investigate this further, we tracked loans for a given borrower over time and divided each borrower into those with loan contracts that did not have floors and introduced floors at some point and those that did not have a floor for the entirety of the sample between 2005 and 2016. As if Figure 17, we set t = 0 as the date in which the floor was introduced. For those borrowers that did not have floors introduced in their loan contracts, we set t = 0 as the middle of July 2011 (which is the median of the date in which the borrowers that had floors introduced them). Comparing the loans with floors and the floors without loans at the median of the loans with floors, we see a sharp increase in the maturity of the loan when a floor is introduced (to one additional year).

We also find similar results with respect to loan size. By introducing floors, loans appear to be associated with larger loan amounts.

All of this has financial stability implications from both the lenders' and borrowers' perspective. First, for the lenders who eventually hold these leveraged term loans, though they are being compensated for receiving higher returns through interest rate floors, OIDs, and upfront fees, the increased cost of funding of the borrowers with greater loan volume may make them riskier. In addition, these riskier interest payments are locked in for longer periods of time through increased maturities, while riskier borrowers who cannot get funding in this market may be able to tap the market with these more costly terms. The question is whether the lenders are adequately being compensated for the increase in risk. Second, from the borrowers' perspective, their interest payments are increasing, but they are allowed to borrow more or for longer maturities through the introduction of floors. This likely increases leverage and the question is whether firms are able to take advantage of investment opportunities.

5.3.2 Empirical Methodology

The key hypothesis with regards to how interest rate floors (and other types of terms introduced by nonbank lenders) may affect the transmission of monetary policy begins with the idea that the responsiveness of the cost of borrowing to monetary policy based on short-term interest rates in the U.S. has been more tenuous recently than in the past and also compared to Europe due to the higher level of nonbank participation in the syndicated term loan market.

We work with the following baseline regression:

$$\begin{aligned}
\Gamma_{l,b,t} &= \alpha_b + \beta R_t \\
&+\gamma_{NB} Nonbank\ lender_{l,b,t} + \gamma_{IL} Inst.\ type_{l,b,t} \\
&+\rho_F Floorclause_{l,b,t} + \rho_O OID_{l,b,t} \\
&+\eta_{PB} Public_{l,b,t} \\
&+\eta_{NR} Debt\ nonrated_{l,b,t} + \eta_{IG} Debt\ IG-rated_{l,b,t} \\
&+\psi Amended\ or\ Refinanced_{l,b,t} \\
&+\epsilon_{l,b,t},
\end{aligned} \tag{2}$$

where $\Gamma_{l,b,t}$ is the total borrowing cost, which is the sum of the base rate (or the binding interest rate floors when there are any), spreads, annualized upfront fees, annual fees, and OIDs for loan l to borrower b at time t. Alternatively, we consider the total cost of borrowing sans the spreads, that is, we take out from the total borrowing cost the information on the riskiness of the loan (see Lee, Liu, and Stebunovs (2016)). This alternative measure helps to ensure that the borrowing cost is unlikely affected by the ex ante credit risk of a loan. Finally, we regress loan spreads on the explanatory variables to see how additional credit risk associated with interest rate floors and other loan characteristics is priced. We include borrower fixed effects α_b that control for the inherent riskiness and other characteristics of the borrower does not change significantly over time. We also control for some publicly available measures of risk: Whether the borrower is public and whether the borrower's debt nonrated or investment grade. R_t is the short-term rate that reflects the stance of monetary policy—the federal funds rate in the United States or the ECB MRO rate in the euro area.[19] Finally, $\epsilon_{l,b,t}$ is a white noise error, which we cluster by time to account for correlations that can be present at a given point in time due to monetary policy across the loans in our sample.

Our hypothesis is that the pass-through, β, of the cost of borrowing to U.S. monetary policy in the U.S. syndicated term loans during 2006-15, was more tenuous than in the past (1996-2005) and compared to the euro area (2006-15), as nonbanks have played a larger role in the market both compared to the past and across the Atlantic.

To delve deeper into such a hypothesis, we include regressors that capture nonbank participation, loan characteristics that are associated with nonbank participation, and some borrower-specific characteristics. Recall from the earlier probit results that nonbanks play a major role in introduction of floor clauses and OIDs. Because the presence of interest rate floors may increase credit risk and a way to reduce such risk is to lend to better known borrowers, we include dummies for loans being amended or refinanced.

Our prior is that, if indeed nonbanks have been playing a large role in the introduction of interest rate floors (and OIDs) that may limit monetary policy transmission. In this

[19]We also look at one year forward policy expectations as a robustness check.

regression, we can capture this hypothesis in a number of ways. First, we can show that β has declined significantly (if not controlled for nonbank participation). Second, we can show that β has not changed much, but the nonbank participation coefficients—γs offset β to a significant extent. Third, the pricing coefficients on other nonbank-related terms—ρs—may further offset β. Overall, we hypothesize that the larger the nonbank role is at origination and subsequently, the more tenuous is the relationship between short-term monetary policy rates and the total borrowing cost and, in particular, the cost sans loan spreads. We are interested in the coefficient on the amended or refinanced loan dummy too, especially, in the regressions with loan spreads—a proxy for credit risk—on the left. While floors in loan contracts may increase credit risk, lenders may seek to mitigate it by lending to well-known borrowers, that is borrowers that have been interacting with most recently. Therefore, an amended or refinanced loan may have better pricing terms than a newly originated one.

We are also interested to see whether nonbank lender participation or presence of contractual floors is associated with increases or decreases in loan sizes and contraction or extension of loan maturities. It is likely that the total borrowing cost and its components are not the only margins of adjustments in response to low benchmark interest rates and active nonbank lender participation in syndication. Therefore, we estimate regression models based on equation 2 with $\Gamma_{l,b,t}$ being a log of a loan amount (in millions of U.S. dollars or euros) or a loan maturity (in months).

We note that we can control for additional borrower characteristics but only a cost of a very significant reduction the sample size. For example, if borrower sales at loan origination are used instead of borrower fixed effects, the sample size shrinks by a third to two thirds, but the statistical and economic significance of many coefficients of interest remains unchanged. Therefore, we prefer to estimate our models on the largest sample possible.

5.3.3 Summary Statistics

Tables 8 to 10 describe the summary statistics of our data by period and region. In Table 8, the summary statistics are for LIBOR-based U.S. syndicated term loans from 1996 to 2005. We see that there was a sizeable degree of variation in all of our variables. The nonbank share at origination was minimal as the median loan had no nonbanks participate in the origination of loans in the primary syndicated loan market. Comparing this to Table 9, the median share increased to 11 percent during the next decade (2006-15). Table 10 shows the summary statistics for EURIBOR-based euro area loans. In Europe, the share of nonbanks at origination are even more muted than two decades ago in the U.S. market. Recently, though, the ECB MRO rate has not gone negative yet, other benchmark interest rates have gone negative in Europe as depicted by the minimum cost of borrowing without spreads.

5.3.4 Results

Tables 11 to 13 show our results for the total borrowing cost, the total borrowing cost sans the loan spread, and loan spreads for the 1996-2005 and 2006-15 periods for the United States and the 2006-2015 period for Europe, respectively.

The results for the 1996-2005 period in the United States suggest that the pass-through from the federal funds rate to the total borrowing cost (not conditional on nonbank participation, column(1) in Table 11) at 0.831 was not perfect and that participation of nonbank lender in syndication boosted notably the total borrowing cost (column (2)).

At the same time, the pass-through from the federal funds rate to the total borrowing cost sans the loan spread was much higher at nearly 1 (columns (3) and (4)). This finding is not surprising for a few reasons. First, the benchmark rate—the U.S. dollar LIBOR—represented the largest component of the total borrowing cost sans the spread and other, less significant components varied little across loans. Second, interest rate floors in loan contracts were very rare and were not binding. Third, the benchmark rate was highly correlated with the federal funds rate. Participation of nonbank lender in syndication did not affect the total borrowing cost sans the loan spread, indicating that participation of nonbank lenders affected riskiness of loans being originated (because the total borrowing cost is in part driven by credit risk) rather than fees that are unrelated to compensation for credit risk.

As for the pass-through from the federal funds rate to loan spreads, the β is negative, as one may expected as monetary policy tends to be countercyclical with respect to credit cycles. In a more causal setting, as in Aramonte, Lee, and Stebunovs (2015) or Lee, Liu, and Stebunovs (2016), the negative β suggest that monetary policy easings encourage risk taking in the syndicated loan market. More importantly, the results suggest that nonbank participation and the presence of interest rate floors are associated with higher credit risk. However, a loan being amended or refinanced is associated with lower credit risk. This regression model does not include OIDs as those were very rare over the sample period.

The results for the 2006-15 period in the United States, which covers the ZLB period, show that the pass-through from the federal funds rate to the total borrowing cost (not conditional on nonbank participation, column(1)) at 0.626 deteriorated significantly (column (1) in Table 12). In contrast, the pass-through that is conditional on nonbank participation and loan characteristics that are associated with it, at 0.835 (column (2)), has changed little from the earlier period. However, the results still suggest severe limits to monetary policy transmission. For example, consider a cut in the federal funds rate in December 2008 from 1 percent to the mid-point of the 0 to 25 basis point range. This cut of 87.5 basis points could have been associated with a 73 basis point reduction in the total borrowing cost being it if not for such a new likely loan characteristic as an interest rate floor, which bumps up the cost by nearly 200 basis points. The overall effect would be an increase of 112.5 basis points in the total borrowing cost for a new loan being originated with nonbank participation. This finding is reminiscent of Brunnermeier and Koby (2016)'s "reversal interest rate", that is, the rate at which accommodative monetary policy "reverses" its effect and becomes contractionary. However, as we have noted earlier and will show later in some more detail, borrowers may be trading off a higher cost of borrowing for other favorable loan terms. For example, higher cost loans with floors appear to be covenant lite loans (see the auxiliary probits) and come with a significant increase in loan sizes and loan maturities. Therefore, it is hard to say whether on balance we are observing a true "reversal interest rate" in Brunnermeier and Koby (2016)'s sense.

Similarly, the pass-through from the federal funds rate to the total borrowing cost sans the loan spread deteriorated as well, but, at 0.892, to a smaller extent. The large difference in the pass-throughs from the federal funds rate to the total borrowing cost and to the total borrowing cost sans the loan spread reflects credit risk working against the effects of the stance of monetary policy. In contrast to the earlier years, participation of nonbank lender in syndication affected the total borrowing cost sans the loan spread likely because of prevalence of binding interest rate floors in loans that were funded in part by nonbank lenders (or originated by banks with intent to sell these loans to nonbank lenders later). Overall, nonbank lender participation affected both the riskiness of loans being originated and the fees that are unrelated to compensation for credit risk.

The results for the 2006-15 period in Europe (in Table 13), which covers the ongoing NIPR period, are somewhat different from those for the United States. The most striking differences include the lack of the nonbank lender participation effect that offsets the effects of the monetary policy stance. Of note, nonbank lender participation at origination is much lower in Europe than it is in the United States, which likely explains the lack of the significance. Interest rate floors, though, still are associated with disrupting the monetary policy transmission channel. These results that are weaker than those for the United States appear to suggest that a potential conflict between monetary policy and financial stability goals in the euro area is weaker than that in the United States, letting the ECB push its policy interest rates further into the negative territory.[20]

Moving on to the regressions explaining variation in loan sizes and maturities which highlight some of the reasons why borrowers may be interested in loans with interest rate floors. Tables 14 and 15 show the results for the regressions for the United States and Europe, respectively. Focusing on the 2006-15 period, the presence of interest rate floors an OIDs is associated with larger loan sizes in the United States, while OIDs are associated with larger loan sizes in Europe.[21] As one would expect, loan maturity is procyclical, it is

[20]It may also suggest that weak credit provision in the stressed European environment is in part because nonbanks are not actively participating in loan syndication.

