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Abstract

We examine whether banks' direct access to the collateralized loan obligation (CLO) market facilitates their risk management and corporate lending provisions. When banks experience an idiosyncratic shock, such as a large-size borrower's default, they start lending conservatively. We analyze how banks with the ability to securitize corporate loans via the CLO market differ from other banks in managing such shocks given that securitization provides extra liquidity and capital relief. For identification, we adopt WorldCom's demise in 2002 as a shock that induced significant losses among its lending banks, eventually leading to a drop in their banks' lending amounts. We find that, among the WorldCom-affected banks, those banks that have direct access to the CLO market significantly increase their securitization amount as well as origination of the type of syndicated loan facilities that are easily securitizable (Term B) under the shock. Our findings imply that securitization is actively used by banks as a risk management tool. The results hold in various robustness tests, including a triple-differences approach that expands the sample to include banks that are unaffected by the shock.

JEL classification: G21; G23; G24

Keywords: Securitization, Collateralized Loan Obligations, Corporate borrowers.

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1 Introduction

The securitization of loans through the collateralized loan obligations (CLO) structure is a key feature of the corporate lending market. Securitization activity via the CLO market, which once collapsed during the 2008 Financial Crisis, has now fully recovered and reached the highest level since the crisis. For example, CLO securities issuance in the US amounted to $125 billion in 2018, with the total size of the CLO market estimated to be $600 billion; during the pre-crisis period, it peaked at $256 billion in September 2008.[1]

CLOs are special-purpose vehicles (SPV) set up to hold and manage pools of leveraged bank loans, allowing banks to implement the originate-to-distribute model and thus to manage their risk exposure in the lending market. These CLO structures are an integral part of the bank intermediation that allows the pooling and tranching of corporate loans that are then sold to investors in the form of securities. On one hand, banks arrange syndicated loans and compose their corporate loan portfolios, and on the other hand they act as underwriters and collateral managers for CLOs, whose role is to acquire mainly syndicated term loans (and to a lesser extent other type of debt obligations) to create new off-balance sheet loan portfolios for securitization. After the initial purchase of new loans from loan arranging banks, the CLO is also actively managed (Peristiani and Santos, 2018). The collateral manager of a CLO would constantly buy and sell individual bank loans to reconstruct the underlying collateral pool in an effort to create trading gains and to minimize losses from deteriorating credits.[2]

Being able to engage in the securitization process directly as a collateral manager or underwriter provides banks with an extra risk management tool because it allows banks to flexibly adjust their balance sheet, manage liquidity, and free up capital (Sarkisyan and Casu, 2013) when necessary. Despite the well-established and increasingly dominant role of the CLO market in the financial system, we know little about banks' use of these structures for risk management

[1] Many of the most dramatic losses by large financial intermediaries announced during 2007 and 2008 were linked to CDO, while CLO-structured loans have shown lower loss rates and more stable ratings than comparable securitized products and corporate bonds. AAA- and AA-rated CLO tranches have never experienced a default or loss of principal, even during the financial crisis.

[2] S&P Global Market Intelligence (2016) showed that manager trades during the 2008-2009 credit crisis reduced potential losses by 10% on average (S&P CLO Spotlight: How Do CLO Managers Perform in Times of Stress, September 6, 2016)

purposes. In particular, understanding how banks' use of securitization affects their corporate lending is important given that bank debt is a pervasive form of corporate financing across all types of industries and firms and how well banks manage shocks on this type of financing have the potential to influence the overall performance of the economy.

In this paper, we investigate whether direct access to the CLO market as a collateral manager or underwriter allows banks to better absorb shocks on their corporate loan portfolio and enable them to continue their lending to corporations. In other words, we test whether banks actively make use of their access to the CLO market to manage risks under a negative shock in their corporate lending activity. We tackle this issue by comparing lending activities between banks with access to the CLO market and banks without access when both types of banks experience an idiosyncratic shock.

For identification, we follow Lin and Paravisini (2012) and use the collapse of the WorldCom Inc. in 2002, one of the largest bankruptcies in the history of the US, as a source of an idiosyncratic corporate lending market shock to the lenders. As Lin and Paravisini (2012) show extensively in their paper, the bankruptcy of WorldCom had a sizable negative impact on the twenty-eight banks that were lending to the company at that time. Losses that the banks experienced through WorldCom eventually led them to lend less to other corporate borrowers, even up to two years after the event. By adopting the set-up, we examine whether those WorldCom affected banks that had CLO market access cope with the negative shock differently in comparison to the banks that were similarly shocked but did not have access to the CLO market in terms of loan origination. We use databases, S&P Capital IQ and DealScan, as sources of data and collect the information on banks' CLO security (liability) issuance and the US syndicated loan deals.

First, we test whether the securitizing banks that are shocked by the WorldCom event become more active in securitization activity after the shock compared to other securitizing banks that are not affected by WorldCom's collapse. Our differences-in-differences (DID) results that are drawn by comparing shocked and non-shocked banks 2 years before and 2 years after the

shock show that shocked banks significantly increase the issuance of CLO securities in the post-shock period. It implies that the securitizing banks increase their engagement in securitization actively when losses occur in the corporate lending market and when their lending ability is impaired.

Second, our results on the syndicate lending market show that securitizing banks become more active in originating those syndicated loan facilities that are more likely to be securitized, namely, Term B, when compared to non-securitizing banks that were similarly shocked. In other types of more traditional facilities such as revolving and amortizing loans, we do not find significant differences between the two types of banks. Notably, securitizing lenders are also more active in amortizing facilities (term loans) only when they are part of a deal that also includes a Term B. In all the analyses, we include lender, time, and borrower fixed effects. In more stringent specifications, we also use borrower-time fixed effects to account for credit demand factors.

Third, we show that, while securitizing banks adjust their loan origination behavior, the effect is not reflected in their loan amount or conditions. When securitizing banks overcome the idiosyncratic shock in the lending market more easily, they are therefore supposed to be less inclined to transfer the negative shock to their customers in terms of credit availability (the total amount of credit they borrow)(Lin and Paravisini, 2012) and loan conditions (strictness of the loan covenants)(Murfin, 2012). However, we do not find supporting evidence of a difference in both loan amount and covenants' terms between securitizing and securitizing banks. Therefore, we conclude that even though securitizing banks adjust their behavior in the loan market using the CLO market, the effect is not reflected in their loan amount or conditions of loans originated by them.

We run the following tests to check the robustness of our results. In all of the tests, our results are unchanged. In our first robustness test, we include bank characteristics in the pre-shock period to account for the possibility that our results are driven by differences in other bank characteristics rather than difference in lenders' access to the securitization market. In a

second test, we use a different proxy for the access to the securitization market, which accounts for the intensity of the participation in the market, i.e., the amount of CLO bonds issued before the shock. Nadauld and Weisbach (2012) suggest that the more CLOs a bank underwrites, the better access it has to CLO managers and hence the more capable it is of distributing loans to the CLO vehicles established by these managers. Third, to further address concerns that the difference we find in DID may come from differences between securitizing and non-securitizing banks, we use a triple-differences approach, where we expand our sample to include banks active in the syndication lending market that did not suffer the shock caused by the WorldCom bankruptcy. Among the non-shocked banks, we classify again the banks into securitizing and non-securitizing types. Fourth, as an additional test, we restrict the analyses to a sub-sample that only include those securitizing lenders that are underwriters but not collateral managers of the CLO deals. This test is motivated by the concerns that our results may be driven by the cases where the role is shared, suggesting that we should find no results for all other cases where there is a formal separation between the two roles. Our results remain robust to all of the tests.

Finally, we address the alternative explanation that our results may also be consistent with banks' risk-taking behavior. One can argue that, instead of using CLO market access for risk management, securitizing banks can simply take advantage of the profitability in originating those facilities that will provide higher fees or spread. If this is the case, Term B with higher spreads, shorter maturity, and smaller size should attract shocked securitizing banks to be lead arrangers more frequently given that these facilities contribute to maximizing profitability. We run our DID by replacing our dependent variable with those facility characteristics and find that securitizing banks and non-securitizing banks do not show meaningful difference. This test confirms that securitizing banks are interested in recovering from the shock via CLO market rather than taking profits from certain types of facilities. This is also supported by the evidence that securitization activities increase when lenders are shocked by the WorldCom default.

Our study contributes to the current literature on securitization in several respects. Firstly, we provide a test for the assessment of the role of securitization in the corporate lending market, which is one of the few securitization market that has fully recovered from the crisis and plays

an important role in the financing of corporate borrowers. Moreover, to reduce the potential confounding effect of the crisis-related distortions in the assessment of the role of securitization, we use securitization data before 2004, thus focusing on the use of a relatively simple type of securitization, i.e., before the introduction of complex structured financing.[3] In fact, during the revitalization of the securitization market, policy-makers emphasized the promotion of simple, transparent, and comparable (STC) securitization.[4] They recognize the importance of distinguishing between a high-quality securitization—in terms of the process by which it is created and the underlying credit quality of the assets involved—and a complex and synthetic securitization, called structured finance (SF). The underlying assumption is that when the securitization is a complex structure, it can be a source of risk, as seen during the crisis (BIS and IOSCO, 2015), but it becomes a useful tool when it meets the criteria of simplicity, transparency, and comparability. Since an increasing number of corporations depend on the US$600 billion US CLO market for financing, our results emphasize an additional role for this market in support of the risk management of banks.[5]

The rest of the paper is organized as follows: Section 2 briefly reviews the literature on securitization and corporate borrowers; section 3 and 4 present our sample, empirical design, and pre-trend analysis; section 5 presents and discusses our main results; and section 6 presents the conclusions.

[3]In Figure 1 and Figure 2, which show the time trend of the securitization structure, we observe that the complex form of structured financing has spiked in volume from the mid-2000s to the time of financial crisis. In this period, securities started to be backed by fewer but larger and more heterogeneous assets, including high-yield bonds, leveraged loans, and tranches of other securitization deals, becoming a source of risk that triggered the crisis. While many studies focus on securitization of this period, we opt to look at the time period of the early 2000s, when securitization had a relatively simple structure.

[4]According to the Basel Committee on Banking Supervision (Basel III Document July 2016, Revisions to the securitization framework),"simplicity" refers to the homogeneity of underlying assets with simple characteristics and to a transaction structure that is not overly complex. "Transparent" refers to providing investors with sufficient information on the underlying assets and on the structure of the transaction and the parties involved in the transaction, thereby promoting a more comprehensive and thorough understanding of the risks involved. The manner in which the information is made available should not hinder transparency, but it should support investors in their assessment. "Comparable" refers to the criteria of promoting comparability and it can assist investors in their understanding of such investments and enable more straightforward comparison across securitization products within an asset class.

[5]There are rising concerns over the CLO market from the financial stability point of view; the institutional investors' increasing demand for high yield CLO securities results in lowered lending standards while an increase in interest rates compresses the margins of these structures. Our analysis in this paper focuses on the role of the CLO structures as part of the intermediation activity by banks, and the market forces behind the boom of the CLO markets are beyond the scope of this study.

2 Related Literature

While most post-crisis studies predominantly support the view that securitization is detrimental to financial stability (Financial Crisis Inquiry Commission, 2011; Demyanyk and Van Hemert, 2011; Mian and Sufi, 2009; Loutskina and Strahan, 2009; Rajan et al., 2015), much of the pre-crisis literature highlights the financial innovation spurred by securitization and its potential to alter the capital markets and provide solutions to problems stemming from financial intermediation (Gorton and Metrick, 2012a).[6]

Academics and policy-makers emphasize liquidity (the ability to raise funding/capital through the market and/or to reduce financing costs) and regulatory capital arbitrage (capital relief) as the two most important rationales for banks' asset securitization (see Fabozzi et al. (2007) and Watson and Carter (2006), among others). Securitization allows banks to obtain new liquidity from the market through the transfer of credit risk, which in turn reduces the need for regulatory capital. This also facilitates risk management in a bank by modifying the risk profile (Marques-Ibanez and Scheicher, 2009). In this regard, securitization allows banks to diversify credit risks among many investors across the financial system and to facilitate efficient use of bank capital. It reduces the cost of capital for loan intermediation, thereby reducing the cost of credit (Duffie, 2008). As a result, benefits for borrowers can be expected in terms of increased credit supply, reduced borrowing costs, and credit on more favorable terms (Altunbas et al., 2009; Goderis et al., 2007; Loutskina, 2011). To the extent that these benefits are passed on to borrowers in terms of more favorable lending conditions and higher credit availability, the economic benefits of securitization are transferred to the real economy. These benefits of securitization are also clearly recognized by current policy-makers whose initiatives encourage a restarting of the securitization market after the dramatic post-crisis decrease, since its revival is considered vital to providing liquidity to the financial system that will eventually boost the economy.

