

(Simple)- Securitization and Bank Liquidity Management: Evidence from US Corporate Lending Market *

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Abstract

We examine how banks use securitization to manage liquidity during periods of idiosyncratic and unexpected bank-specific liquidity shock. We focus on revolver lines and term facilities in the US syndication loan market and compare lending behaviours between securitizing and non-securitizing banks that are both affected by the collapse of WorldCom in 2002. Using borrower and lender fixed-effects, we find that, after the shock, securitizing banks are more likely to become lead arrangers than other equally affected but non-securitizing banks in those loan facilities that are more likely to be securitised. Results also hold in a triple differences approach that expands the analysis to unaffected banks. Overall, these results shed light on the dependence of the originate-to-distribute model on the financial markets (ABS market), even during the period when the structure of securitization was close to the kind that policy-makers are currently supporting, i.e. simple and transparent in early 2000s.

JEL classification: G21; G23; G24

Keywords: securitization, liquidity, Collateralized-Loan Obligations, corporate lending

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1 Introduction

How do banks use securitization to manage liquidity under idiosyncratic shocks? Does access to securitization reduce the transmission of lender-specific shocks to corporate borrowers? Understanding the implication of the use of securitization for both banks and borrowers has been an emerging issue after the 2007-2008 financial crisis. This is primarily due to the enormous challenges faced by market participants in the valuation of their positions in complex securitized assets such as collateralized-debt obligations (CDOs) at the height of the crisis (Brunnermeier (2009)). A wider questioning on the originate-to-distribute model (OTD) in modern banks appeared when losses were materialized in banks' balance sheet in the aftermath of the crisis (Acharya et al. (2013); Financial Stability Forum (2008)). The post-crisis evidence is predominantly in favor of the view that securitization is detrimental to financial stability (Financial Crisis Inquiry Commission (2011); Mian and Sufi (2009); Demyanyk and Van Hemert (2011); Loutskina and Strahan (2009); Rajan et al. (2015)).

Most of these studies, however, often fail to distinguish between different types of securitization as well as to isolate the effect of securitization from other contributing factors of the financial crisis. On the one hand, in the years leading to the crisis, the process of securitization had become increasingly complex and opaque in terms of underlying assets and cash-flows' structures. On the other hand, banks' securitization activity had a dramatic increase, influenced by the disputable incentives for excessive risk-taking (Keys et al. (2012)); by Federal Reserve's tight monetary policy (Jimenez et al. (2014); Ioannidou et al. (2015)); by loopholes in the prudential treatment of securitization in Basel II trading book rules (Efung (2015)); by the overheated credit conditions and the demand for safe collaterals that lead to the growth of shadow banking (Gennaioli et al. (2013)); by the increasing presence of institutional investors after 2002 (Ivashina and Sun (2011)); by the reduction in the share of the retained fractions by originating banks (Bord and Santos (2012)); by the regulatory arbitrage opportunities and changes in accounting rules about the consolidation of Special Purpose Entity (SPE) in 2004 (Acharya et al. (2013)). As suggested by Sarkisyan and Casu (2013), the risks associated with increasingly complex securitization, as those created in the run-up to the 2007-2008 crisis, might outweigh the benefits for banks in terms of liquidity management and thus also reduce the impact on their borrowers, and more generally for the economy. As the crisis spreads across regions and

markets and risks of complex securitization materialize as losses, banks' securitization activity was severely impaired by the long-standing freezing of the asset-backed securities (ABS) market.

Pre-crisis literature highlighted the innovation spurred by securitization and its potential to alter the capital markets, the functioning of financial intermediation, and the challenges posed to many theories of the role of financial intermediaries (Gorton and Metrick (2012)). Securitization was seen as an innovative financing technique that allowed banks to obtain new liquidity from the market through the transfer of credit risk, which in turn reduced the need for regulatory capital and of the cost of credit (among others, Cebenoyan and Strahan (2004); Jiangli et al. (2007); Duffie (2008)). The main benefit of securitization was recognized in the risk sharing between banks and markets, as credit risk could be transferred and distributed among investors, so that the total risk remains within the banking system while the individual banks diversify their loan portfolios. The benefits of securitization are clearly recognized by the policy-makers today as many initiatives have been put in place to encourage a restarting of the securitization market after the dramatic post-crisis decrease. Its revival is considered vital to restart the economy. Not surprisingly, in the re-regulation process, policy makers put great emphasis on promoting Simple, Transparent and Comparable securitization structures (STC)¹, recognizing the importance of distinguishing between high quality securitization - in terms of the process by which it is created and the underlying credit quality of the assets involved - and complex and synthetic securitization structure. In Europe, STC securitization is expected to play an important role, allowing banks to expand their credit and to support the economic recovery (Bank of England and European Central Bank (2014)). 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 is a useful tool when it meets criteria of simplicity, transparency, and comparability.