[21]In a specification without nonbank participation variables, the results are consistent with the bank lending channel literature: Lower interest rates translates to greater loan size. However, once we introduce interest rate floors into the equation, this relationship disappears.

positively correlated with the stance of monetary policy. In the 1996-2005 period, given the rarity of loans with interest rate floors, the floors have no effect on loan maturity. However, in the ZLB and NIPR periods, the presence of interest rate floors in loan contracts appear to extend loan maturity by a significant 6 to 7 months. (A typical maturity of syndicated term loans is about 5 years.) In addition, OIDs in loans originated in the United States are associated with a 7 month extension of loan maturities. Overall, in the United States, loan characteristics associated with nonbanks—floors and OIDs—add about 12 months to loan maturity.

It appears that borrowers may be trading a higher total borrowing cost (because of binding floors and OIDs) for larger loans with longer maturity. However, this extension of loan maturities may not necessarily reduce a financial stability risk of widespread loan defaults for two reasons. First, given an economic slowdown with deflationary pressures which lead to a ZLB or NIPR period, borrowers may experience a fall in revenue and, therefore, suffer from a higher debt servicing burden. Second, many of the loans with interest rate floors have a balloon payment at maturity to closely mimic the cash flow of a typical fixed income to please nonbank lenders. Therefore, a borrower does not get to pay smaller principal installments over the loan duration but faces a large one-time principal payment at loan maturity. Assuming that there is a sizeable rollover risk, facing a large balloon payment may pose a higher default risk.

To sum up, nonbank participation and the loan characteristics appear to aggravate the dynamics of low rates, higher debt burden, and greater financial stability risk outlined above.

5.4 Nonbanks and first time borrowers

We have speculated that nonbank participation may have facilitated easier access to syndicated term loans for first time borrowers, repeated borrowers, or both. That is, nonbank participation may be associated with the expansion of credit on both an intensive margin and an extensive margin. This is a testable hypothesis. To set things up a bit more, consider Figure 20 which shows the annual numbers of loans that nonbanks originated or likely bought into, loans made to repeat borrowers, and loans made to first time borrowers. It is striking that that the nonbank loan trend and the repeat borrower trend are similar, while the first time borrower trend diverges notably from the two. To be more formal, we estimate a probit similar to the earlier ones, see model 1. In these new probits, we replace the dependent variable with a dummy for first time borrower and drop one or two redundant variables and estimate the model for the 2006-15 period.

The construction of the first time borrower dummy is straight forward. The dummy is defined at a parent level of a borrower. We assign the value of 1 to the dummy when (1) a given borrower parent had not borrowed a syndicated term loan in the 1996-2006 period and (2) borrows for the first time in the 2006-15 period.[22]

Table 16 shows the estimation results for both the United States and Europe. For the United States, the policy rate is the federal funds rate, and, for Europe, the ECB MRO rate. As the coefficients on the nonbank lender and institutional loan variables suggest, nonbank participation reduces the likelihood of a first time borrower loan. In addition, the interaction term of the policy rate and nonbank participation suggests that a policy easing is associated with lower likelihood of first time borrower loans conditional on nonbank participation. Possible reasons for nonbanks' lack of enthusiasm for opaque, first time borrowers are risk aversion and asymmetric information about borrower quality—both of which likely increases in a crisis. In this vein, more generally, borrowers that have non-rated debt and that are private companies appear to be less likely to be first time borrowers. For Europe, the results are qualitatively similar but statistically somewhat weaker.

Of note, the explanatory power, as suggested by pseudo R-squareds, is quite low which is not surprising since we have a limited set of borrower-specific right-hand side variables. There are at least two reasons why we do not model borrower decisions to borrow in general and to borrow in the syndicated term loan market at a certain moment in particular. First, the corporate finance literature is yet to converge on a standard model for such decisions.[23] Second, our focus is on the supply side of term loans, in particular, on the importance of the changing structure of the syndicated term loan market.

6 Further points and robustness checks

Finally, we conduct a few robustness checks. First, we replace the spot policy rates—the federal funds rate and the MRO rate—with one-month OIS rates 12 months ahead which are denominated, respectively, in the U.S. dollars and euros. These OIS rates are often used as proxies for policy rate expectations and are determined, in part, by the central banks' forward guidance. Therefore, this analysis captures the effects of forward guidance on the cost of borrowing: We can show, for example, that, interest rates floors were introduced in anticipation of the ZLB in the United States. We find qualitatively similar results to those presented earlier (not shown). In addition, this analysis alleviates identification concerns

[22] The results are robust to an alternative specification that takes into account a given borrower's history of credit lines and term loans.

[23] We are also concerned about data requirements for such an exercise. Inevitably, we will have to deal with a significant reduction in the sample size and a severe sample selection issue as the reduced sample will capture only public companies. However, we are aware of evidence that certain types of firms look for funding the syndicated market while others in the bond market. For example, Altunbas, Kara, and Marques-Ibanez (2010) investigate the financial factors behind the issuance of syndicated loans for an extensive sample of euro area non-financial corporations. In particular, they compare these factors to those of its major competitor: The corporate bond market. They find that large firms, with greater financial leverage, more (verifiable) profits, and higher liquidation values tend to prefer syndicated loans. In contrast, firms with larger levels of short-term debt and those perceived by markets as having more growth opportunities favor financing through corporate bonds.

about the limited variation in the federal funds rate in the post crisis period. The U.S. dollar OIS rate varied significantly more than the federal funds rate, as market participants adjusted their views about the timing and magnitude of a lift-off. Second, we restrict our analysis to the subset of borrowers that received leverage loans which we identified as loans with loan spreads above a certain threshold. Based on available data of debt to EBITDA multiples of three or more, we determined these thresholds to be 250 basis points for the U.S. market and 225 for the European market. We find the same results for cost of borrowing minus spreads as our dependent variable (not shown).

Third, we explore potential conflicts of monetary policy and financial stability goals in more detail. To illustrate these conflicts, we look at a real borrowing cost. We think of the real borrowing cost as a proxy for a borrower's debt servicing burden. We consider expected inflation, which we take out from the nominal borrowing cost, to be a good indicator of expected growth in borrower revenue, on average across borrowers. As in Gilchrist, Lopez-Salido, and Zakrajsek (2015), for the United States, we use inflation compensation as a measure of expected inflation which is available from the early 2000s. The results (not shown) suggest that, as earlier, nonbank participation in loan syndication weakens the monetary policy transmission. Nonbank participation and associated loan characteristics increase the real borrowing cost, with or without the loan spread, no matter the federal funds rate. Note that borrowers which have loans with interest rate floors tend to be leveraged. Therefore, the riskiest corporations tend to benefit to a significantly smaller extent from the easing of financial conditions.[24]

Fourth, for a subset of loans, we verified that information about interest rate floors in LoanConnector matches that in borrower regulatory filings. We go over this check in detail in the appendix.

7 Conclusion

This paper analyzes a particular development in the syndicated term loan markets in the U.S. and Europe that been a result of substantial easing of monetary policy and the emergence of nonbank lenders as larger players in the market. These two factors have contributed to the emergence of interest rate floors in many of these loans, especially to those associated with higher spreads. As nonbanks have less flexibility to adjust their liabilities when faced with very low short-term interest rates, they require a certain guaranteed return on their investments. Although they have allowed the interest rate floors to be introduced with greater maturities and some evidence of greater loan size, this has led to the decoupling of the relationship between monetary policy rates and the cost of borrowing. This impairment

[24]Of course, we do not rule out the possibility that such borrowers can not have access to funding if it were not for nonbank borrowers.

has been most severe in the U.S. market as nonbanks appear to play a larger role in both the syndication process and secondary market activity compared to Europe and also compared to a decade ago.

Our results have implications for the interaction between monetary policy and financial stability goals. First, if nonbanks are not fully compensated for the additional risk taken on by increasing interest expenses for longer maturities otherwise, not only monetary policy is impaired, financial stability risk may increase in a zero lower bound environment. Second, if borrowers do not take advantage of their longer maturities in terms of investment opportunities, their debt service may become burdens in the long run.

Plenty of caveats to our analysis exist. For example, the most sophisticated firms may have hedged in the past (using collar options to have an interest rate floor and cap) or invested in interest rate swaps. The introduction of interest rate floors may have simply substituted for such behavior. However, it is difficult to imagine that all the borrowers, which include public and private firms, in our sample would engage in this exercise. Also, we investigate only originations, but the lending channel may occur through the general balance sheet of firms. Namely, there may be a larger impairment when it comes to the aggregate balance sheet of firms during the zero lower bound period. The effects we find may be underestimating the disruptions to the link between monetary policy and borrowing costs.

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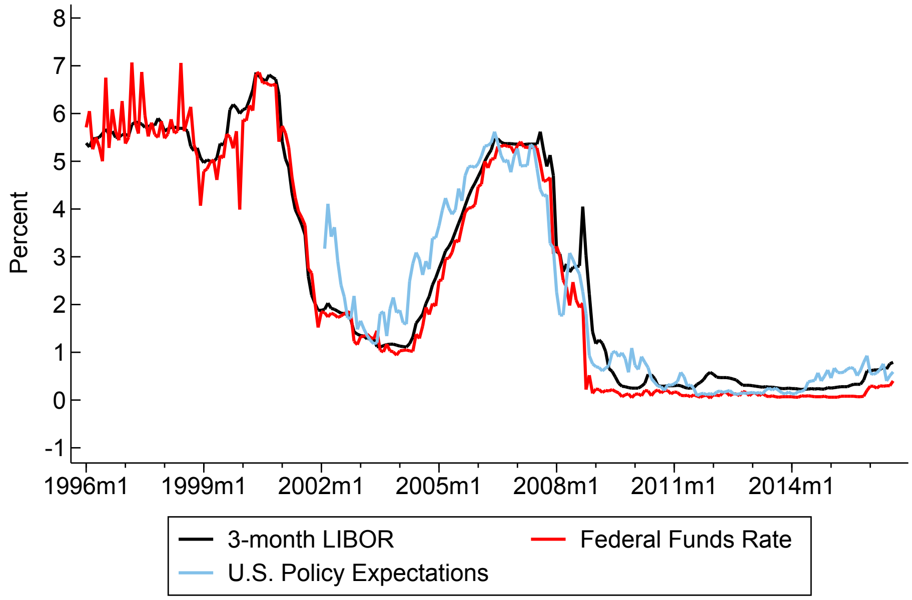
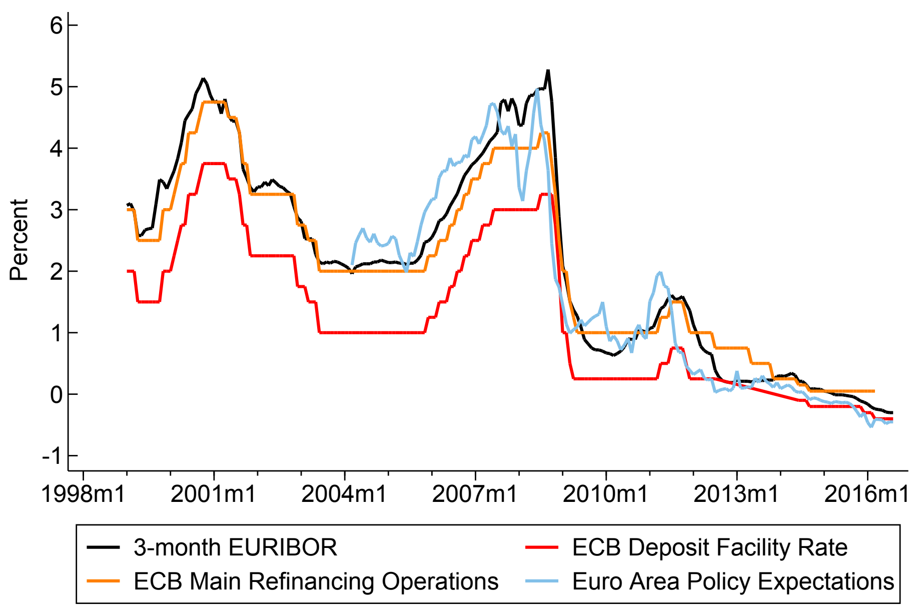


Note. Policy Expectations defined as one-month U.S. dollar OIS rate 12 months ahead.