[6]It is difficult to evaluate whether securitization can be beneficial or detrimental for credit availability because of the several identification challenges in trying to disentangle the decision of banks to securitize from other concurrent drivers of banks' lending behavior and excessive risk-taking in the period leading to the financial crisis. Prior to the crisis, securitization activity showed dramatic growth, spurred by several factors such as distorted incentives for lower lending standards (Keys et al., 2012), weak governance, and CEO compensation (Erkens et al., 2012; Gande and Kalpathy, 2017) loopholes in the prudential treatment of securitization in Basel II trading book rules (Efing, 2015), overheated credit conditions and the demand for safe collateral that leads to the growth of shadow banking (Gennaioli et al., 2013), increasing presence of institutional investors (Ivashina and Sun, 2011), reduction in the share of the retained fractions by originating banks (Bord and Santos, 2012), and regulatory arbitrage opportunities and changes in accounting rules about the consolidation of Special Purpose Vehicle (SPV) in 2004 (Acharya et al., 2013).

Most recent studies, however, based on the evidence of the financial crisis, underline that these benefits are associated with a cost for the economy in terms of financial instability. It is because securitization is associated with an over-extension of banks' balance sheets, thereby leading them to a lower screening and monitoring of the borrowers; and this creates more credit risk (Acharya et al., 2013; Sarkisyan and Casu, 2013). Importantly, securitization may harm financial stability by increasing the contagion among financial institutions (Allen and Carletti, 2006).

Different evidence, however, is documented, depending on the type of lending. Studies are mainly divided into those focusing on mortgage lending and those focusing on corporate loans. Concerning the former, empirical evidence shows that securitization results in lower lending standards (Drucker and Mayer, 2008; Keys et al., 2012; Nadaul and Sherlund, 2009) mainly because of adverse selection problems. Concerning the latter, Wang and Xia (2014) found that banks active in securitization impose looser the covenants on corporate borrowers at origination (less monitoring), and Nadaul and Weisbach (2012) found evidence that securitization reduces the cost of corporate debt. There is no conclusive evidence of lower lending standards for corporate borrowers (Bord and Santos, 2015; Shivdasani and Wang, 2011; Benmelech et al., 2012). To what extent the access to the securitization market has implications in terms of loan provision and conditions for corporate borrowers is an empirical question that has not been investigated before.

Close to our study are works by Carbo-Valverde et al. (2015) and Bonaccorsi di Patti and Sette (2016). The first study analyzed the impact of securitization on credit rationing for Spain, comparing normal and crisis periods for two different forms of securitization: ABS and covered bonds. They found that firms borrowing from banks that are actively involved in securitization (ABS issuance and covered bonds) see their credit constraints more relaxed in normal times; however, during the crisis, they also witness credit rationing that is proportional to the amount of the ABS issued. Concerning the second work, during the crisis, the authors analyzed the effect of the ABS market freezing on the credit supply in Italy, and they found that banks that were

more involved in securitization before the crisis engaged in more credit rationing after the crisis, imposed higher interest rates, and had a lower probability of accepting loan applications and a higher probability of relationship termination. Compared to these studies, we observe the effect of securitization on corporate lending as a result of an unexpected bank-specific idiosyncratic shock, while the crisis period they observed coincides with a systemic shock: that is, the ABS market's collapse after the Lehman Brothers' failure when the complex interconnections between securitization, regulatory arbitrage, and the shadow banking system (i.e., through ABCP and repo market, see Gorton and Metrick (2012b) and Covitz et al. (2013) were revealed.

This growing empirical literature primarily focuses on the syndicated loan tranches obtained by institutional investors that are subject to securitization, that is, Term B. Unlike previous studies, we focus on all the facilities provided by banks—revolving facilities, term loans or Term A, and Term B. These other types of facilities are also provided by banks in the syndicate lending market and can potentially benefit borrowers; therefore their inclusion suits the purpose of our analysis. Similar to previous literature, we assume that securitizing banks are those that are collateral managers or underwriters as in the studies by Nadaul and Weisbach (2012) and Wang and Xia (2014).

3 Data and Descriptive Statistics

3.1 The Shock

First, as a shock, we adopt the demise of WorldCom in 2002 following Lin and Paravisini (2012), who present an extensive evidence that WorldCom's bankruptcy affected the supply of credit to firms that were borrowing from WorldCom as well. According to Lin and Paravisini (2012), the firms that shared WorldComâs lenders experienced a sharp decline in the new syndicated credit amount during the years after WorldCom bankruptcy and an increase in the cost of borrowing persisted over 2 years, relative to comparable firms that were unrelated to WorldCom lenders. While the authors do not test the mechanisms, there can be several reasons. The banks may have experienced a temporary drop in liquidity available for lending due to the losses they had from not being able to recover the loans from WorldCom. Another possible reason would be

that WorldCom's collapse raised concerns regarding the banks' screening and monitoring abilities over corporate borrowers and led them to be more stringent in loan origination.

While Lin and Paravisini (2012) shows the average effect from all WorldCom-affected banks, we separately observe lending behaviors of two sub-groups of banks: the banks with access to securitization (securitizing banks) and the other banks (non-securitizing banks). The main hypothesis is that such negative shock from WorldCom on banks should be weaker for securitizing banks due to the benefits they can draw from securitization activities such as flexible adjustment of balance sheet and capital and a fast recovery of liquidity. For this reason, we would expect that securitizing banks would remain more active in the corporate lending market after the shock compared to non-securitizing banks.

3.2 Data

Our sample comprises the following three types of syndicated loan facilities from the DealScan database: revolving facilities, term loan or Term A, and Term B. We restrict our sample to DealScan facilities that originated between 1999Q3 and 2004Q1, that is, 2 years before and 2 years after the collapse of WorldCom, to capture the effect of the shock.

The DealScan dataset contains information on borrowers and lenders of syndicated loan deals in the US. It contains data on loan facilities that belong to a deal, typically each deal containing one or more facilities. Traditionally, banks provide pro-rata facilities (i.e., credit lines) named revolving facilities and/or amortizing loans called term loan or Term Loan A (Term A, hereafter). Term Loan B (or the next order facilities such Term Loan C, D, etc.) is referred to as institutional facilities, arranged by banks and traditionally syndicated by institutional investors. Typically, if a syndicated loan deal contains Term Loan B (Term B, hereafter), then the amortizing part of the loan is called Term A, and if it does not contain a Term B, then the traditional part is named just term loan. Although the characteristics of traditional loan facilities may be similar to that of a term loan and Term A, we separate the two types due to the fact that lenders' interests to participate in them may be different as the origination of Term A may be

a necessary condition to participate in the origination of Term B.

Contrary to much of the literature on syndication lending, which has focused mostly on the securitization effect on institutional loan facilities (Term B) and leveraged loans, we focus on all types of facilities such as term loan, Term A, Term B, and revolving facilities. Revolving facilities represent the majority of all syndication loans and the most important type of facility for liquidity provision. Compared to the other facilities, they create more liquidity risk for the lenders since the borrower may draw down and repay any amount up to a fixed amount with fixed maturities as he desires. Term A and B are more standard loans and used for longer term needs of the borrowers. Term loans are standard loan facilities with a fixed amount and maturities. Term B is typically the facility that is securitized, while the revolving and the term loans are typically held by the originating lender. The three types of facilities can be part of the same deal, in which case the term loan is then defined as Term A. We focus on the probability of a bank being the lead arranger of each of these facilities. This measure captures the ability of a bank to participate in the syndicated loan market as a main provider and negotiator of the loan, tasked with monitoring the borrower.[7] Particularly, it reflects the following three types of a bank's abilities (or interests) in the syndicated loan market: the ability to provide liquidity commitment in the format of credit lines (Revolving), the ability to lend a standard loan (term loan and Term A), and the ability (interest) to arrange a type of loan facility that is more likely to be securitized (Term B), i.e., transferable to a CLO structure.[8]

Using data from the DealScan, we classify a facility as 'WorldCom-affected' when its lead arranger is a WorldCom-affected bank. The role of a lead arranger is performed by one or multiple banks in a syndicated loan facility of a deal, and lead arrangers are supposed to be most influential over the conditions of a syndicated loan deal. Lead arrangers are identified through the following steps. First, we refer to the facility-level reported information when available. We observe each bank's role in each facility and identify the main lender of the facility. If multiple

[7]Before the financial crisis, banks were not obliged to retain any part of the originated loan, since the retention rule was only introduced after the crisis. Recently, in February 2018, a court ruling has again exempted the CLO deals in the US market from Dodd-Frank âskin in the gameâ rules.

[8]Although a similar test can be designed using the lead arranger's share in each loan facility, due to patchy data on the lender's share variable as extensively explained in (Bruche et al., 2017), the number of observations would be dramatically reduced when the DealScan is used. Therefore, we opt for a measure that is unaffected by this issue, which involves measuring the probability of being a lead arranger of different types of loan facilities.

banks share the same role, then we use those bank's size of share in a facility to decide their hierarchy; the bank with the highest share in a facility is identified as the main lender. In the cases where bank share information is missing, we take multiple banks as lead arrangers.

Subsequently, we classify the facilities as being originated by a WorldCom-affected bank if the lead arranger participated in syndicated loan deals to WorldCom between the second quarter of 2001 and the first quarter of 2002, following Lin and Paravisini (2012). There are 28 such banks. We exclude borrowers that belong to the same industry sector as WorldCom, that is, the telecommunications industry. This was done to avoid the possibility of capturing the effect of the telecommunication industry-wide shock rather than the shock faced by banks in the corporate lending market, given that WorldCom was the largest player in the industry. We also exclude financial firms and regulated industries.

Our identification of the bank's access to the CLO market is based on a unique dataset of collateralized loan obligation/collateralized debt obligation (CLO/CDO) deals from the S&P Capital IQ database. S&P Capital IQ preserves the list of global CLO/CDO deals that are rated by the rating agency, Standard & Poor's, reporting their origination date, type, underwriter, collateral manager, and amount issued. From these data, we collect the identity of underwriters and collateral managers who arranged CLO deals in the period before the WorldCom shock. Our assumption is that both have a role in managing the underlying portfolios of CLO deals, as also suggested by (Chernenko, 2017), and thus can easily access the securitization market when they need to manage their corporate loan portfolio. Our proxy is defined at the lender level; hence, all loans from securitizing lenders are considered 'treated': that is, affected by the access to securitization regardless of whether those loans or facilities are actually securitized, alleviating the concerns for cherry-picking loans to securitize (Wang and Xia, 2014). Before considering the impact on their lending activities, our first test is to assess whether lenders do become more active in the CLO market after the WorldCom shock. We set up a DID regression following many banking studies (Berger and Roman, 2015, 2017) using a sample of securitization banks in which one group of them is affected by the WorldCom bankruptcy and the other is not. The regression shows whether securitizing banks facing the shock increase their issuance of CLO

bonds relative to the securitizing banks that are not facing the shock. We find that shocked banks increase their issuance of CLO relative to the non-shocked banks after the shock. This result gives support to our underlying assumption that loan arrangers deal with an idiosyncratic shock using the CLO market.

To clarify, in the study, we do not assume that the facilities we observe are securitized due to the fact that the lead arranger is a securitizing bank. This is different from most previous studies that pursue to identify securitized loans. The securitization of loans in our study is only valid, to a certain extent, to the Term B tranches, since the other facilities are rarely securitized. In our analysis, all the facilities are expected to be affected by the recovery of lending banks, which may depend on their access to the securitization market. We test mainly whether the use of this alternative source of funding—securitization—allows banks to provide more loans when compared to the banks that are shocked but do not have access to a securitization market. The question of whether the type of loans they provide will change because they are experiencing a negative shock in the corporate lending market is secondary.

To address the issue that our measure of securitization may capture other bank-level characteristics unrelated to securitization, that is, other risk management activities, our analyses rely on lender fixed effects for all specifications. Moreover, to address the possibility that market conditions in the securitization market may contaminate the interpretation of our results, we also identify securitizing banks for a control sample of facilities unaffected by the WorldCom collapse and expand the sample by including them with non-securitizing, non-affected banks. By conducting a comparison with unaffected securitizing banks, we also address the concern that securitizing banks may always behave differently from the non-securitizing banks. All specifications also include quarter fixed effects.