We aim to examine whether securitization plays a role as a risk management tool for lenders by allowing them to manage their liquidity provision and lending in an important market such

¹According to 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 a transaction structure that is not overly complex; "Transparent" refers to providing investors with sufficient information on the underlying assets, 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 available should not hinder transparency, but instead support investors in their assessment; "Comparable" refers to criteria promoting comparability and could assist investors in their understanding of such investments and enable more straightforward comparison across securitization products within an asset class.

as the corporate lending market. As suggested by Loutskina (2011), securitization is an integral part of bank-liquidity management. Our setting allows us to test the potential benefits of securitization when it is expected to be most useful, i.e when the liquidity derived from securitization activity can help lenders cope with an unexpected and idiosyncratic liquidity shock. Our main contribution is to investigate this question by using US syndication facilities arranged during the first wave of (simple-) securitization, before 2005, and test it using an identification strategy that adopts a difference-in-difference specification. Before securitization built up to become one of the most complex and opaque markets before the crisis, a more traditional type of securitization was common in the corporate lending market. It was mostly composed of collateralized-loan obligations (CLOs) in which the underlying assets were highly diversified pools of homogeneous corporate loans. CLOs, and the more general category of collateralized-debt-obligations (CDOs), were structured in the form of bankruptcy-remote SPEs that acquired pieces of syndicated corporate loans and issued securities to investors backed by the principal and interest payments from loans (mainly with a cash flow structure). From mid-2000s, a new generation of securitization started to acquire market share in the US with the creation of synthetic collateralized-debt-obligations (SCDOs) and other complex structures (referred to as structured finance) that departed from traditional securitization model because of the underlying collaterals (Figure 1).

Insert Figure 1 here

In particular, they started to be backed by fewer but larger and more heterogeneous assets including high yield bonds, leveraged loans, and tranches of other securitization deals. Thus, in the second wave which last until the crisis, both the number of syndicated (high yield) loans as well as the number of CDOs spiked dramatically. After the crisis, the whole securitization market experienced a dramatic fall mainly due to investors' lack of confidence in the securitization based products such as ABSs and CDOs and in more opaque and complex second generation of CDOs (Figure 2).

Insert Figure 2 here

What drove such exponential growth of the CLO/CDO market is still unclear, but it is reasonable to link it to the other contributing factors of the crisis such as the demand for collateral from increasingly wealthy outside investors (Gennaioli et al. (2013); Nadaul and Weisbach

(2012)). To avoid confounding effects of other competing factors, we focus on the period of the first wave of securitization in late 1990s and early 2000s. It allows us to have a clearer identification of the effect of securitization as a liquidity management tool as this was the time period when securitization structure was closer to the type that is currently promoted as simple, transparent and comparable by policy-makers and regulators.

Our empirical tests are based on the US syndication loan market in the period of 2000-2004. Following Lin and Paravisini (2012), we 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 liquidity shock on the US banks. As documented by the authors, as WorldCom went bankrupt, corporate borrowers who borrowed from the banks that lent to WorldCom suffered from unstable loans due to liquidity issues in those banks. In this experimental set-up, we design a difference-in-differences test to study whether among the shocked banks, those that had access to the securitization market were affected differently (less), presumably by engaging in more securitization activity after the shock.

Our identification of the securitizing banks is based on a unique dataset of CLO/CDO deals from S&P. From this data, we collect the identity of collateral managers and administrators sponsoring an SPE who arranged at least one CLO/CDOs deal in the period before the WorldCom shock. This is our measure of banks' participation in the securitization market. Notably, this measure does not simply rely on the ability to securitize loans to obtain liquidity, which can be obtained also via loan sales or the selling of loans to SPV sponsored by other banks. Instead, both collateral managers and sponsors have a role in the managing of the underlying portfolios, so that they have a direct access to the securitization market. Moreover, this measure does not capture the CDO underwriting activity, because this activity was typically managed by large dealers and investment banks who did not originate the assets and did not have a direct control on the assets in the CLO/CDLOs portfolio. Instead, it considers whether the lender, who is active in the syndicated loan market, had a role during the pre-shock event window as a controller of a CLO/CDO deal which implies their ability to arrange new deals when needed. This is a clear proxy of bank's direct access to securitization market but it does not capture whether a specific loan is securitized or not. Our proxy is defined at bank-level therefore all loans from securitizing banks are considered "treated", i.e. affected by the access to securitization regardless

if those loans are actually securitized or not, alleviating the concerns for cherry-picking loans to securitize (Wang and Xia (2014)). In contrast 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 extend the analysis to other types of facilities such as term loan A and revolving facilities in which banks are more heavily involved. As suggested by Bord and Santos (2012), CLOs rarely invest in these types of loan facilities. However, our analysis is on the effect of securitization on the ability of banks to contribute to corporate lending market thus in the provision of all types of facilities - not only the ones they are able to securitize. We aim to document direct implications of banks' securitization activities for lending and banking regulation by testing whether the benefits that banks derive from securitization allow them to provide more lending and in which types of loan facilities.