Figure 1: **U.S. Short-term Interest Rates**



Note. Policy Expectations defined as one-month euro OIS rate 12 months ahead.

Figure 2: **European Short-term Interest Rates**

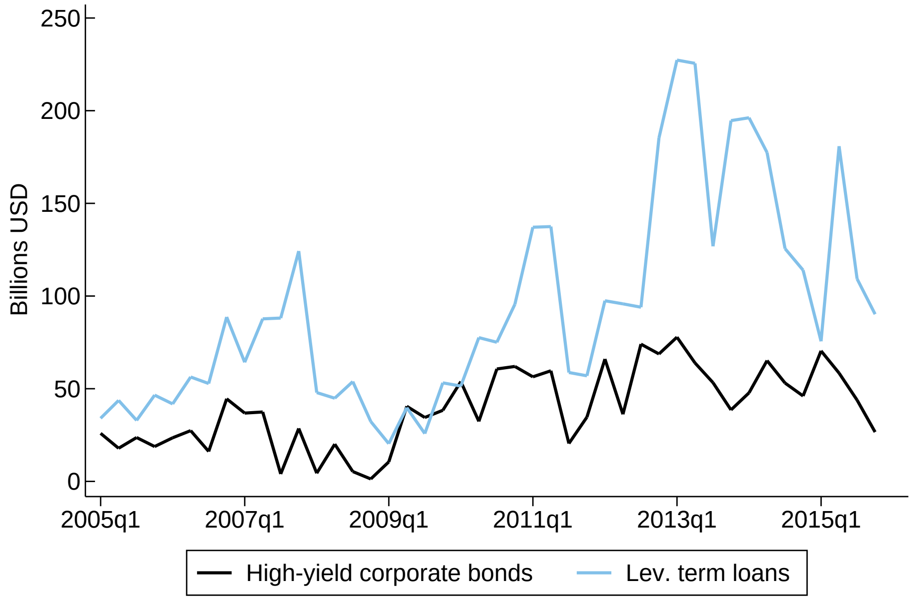
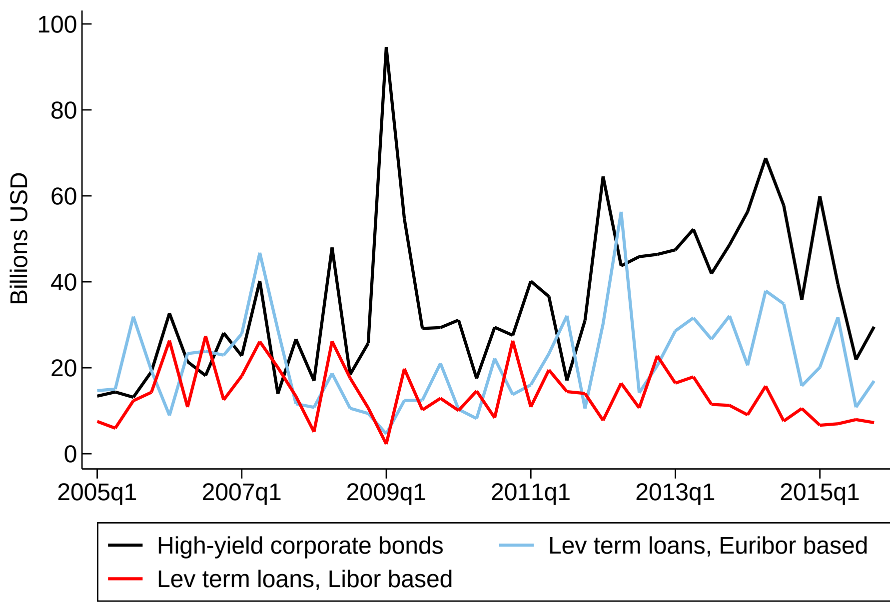
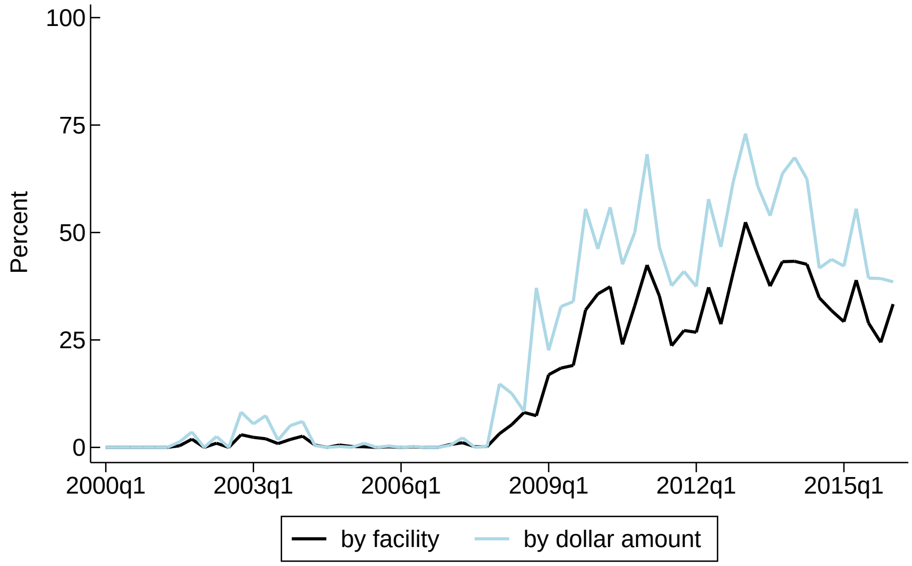


Figure 3: **Issuance of High-yield Bonds and Leveraged Loans, U.S.**



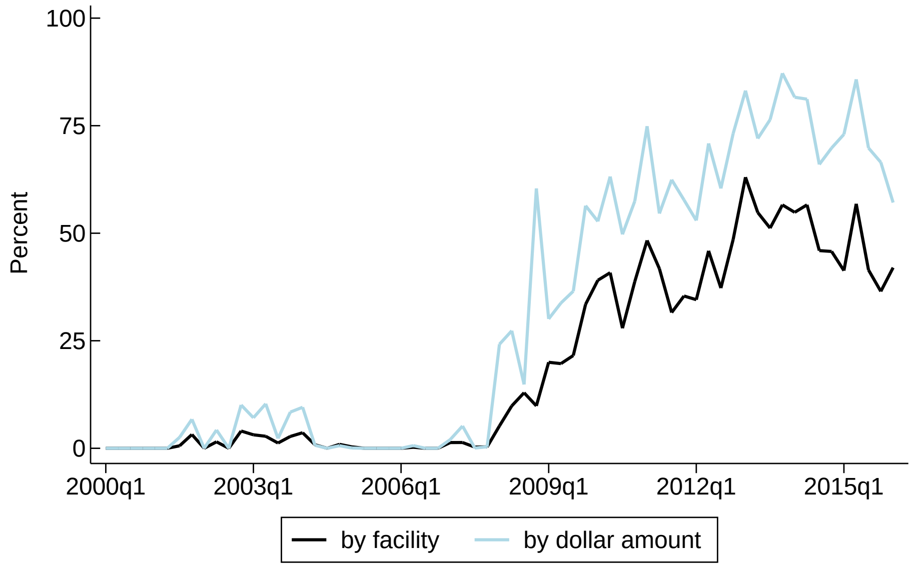
Note. Volumes in euros converted to U.S. dollars at end-quarter exchange rates.

Figure 4: **Issuance of High-yield Bonds and Leveraged Loans, Euro Area**



Note. Based on loans indexed to the LIBOR.

Figure 5: **Prevalence of LIBOR Floors in the U.S. Syndicated Term Loan Market**



Note. Based on loans indexed to the EURIBOR.

Figure 6: **Prevalence of LIBOR Floors in the U.S. Leveraged Term Loan Market**

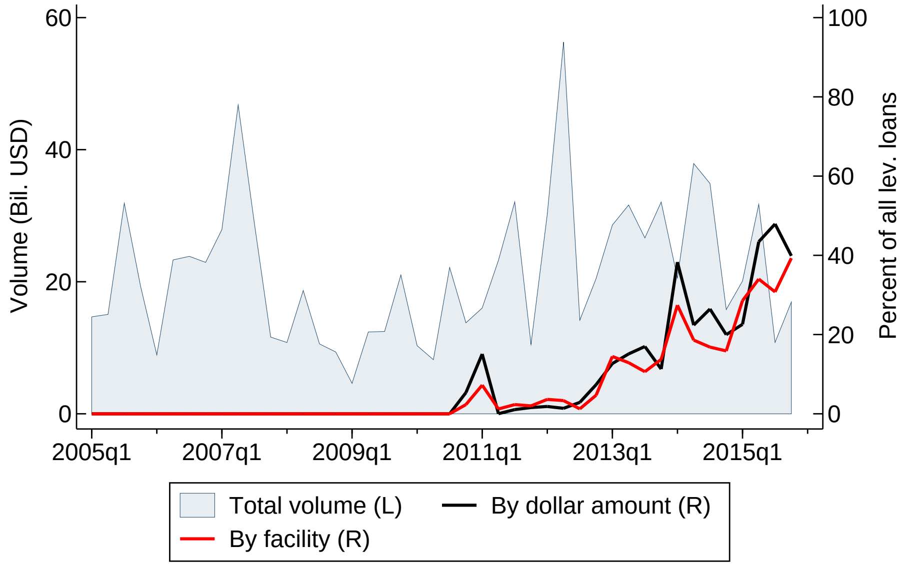


Figure 7: **Prevalence of EURIBOR Floors in the European Leveraged Term Loan Market**