Finally, we consider that affected/unaffected banks as well as securitizing/non-securitizing banks may serve different borrowers. However, matching conducted using the Compustat database for borrowers' information would significantly reduce the number of observations and, more importantly, introduce a potential selection bias among borrowers. Therefore, we opt to

include borrower fixed effects in all our specifications.

We consider a period before the "securitization boom," which implies that the demand for CLO plays a minor role. The concern regarding demand effect is further alleviated in the extended sample that includes all securitizing banks, regardless of their involvement in the WorldCom shock.

Table 1 reports summary statistics for the loan facilities in the analysis for the pre-shock period, 2001. Panel A reports the means and standard deviations for the loan facilities by the "WorldCom-affected" lenders (Column (1)), sub-sample of lenders that were not actively involved in securitization (Column (2)), and sub-sample of lenders that were actively involved in securitization. Column (4) reports the difference in means between the two subsamples. Among affected lenders, securitizing banks grant larger deals, charge a higher spread on Term A, and participate in syndicates with a higher number of participants. Moreover, they are overall more likely to be lead arrangers for all the facilities.

Panel B reports means and standard deviations for the characteristics and facilities of deals originated by all the lenders originating or participating in a syndicated deal in 2001 (Column (1)), sub-sample of "WorldCom-affected" lenders (Column (2)), and sub-sample of lenders not affected by the collapse of WorldCom (Column 3). Column (4) reports the difference in means between the two subsamples. Among lenders, those that lent to WorldCom before the collapse grant larger deals, charge a higher spread on Term A, and participate in syndicates with a higher number of participants. Moreover, they are overall more likely to be lead arrangers for all the facilities.

Panel C reports means and standard deviations for the characteristics and facilities of deals originated by all the lenders originating or participating in a syndicated deal in 2001 (Column (1)), sub-sample of non-securitizing lenders (Column (2)), and sub-sample of securitizing lenders (Column 3). Column (4) reports the difference in means between the two sub-samples. Among lenders, securitizing lenders grant larger deals, charge a lower spread, and participate in syn-

dicates with a higher number of participants. Finally, overall, they are more likely to be lead arrangers for all the facilities (not only for Term B).

Insert Tables 1 and 2 here

Table 2 reports summary statistics for WorldCom affected lenders' (banks') characteristics in our sample. We provide summaries of non-securitizing lenders in column (2) and securitizing lenders in column (3). Column (4) reports the difference in means between the two sub-samples. In our sample, securitizing lenders are larger in size and have higher capital, deposit, and liquidity. However, when we normalize the variables by lenders' size, we do not see significant differences in the two groups as shown in the last three rows.[9]

4 Empirical Design

4.1 Pre-event Trend Analysis

An underlying assumption of our analysis is that there was no difference in the lending abilities of both securitizing and non-securitizing banks before the shock. For our main empirical strategy—DID—to work, the parallel pre-trend assumption should hold. Although there is no direct test for the assumption, we graphically present whether there existed a notably different trend in the pre-shock period.

Figure 3 presents the total number of syndicated loan deals originated by securitizing banks and non-securitizing banks, within the WorldCom-affected banks. The number of deals in the graph is normalized to 100 at January 2001. The WorldCom-affected months are shaded in gray. Before the shock, the number of deals originated by the two groups of banks was relatively parallel. Additionally, over the WorldCom trouble months, the solid line denoting the treated (securitizing) banks shows us that the total number of deals originated by securitizing banks show a relative increase during the treatment period. In Figure 4, we observe the number of

[9]Because the size gap between securitizing and non-securitizing banks raises concern in comparing the two groups, in our robustness tests we expand our sample to include another group of securitizing and non-securitizing lenders that are not shocked by WorldCom. The three-way comparison allows us to compare our treatment group to securitizing lenders as well.

total facilities that are originated by the two groups of banks. Similar to the number of deals, the two groups of banks show relatively parallel trends around the shocked time period.

Insert Figures 3 and 4 here

From Figure 5 to 7, we present the total number of facilities originated for each type facility. Each of the figures corresponds to the number of Term B deals, revolving loans, and Term A deals respectively. Overall, we see that the origination of each type of loan is more or less parallel over the pre-shock period. Over the shock period, we observe in 5 that the origination of the Term B becomes noticeably active for securitizing banks when compared to what we observe for the revolving loan(Figure 6) or Term A (Figure 7).

Insert Figures 5, 6, and 7 here

4.2 CLO Security Issuance

In this section, we explore whether securitizing banks' activity changes when they experience a negative and idiosyncratic shock in the corporate lending market, more specifically in the syndicated loan market. By observing post-shock securitization activities of banks, we can draw implications on whether securitizing banks overcome the negative shock by actually engaging in the securitization activity or through other unobservable factors. The larger issuance of CLO securities (bonds) is related to a larger portfolio of loans being securitized. To test this, we looked at the total amount of CLO liabilities (bonds) issued by each bank. The sample is restricted to securitizing banks only in this test, and we compare securitizing banks facing the shock to the rest of the securitizing banks.

The specification for the DID test is as follows:

$$Ln(CLO)_{Lender,t} = \alpha + FE_{Lender} + \lambda_t + \beta Post_t \cdot WorldCom_{Lender} + \epsilon_{Lender,t} \qquad (1)$$

where $Ln(CLO)_{Lender,t}$ is the log-transformed amount of CLO liabilities issued by a bank, $Lender$, in the quarter, t. The coefficient β captures the change after the shock in the CLO

liabilities issued by securitizing banks that were shocked by WorldCom's collapse relative to those that were equally securitizing banks but not affected by WorldCom's shock.[10]

The result is expected to show whether securitizing banks change their securitizing activities after the shock in such a way that they increase their involvement in securitization.

4.3 Banks' Loan Origination Behavior

In this section, we study the role of securitization on the ability of lenders to overcome idiosyncratic and unexpected negative shocks in the lending market. We expect shocked lenders with direct access to the securitization market to be less affected in the provision of loans, owing to their ability to convert illiquid loans into liquid funds, as suggested by Loutskina (2011). To the extent that lenders benefit from securitization on their balance sheet, we should expect them to be less shocked than other lenders in the ability to provide loans as well. We begin our analysis by using the sample of WorldCom lenders that were negatively affected by its collapse in 2002. The sample includes the following two types of lenders: securitizing and non-securitizing lenders.

We focus on a lender's ability to participate as a lead arranger in different types of syndicated loan facilities—Term B, term loan or Term A, and revolving.[11] Term loan B represents the loan facilities that are most likely to be securitized. The Term A and revolving loan represent a stronger liquidity commitment by lenders. This is due to the fact that, in the case of Term A, the lead arrangers are expected to hold their shares in the loans for a longer period and that, in the case of revolving facilities, the lenders are expected to provide a loan (liquidity) at any point in time during the contract when borrowers demand the loan. The main test is to see whether access to the securitization market as an alternative source of funding implies lenders'

[10]Shortly before the WorldCom event, in December 2001, Enron filed for bankruptcy under Chapter 11 of the US Bankruptcy Code, the largest corporate bankruptcy filings at that time. The Enron case highlighted the role of off-shore/ off-balance activities and, according to Loutskina (2011), led regulators to discuss more stringent rules and the securitization market to stall until the uncertainty on the rules was addressed later in 2004. One could argue that the Enron case was a contemporaneous shock to the securitization market, which should work against our hypothesis due to its closeness in terms of time period. Given that the direction of the coefficient would be the opposite with the Enron event, if our results are affected by it, we estimate that our coefficients only contain a downward bias.

[11]Playing the role of a lead arranger in a loan facility implies that the bank provides a fairly high share of funds and has a high negotiation power over the conditions of the loan.

higher ability to provide traditional illiquid loans (term loan or Term A and revolving loan) or to provide loans that are participated by institutional investors and are more likely to be securitized (Term B).

Although both term loan and Term A are used to indicate the most traditional type of loan facilities in syndicated loans, there is an important difference between them. The traditional primary loan facilities are named term loans in those syndicated loan deals wherein there are no other facilities than revolving facilities, and the facilities of the same kind are named Term A if there are additional term loan facilities such as Term B. Hence, the existence of Term A is conditional on the existence of Term B in the same deal. Given that we are trying to observe the loan origination behavior in different types of facilities and compare the lenders' choice to be lead arrangers in facilities with high liquidity commitment and the rest, we conduct separate analyses for term loans and Term A.

Our baseline DID specification is as follows:

$$\begin{aligned} LA^{Fac}_{Lender,Borrower,t} = \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t \\ +\beta Post_t \cdot Sec_{Lender} + \epsilon_{Lender,Borrower,t} \end{aligned} \tag{2}$$

where the dependent variable $LA_{Lender,Borrower,t}$ is a binary variable that indicates whether the bank, $Bank$, is a lead arranger in the facility, Fac, which is originated in the quarter t. FE_{Lender}, $FE_{Borrower}$, and λ_t represent, respectively, lender (bank), borrower, and time (quarter) fixed effects. The binary variables $Post_t$, and Sec_{Lender}, respectively, indicate the time period after WorldCom's collapse and identify whether the lender is a securitizing bank. We run separate regressions for each type of facility—revolving, term loan, Term A, and Term B.

4.4 Implications to Corporate Borrowers

When bank lenders are under an idiosyncratic shock, they could potentially transmit the negative effect to their borrowers through lower amount of loans (Lin and Paravisini, 2012). This may imply that when lenders recover more quickly from the shock through securitization, the

transmission of the negative shock from banks to borrowers could have be affected, i.e., weaker, and thus corporate borrowers may benefit when they borrow from securitizing banks. To test this, we replace the dependent variable of previous models with the following two variables: size of syndicated loan deals and loan covenant.

The loan amount a lender can provide to a syndicated loan is an indicator of how reliable source of funding a lender can be for a borrower. As a lead arranger, a bank is deemed to contribute to a deal with a largest portion of loan, hence the size of a deal is a proxy of the amount of liquidity its lead arranger provides to the loan. Under a negative shock, a lender is likely to play as lead arranger in smaller size loan deals. Based on the fact that the shock on lender is random, we assume that the borrowers of treated lenders were not different from those of control lenders in terms of loan demand and test whether loan size is less negatively affected in case their lender had access to securitization.

Another question that arises is whether lenders also adjust loan conditions when they experience changes in loan organization activities due to an exogenous shock, as in our study. Concerning lenders' securitization activities particularly, there is evidence that lenders' monitoring tends to weaken for securitized loans (Wang and Xia, 2014). Although we do not directly observe those loans that are securitized in our study, we test whether the changes in lenders' motivation to originate loans lead to changes in loan conditions, on average, for all loans. One possible hypothesis is that lenders may relax the loan conditions when they originate Term B for which they will exert lower monitoring efforts. An alternative hypothesis is that shocked lenders adjust their screening and monitoring level as they revise their previous practice (Murfin, 2012), or they invite additional lower quality borrowers into their pool of borrowers (loans) and apply stricter loan conditions to impose higher monitoring. In both cases, the changes in loan condition will mean that borrowers absorb a part of the lenders' shock due to the reasons that are unrelated to borrowers' condition. We test whether the magnitude of such a change depends on the lender type—securitizers and non-securitizers. To test this, we use one of the most critical types of loan conditions— covenants. We adopt the covenant strictness index that is built by Bradley and Roberts (2015).

To test the two dependent variables, we use the following specification for DID regressions:

$$Y_{Deal,Borrower,t} = \alpha + FE_{Borrower} + FE_{Lender} + \lambda_t + \beta Post_t \cdot Sec_{Deal} + \epsilon_{Lender,Borrower,t} \quad (3)$$

where the dependent variable, Y, is either $DealAmount_{Lender,Borrower,t}$ or $Covenant_{Deal,Borrower,t}$ depending on the model. $DealAmount_{Lender,Borrower,t}$ is the total size of loan that a *Lender* provided in a deal originated at a quarter, t. $Covenant_{Deal,Borrower,t}$ is covenant strictness measured at the syndicated loan deal level, as in Bradley and Roberts (2015). The coefficient of interest is β that captures the difference in the sizes of loans originated by the two types of banks after the shock or the effect of the shock on the related loan deals' covenant level in the loans that were originated by securitizing banks.

5 Results

5.1 CLO Security Issuance

In this section, we run a preliminary test whether securitizing banks become more active in securitization activity. In order to show that securitization activity is used as a risk management tool by those banks that engage in securitization and also to support the main test that securitizing banks change their loan origination behavior after a shock due to securitization, on the sample of securitizing lenders, we differentiate those that are shocked by WorldCom from the rest in this sample. In a DID setting, we consider the amount of CLO liabilities, that is, the total amount of CLO bonds issued by securitizing lenders facing the shock(treated) relative to that of the non-shocked securitizing lenders (control) after the shock. The issuance of CLO bonds is a proxy of the amount of loans securitized by the sponsoring bank. By showing that the securitization activities increase when lenders are shocked by the WorldCom default, we indirectly show that banks use securitization to manage their liquidity after the shock.