In the difference-in-differences (DID) regressions, we test whether securitizing banks and non-securitizing banks react to the liquidity shock caused by WorldCom in different ways in terms of loan facility origination activities. We focus on the probability of being the lead arranger of a facility to observe banks' lending activities. This measure captures the ability of a bank to participate in the syndicated loan market as a main provider and negotiator of the loan. In particular, it reflects three different types of bank's ability (or interests) in syndicated loan market: the ability to provide liquidity commitment in the format of a revolving facility or credit lines (revolver), the ability to lend a standard loan (term loan A), and the ability (interest) to arrange a specific type of loan facility that is likely to be bought by institutional investors and securitized (term loan B). Although a similar and more detailed test can be designed through the use of the lead arranger's share in each loan facility, due to the patchy data for the lender's share variable, the number of observation would be dramatically reduced when the DealScan is used. Therefore, we opt for a measure that is unaffected by this issue, which is simply measuring the probability of being lead arranger in different types of loan facilities. After running the DID regressions, we expand our sample to include those banks that are not shocked by WorldCom incidence. Within the non-shocked banks, we also have securitizing banks and non-securitizing banks and this allows us to test our hypothesis in triple differences regressions. By including non-shocked securitizing banks and comparing them to shocked banks in triple differences set-up, we address such concerns that the difference we find in DID may come from fundamental differences in securitizing and non-securitizing banks.

In our DID analysis, we find that securitizing banks become more active in originating those facilities that are more likely to be securitized, namely term loan B, as lead arrangers compared to non-securitizing banks after the liquidity shock. In other types of facilities, we do not find significant differences between the two types of banks. The results hold in triple differences as well. Our results show that securitizing banks are indeed more able to provide loans after the liquidity shock. Although our hypothesis was that securitizing banks may use securitization to react more quickly to the shock enabling them to provide more lending, i.e. for all types of loans including those facilities that stand for banks' liquidity commitment and standard lending capacity, it turns out that this was not the case. Meaningful differences between securitizing banks and non-securitizing banks are found only in the specific type of facilities that are easily securitizable.

To see whether the recovery of the securitizing banks is indeed from their participation in the CLO/CDO securitization market, we also test whether the shocked securitizing banks increase their issuance of CDO bonds relative to the securitizing banks that are not shocked. A larger issuance of CDO bonds is related to a larger portfolio of loans being securitized. We find that CDO liabilities issued by shocked banks increases relative to the non-shocked banks after the shock. This result reinforces our hypothesis that banks may deal with idiosyncratic liquidity shock using their participation in securitizing activities.

Another interesting follow-up question is whether banks adjust their loan conditions when they change their loan origination activities to manage the liquidity shock. Securitization may alter the monitoring function performed by banks (Diamond (1984) and Holmstrom and Tirole (1997)). Although our finding does not directly indicate that those loans that are being originated after the shock are being the ones that are securitized, when lenders originate loans with changing intentions, this may affect their negotiation or monitoring of the loans. On the one hand, lenders may relax the loan conditions when they want to originate certain types of loans more than others to facilitate the changes. On the other hand, they may end up inviting lower quality borrowers into their pool of borrowers (loans) and apply more strict loan conditions. More in general, shocked banks may increase their covenants as they realize that their screening and monitoring activity was insufficient (Murfin (2012)). We want to study whether lending conditions are distorted due to lenders securitizing activities and hence to reasons that are un-

related to borrowers' conditions. In the same difference-in-differences setting, we test whether there is a relative change in loan covenant strictness after the shock. We do not find supporting evidence of a difference in covenants' terms. Therefore, we conclude that even though securitizing banks adjust their behavior in loan market due to idiosyncratic shocks, the effect is not reflected in their loan conditions on originated loans.