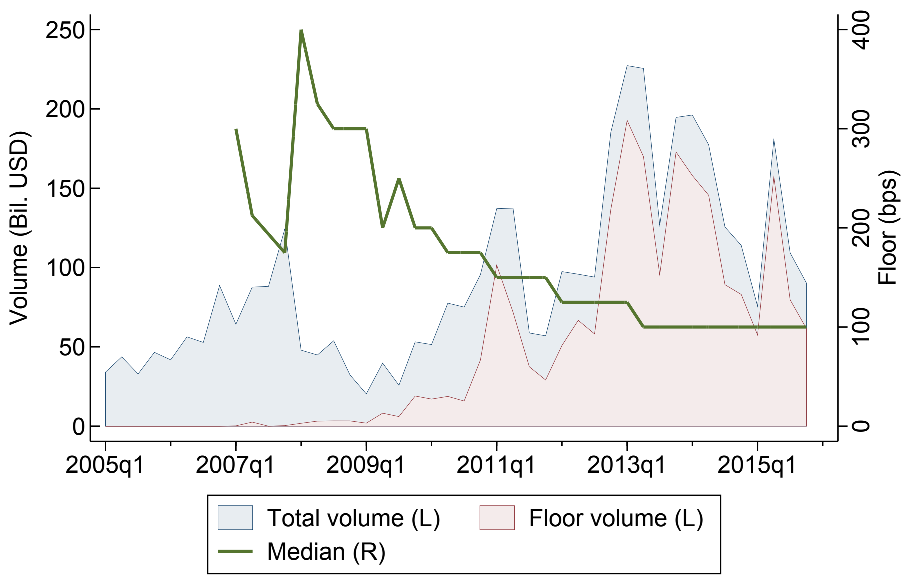


Figure 8: **Level of LIBOR Floors in the U.S. Leveraged Term Loan Market**

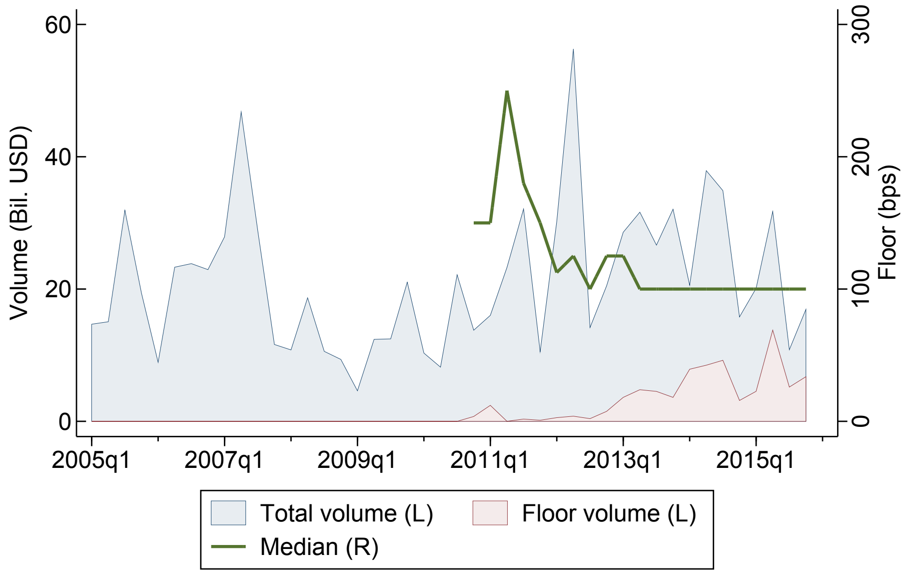


Figure 9: **Level of EURIBOR Floors in the European Leveraged Term Loan Market**

Figure 10: **Total Cost of Borrowing of Leveraged Loans, U.S.**

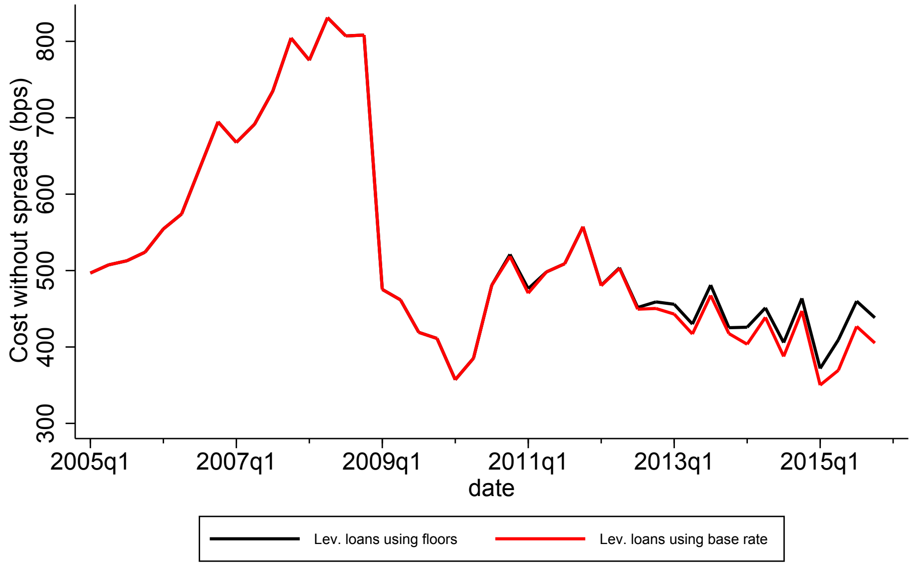


Figure 11: **Total Cost of Borrowing of Leveraged Loans, Euro Area**

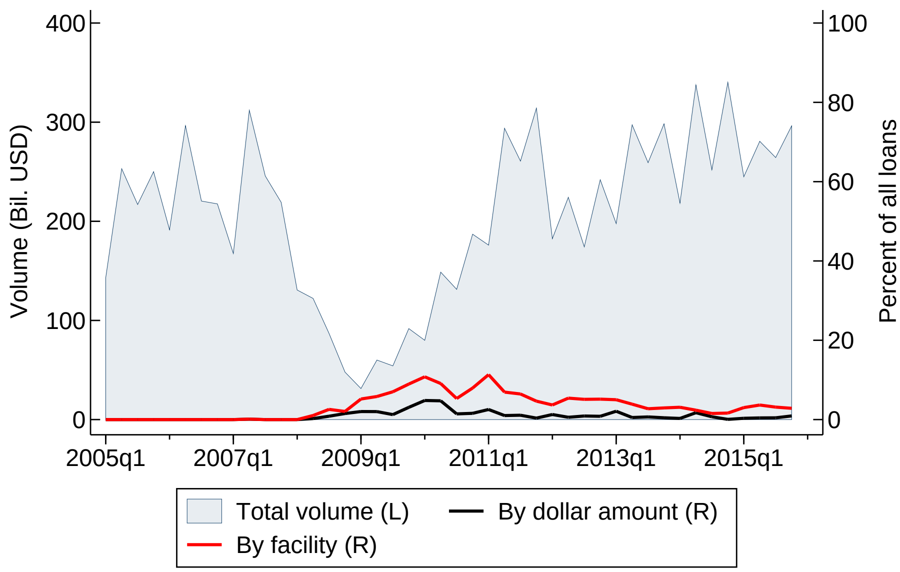


Figure 12: **Prevalence of LIBOR Floors in the U.S. Syndicated Revolver Market**

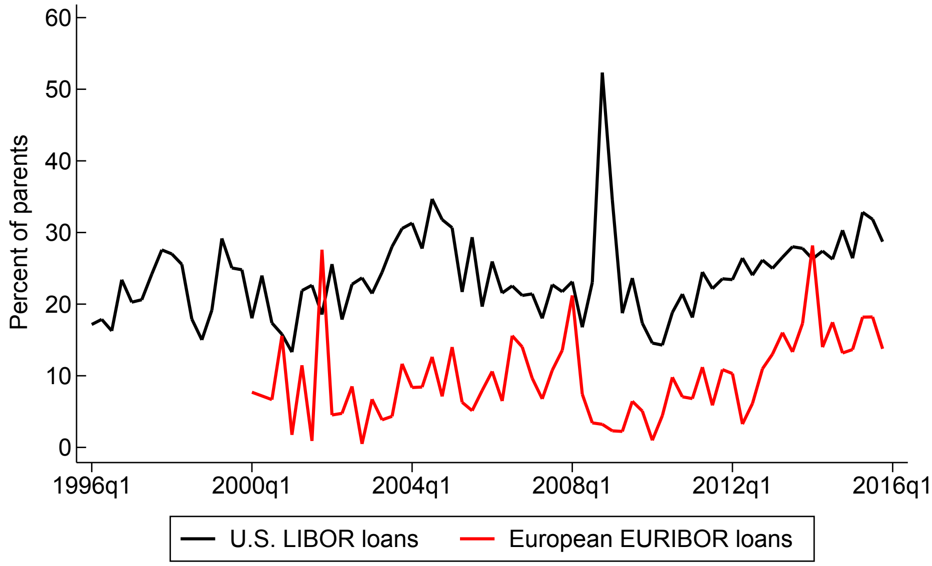
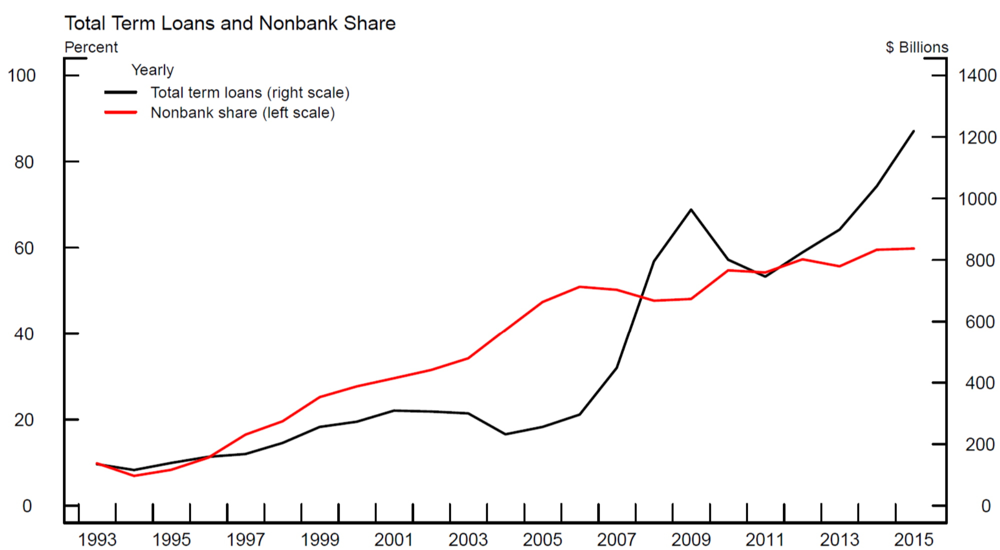


Figure 13: **Nonbank Shares (of Number of Lenders) at Origination for Syndicated Leveraged Loans**



Source: Shared National Credit.