The results are presented in Table 3. As shown in Equation 1, the dependent variable denotes the total CLO liabilities issued in each quarter. The variables of interest are the interaction term between $WorldCom$, which is equal to 1 if the bank was affected by the WorldCom shock, and

Post, which is equal to 1 if the observation is in the post-shock period. The coefficient is consistently positive and significant in all specifications, indicating that shocked securitizing banks increase their CLO liabilities issued relative to the non-shocked securitizing banks after the shock. We find the strongest effect in the most restricted model in Column (3), in which we include time fixed effect and bank fixed effect.

Insert Table 3 here

5.2 Banks' Loan Origination Behavior

In this section, we present the results of our main analyses on the probability of being a lead arranger in different types of syndicated loan facilities. Table 4 – 6 reports the results from the DID model in Equation (2) using different samples of loan facilities.

Table 4 reports the results of a simple split of three types of loan facilities: 1) revolving, which is the syndicated loan facilities that require higher liquidity commitment from lenders although there is no immediate transfer of liquidity at the time of loan contract; 2) term loans and Term A (amortizing loan facilities), which require immediate transfer of liquidity and are likely to remain in lenders' balance sheet; and 3) Term B, which require liquidity transfer but are likely to be securitized on providing a quick liquidity recovery. The coefficient of interest is the interaction term between *Sec* that is equal to 1 if the bank is a securitizing bank, and *Post* that is equal to 1 if the observation is in the post-shock period. The coefficient captures whether securitizing banks participate in the origination of each type of facilities more actively after the shock relative to those shocked in a similar way but with no direct access to securitization. Depending on the model, we include lender, borrower, and time fixed effects or lender fixed effect and borrower-time fixed effect. While we do not find significant differences in the probability of being a lead arranger in revolving or first tranche of amortizing loans (term loan and Term A), we find positive and significant coefficients in case of Term B as shown in columns (5) and (6). More specifically, lenders that have direct access to securitization market are 11.7% more likely to be lead arrangers in Term B after the shock relative to those lenders that do not have access to securitiziation. The results show that, compared to similarly shocked non-securitizing banks, securitizing banks are more likely to be lead arrangers only in Term B.

Insert Table 4 here

The following regressions in Tables 5 and 6 confirm securitizing lenders' increased interest in originating Term B by showing their activeness in other facilities that is limited to those cases where Term B is present in the same deal. In Table 5, we split the amortizing loan facility sample into term loans in columns (1) and (2) and Term A in columns (3) and (4). Typically, a syndicated loan deal will have a facility referred to as "Term Loan" without the classification of A or B if the deal contains only one tranche of amortizing loan. This first tranche of amortizing loan that is most likely to remain in banks' balance sheet, hence less likely to be securitized on. If the deal also contains a second tranche of amortizing loan (Term B) that is lower in seniority and more likely to be securitized on, the first tranche of amortizing loan is named "Term A." Hence, the presence of Term A is conditional on presence of Term B in the same loan. Although both Term Loan and Term A are similar to each other in their characteristics, like most traditional loans, the origination motivation for the two can be different from the lenders' perspectives due to the fact that the lead arranger of Term A is more likely to serve as a lead arranger in Term B in a deal that contains both. If a lender is interested in originating Term B, its participation as a lead arranger in Term A may also increase within the same deal, while there is no such dynamic regarding Term Loan facilities. As shown in Table 5, we find that securitizing lenders are more active lead arrangers of Term A compared to non-securitizing lenders, but such effect is not found in Term Loans. It implies that securitizing lenders play lead arrangers of the first tranche of amortizing loans only when this is likely to entitle them to be a lead arranger of the next tranche of loan facility, Term B, that is securitizable.

Insert Table 5, and 6 here

A similar tendency is found in the revolving facilities although weaker. In Table 6, we split Revolving facility sample based on whether the deal it belongs to also contains Term B. We find evidence that lenders with access to securitization tend to be more frequently lead arrangers in revolving facilities in those deals where Term B is present as well although the result is only weakly significant. It implies that when a lender is interested in being a lead arranger in Term B, they try to be more influential in other facilities as well which may, in turn, allow them higher access to lead arranger role in Term B.

Overall, the results show that lenders who have access to securitization market become more active in originating securitizable loan facilities after the shock and that they remain active in other types of facilities conditional on the fact that this helps their control over Term B. The results in Section 5.1 that show shocked securitizing banks increase their securitization activity provide evidence for the securitizing lenders' increased interest to be involved in those loan facilities which they can securitize on. Also given that those loan facilities are taken off balance sheet sooner than maturity and let lenders recover liquidity shortly, it may put less pressure on lenders' liquidity. Such a function played by securitization would be the most useful in the period that lenders are negatively shocked. This implies that access to securitization market allows lenders to control their liquidity more flexibly without having to commit to provide liquidity for full maturity period and allow them to continue with their main business operation, loan origination.

Although other lenders that do not have direct access to the securitization market can also sell their loans to third parties during the shock period, the benefit of loan sales is unlikely to be matched to having control over securitization as a first-hand executor. For example, the timing of the demand and supply may not be matched, meaning it could be difficult to find buyers of loans when they need to sell, or the cause of shock can place negative reputation for lenders' loan monitoring ability and lower the demand for their loans. Such additional frictions to loan sales limit the benefit of securitization and our results corroborate the idea by showing that only those lenders with direct access increase their loan origination activities.

The fact the lenders use securitization as a risk management tool means that they have an additional means of managing shocks compared to others lenders that do not have direct access to the securitization market. Given that lenders benefit from the risk management that securitization can offer, the important question is whether such benefits are also delivered to their borrowers as well. In this section's analyses, we find that that securitizing lenders become lead arrangers more frequently not only in Term B but also in Term A and revolving facilities in those deals where Term B exists during the shocked period. It implies that indirectly borrowers also benefit from securitizing lenders' involvement in securitization. In the next section, we test

whether benefits are transmitted more directly to their borrowers through loan conditions.

5.3 Implications to Corporate Borrowers

While lenders are first to benefit from the securitization presumably by being able to flexibly control their loan origination and sales better than other lenders, borrowers of those lenders may benefit from lenders' superior risk management ability as well. In this section, we test whether such risk management benefits are transmitted to the lenders' corporate borrowers through more stable lending ability.

The first variable to be tested is the loan amount given to the borrowers. As shown by Lin and Paravisini (2012), the loan amount originated by the banks facing the shock declines immediately after the shock. However, if securitizing banks recover more quickly from the shock through risk management, we would expect that the loan amount provided to their corporate borrowers would be more stable or less negatively shocked. This would be true even in the short-term, given the immediate response of the banks to the shock and the immediate adjustment in loan origination behavior, as shown in the results in Section 5.2. The hypothesis is not corroborated by the regression results. As presented in columns (1) and (2) of Table 7, we do not find significant results for both DID regressions of different specifications. The coefficients are expected to be positive, showing that securitizing lenders can increase lending when compared to non-securitizing lenders when both are facing a shock. However, the coefficients are negative, although not significant. This implies that, even when securitizing banks adjust their loan origination and securitization activity flexibly when they run into a shock, it does not necessarily suggest that the banks' borrowers would benefit from such agility in terms of loan amount.

Insert Table 7 here

The second aspect of loan conditions that we test is loan covenant. We test whether loan covenant that may affect borrowers directly is affected either negatively or positively depending on lenders' engagement in securitization activity. As suggested by Murfin (2012),[12] recent

[12]We use a different measure of covenant strictness, based on Bradley and Roberts (2015), as our level of analysis is loan deals, while Murfin (2012)'s analysis is at the borrower level. To control for borrower specificity, we decide to include borrower fixed effects.

defaults inform about the lender's perception of its screening ability, thereby impacting its contracting behavior and ensuring that the lender writes tighter contracts. In line with this theory, we should expect that lenders facing shocks originate deals with stricter covenants than their peers in the syndication lending market. On the other hand, securitization is often associated with lower incentives to monitor the loans (Wang and Xia, 2014). However, to the extent that securitizing lenders invite low-quality borrowers into their pools, they may opt to apply more strict loan conditions.

Columns (3) and (4) in Table 7 present the regression results of the syndicated loan covenant strictness on the interaction term between post-shock period and securitizing banks. In all the specifications, we do not find significant results for the coefficient of interest, although the coefficients are consistently positive in all models. Therefore, we reject the hypothesis that loan conditions may be affected by a shock faced by lenders even though securitizing lender changes their loan origination behavior under the shock.

5.4 Robustness Test

5.4.1 Lender Characteristics

In the main analysis we find that securitizing lenders become more active in originating Term B as lead arrangers. In this section, we provide robustness tests for the main findings.

In the first test, we run the main specification regressions in Table 4 by including lender characteristics as controls. The bank characteristics are size that is proxied by log of total assets, capital that is banks' equity, return on assets as a proxy for profitability, deposit that is banks' total deposit from customers, and liquidity that is banks' cash equivalent holdings. These characteristics may change over time due to the shock as well, hence we fix the level at the pre-shock period level instead of allowing them to be time-varying to avoid possible endogeneity from concurrent changes in those variables. By including continuous variables that represent banks' financial status in the pre-shock period, we further exclude the possibility that the resulting significance in the coefficients in our DID may come from differences in bank characteristics

rather than difference in lenders' access to securitization market.

Insert Table 8 here

As shown in columns (5) and (6) of Table 8, our results hold even after controlling for banks' pre-shock characteristics. Even though we consider the bank characteristics, securitizing lenders remain active in originating Term B, while the same effect is not found for revolving or first tranche of amortizing loan facilities.

5.4.2 Securitization Amount

We show that lenders that had access to securitization market become active in CLO issues after the shock as well as in their origination of Term B. This implies that their previous experience in the securitization market allow them to engage in future securitizations. In this section, we run the main specification in Equation 1 by replacing the binary variable that classifies lenders' access to securitization market (Sec) with the amount of securitization they were engaged in before the shock ($SecAmt$). This let us test whether the intensity of lenders' engagement in securitiziation activity also matters.

Insert Table 9 here

Table 9 presents the results. The variable, $SecAmount$, is a continuous variable that takes logarithm of total amount of CLO issue (mm US dollars) by the lender before the shock[13]. To avoid endogeneity issues resulting from possible concurrent changes in the amount of CLO issues after the shock, we fix the amount to total amount of CLO issue of the time period before the shock. When it is interacted with $Post$, which is equal to 1 for the post-shock period, it shows a significant and positive coefficient. This means that lenders with higher amount of securitization issues before the shock show tendency to become more active in origination of Term B after the shock. This adds to our main finding by confirming that intensity of securitization activity matters as well as the lender's access to the securitization market.

[13]To avoid taking logarithm of 0, 1 is added in case of non-securitizing lenders, which eventually return the value of 0 after log-transformation.

5.4.3 Triple Differences

As a third robustness test, we set up triple differences regressions. The natural concern in our DID setup is that there may be fundamental differences between securitizing banks and non-securitizing banks, and our findings would result from such differences rather than lenders' different intentions after the shock. For example, as shown in the summary statistics in Panel A of Table 1 and Table 2, securitizing lenders are on average larger and engage in originations of larger-sized loans, hence such concern is legitimate. To deal with it, we expand our sample to include those lenders that are not affected by the collapse of WorldCom. These lenders can be divided into securitizing lenders and non-securitizing lenders, and it allows us to set up a triple differences regressions. In the triple differences regressions, the first difference is before and after the shock, the second difference is between securitizing lenders and non-securitizing lenders, and the third difference is between securitizing lenders that are shocked and securitizing lenders that are not shocked. The third difference lets us take care of the part of coefficient that is the result of fundamental difference between securitizing lenders and non-securitizing lenders.

The model specification for triple differences regression is as follows:

$$\begin{aligned} LA^{Fac}_{Lender,Borrower,t} = \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t + \beta Post_t \cdot Sec_{Lender} \cdot WorldCom_{Lender} \\ + \gamma Post_t \cdot Sec_{Lender} + \eta Post_t \cdot WorldCom_{Lender} + X^{Fac}_t + \epsilon_{Lender,Borrower,t} \end{aligned} \tag{4}$$

where we add the triple interaction term for $Post_t$, Sec_{Lender}, and $WorldCom_{Lender}$ to our DID specification. $WorldCom_{Lender}$ is a binary variable that indicates whether the lender is affected by WorldCom's collapse, that is, whether the lender was lending to the WorldCom at the time it went bankrupt.

Insert Table 10 here

The results are reported in Table 10. For revolving facilities and Term Loan and Term A, we do not find statistically significant results for the coefficients of interest. This confirms that securitizing lenders do not change their loan origination activities regarding the loan facilities

that are classified as more liquidity-demanding.[14] However, in Term B, we find that when securitizing lenders are shocked, they become more active in being lead arrangers, not only relative non-securitizing lenders, but also relative to those securitizing lenders that are not affected by WorldCom. Both the significance and magnitude of coefficients are consistent to those in the DID regressions, providing strong evidence that lenders actively use securitization as a risk management tool when they are negatively shocked.

Insert Table 11 and 12 here

We additionally test the split sample regressions in Tables 5 and 6 in the triple differences set up. More specifically, we test whether lenders behave differently in Term Loan and Term A and in Revolving facilities in deals that have Term B and those that do not. Through Tables 11 and 12, we confirm that securitizing lenders remain active only in those cases where their active engagement in other types of facilities lead them to have higher access and control over Term B.

5.4.4 Lenders that are CLO underwriters but not collateral managers

In the next test, we discuss the issue of CLO collateral managers' independence from deal underwriters and run an additional test to check the robustness of our results to this discussion.

In theory, the collateral manager of a CLO deal who provides a service regarding portfolio construction and monitoring of portfolio performance is supposed to be independent from CLO deal underwriters. This means that they are not influenced by underwriters in terms of which loans would be included in a CLO vehicle for securitization. It implies that the securitizing lenders who are underwriters of CLO deals in our set up do not have full control in the securitization process, especially regarding the loan selection process. However, in reality, there can be different types of interactions between collateral managers and underwriters. One possibility is that underwriters for large-sized investment banks can set up or own smaller size financial institutions that they can hire as collateral managers for their securitization vehicles. In this type

[14]The coefficient of the interaction term, Post X WorldCom, shows significant positive signs for the Revolving facilities sample. It means that all shocked lenders, both securitizing and non-securitizing lenders, tend to become more actively lead arrangers of Revolving facilities. A possible reason is that, by actively participating in revolving facilities, shocked lenders can signal their financial health while they do not have to transfer liquidity immediately to borrowers due to the characteristics of the type of facilities.

of relation, underwriters are more likely to have negotiation power over deal-related decisions due to their pre-existing relationship and strong influence. Even if underwriters and collateral managers are not tied into such a strong relationship, there is evidence that underwriters of CLO deals do have influence over portfolio constructions for such reasons that they are larger and more influential in general compared to collateral managers who share interwound interests with them (Chernenko, 2017).

Nonetheless, a relevant concern for our case is the possibility that our results are drawn from such cases and that the results do not hold for more common cases where collateral managers are thought to be independent. If there are collateral managers that are not under underwriters' influence and can refuse to include the underwritersâ (securitizing lenders at the same time) own loans in their vehicles, the securitizing lenders' efforts of being a lead arranger in Term B would be futile; therefore our results may not hold in this case. We provide a robustness test regarding the possibility that securitizing lenders do not react in the same way in case collateral managers are independent. Based on the assumption that underwriters' influence over collateral managers would be stronger if they belong to the same financial group, we rerun the main regressions by excluding those samples where the CLO collateral manager and CLO underwriter share common names. For example, there can be a case where the underwriter is Goldman Sachs International, while the collateral manager is Goldman Sachs Asset Management. After excluding those cases, we are left with samples where the collateral managers are thought to be independent.

Insert Table 13 here

By presenting the results in Table 13, we confirm that our main result is not reliant only on those cases where underwriters have more direct influence over collateral managers. This, in turn, proves that even in those cases where collateral managers are supposedly more independent, underwriters do have control over loan selection, and they change their loan origination behavior with an increased interest to engage in securitization.

5.5 Other Loan Characteristics

In this section, we explore an alternative explanation that our main results are driven simply by shocked lendersâ increased interests in originating high profit loan tranches rather than risk management ability that securitization can offer. One can argue that shocked lenders' interest in engaging in the securitizing market is due to the high profitability they can expect in origination of the securitizable loans, not necessarily due to the liquidity they may recover through securitization. If this is the case, we should observe certain characteristics in those loan facilities that shocked lenders originate. More specifically, if this is true, we would expect the size of loans would be larger given that the fees are proportional to the loan size, loan maturity would be longer for the same reason (Gottesman and Roberts, 2004), and loan spread would be higher. We test our DID by replacing our dependent variable with facility amount, maturity and spread and find that there is no difference between securitizing banks and non-securitizing banks.

Insert Table 14 here

Table 14 reports the DID results. By showing that securitizing lenders' loan facility characteristics are not significantly different from those from non-securitizing lenders, the results confirm that securitizing banks are interested in recovering liquidity through securitization rather than the profit that Term B can generate.

6 Conclusion

Our study aims to examine whether banks' direct access to the CLO market serves as a risk management tool by allowing them to manage their corporate loan portfolio when shocked by a default of a large borrower. We identify lenders that experienced a shock due to WorldCom's collapse and find that banks with access to the CLO market show a different ability to retain their lending activities from the rest of the banks after the shock, in a DID set-up.

Our regression analysis provides evidence that those banks that had direct engagement in securitization of loans increase their issuance of CLO securities relatively more compared to

the non-shocked securitizing banks after the shock. They also become more actively engaged in originating those facilities that are more likely to be securitized, namely, Term B, compared to other shocked but non-securitizing banks. Moreover, they also remain relatively active in origination of Term A facilities, but only when they are part of loan deals that include a Term B. This is another supporting evidence that the securitizing banks have clear interests in originating Term B because often lead arrangers of Term A have rights to become lead arrangers of Term B. In other types of facilities, we do not find significant differences between the two types of lenders. The results hold in triple differences, where we include non-shocked securitizing and non-securitizing lenders.

Additionally, we test whether banks with direct access to the CLO market also reacted to the shock by adjusting their loan condition such as the loan amount and loan covenant strictness after the shock. We do not find a difference between deals provided by securitizing and non-securitizing lenders. Overall, these findings show that, even though securitizing banks adjust their behavior in the loan market to deal with idiosyncratic shocks, their reactions seem to be limited to the change in the type of facilities they originate.

We provide the results are robust to various tests. Finally, our test confirms that the results are not explained by the higher profitability of the Term B loans, supporting our hypothesis that the access to the CLO market serves risk management purposes.

Overall, our paper shows that banks actively make use of securitization as a risk management tool. It also emphasizes the link between the originate-to-distribute model used by banks and the provision of funding in the corporate lending market. Our focus is on an idiosyncratic shock placed on the supply side of the corporate lending market; however more research is needed on the impact on the demand side of the CLO market and the implications for banks and corporate borrowers, since both are becoming more and more dependent on this market.

References

Acharya, V., Schnabl, P., and Suarez, G., 2013. Securitization without risk transfer. Journal of Financial Economics, 107(3), 515–536.

Allen, F., Carletti, E., 2008. Credit Risk Transfer and Contagion, Journal of Monetary Economics, 53, 89–111.

Altunbas, Y., Gambacorta, L., and Marques-Ibanez, D., 2009. securitization and the bank lending channel. European Economic Review, Elsevier, 53(8), 996-1009.

Bank of England and European Central Bank, 2014. The case of a Better Functioning Securitization Market in the European Union, A discussion paper. Available from http://www.bankofengland.co.uk/publications/Documents/news/2014/paper300514.pdf

Benmelech, E., Dlugosz, J., and Ivashina, V., 2012.Securitization without adverse selection: The case of CLOs, Journal of Financial Economics, Elsevier, 106(1), 91–113.

Berger, A.N. and Roman, R.A., 2015. Did TARP banks get competitive advantages?. Journal of Financial and Quantitative Analysis, 50(6), pp.1199-1236.

Berger, A.N. and Roman, R.A., 2017. Did saving wall street really save main street? The real effects of TARP on local economic conditions. Journal of Financial and Quantitative Analysis, 52(5), pp.1827-1867.

Bank for International Settlements and IOSCO, 2015. Criteria for identifying simple, transparent and comparable securitizations. Consultative Document, Joint Task Force on Securitization Markets, Bank for International Settlements. Retrieved from http://www.bis.org/bcbs/publ/d304.pdf

Bonaccorsi di Patti, E., and Sette, E., 2016. Did the securitization market freeze affect bank lending during the financial crisis? Evidence from a credit register. Journal of Financial Intermediation, Elsevier, vol. 25(C), 54–76.

Bord, V. M., and Santos, J. A., 2012. The rise of the originate to distribute model and the role of banks in financial intermediation. Economic Policy Review, 18(2), 21–34.

Bord, V. M., and Santos, J. A., 2015. Does Securitization of Corporate Loans Lead to Riskier Lending?. Journal of Money, Credit and Banking, 47, 415–444.

Bradley, M. and Roberts, M.R., 2015. The structure and pricing of corporate debt covenants. The Quarterly Journal of Finance, 5(02), p.1550001.

Bruche M., Malherbe F. and Meisenzahl R. R., 2017. Pipeline Risk in Leveraged Loan Syndication. LSE Discussion Paper Series, Discussion paper 763.

Carbo-Valverde, S., Degryse, H., and Rodriguez-Fernandez, F., 2015. The impact of securitization on credit rationing: Empirical evidence, Journal of Financial Stability, Elsevier, 20(C), 36–50.

Cebenoyan, A.S. and Strahan, P.E., 2004. Risk Management, Capital Structure and Lending at Banks. Journal of Banking and Finance, 28, 19–43.

Chernenko, S. 2017. The Front Men of Wall Street: The role of CDO Collateral managers in the CDO Boom and Bust. The Journal of Finance, 72, 1893–1936.

Covitz D., Liang N., Suarez G.A., 2013. The Evolution of a Financial Crisis Collapse of the Asset-Backed Commercial Paper Market. The Journal of Finance, 68 (3), 815–848.

Demyanyk Y., Van Hemert O., 2011. Understanding the Subprime Mortgage Crisis. The Review of Financial Studies, 24(6), 1848–1880.

Drucker, S., Mayer, C., 2008. Inside Information and Market Making in Secondary Mortgage Markets. Wp Renaissance Technologies LL3. Retrieved from http://www8.gsb.columbia.edu/rtfiles/realestate/Chris%27%20papers/Underwriters-MBS-Drucker-Mayer-01-2008.pdf

Duffie, D., 2008. Innovations in credit risk transfer: Implications for financial stability. BIS Working Papers 255, Bank for International Settlements.

Efing, M., 2015. Arbitraging the Basel securitization framework: Evidence from German ABS investment, Discussion Papers 40, Deutsche Bundesbank, Research Centre.

Erkens, D. H., Hung, M., Matos, P., 2012. Corporate governance in the 2007?2008 financial crisis: Evidence from financial institutions worldwide. The Journal of Corporate Finance, 18(2), 389–411.

Fabozzi, F. J., Davis, H. A., Choudhry, M., 2007. Credit-linked notes: a product primer. The Journal of Structured Finance, 12(4), 67–77.

Financial Crisis Inquiry Commission, 2011. The Financial Crisis. Final Report of the National Commission on the causes of the financial and economic crisis in the United States. Available at: https://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf

Financial Stability Forum, 2008. Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience.

Gande, A., Kalpathy S., 2013. CEO compensation and risk-taking at financial firms: Evidence from U.S. federal loan assistance. Journal of Corporate Finance, 47, 131–150.

Gennaioli, N., Shleifer A., Vishny R. W., 2013. A Model of Shadow Banking. The Journal of Finance, 68, 1331–1363.

Goderis, B., Marsh, I. W., Castello, J. V., and Wagner, W.„ 2007. Bank behaviour with access to credit risk transfer markets, Research Discussion Papers 4/2007, Bank of Finland.

Gorton G., Metrick A., 2012a. Securitization. NBER Working Papers 18611, National Bureau of Economic Research, Inc.

Gorton, G., Metrick A., 2012b. Securitized banking and the run on repo, Journal of Financial Economics, 104(3), pp. 425–451.

Gottesman, A.A. and Roberts, G.S., 2004. Maturity and corporate loan pricing. Financial Review, 39(1), pp.55-77.

Ivashina, V., Sun, Z., 2011. Institutional stock trading on loan market information. Journal of Financial Economics, 100(2), 284–303.

Jiangli, W., Pritsker M., Raupach P., 2007. Banking and securitization, working paper.