Figure 14: **Nonbank Shares of Outstanding U.S. Syndicated Term Loans**

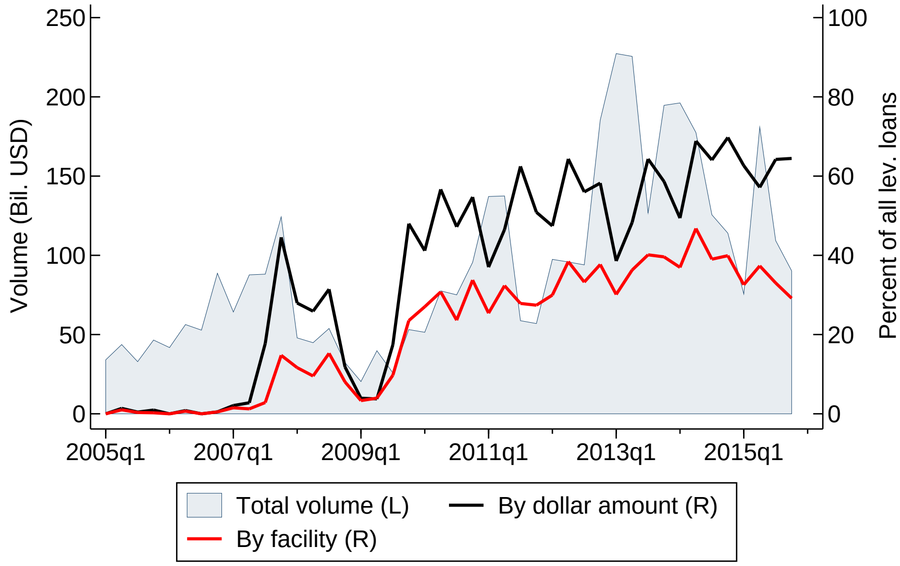


Figure 15: **Prevalence of OIDs in the U.S. Syndicated Leveraged Term Loan Market**

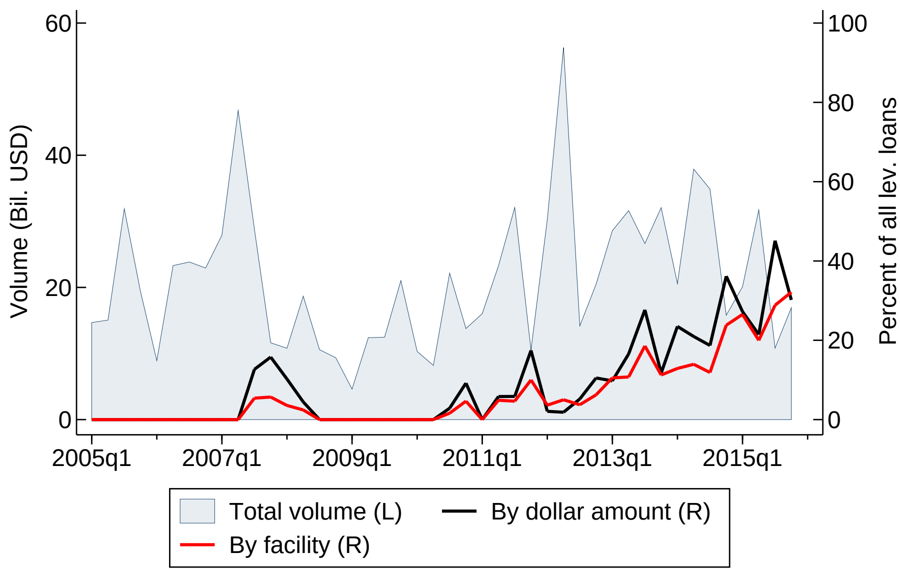


Figure 16: **Prevalence of OIDs in the European Leveraged Term Loan Market**

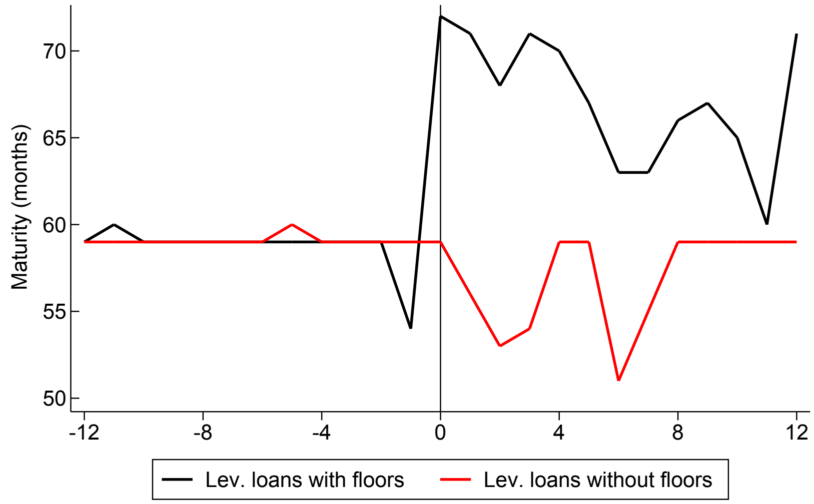
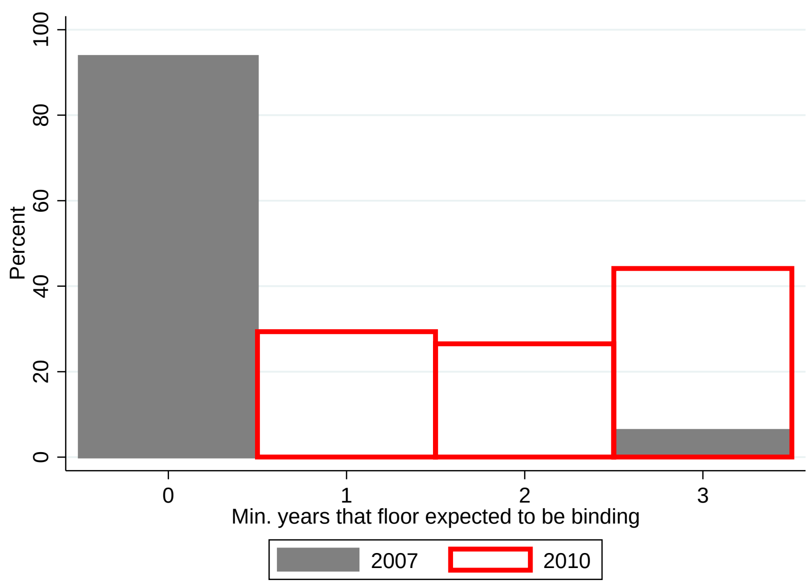
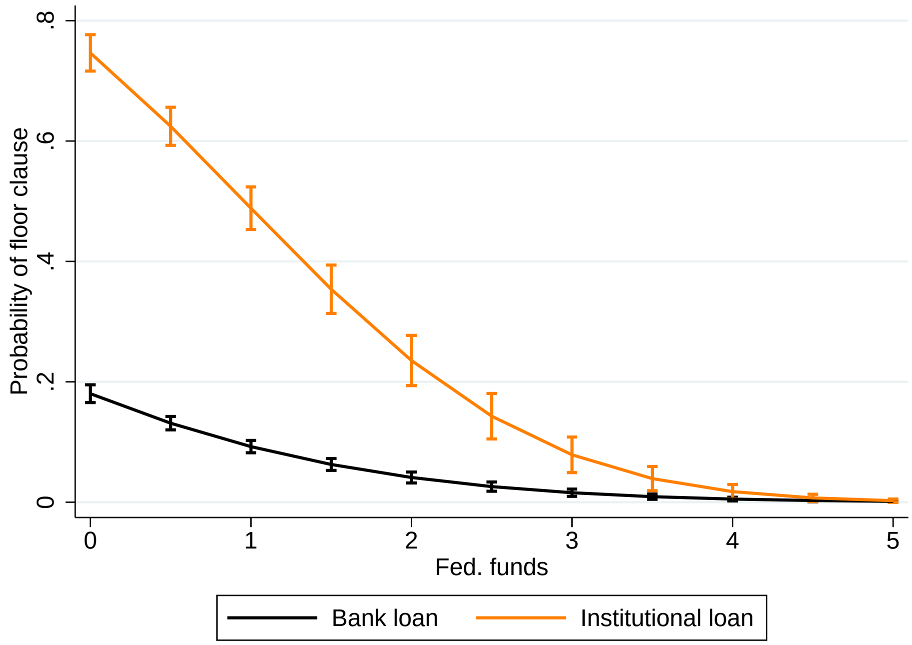


Figure 17: **Median Maturity for Loans with and without Interest Rate Floors, U.S. Syndicated Leveraged Term Loans since 2005**



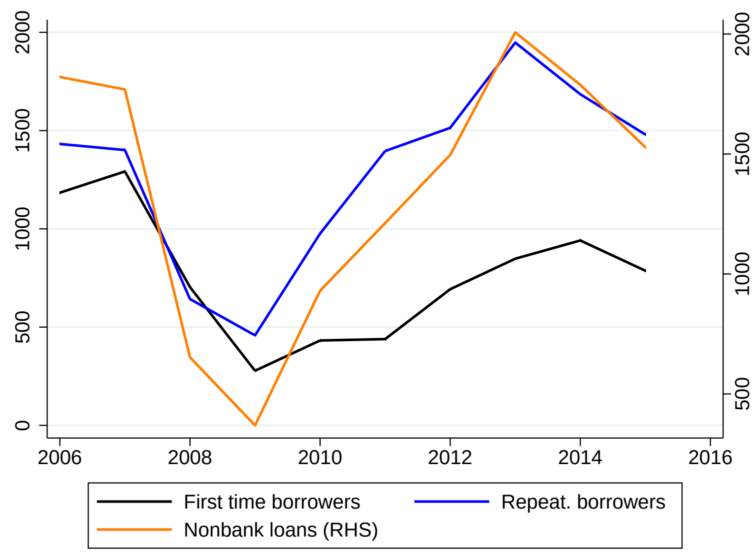
Note: Out of 2693 loans in 2007 and of 1408 loans in 2010, about 16 loans and 460 loans, respectively, have interest rate floors. The histogram is based on these latter subsets.

Figure 18: **Histogram of the Number of Years Floors are Expected to be Binding for U.S. Leveraged Term Loans since 2006**



Note: Based on the results in column (4) of Table 3. Predicted probabilities of interest rate floors in U.S. loans conditional on a loan being a bank loan or an institutional loan and other variables being at their means. 95 percent confidence intervals shown.

Figure 19: **Predicted probabilities of interest rate floors in U.S. loans, 2006-15**



Note: Nonbank loan—an institutional or nonbank lender loan.

Figure 20: **Nonbanks and repeat and first time borrowers, U.S. loans, 2006-15**

Table 1: Information Sources for Thomson Reuters LPC DealScan, U.S. (2005-15)

Source	SEC filings	League Tables	NY LC stories	Reporting	Other	Total
Count	3996	12413	6662	57	18	23146
% of total	17.3%	53.6%	28.8%	0.3%	0.1%	
Amount	1767	1320	2900	34	10	6030
% of total	29.3%	21.9%	48.1%	0.6%	0.2%	

Note: Amount is in billions of U.S. dollars.

Table 2: Information Sources for Loans with Interest Rate Floors, U.S. (2005-15)

Source	SEC filings	League Tables	NY LC stories	Reporting	Other	Total
Count	621	481	3849	24	2	4977
% of total	12.5%	9.7%	77.3%	0.5%	0.0%	
Amount	338	67	1690	15	10	2120
% of total	16.0%	3.1%	79.7%	0.7%	0.5%	

Note: Amount is in billions of U.S. dollars.