Keys, B. J., Seru, A., Vig, V., 2012. Lender screening and the role of securitization: evidence from prime and subprime mortgage markets, Review of Financial Studies, 25(7), 2071–2108.

Lin, H., Paravisini, D., 2012. The effect of financing constraints on risk. Review of Finance, 17(1), 229–259.

Loutskina, E., 2011. The role of securitization in bank liquidity and funding management, Journal of Financial Economics, 100(3), 663–684.

Loutskina, E., Strahan, P. E., 2009. Securitization and the Declining Impact of Bank Finance on Loan Supply: Evidence from Mortgage Originations. The Journal of Finance, 64, 861–889.

Marques-Ibanez, D., Scheicher, M.,2009. Securitization: instruments and implications.The Oxford Handbook of Banking (1 ed.), A. Berger, P. Molyneux and J. Wilson, eds., Oxford University Press.

Murfin, J., 2012. The Supply-Side Determinants of Loan Contract Strictness. The Journal of Finance, 67(5), 1565–1601.

Mian A., Sufi A., 2009. The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis, The Quarterly Journal of Economics, 124(4) 1449–1496,

Nadauld, T. D., Sherlund, S. M., 2009. The role of the securitization process in the expansion of subprime credit. Finance and Economics Discussion Series 2009–28, Board of Governors of the Federal Reserve System (U.S.).

Nadauld, T. D., Weisbach, M. S., 2012. Did securitization affect the cost of corporate debt? Journal of Financial Economics, 105(2), 332–352.

Peristiani,S., Santos, J.A.C., 2018. CLO trading and collateral manager bank affiliation, Journal of Financial Intermediation,ISSN 1042–9573.

Rajan, U., Seru A., Vig, V., 2015. The failure of models that predict failure: Distance, incentives, and defaults, In Journal of Financial Economics, 115(2), 237–260.

Sarkisyan, A., Casu, B., 2013. Retained Interest in Securitizations and Implications for Bank Solvency. Working Paper Series 1538, European Central Bank.

Wang, Y., Xia, H., 2014. Do lenders still monitor when they can securitize loans? The Review of Financial Studies, 27(8), 2354–2391.

Shivdasani, A. and Wang, Y. 2011. Did Structured Credit Fuel the LBO Boom? The Journal of Finance, 66, 1291–1328.

Watson, R., Carter, J., 2006. Asset securitization and synthetic structures: innovations in the European credit markets. London:Euromoney Books.

Table 1: Summary Statistics I: Loan Characteristics in 2001(Pre-Treatment)

	Panel A: WorldCom Affected Lenders: Non-Sec and Sec Lenders							
	All		Non-Sec Lender		Sec Lender		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal Amount (mm)	378.41	749.37	203.28	340.94	441.30	840.62	-238.01***	(-6.79)
Maturity	35.82	33.86	35.83	37.11	35.82	32.63	0.01	(0.01)
Loan Spread in Revolving	178.72	114.65	185.01	108.56	176.66	116.57	8.35	(0.97)
Loan Spread in Term Loan A	212.06	114.70	174.17	109.99	223.27	113.77	-49.10***	(-4.47)
Loan Spread in Term Loan B	313.80	86.87	332.52	99.56	310.55	84.65	21.97	(0.93)
Total Loan Spread	159.27	113.94	155.23	105.79	160.54	116.40	-5.31	(-0.86)
N of Loan Participants	8.04	8.22	6.82	6.86	8.48	8.62	-1.66***	(-4.29)
N of Term Loan Originated as Lead Arranger	104.64	88.63	32.64	12.10	130.99	89.91	-98.36***	(-29.48)
N of Term Loan A Originated as Lead Arranger	12.17	10.72	1.59	1.39	16.05	10.01	-14.45***	(-38.91)
N of Term Loan B Originated as Lead Arranger	17.88	16.10	2.71	2.11	23.43	15.41	-20.72***	(-36.24)
N of Revolving Facilities Originated as Lead Arranger	175.49	169.14	46.89	37.99	222.57	174.02	-175.68***	(-27.06)
Observations (Deal)	2305		609		1696			
	Panel B: All Sample Lenders: WorldCom Affected Lenders and the Others							
	All		WorldCom Lender		The Others		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal Amount (mm)	340.20	706.38	312.81	672.65	378.41	749.37	-65.60***	(-3.41)
Maturity	36.79	37.88	37.49	40.51	35.82	33.86	1.66	(1.61)
Loan Spread in Revolving	195.64	115.84	209.32	115.03	178.72	114.65	30.60***	(6.14)
Loan Spread in Term Loan A	220.95	122.89	228.69	129.19	212.06	114.70	16.64**	(2.43)
Loan Spread in Term Loan B	333.04	84.20	343.27	81.12	313.80	86.87	29.47***	(2.98)
Total Loan Spread	175.50	123.27	190.35	129.49	159.27	113.94	31.08***	(7.95)
N of Loan Participants	7.24	8.01	6.66	7.81	8.04	8.22	-1.38***	(-6.31)
N of Term Loan Originated as Lead Arranger	50.51	70.43	17.86	19.55	104.64	88.63	-86.78***	(-63.35)
N of Term Loan A Originated as Lead Arranger	6.58	8.51	3.20	4.07	12.17	10.72	-8.98***	(-50.60)
N of Term Loan B Originated as Lead Arranger	9.39	12.81	4.27	6.07	17.88	16.10	-13.61***	(-51.14)
N of Revolving Facilities Originated as Lead Arranger	86.28	131.79	32.47	53.84	175.49	169.14	-143.02***	(-52.62)
Observations (Deal)	5520		3215		2305			
	Panel C: All Sample Lenders: Non-Sec Lenders and Sec Lenders							
	All		Non-Sec Lender		Sec Lender		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal Amount (mm)	340.20	706.38	213.51	449.00	474.17	882.42	-260.65***	(-13.94)
Maturity	36.79	37.88	37.10	40.44	36.46	34.98	0.64	(0.63)
Loan Spread in Revolving	195.64	115.84	209.95	112.09	181.62	117.77	28.34***	(5.71)
Loan Spread in Term Loan A	220.95	122.89	217.04	126.84	224.39	119.29	-7.35	(-1.07)
Loan Spread in Term Loan B	333.04	84.20	341.98	81.94	326.79	85.42	15.19	(1.57)
Total Loan Spread	175.50	123.27	188.67	122.96	163.86	122.41	24.81***	(6.32)
N of Loan Participants	7.24	8.01	5.99	6.64	8.56	9.06	-2.57***	(-12.08)
N of Term Loan Originated as Lead Arranger	50.51	70.43	15.53	14.97	93.91	86.23	-78.38***	(-56.55)
N of Term Loan A Originated as Lead Arranger	6.58	8.51	1.63	2.21	12.72	9.39	-11.09***	(-72.40)
N of Term Loan B Originated as Lead Arranger	9.39	12.81	2.14	2.75	18.38	14.57	-16.23***	(-69.10)
N of Revolving Facilities Originated as Lead Arranger	86.28	131.79	20.69	26.16	167.66	161.59	-146.97***	(-56.72)
Observations	5520		2837		2683			

This table reports summary statistics for syndicated loan deal characteristics in the year 2001 (before the treatment). Panel A presents the differences in syndicated loan deal characteristics between securitizing and non-securitizing lenders among WorldCom affected lenders. Panel B presents differences between WorldCom affected lenders and unaffected lenders. Panel C presents differences between non-securitizing banks and securitizing banks among all sample lenders including WorldCom affected and unaffected lenders. Column (1) is for all samples, while column (2) and (3) are for separate samples of non-securitizing lenders and securitizing lenders. Column (4) reports t-statistics between the two groups of sample. The deal amount is the total size of a syndicated loan deal expressed in millions of US dollars. Maturity is the number of months between the deal start and end dates. Loan spread is expressed in basis points, and total loan spread is the sum of the spreads in Term Loans A and B. The N of loan participants is the total number of banks that participated in one deal. Number of facilities originated as a lead arranger is the number of each type of facilities that are originated by each type of lender as a lead arranger.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Summary Statistics II: Bank Characteristics in 2001(Pre-Treatment)

	WorldCom Lenders: Sec and Non-Sec Lenders							
	All		Non-Sec Lender		Sec Lender		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Lender Total Assets	369.84	260.36	246.59	148.47	567.05	285.20	-320.46***	(-3.78)
Lender Capital	20.06	17.65	13.66	10.24	30.30	22.38	-16.63**	(-2.59)
Lender ROA (%)	0.58	0.52	0.64	0.55	0.50	0.49	0.13	(0.62)
Lender Deposit	180.39	126.11	121.35	97.48	274.87	110.54	-153.52***	(-3.71)
Lender Liquidity	36.27	60.31	10.51	10.31	77.49	82.82	-66.98***	(-3.23)
Lender Capital over Total Assets	0.06	0.02	0.06	0.03	0.05	0.02	0.01	(0.97)
Lender Deposit over Total Assets	0.52	0.19	0.52	0.23	0.52	0.11	0.00	(0.01)
Lender Liquidity over Total Assets	0.08	0.09	0.06	0.08	0.11	0.10	-0.05	(-1.38)
Observations	26		10		16			

This table reports lender (bank) characteristics in the year 2001 (before the treatment). Column (1) is for all samples, while column (2) and (3) are for separate samples of non-securitizing lenders and securitizing lenders.Column (4) reports t-statistics between the two groups of sample. Lender capital is measured by bank equity. Lender Deposit is total deposit from customers. Lender Liquidity is total cash holdings held by banks.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: CLO Issuance around WorldCom collapse: DID

	Ln(CLO Issuance)		
	(1)	(2)	(3)
Post X WorldCom	0.676*	0.664*	0.632**
	(0.345)	(0.367)	(0.256)
Post	-0.143		
	(0.201)		
WorldCom	0.269	0.294	
	(0.236)	(0.213)	
Constant	19.949***	20.267***	18.195***
	(0.155)	(0.249)	(0.459)
Observations	288	288	288
Adjusted R^2	0.022	0.054	0.464
Time FE	N	Y	Y
Lender FE	N	N	Y

This table reports the regression results of Equation 1 that measures whether WorldCom-affected banks increase the issuance of CLOs after the shock. The dependent variable is log of the amount of CLO liabilities issuance. The explanatory variable is the interaction between WorldCom that is equal to 1 if the bank is affected by WorldCom. Post is equal to 1 if the observation is in the post-shock period.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Probability of being Lead Arranger in Syndicated Loan Facilities: DID

	Prob(Lead Arranger)					
	Revolving		Term&Term A		Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
Sec X Post	-0.016	-0.020	0.010	0.021	0.117**	0.117**
	(0.025)	(0.026)	(0.032)	(0.028)	(0.049)	(0.051)
Observations	13163	12932	6134	6038	1536	1499
Adjusted R^2	0.246	0.237	0.322	0.340	0.338	0.326
Lender, Borrower & Time FE	Y	N	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample of loan facilities comprises Revolving facilities in columns (1) and (2), Term Loan and Term A in columns (3) and (4), and Term B in columns (5) and (6). Columns (1), (3), and (5) present results with lender, borrower, and loan origination quarter fixed effects. In columns (2), (4), and (6) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Probability of being Lead Arranger in Term Loan and Term A: DID

	Prob(Lead Arranger)			
	Term Loan		Term A	
	(1)	(2)	(3)	(4)
Sec X Post	-0.015	-0.007	0.103**	0.111**
	(0.033)	(0.031)	(0.050)	(0.051)
Observations	5001	4927	1113	1106
Adjusted R^2	0.325	0.339	0.359	0.356
Lender, Borrower & Time FE	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample of loan facilities comprises Term Loan in columns (1) and (2) and Term A in columns (3) and (4). Columns (1) and (3) present results with lender, borrower, and loan origination quarter fixed effects. Columns (2) and (4) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Probability of being Lead Arranger in Revolving in Deals without Term B and with Term B: DID

	Prob(Lead Arranger)			
	Revolving in Deals without Term B		Revolving in Deals with Term B	
	(1)	(2)	(3)	(4)
Sec X Post	-0.029	-0.036	0.103*	0.095
	(0.025)	(0.026)	(0.059)	(0.060)
Observations	11525	11348	1604	1584
Adjusted R^2	0.238	0.228	0.316	0.322
Lender, Borrower & Time FE	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. In columns (1) and (2), the sample of loan facilities comprises Revolving facilities of those syndicated deals that do not contain Term B. In columns (3) and (4), the sample is Revolving facilities in the deals that contain Term B at the same time. Columns (1) and (3) present results with lender, borrower, and loan origination quarter fixed effects. Columns (2) and (4) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Loan Conditions: DID