Table 3: Probit for interest rate floors and OIDs in U.S LIBOR-based loans, 1996-2015

	(1) Floor 96-05	(2) Floor 96-05	(3) Floor 06-15	(4) Floor 06-15	(5) OID 06-15	(6) OID 06-15
Fed. funds	-0.298^{***}	-0.297^{***}	-0.368^{***}	-0.373^{***}	-0.241^{***}	-0.250^{***}
	(-3.849)	(-3.860)	(-9.614)	(-9.781)	(-5.404)	(-4.954)
Fed. Funds*Nonbank lender	-0.330^{**}	-0.365^{***}	-0.071	-0.073	-0.059^{**}	-0.060^{**}
	(-2.495)	(-2.704)	(-1.558)	(-1.637)	(-2.256)	(-2.531)
Fed. Funds*Inst. loan	0.024	0.049	-0.276^{***}	-0.280^{***}	-0.246^{***}	-0.238^{***}
	(0.196)	(0.396)	(-9.147)	(-9.067)	(-10.682)	(-11.081)
Nonbank lender	0.572^{***}	0.603^{***}	0.465^{***}	0.448^{***}	0.363^{***}	0.340^{***}
	(2.935)	(3.108)	(13.869)	(12.466)	(9.321)	(8.035)
Inst. loan type	0.430	0.264	1.820^{***}	1.578^{***}	1.828^{***}	1.583^{***}
	(1.600)	(0.951)	(35.534)	(33.080)	(40.272)	(34.963)
Public		0.245^{*}		-0.327^{***}		-0.398^{***}
		(1.708)		(-5.876)		(-8.852)
Debt nonrated		-0.218		-0.157^{**}		-0.393^{***}
		(-0.692)		(-2.490)		(-6.639)
Debt SG-rated		0.071		0.815^{***}		0.614^{***}
		(0.286)		(9.509)		(7.228)
Amend./refin. loan		0.345^{***}		0.129^{***}		0.118^{***}
		(2.839)		(3.144)		(2.672)
Num. of observations	14191	14191	20531	20531	20531	20531
Num. of clusters	40	40	40	40	40	40
Pseudo R-sq.	0.19	0.23	0.43	0.47	0.40	0.46

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: The dependent variable in columns (1) to (4) is the dummy for a floor clause in a loan contract and in columns (5) and (6) the dummy for an original issue discount (OID). Regressions are based on loans that are denominated in U.S. dollars, indexed to U.S. LIBOR, and originated in the United States. The sample period in columns (1) and (2) is 1996-2005 and 2006-15 in columns (3) to (6). Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. While we do not include fixed effects to avoid accidental parameter and inconsistency issues, the dummies for a borrower being a public company or having a debt of certain rating capture some firm effects. Errors are clustered by time; the results are robust to alternative clustering.

Table 4: Probit for interest rate floor clauses and OIDs in EURIBOR-based loans, 2006-15

	(1) Floor	(2) Floor	(3) OID	(4) OID
ECB MRO Rate	−0.983***	−1.002***	−0.230*	−0.233*
	(−3.110)	(−3.157)	(−1.899)	(−1.953)
ECB MRO*Nonbank lender	−0.173	−0.226	−0.267**	−0.279***
	(−0.520)	(−0.752)	(−2.525)	(−2.715)
ECB MRO*Inst. loan	−0.118	−0.021	−0.158**	−0.143**
	(−0.469)	(−0.078)	(−2.113)	(−1.974)
Nonbank lender	0.820***	0.861***	0.964***	0.980***
	(4.665)	(5.304)	(6.717)	(7.466)
Inst. loan type	1.077***	0.968***	1.410***	1.354***
	(6.044)	(5.585)	(12.507)	(12.731)
Public		−0.407**		−0.239*
		(−2.510)		(−1.746)
Debt nonrated		−0.137		−0.046
		(−0.772)		(−0.226)
Debt SG-rated		1.316***		0.879***
		(7.533)		(3.928)
Amend./refin. loan		−0.170		−0.100
		(−1.123)		(−0.822)
Num. of observations	4453	4453	4453	4453
Num. of clusters	40	40	40	40
Pseudo R-sq.	0.44	0.48	0.39	0.40

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: The dependent variable in columns (1) and (2) is the dummy for a floor clause in a loan contract and in columns (3) and (4) the dummy for an original issue discount (OID). Regressions are based on loans that are denominated in euros, indexed to EURIBOR, and originated in Europe. The sample period is 2006-15. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. While we do not include fixed effects to avoid accidental parameter and inconsistency issues, the dummies for a borrower being a public company or having a debt of certain rating capture some firm effects. Errors are clustered by time; the results are robust to alternative clustering.

Table 5: Number of years that floors are expected to bind for U.S. loans originated in 2006-15

	Mean	*Stand.dev.*	*25th pct*	*50th pct*	*75th pct*
Min. years expected to bind	2.0	0.9	1	2	3
Loan maturity	5.9	1.3	5	6	7

Note: In our data set, out of a total of about 20500 loans, about 5250 loans have interest rate floors. To estimate the minimum number of years that an interest rate floor is expected to bind, we compare the interest rate floor with one-month OIS rates 12, 24, and 36 months ahead.

Table 6: Probit for other loan characteristics in U.S LIBOR-based loans, 2006-15

	(1) Lever.	(2) Lever.	(3) Cancel.	(4) Cancel.	(5) Lite	(6) Lite
Floor clause	1.479***	1.499***	1.926***	1.845***	1.489***	1.369***
	(11.259)	(10.107)	(24.298)	(22.029)	(17.643)	(15.549)
Fed. funds	−0.104***	−0.118***	0.133***	0.140***	0.072	0.072
	(−7.560)	(−8.438)	(8.694)	(9.593)	(1.616)	(1.619)
Fed. Funds*Nonbank lender	0.053***	0.049***	0.022	0.014	0.010	0.008
	(4.377)	(3.846)	(1.395)	(0.929)	(0.459)	(0.336)
Fed. Funds*Inst. loan	−0.126***	−0.142***	−0.158***	−0.159***	−0.054***	−0.052***
	(−4.009)	(−4.326)	(−7.616)	(−7.702)	(−3.073)	(−3.056)
Nonbank lender	0.305***	0.391***	0.038	0.036	0.225***	0.224***
	(7.822)	(11.030)	(0.900)	(0.805)	(5.248)	(4.511)
Inst. loan type	1.064***	1.154***	0.749***	0.641***	0.492***	0.387***
	(8.663)	(8.946)	(12.462)	(11.704)	(9.172)	(7.893)
Public		−0.571***		0.192***		−0.258***
		(−9.360)		(4.837)		(−4.259)
Debt nonrated		0.942***		−0.092		−0.010
		(14.731)		(−1.135)		(−0.107)
Debt SG-rated		1.106***		0.390***		0.485***
		(13.976)		(4.290)		(7.128)
Amend./refin. loan		−0.076**		0.226***		0.214***
		(−2.123)		(4.720)		(3.627)
Num. of observations	20531	20531	20531	20531	20531	20531
Num. of clusters	40	40	40	40	40	40
Pseudo R-sq.	0.21	0.27	0.42	0.44	0.29	0.32

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: The dependent variable in columns (1) to (2) is the dummy for a loan being a leveraged loan, in columns (3) and (4) the dummy for a loan cancelation fee in a loan contract, and in columns (5) and (6) the dummy for a covenant lite loan. Regressions are based on loans that are denominated in U.S. dollars, indexed to U.S. LIBOR, and originated in the United States. The sample period in columns (1) and (2) is 1996-2005 and 2006-15 in columns (3) to (6). Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. While we do not include fixed effects to avoid accidental parameter and inconsistency issues, the dummies for a borrower being a public company or having a debt of certain rating capture some firm effects. Errors are clustered by time; the results are robust to alternative clustering.

Table 7: Probit for other loan characteristics in EURIBOR-based loans, 2006-15

	(1) Lever.	(2) Lever.	(3) Cancel.	(4) Cancel.	(5) Lite	(6) Lite
Floor clause	1.534***	1.326***	2.154***	2.194***	1.926***	1.849***
	(4.245)	(3.559)	(12.031)	(12.594)	(9.906)	(9.818)
ECB MRO Rate	−0.333***	−0.364***	−0.747**	−0.870*	−0.163	−0.153
	(−10.308)	(−10.919)	(−2.003)	(−1.761)	(−1.326)	(−1.496)
ECB MRO*Nonbank lender	0.153***	0.128***	0.119	−0.043	0.019	−0.031
	(4.271)	(3.358)	(0.326)	(−0.089)	(0.088)	(−0.139)
ECB MRO*Inst. loan	0.071	0.094	−0.042	−0.004	−0.165	−0.137
	(1.042)	(1.389)	(−0.091)	(−0.007)	(−0.719)	(−0.580)
Nonbank lender	−0.242***	−0.116	0.373**	0.475**	0.262	0.294
	(−2.773)	(−1.384)	(2.234)	(2.206)	(1.189)	(1.361)
Inst. loan type	1.482***	1.374***	0.474**	0.354	0.610***	0.545***
	(7.327)	(6.566)	(2.097)	(1.565)	(3.034)	(2.614)
Public		−0.515***		−0.262		−0.577***
		(−4.677)		(−1.130)		(−2.644)
Debt nonrated		0.902***		−0.740*		−0.507
		(6.136)		(−1.766)		(−1.303)
Debt SG-rated		1.214***		0.289		0.270
		(3.458)		(0.777)		(0.716)
Amend./refin. loan		0.005		0.508**		0.206
		(0.094)		(1.983)		(1.140)
Num. of observations	4448	4448	4453	4453	4453	4453
Num. of clusters	40	40	40	40	40	40
Pseudo R-sq.	0.24	0.28	0.63	0.67	0.54	0.56

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Note: The dependent variable in columns (1) to (2) is the dummy for a loan being a leveraged loan, in columns (3) and (4) the dummy for a loan cancelation fee in a loan contract, and in columns (5) and (6) the dummy for a covenant lite loan. Regressions are based on loans that are denominated in euros, indexed to EURIBOR, and originated in Europe. The sample period is 2006-15. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. While we do not include fixed effects to avoid accidental parameter and inconsistency issues, the dummies for a borrower being a public company or having a debt of certain rating capture some firm effects. Errors are clustered by time; the results are robust to alternative clustering.

Table 8: Summary Statistics LIBOR-based Syndicated Term Loans, U.S. (1996-2005)

	Mean	Median	Std.Dev.	Min	Max
Cost of borrowing	6.81	6.97	2.14	1.32	19.79
Cost without spreads	3.98	4.33	1.92	1.00	13.29
Fed funds rate*	3.89	4.79	1.92	1.00	6.52
Nonbank share	18	0	27	0	100

Note: Summary statistics are for 14191 loan level observations except for the Fed funds rate, which is for 40 quarters. Data is from 1996:Q1 to 2005:Q4. All units are in percent.

Table 9: Summary Statistics LIBOR-based Syndicated Term Loans, U.S. (2006-15)

	Mean	Median	Std.Dev.	Min	Max
Cost of borrowing	5.73	5.45	2.68	0.32	58.50
Cost without spreads	2.07	1.09	2.08	0.22	50
Fed funds rate*	1.28	0.15	1.99	0.07	5.27
Nonbank share	23	11	30	0	100

Note: Summary statistics are for 20531 loan level observations except for the Fed funds rate, which is for 40 quarters. Data is from 2006:Q1 to 2015:Q4. All units are in percent.

Table 10: Summary Statistics EURIBOR-based Syndicated Term Loans, Euro Area (2006-15)

	Mean	Median	Std.Dev.	Min	Max
Cost of Borrowing	5.17	5.18	1.86	0.22	15.78
Cost without Spreads	2.37	2.63	1.76	-0.13	6.66
ECB MRO rate*	1.57	1.00	1.39	0.05	4.24
Nonbank share	7	0	15	0	100

Note: Summary statistics are for 4453 loan level observations except for the ECB MRO rate, which is for 40 quarters. Data is from 2006:Q1 to 2015:Q4. All units are in percent.

Table 11: Borrowing cost of U.S. dollar LIBOR-based loans over 1996-2005

	(1) Total cost	(2) Total cost	(3) No spread	(4) No spread	(5) Spread	(6) Spread
Fed. funds	0.831***	0.869***	0.998***	1.004***	−0.166***	−0.134***
	(30.716)	(33.046)	(88.587)	(81.755)	(−6.867)	(−5.577)
Nonbank lender		0.248***		0.029**		0.222***
		(4.712)		(2.346)		(4.300)
Inst. loan type		0.174		−0.017**		0.189
		(1.316)		(−2.153)		(1.394)
Floor clause		2.994***		1.036***		1.999***
		(7.407)		(8.012)		(4.900)
Debt nonrated		0.528***		−0.009		0.538***
		(4.257)		(−0.192)		(4.474)
Debt SG-rated		0.836***		−0.006		0.830***
		(7.451)		(−0.161)		(7.392)
Amend./refin. loan		−0.092*		0.022		−0.114**
		(−1.875)		(1.308)		(−2.432)
Num. of observations	14191	14191	14191	14191	14182	14182
Num. of clusters	40	40	40	40	40	40
Adj. R-sq.	0.75	0.76	0.98	0.98	0.43	0.45

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$

Note: Regressions are based on loans that are denominated in U.S. dollars, indexed to U.S. LIBOR, and originated in the United States. Regressions include borrower fixed effects. For a given loan, the dependent variable in columns (1) and (2) is the total borrowing cost which comprises the benchmark rate if an interest rate floor is not contracted or the maximum of the benchmark rate or the interest rate floor if it is contracted; various annualized fees; an annualized OID; and a loan spread (a proxy for ex ante credit risk). The dependent variable in columns (3) and (4) is the total borrowing cost sans the loan spread and, therefore, does not reflect ex ante credit risk. The dependent variable in columns (5) and (6) is the loan spread. The dependent variables and the federal funds rate are in percent. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. If borrower sales at loan origination are used instead of borrower fixed effects, the sample size shrinks by about a third and the statistical and economic significance of the coefficients on the nonbank variables remains unchanged. Errors are clustered by time; the results are robust to alternative clustering.

Table 12: Borrowing cost of U.S. dollar LIBOR-based loans over 2006-15

	(1) Total cost	(2) Total cost	(3) No spread	(4) No spread	(5) Spread	(6) Spread
Fed. funds	0.626***	0.835***	0.892***	0.984***	−0.266***	−0.148***
	(25.165)	(29.944)	(74.950)	(84.690)	(−15.077)	(−6.080)
Nonbank lender		0.059		−0.008		0.067
		(1.083)		(−0.416)		(1.444)
Inst. loan type		−1.128***		−0.066***		−1.063***
		(−9.376)		(−3.779)		(−9.021)
Floor clause		1.985***		0.941***		1.043***
		(13.990)		(13.479)		(8.747)
OID present		0.237*		0.099*		0.140
		(1.734)		(1.762)		(1.375)
Debt nonrated		0.087		0.076		0.009
		(0.578)		(1.402)		(0.083)
Debt SG-rated		0.266**		−0.023		0.288***
		(2.077)		(−0.602)		(2.932)
Amend./refin. loan		−0.262***		−0.045*		−0.217***
		(−3.963)		(−1.953)		(−4.143)
Num. of observations	20531	20531	20531	20531	20523	20523
Num. of clusters	40	40	40	40	40	40
Adj. R-sq.	0.66	0.73	0.95	0.97	0.50	0.57

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: Regressions are based on loans that are denominated in U.S. dollars, indexed to U.S. LIBOR, and originated in the United States. Regressions include borrower fixed effects. For a given loan, the dependent variable in columns (1) and (2) is the total borrowing cost which comprises the benchmark rate if an interest rate floor is not contracted or the maximum of the benchmark rate or the interest rate floor if it is contracted; various annualized fees; an annualized OID; and a loan spread (a proxy for ex ante credit risk). The dependent variable in columns (3) and (4) is the total borrowing cost sans the loan spread and, therefore, does not reflect ex ante credit risk. The dependent variable in columns (5) and (6) is the loan spread. The dependent variables and the federal funds rate are in percent. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. If borrower sales at loan origination are used instead of borrower fixed effects, the sample size shrinks by more than half and the statistical and economic significance of the coefficients on the nonbank variables remains unchanged. Errors are clustered by time; the results are robust to alternative clustering.

Table 13: Borrowing cost of EURIBOR-based loans over 2006-15

	(1) Total cost	(2) Total cost	(3) No spread	(4) No spread	(5) Spread	(6) Spread
ECB MRO Rate	0.769***	0.812***	1.154***	1.178***	−0.386***	−0.366***
	(14.148)	(14.384)	(41.040)	(46.902)	(−8.974)	(−7.955)
Nonbank lender		0.017		0.020		−0.006
		(0.138)		(0.933)		(−0.047)
Inst. loan type		0.047		0.001		0.046
		(0.540)		(0.093)		(0.523)
Floor clause		1.288***		0.822***		0.466**
		(7.001)		(10.122)		(2.627)
OID present		0.073		0.127*		−0.053
		(0.426)		(2.014)		(−0.375)
Debt nonrated		0.141		0.104		0.037
		(0.501)		(0.715)		(0.135)
Debt SG-rated		0.638		−0.081		0.719
		(1.578)		(−0.623)		(1.591)
Amend./refin. loan		0.069		−0.052		0.116
		(0.574)		(−1.470)		(1.140)
Num. of observations	4453	4453	4453	4453	4452	4452
Num. of clusters	40	40	40	40	40	40
Adj. R-sq.	0.69	0.70	0.98	0.99	0.55	0.55

t statistics in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Note: Regressions are based on loans that are denominated in euros, indexed to EURIBOR, and originated in Europe. Regressions include borrower fixed effects. For a given loan, the dependent variable in columns (1) and (2) is the total borrowing cost which comprises the benchmark rate if an interest rate floor is not contracted or the maximum of the benchmark rate or the interest rate floor if it is contracted; various annualized fees; an annualized OID; and a loan spread (a proxy for ex ante credit risk). The dependent variable in columns (3) and (4) is the total borrowing cost sans the loan spread and, therefore, does not reflect ex ante credit risk. The dependent variable in columns (5) and (6) is the loan spread. The dependent variables and the federal funds rate are in percent. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. If borrower sales at loan origination are used instead of borrower fixed effects, the sample size shrinks by more than two thirds and the statistical and economic significance of the coefficients on the nonbank variables remains unchanged. Errors are clustered by time; the results are robust to alternative clustering.

Table 14: Nonprice Terms of U.S. dollar LIBOR-based loans, 1996-2015

	(1) log(Size) 96-05	(2) Maturity 96-05	(3) log(Size) 06-15	(4) Maturity 06-15
Fed. funds	0.006	2.732***	−0.007	2.615***
	(0.370)	(6.691)	(−0.691)	(11.779)
Nonbank lender	0.079***	2.729***	0.114***	2.138***
	(2.925)	(3.349)	(3.271)	(3.433)
Inst. loan type	0.189***	11.781***	0.469***	−0.963
	(4.411)	(9.070)	(16.793)	(−1.245)
Floor clause	0.178	−1.020	0.169***	6.288***
	(1.276)	(−0.276)	(2.988)	(3.791)
OID present			0.191***	6.768***
			(3.369)	(5.666)
Debt nonrated	−0.295***	1.259	−0.055	−5.553***
	(−2.943)	(0.516)	(−0.946)	(−3.988)
Debt SG-rated	−0.003	−0.307	0.111*	0.039
	(−0.045)	(−0.130)	(1.714)	(0.029)
Amend./refin. loan	0.214***	−0.909	0.039	−1.532*
	(6.135)	(−0.883)	(0.996)	(−1.912)
Num. of lenders	0.009***		0.031***	
	(4.024)		(5.812)	
Num. of observations	14191	12928	20531	19997
Num. of clusters	40	40	40	40
Adj. R-sq.	0.70	0.64	0.69	0.61

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: Regressions are based on loans that are denominated in U.S. dollars, indexed to U.S. LIBOR, and originated in the United States. Regressions include borrower fixed effects. For a given loan, the dependent variable in columns (1) and (3) is the log of a loan size in millions of U.S. dollars and in columns (2) and (4) a loan maturity in months. The dependent variables and the federal funds rate are in percent. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. Errors are clustered by time; the results are robust to alternative clustering.

Table 15: Nonprice Terms of EU dollar LIBOR-based loans, 2006-15

	(1) log(size)	(2) Maturity
ECB MRO Rate	−0.001	7.688***
	(−0.022)	(10.837)
Nonbank lender	0.084	0.273
	(1.095)	(0.152)
Inst. loan type	0.177**	7.956***
	(2.196)	(9.280)
Floor clause	0.129	7.500***
	(0.970)	(2.976)
OID present	0.262*	3.261
	(1.891)	(1.278)
Debt nonrated	−0.392**	−2.404
	(−2.250)	(−0.822)
Debt SG-rated	−0.464**	−3.148
	(−2.183)	(−0.663)
Amend./refin. loan	0.181***	−4.076**
	(2.970)	(−2.261)
Num. of lenders	0.020***	
	(3.395)	
Num. of observations	4440	4394
Num. of clusters	40	40
Adj. R-sq.	0.72	0.83

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: Regressions are based on loans that are denominated in euros, indexed to EURIBOR, and originated in Europe. Regressions include borrower fixed effects. For a given loan, the dependent variable in columns (1) and (3) is the log of a loan size in millions of euros and in columns (2) and (4) a loan maturity in months. The dependent variables and the federal funds rate are in percent. Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. Errors are clustered by time; the results are robust to alternative clustering.

Table 16: Nonbank participation and first time borrowers, 2006-15

	U.S.	U.S.	EU	EU
Policy rate	0.080***	0.086***	0.052*	0.035
	(6.737)	(7.226)	(1.757)	(1.135)
Policy rate*Nonbank lender	−0.013	−0.012	0.027	0.022
	(−1.155)	(−1.006)	(0.568)	(0.454)
Policy rate*Inst. loan	0.046***	0.026**	0.055**	0.053*
	(3.928)	(2.011)	(1.980)	(1.956)
Nonbank lender	−0.116***	−0.077***	−0.495***	−0.438***
	(−4.249)	(−2.794)	(−4.461)	(−3.998)
Inst. loan type	−0.569***	−0.393***	−0.279***	−0.336***
	(−16.285)	(−11.164)	(−3.235)	(−3.728)
public_ind		−0.618***		−0.571***
		(−14.229)		(−5.621)
Debt nonrated		0.771***		0.883***
		(14.593)		(5.664)
Debt SG-rated		0.107*		0.113
		(1.801)		(0.503)
Num. of observations	20531	20531	4453	4453
Num. of clusters	40	40	40	40
Pseudo R-sq.	0.04	0.11	0.03	0.07

t statistics in parentheses
* $p < .1$, ** $p < .05$, *** $p < .01$
Note: ... Nonbank lender is the dummy for at least one nonbank lender among lenders that originated a loan. Institutional loan type is the dummy for a term loan B (and alike) loan type. Errors are clustered by time; the results are robust to alternative clustering.

Appendix: Identification of interest rate floors

For the longer time series, we relied on the comments fields to determine the prevalence of interest rate floors going back to the latter half of the 1990s. This loan-level data provides comment fields which contain additional information about a given syndicated loan. By text mining this field, we were able to create an indicator for whether a given floating rate loan contains a LIBOR, EURIBOR, or interest rate floor. Because the information listed in the comment field is different from loan to loan, it is difficult to determine why information about an interest rate floor would be missing from Dealscan. There are two possibilities for this: either the loan agreement does not contain a floor or Thomson Reuters was unable to accurately find interest rate floor information within the loan agreement. To test this, we randomly selected facilities to publicly traded U.S. companies to compare to SEC filings. We limited our data to only U.S. dollar-denominated term loans originated in 2010. When the federal funds rate lower bound decreased to zero, loans already in syndication would not reflect the new rate, but the pre-zero interest rate. Because of the time it takes to syndicate a loan, we would expect loans which included floors due to the zero interest rate environment to be originated after mid-2009. 2010 was chosen as it was the first full year in which loans had time to incorporate the zero lower bound into the terms of the loan. 306 loans in the Dealscan database met the above criteria.