	Ln(Deal Amount)		Deal Covenant Strictness	
	(1)	(2)	(3)	(4)
Post X Sec	-0.003	-0.180	0.112	0.039
	(0.066)	(0.419)	(0.151)	(0.474)
Observations	4583	4583	860	684
Adjusted R^2	0.693	0.614	0.612	0.554
Lender, Borrower & Time FE	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y

This table reports regression results from Equation 4. The columns (1) and (2) present the results for dependent variable, log-transformed Deal Amount. Columns (3) and (4) report the results from dependent variable, Covenant Strictness. It is a measure that is between 0 and 6, which is constructed by counting the number of loan covenants that exist in the contract of the syndicated loan deal. The variables Sec is a binary variable that are equal to 1 if the lender is a securitizing bank. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at borrower level and lender level and are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Probability of being Lead Arranger in Syndicated Loan Facilities: controlling for lender characteristics

	Prob(Lead Arranger)					
	Revolving		Term&Term A		Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
Sec X Post	-0.041*	-0.046	-0.021	0.001	0.125**	0.134**
	(0.022)	(0.028)	(0.033)	(0.034)	(0.056)	(0.065)
Ln(Lender Total Assets)	-0.086	-0.116	-0.072	-0.105	-0.176	-0.187
	(0.066)	(0.068)	(0.078)	(0.080)	(0.141)	(0.153)
Lender Capital	0.645***	0.627***	0.812***	0.662***	0.084	0.077
	(0.138)	(0.154)	(0.187)	(0.224)	(0.404)	(0.473)
Lender ROA (%)	-0.139***	-0.121*	0.072	0.116	-0.011	0.001
	(0.049)	(0.063)	(0.140)	(0.153)	(0.239)	(0.288)
Lender Deposit over Total Assets	-0.184	-0.251*	0.051	-0.057	-0.096	-0.244
	(0.122)	(0.138)	(0.155)	(0.162)	(0.284)	(0.343)
Lender Liquidity over Total Assets	-0.175**	-0.190*	-0.216*	-0.176	-0.102	-0.013
	(0.074)	(0.094)	(0.110)	(0.124)	(0.258)	(0.288)
Observations	11526	11277	5306	5203	1374	1330
Adjusted R^2	0.248	0.235	0.326	0.343	0.342	0.330
Lender, Borrower & Time FE	Y	N	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y	N	Y

This table repeats the regressions in Table 2 but controlling for lender (bank) characteristics. As in Table 4, the sample of loan facilities comprises Revolving facilities in columns (1) and (2), Term Loan and Term A in columns (3) and (4), and Term B in columns (5) and (6). Columns (1), (3), and (5) present results with lender, borrower, and loan origination quarter fixed effects. In columns (2), (4), and (6) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Ln(Lender Size) is log of bank total assets. Lender Capital is banks' equity scaled by total assets. Lender ROA is banks' return on assets. Lender Deposit is banks' total deposit from customers scaled by total assets. Lender Liquidity is banks' cash holdings scaled by total assets. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Probability of being Lead Arranger in Syndicated Loan Facilities: DID: Using CLO Issue Amount

	Prob(Lead Arranger)					
	Revolving		Term&Term A		Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
$SecAmount_{Pre}$XPost	-0.002	-0.002	-0.001	-0.000	0.006**	0.007**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)
Observations	13163	12932	6134	6038	1536	1499
Adjusted R^2	0.247	0.237	0.322	0.340	0.338	0.328
Lender, Borrower & Time FE	Y	N	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample of loan facilities comprises Revolving facilities in columns (1) and (2), Term Loan and Term A in columns (3) and (4), and Term B in columns (5) and (6). Columns (1), (3), and (5) present results with lender, borrower, and loan origination quarter fixed effects. In columns (2), (4), and (6) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables SecAmount is a continuous variables that is log of (Total Amount of CLO issued by the lender before the shock+1). In case of non-securitizing lenders, the value takes 0. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Probability of being Lead Arranger in Syndicated Loan Facilities: Triple Differences

	Prob(Lead Arranger)					
	Revolving		Term&Term A		Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
Sec X Post X WC	0.006	0.007	0.039	0.038	0.110**	0.109*
	(0.029)	(0.028)	(0.033)	(0.035)	(0.054)	(0.056)
Sec X Post	-0.012	-0.017	-0.020	-0.019	-0.007	-0.008
	(0.016)	(0.016)	(0.021)	(0.023)	(0.021)	(0.021)
Post X WC	0.020**	0.020*	0.010	0.015	-0.005	-0.001
	(0.010)	(0.011)	(0.015)	(0.017)	(0.033)	(0.034)
Observations	53333	53333	34819	34818	12360	12360
Adjusted R^2	0.217	0.228	0.275	0.295	0.346	0.346
Lender, Borrower & Time FE	Y	N	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y	N	Y

This table reports the regression results from the triple differences model in the Equation 3 that measures whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample of loan facilities comprises Revolving facilities in columns (1) and (2), Term Loan and Term A in columns (3) and (4), and Term B in columns (5) and (6). Columns (1), (3), and (5) present results with lender, borrower, and loan origination quarter fixed effects. In columns (2), (4), and (6) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec and WorldCom are both binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec and a WorldCom-affected bank in case of WorldCom. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at borrower level and lender level and are in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Probability of being Lead Arranger in Term Loan and Term A: Triple Differences

	Prob(Lead Arranger)			
	Term Loan		Term A	
	(1)	(2)	(3)	(4)
Sec X Post X WC	0.033	0.029	0.109**	0.110**
	(0.035)	(0.038)	(0.053)	(0.054)
Sec X Post	-0.040*	-0.040*	0.007	0.005
	(0.023)	(0.024)	(0.034)	(0.034)
Post X WC	0.021	0.027	-0.037	-0.035
	(0.017)	(0.020)	(0.033)	(0.033)
Observations	28543	28543	5909	5909
Adjusted R^2	0.282	0.303	0.276	0.276
Lender, Borrower & Time FE	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 3 using a subsample of Term Loan and Term A facilities. The sample of loan facilities comprises Term Loan in columns (1) and (2) and Term A in columns (3) and (4). Columns (1) and (3) present results with lender, borrower, and loan origination quarter fixed effects. Columns (2) and (4) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec and WorldCom are both binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec and a WorldCom-affected bank in case of WorldCom. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: Probability of being Lead Arranger in Revolving in Deals without Term B and with Term B: Triple Differences

	Prob(Lead Arranger)			
	Revolving in Deals without Term B		Revolving in Deals with Term B	
	(1)	(2)	(3)	(4)
Sec X Post X WC	-0.004	-0.003	0.106*	0.105
	(0.030)	(0.029)	(0.063)	(0.064)
Sec X Post	-0.016	-0.022	-0.001	-0.002
	(0.017)	(0.017)	(0.029)	(0.029)
Post X WC	0.020**	0.019*	0.017	0.021
	(0.009)	(0.010)	(0.049)	(0.050)
Observations	44169	44169	8801	8801
Adjusted R^2	0.215	0.228	0.283	0.284
Lender, Borrower & Time FE	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 3 using a subsample of Term Loan and Term A facilities. In columns (1) and (2), the sample of loan facilities comprises Revolving facilities of those syndicated deals that do not contain Term B facilities. In columns (3) and (4), the sample is Revolving facilities in the deals that contain Term B facilities at the same time. Columns (1) and (3) present results with lender, borrower, and loan origination quarter fixed effects. Columns (2) and (4) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec and WorldCom are both binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec and a WorldCom-affected bank in case of WorldCom. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 13: Probability of being Lead Arranger in Syndicated Loan Facilities: sub-sample of lenders that are CLO underwriters but not collateral manager

	Prob(Lead Arranger)					
	Revolving		Term&Term A		Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
Sec X Post	-0.019	-0.028	0.007	0.024	0.135**	0.125**
	(0.018)	(0.020)	(0.032)	(0.030)	(0.051)	(0.051)
Observations	10774	10495	4944	4826	1221	1174
Adjusted R^2	0.271	0.255	0.344	0.364	0.380	0.365
Lender, Borrower & Time FE	Y	N	Y	N	Y	N
Lender FE & Borrower-Time FE	N	Y	N	Y	N	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample excludes those loans that are arranged by CLO underwriters that have high influence over collateral managers in terms of loan syndication. The sample of loan facilities comprises Revolving facilities in columns (1) and (2), Term Loan and Term A in columns (3) and (4), and Term B in columns (5) and (6). Columns (1), (3), and (5) present results with lender, borrower, and loan origination quarter fixed effects. In columns (2), (4), and (6) present results with lender fixed effect and borrower-time fixed. The dependent variable—Lead Arranger—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan facility, and 0 otherwise. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Loan Characteristics

	Panel A: Revolving		
	(1)	(2)	(3)
	Ln(Facility Amount)	Ln(Facility Maturity)	Spread
Sec X Post	-0.009	-0.003	3.015
	(0.014)	(0.004)	(2.645)
Observations	1005	997	883
Adjusted R^2	0.863	0.681	0.962
	Panel B: Term&Term A		
	(1)	(2)	(3)
	Ln(Facility Amount)	Ln(Facility Maturity)	Spread
Sec X Post	-0.060*	-0.000	-0.018
	(0.033)	(0.021)	(0.032)
Observations	871	877	683
Adjusted R^2	0.729	0.881	0.821
	Panel C: Term B		
	(1)	(2)	(3)
	Ln(Facility Amount)	Ln(Facility Maturity)	Spread
Sec X Post	0.000	-0.053	0.000
	(0.000)	(0.057)	(0.000)
Observations	144	142	140
Adjusted R^2	0.861	0.813	0.987
Lender FE & Borrower-Time FE	Y	Y	Y

This table reports the regression results from the DID model in the Equation 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after it faces a shock. The sample excludes those loans given to investment grade borrowers. The sample of loan facilities comprises Revolving facilities in Panel A, Term Loan and Term A in Panel B, and Term B in Panel C. In all columns, lender, borrower, and loan origination quarter fixed effects are considered. The dependent variable is log-transformed facility amount and facility maturity as well as spread measured in basis point. The variables Sec is a binary variables that are equal to 1 if the lender is a securitizing bank in case of Sec. Post is equal to 1 if the observation is in the post-shock period. Standard errors are clustered at the facility level and lender level and are in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

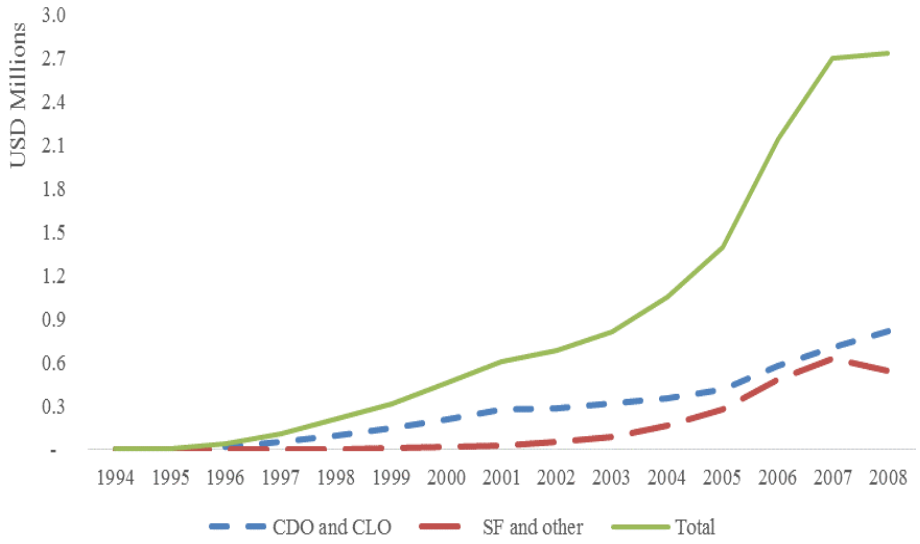

Figure 1: *Source: SIFMA. CDO is a generic category of CDOs that includes CBOs; it is inclusive of early EM CBOs, unknown collateral, mixed collateral, trust-preferred CDOs, and certain public finance/infrastructure backed debt. CLO includes certain middle market CLOs, corporate loan CLOs, and leveraged loan CLOs (depending on the percentage of high-yield bonds, securities may fall into CLO or generic CDO category). SF (Structured Finance) includes CDO that is backed by structured finance collateral (i.e., ABS/MBS, CDOs of CDOs, and SF indices), CRE CDOs.*