Using a simple random sample, 40 Dealscan facilities were chosen to determine whether a floor existed on the loan in SEC filings (see Figure A1). Using the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR) on the SEC web site, I found the original loan agreements and amended loan agreements attached to 8-K, 10-Q and 10-K filings. If explicit information about an interest rate floor was not found in the loan agreements or SEC filings, it was assumed that the syndicated loan did not contain a floor. The attached table contains the 40 Dealscan facilities, the relevant SEC filings, and information about the borrower. As the EDGAR database contains the text of the loan agreement, we assume that if the information from Dealscan and EDGAR differ then the SEC filings are accurate.

Results Of the 40 loans sampled, 32 had SEC Filings in EDGAR containing term loan agreements. Eight loans did not have SEC filings because the company was private at the time the loan was originated. Of the 13 loans with floors in the Dealscan database, two had incorrectly listed floors. The loan to PVH Corp erroneously listed the floor in the term loan B portion of the deal as the floor in the term loan A portion in our sample. A loan to Green Plains Grain Co LLC mistakenly lists the interest rate floor as a LIBOR floor. Although the rates on these two loans were misidentified, we were able to find a floor in the SEC filings for all loans with a floor in the Dealscan sample. For the 19 loans without a listed floor, only one loan (Prestige Brands International) was incorrectly specified. Overall, we find that 91 percent of the randomly selected loans from Dealscan properly identified the floor of the loan or if there was no floor. 95 percent of the randomly selected loans without a floor in Dealscan did not have a listed floor in the SEC Filings. Due to these results, the floor information from Dealscan accurately reflects the floor data from SEC Filings. Accordingly, Dealscan accurately records floor information from the syndicated loan market and can be used in the analysis of term loan floors.

facilitystartdate	CompanyID	Company	Ticker	Country	8-K	10-K/Q	SEC Floor (bps)	FacilityID	PackageID	Currency	FacilityAmount	Dealscan FloorFound
3/18/2010	26960	QuadraMed Corp	QDHC	USA				252312	185140	United States Dollars	60,000,000	
2/22/2010	30150	Smurfit-Stone Container	SSCCQ	USA		https://www.sec.gov/Archives/edgar/data/94610/000110465910025820/a10-5817_110q.htm	200	252969	185413	United States Dollars	1,200,000,000	YES
2/5/2010	30846	CB Richard Ellis Services Inc	CBG	USA	https://www.sec.gov/Archives/edgar/data/1138118/000119312509064410/dex101.htm	https://www.sec.gov/Archives/edgar/data/1138118/000119312511051618/d10k.htm	200	253540	185923	United States Dollars	115,524,952	YES
3/16/2010	39228	MGM Mirage	MGM	USA	https://www.sec.gov/Archives/edgar/data/789570/000095012310026882/p17147exv10.htm	https://www.sec.gov/Archives/edgar/data/789570/000095012310046015/p17591e10vq.htm	200	254566	186225	United States Dollars	830,739,552	YES
3/8/2010	131287	True North Energy LLC	TNEN	USA				254841	186829	United States Dollars	57,000,000	
3/31/2010	18959	Borders Group Inc	BGP	USA	https://www.sec.gov/Archives/edgar/data/940510/000095012310031282/k49075e8vk.htm	https://www.sec.gov/Archives/edgar/data/940510/000094051010000013/q1201010q.htm	250	255493	187325	United States Dollars	90,000,000	YES
4/28/2010	36960	Lamar Media Corp	LAMR	USA	https://www.sec.gov/Archives/edgar/data/899045/000095012310042765/d72662exv10w1.htm	https://www.sec.gov/Archives/edgar/data/899045/000095012311018470/d78824e10vk.htm		255582	187386	United States Dollars	270,000,000	
5/17/2010	108842	Medical Properties Trust Inc	MPW	USA	https://www.sec.gov/Archives/edgar/data/1287865/000095012310051638/g23499e8vk.htm	https://www.sec.gov/Archives/edgar/data/1287865/000095012310074332/g24164e10vq.htm	150	255783	187506	United States Dollars	150,000,000	YES
5/7/2010	21313	US Silica Corp	SLCA	USA				255786	187509	United States Dollars	165,000,000	YES
4/19/2010	131734	Green Plains Grain Co LLC	GPRE	USA	https://www.sec.gov/Archives/edgar/data/1309402/000119312510089590/dex105.htm	https://www.sec.gov/Archives/edgar/data/1309402/000119312510174900/d10q.htm	Interest Rate Floor: 450	256299	187824	United States Dollars	20,000,000	YES
4/22/2010	13572	MedQuist Inc	MEDQ	USA	https://www.sec.gov/Archives/edgar/data/884497/000089882210000266/creditagreement.htm	https://www.sec.gov/Archives/edgar/data/884497/000095012311025780/w81804ae10vk.htm	200	256364	187871	United States Dollars	50,000,000	YES
8/30/2010	13297	Universal Health Services	UHS	USA	https://www.sec.gov/Archives/edgar/data/352915/000095015710002042/ex10-1.htm	https://www.sec.gov/Archives/edgar/data/352915/000119312511050142/d10k.htm		256775	188154	United States Dollars	1,050,000,000	
5/6/2010	3680	PVH Corp	PVH	USA	https://www.sec.gov/Archives/edgar/data/78239/000007823910000032/eightkclosingfinal051210.htm	https://www.sec.gov/Archives/edgar/data/78239/000007823911000015/formtenkjan302011.htm	175 for TL-B not TL-A	256991	186632	United States Dollars	367,700,000	YES
5/7/2010	35390	Xerium Tech	XRM	USA		https://www.sec.gov/Archives/edgar/data/1287151/000119312510188563/d10q.htm	200	257157	188390	United States Dollars	230,553,072	YES
6/18/2010	30468	Alliance Data Systems Corp	ADS	USA	https://www.sec.gov/Archives/edgar/data/1101215/000119312509113538/dex101.htm	https://www.sec.gov/Archives/edgar/data/1101215/000119312510182534/0001193125-10-182534-index.htm		257865	188816	United States Dollars	161,000,000	
8/4/2010	25828	GEO Group Inc	GGI	USA	https://www.sec.gov/Archives/edgar/data/923796/000095012310075726/g24303exv10w44.htm	https://www.sec.gov/Archives/edgar/data/923796/000095012310104053/g24633e10vq.htm		257984	188888	United States Dollars	150,000,000	
7/1/2010	18070	Dean Foods Co	DF	USA	https://www.sec.gov/Archives/edgar/data/931336/000119312510152091/dex991.htm	https://www.sec.gov/Archives/edgar/data/931336/000119312511052076/d10k.htm		258459	188703	United States Dollars	561,000,000	
8/2/2010	123724	Western Gas Partners LP	WES	USA	https://www.sec.gov/Archives/edgar/data/1414475/000095012310073496/h75012exv10w2.htm	https://www.sec.gov/Archives/edgar/data/1414475/000095012311017771/h79797e10vk.htm		258595	189299	United States Dollars	250,000,000	
6/11/2010	108283	TAL International Container	TAL	USA				258936	189517	United States Dollars	50,000,000	
7/7/2010	124849	Laredo Petroleum	LPI	USA				259232	189709	United States Dollars	100,000,000	
7/23/2010	16235	RalCorp Holdings Inc	RAH	USA	https://www.sec.gov/Archives/edgar/data/1029506/000095012310069115/c59317exv10w1.htm	https://www.sec.gov/Archives/edgar/data/1029506/000095012310109405/c60605e10vk.htm		259480	189878	United States Dollars	200,000,000	
6/11/2010	132761	Cytori Therapeutics	CYTX	USA	https://www.sec.gov/Archives/edgar/data/1095981/000109598110000013/exhibit1070.htm			259680	190011	United States Dollars	20,000,000	
8/13/2010	28748	Las Vegas Sands Corp	LVS	USA	https://www.sec.gov/Archives/edgar/data/1300514/000095014207001251/form-8k_052307.txt	https://www.sec.gov/Archives/edgar/data/1300514/000095012311020089/c08516e10vk.htm		259928	189729	United States Dollars	2,157,222,426	
8/27/2010	101854	Innophos Holdings Inc	IPHS	USA	https://www.sec.gov/Archives/edgar/data/1364099/000136409910000106/creditagreement.htm			260682	190661	United States Dollars	100,000,000	
12/17/2010	25256	Green Mountain Coffee Roasters Inc	GMCR	USA		https://www.sec.gov/Archives/edgar/data/909954/000119312511023163/dex101.htm		260921	190819	United States Dollars	250,000,000	
10/7/2010	96045	Nalco Co	NLC	USA	https://www.sec.gov/Archives/edgar/data/1298341/000119312510224361/dex101.htm		150	261317	191097	United States Dollars	650,000,000	YES
9/28/2010	33646	Jones Lang Lasalle Inc	JLL	USA	https://www.sec.gov/Archives/edgar/data/1037976/000119312510218765/d8k.htm			261425	191171	United States Dollars	200,000,000	
10/29/2010	12338	Angelica Corp	AGL	USA				261851	191463	United States Dollars	50,000,000	YES
11/1/2010	133504	Exterran Partners	EXLP	USA	https://www.sec.gov/Archives/edgar/data/1367064/000095012310102987/h77534exv10w1.htm			262226	191709	United States Dollars	150,000,000	
10/20/2010	39822	DaVita Inc	DVA	USA	https://www.sec.gov/Archives/edgar/data/927066/000119312510233483/dex101.htm		150	262331	191450	United States Dollars	1,750,000,000	YES
11/16/2010	19349	Sports Authority Inc	TSA	USA				262428	191846	United States Dollars	300,000,000	YES
10/22/2010	112738	Healthspring Inc	HS	USA	https://www.sec.gov/Archives/edgar/data/1339553/000095012310097069/c07312e8vk.htm		150	262728	190383	United States Dollars	200,000,000	YES
10/21/2010	105502	Easylink Services International Inc	ESIC	USA	https://www.sec.gov/Archives/edgar/data/894738/000114420410055032/v199614_ex10-3.htm			262860	192098	United States Dollars	110,000,000	
11/1/2010	85204	Prestige Brands International	PBH	USA		https://www.sec.gov/Archives/edgar/data/1295947/000100579410000107/creditagreement.htm	150	262937	186378	United States Dollars	115,000,000	
10/27/2010	27244	OMNI Energy Services	OMNI	USA				263086	192245	United States Dollars	22,500,000	
12/1/2010	113895	AT&T Inc	T	USA	https://www.sec.gov/Archives/edgar/data/732717/000073271710000102/ex10a.htm			263208	192321	United States Dollars	5,000,000,000	
11/24/2010	120542	Heartland Payment Systems	HPY	USA	https://www.sec.gov/Archives/edgar/data/1144354/000119312510272309/dex101.htm			264410	193093	United States Dollars	100,000,000	
12/30/2010	3223	Ingles Markets Inc	IMKTA	USA	https://www.sec.gov/Archives/edgar/data/50493/000115752309003949/a5965539ex10_1.htm			264857	193401	United States Dollars	100,000,000	
12/21/2010	24883	Cenveo Corp	CVO	USA	https://www.sec.gov/Archives/edgar/data/920321/000106880010000107/ex10p1.htm		150	264927	192700	United States Dollars	380,000,000	YES
12/21/2010	14052	Delphi Financial Group	DFG	USA	https://www.sec.gov/Archives/edgar/data/859139/000095012310116736/w80990exv10w1.htm			265014	193497	United States Dollars	175,000,000	

Figure A1: **Sampled loans**