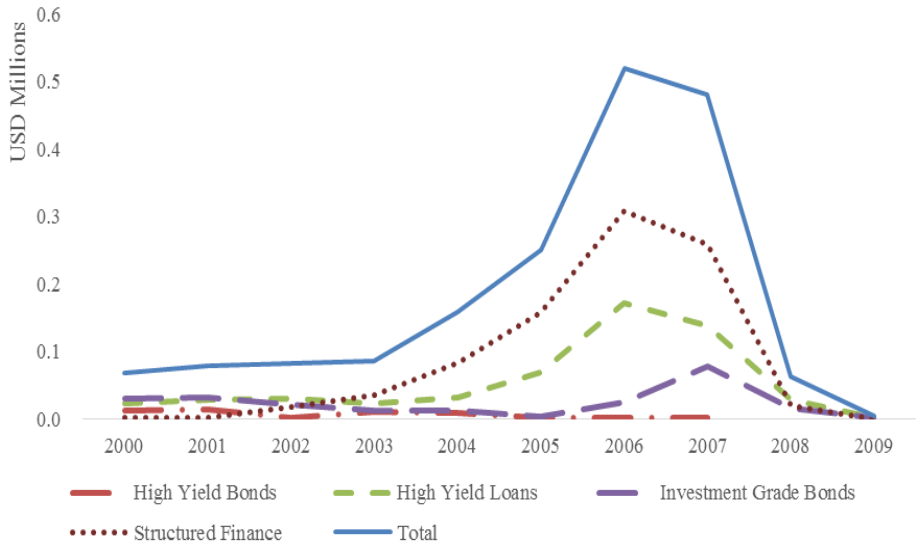

Figure 2: *Source: SIFMA. Investment grade loans are defined as loans with ratings at or above Baa3, from Moodys, or BBB, from Standard & Poors. High-yield loans are defined as transactions of borrowers with senior unsecured debt ratings at financial close below Moodys or BBB, from Standard & Poors. Investment grade bonds are defined as bonds with ratings equal to or above Baa3, from Moodys, or BBB, from Standard & Poors. High-yield bonds are defined as bonds with ratings below Baa3, from Moodys, or BBB, from Standard & Poors. The structured finance collateral includes assets such as RMBS, CMBS, ABS, CMOs, CDOs, CDS, and other structured products.*

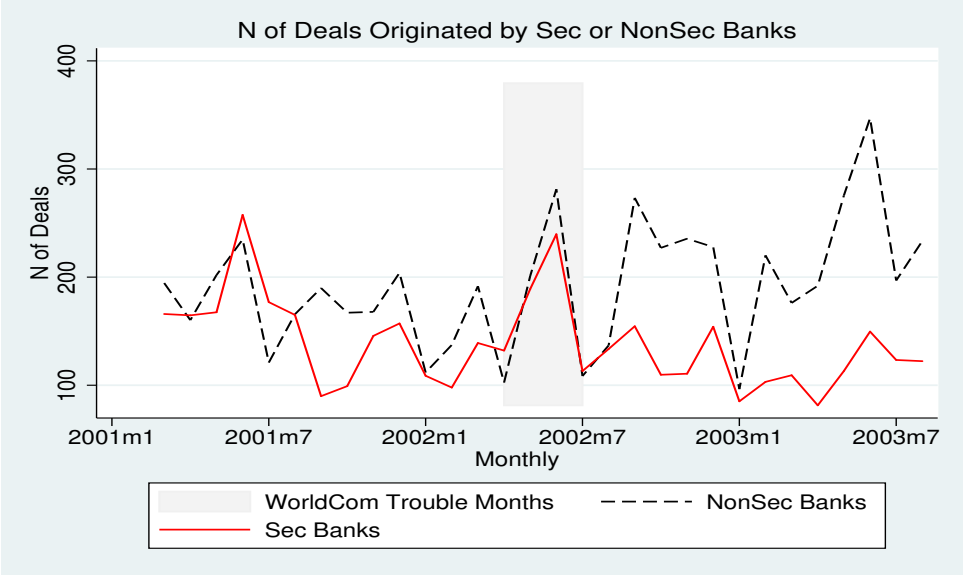

Figure 3: *The graph plot presents the monthly trends in the number of syndicated loan deals originated by securitizing banks relative to non-securitizing banks among the WorldCom-affected banks. The Y-axis denotes the monthly average number of syndicated loan deals (normalized at 2000Q1=100), and the x-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for non-securitizing banks.*

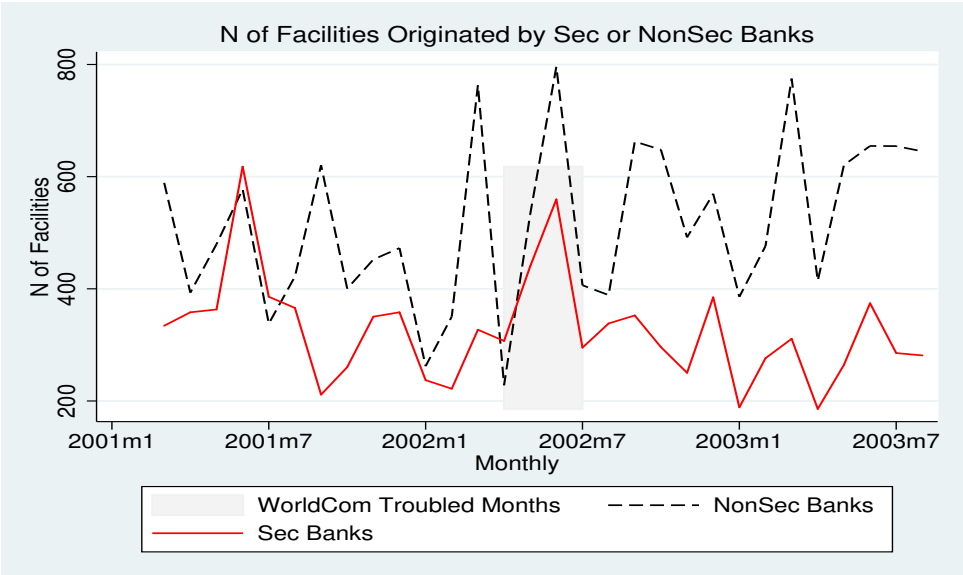

Figure 4: *The graph plot presents the monthly trends in the number of facilities originated by WorldCom-affected lenders. The Y-axis denotes the monthly average number of facilities (normalized at 2000Q1=100) originated, and the X-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for non-securitizing banks.*

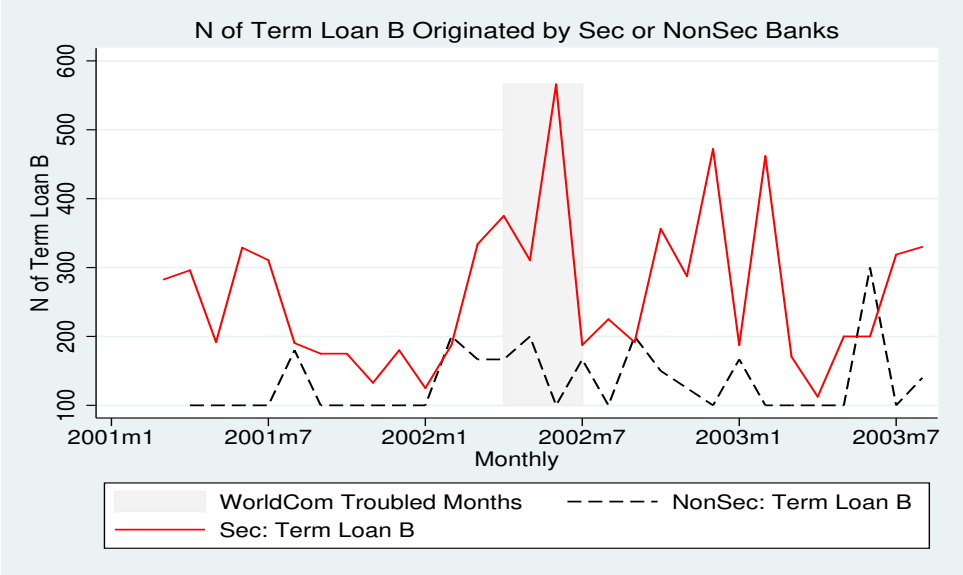

Figure 5: *The graph plot presents the monthly trends in the number of Term B originated by WorldCom-affected lenders. The Y-axis denotes the monthly average number of Term B (normalized at 2000Q1=100) originated, and the X-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for non-securitizing banks.*

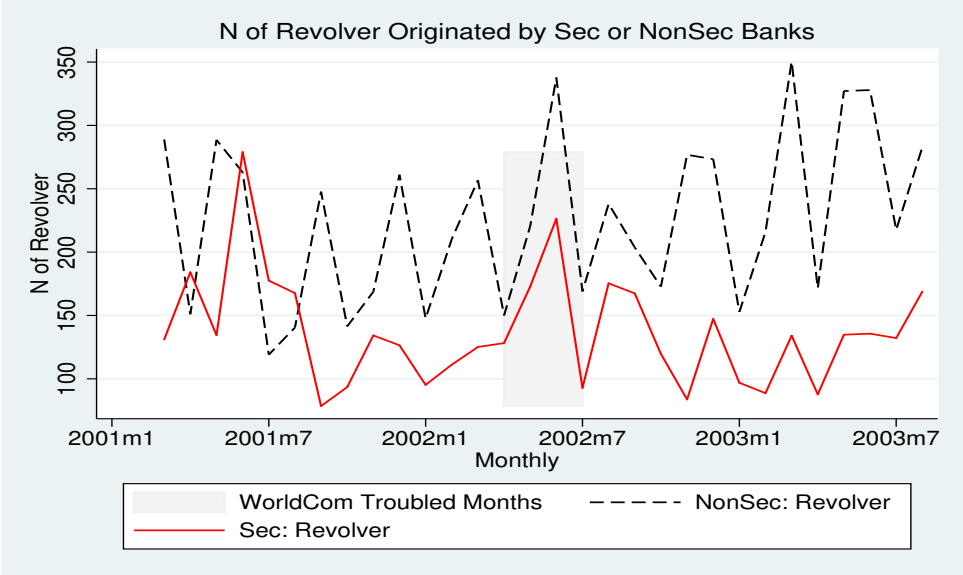

Figure 6: *The graph plot presents the monthly trends in the number of Revolving facilities originated by WorldCom-affected lenders. The Y-axis denotes the monthly average number of Revolving facilities (normalized at 2000Q1=100) originated, and the X-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for non-securitizing banks.*

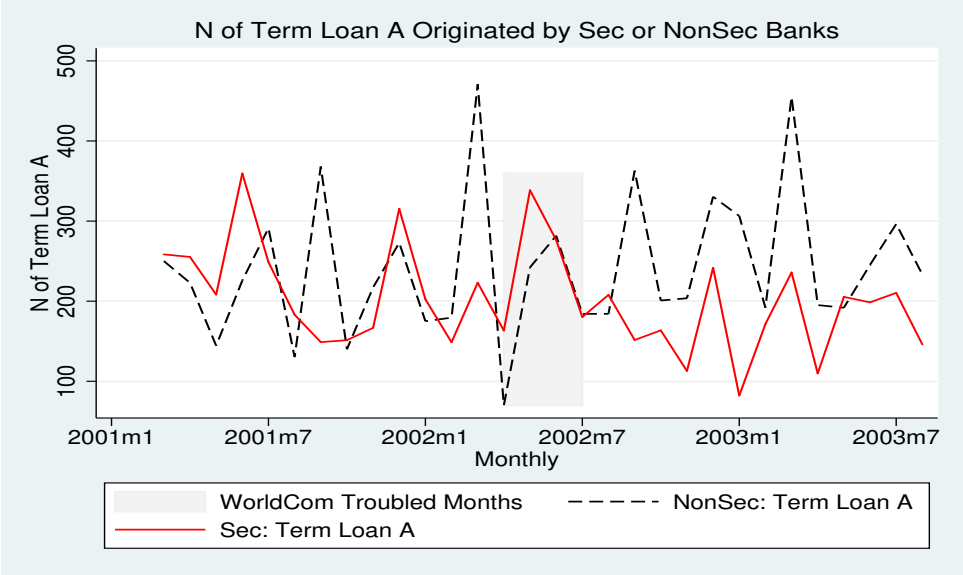

Figure 7: *The graph plot presents the monthly trends in the number of Term A originated by WorldCom-affected lenders. The Y-axis denotes the monthly average number of Term A (normalized at 2000Q1=100) originated, and the X-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for non-securitizing banks.*