By highlighting a key role of securitization in lending and liquidity provision, our paper speaks to the current debate on the revitalization of the ABS market and whether regulation should favor its use by banks or discourage it by imposing higher capital charges. Policy makers have approached the revision of the securitization rules with the objective to create incentives for simpler securitization and to eliminate regulatory loopholes. Our results provide evidence on the impact of securitization which is novel as they refer to simpler securitization structure and for a period far from the 2007-2008 crisis. They reveal that banks' access to even simple securitization market can have a significant impact on banking sector's ability to grant credit under unexpected and negative shocks on banks but at the cost of a stronger dependence on financial markets (ABS market). This is consistent with post-crisis evidence, whereas the freeze of the ABS market impaired the ability of banks to provide more lending as they could not rely on the securitization market. Our study is not on answering the question whether securitization made banks more vulnerable to the 2007 crisis. We limit our interpretation to the role of securitization in making banks less vulnerable to idiosyncratic liquidity shocks based on a clean identification strategy.

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

2 Related Literature

How the securitization activity of banks affects corporate lending is particularly important because bank debt is a pervasive form of corporate financing across all types of industry and firms. Shocks to this type of financing method have the potential to impact the whole economy.

Academics typically stress liquidity (the ability to raise funding/capital via the market and/or reduce financing costs) and regulatory capital arbitrage (capital relief) as the two most important rationales for banks asset securitization (among others, see Fabozzi et al. (2007) and Watson and Carter (2006)). Securitization allows banks to obtain new liquidity from the market through the transfer of credit risk, which in turn reduce the need of regulatory capital. By modifying the risk-profile of the bank, this also facilitated the bank's risk management (Marques-Ibanez and Scheicher (2009)). In this regard, securitization allows banks to diversify away credit risks among many investors across the financial system and to produce a more efficient use of bank capital. It reduces the cost of capital for loan intermediation, leading to a lower cost of credit (Duffie (2008)). As a result, benefits for borrowers are expected in terms of increased credit supply, reduced borrowing costs, and credit on more favorable terms (Goderis et al. (2007); Altunbas et al. (2009); Loutskina (2011)).

Most recent papers, 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 allows banks to overextend their balance sheets leading them to a lower screening of borrowers and that this creates more credit risk while capital is not and in some cases, without a real transfer of the risk given different forms of interests involved (Acharya et al. (2013); Sarkisyan and Casu (2013)). More 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 in those focusing on mortgage lending and those focusing on corporate loans. As to 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. As to the latter, Wang and Xia (2014) find that banks active in securitization impose looser covenants on corporate borrowers at origination (less monitoring) and Nadaul and Weisbach (2012) find evidence that securitization reduces the cost of corporate debt. There is no conclusive evidence of lower lending standards for corporate borrowers (Shivdasani and Wang (2011); Benmelech et al. (2012); Bord and Santos (2015)).

This growing empirical literature primarily focuses on the syndicated loan tranches by insti-

tutional investors that are subject to securitization, i.e. term loan B. These additional tranches complement the traditional term loans (term loan A) and revolving facilities typically arranged by a bank within the same deal. Often, however, the institutional investor financing the term loan B is a CLO/CDO vehicles sponsored by a bank that is also the lead arranger of the facility or of the whole deal ². We are interested in observing how banks' involvement in securitization activities influence their loan providing activities: whether securitizing banks provide loans more steadily under a liquidity shock and whether such effect is found in all types of loan facilities or is focused on certain types, for example, securitizable facilities. Therefore, differently from previous studies, we focus on all the facilities provided by banks: revolving facilities, term loans or term loan A, term loan B. Moreover, differently from previous literature, we assume that securitizing banks are those that are collateral managers or administrators of a CLO/CDO, not only underwriters of securitized assets as in Nadaul and Weisbach (2012) and Wang and Xia (2014). The underwriter role does not imply a control over the assets in the CLOs, i.e., a direct assets to the securitization market and thus the adoption of an originate-to-distribute model.

We contribute to this literature in several respects. First, we consider a time period characterized by securitization with simple structures, thus we disentangle the effect of banks' securitization from other confounding effects of complicated structures that led to the financial crisis. Close to our study are works by Carbo-Valverde et al. (2015) and Bonaccorsi di Patti and Sette (2016). The first study analyzes the impact of securitization on credit rationing for Spain, comparing normal and crisis periods for two different forms of securitization, i.e. ABS and covered bonds. They find that firms borrowing from banks that were more involved in securitization (ABS issuance and covered bonds) see their credit constraints more relaxed in normal times, but more credit rationing during the crisis proportionally to the amount of ABS issued. As to the second work, the authors analyze the effect of the ABS market freezing during the crisis on the credit supply in Italy and find that banks that were more involved in securitization before the crisis engaged in more credit rationing after the crisis, imposed higher interest rates, had lower probability of accepting loan applications and 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 observe

²An SPV has no employees and no management, therefore the portfolio decisions are taken by the collateral managers and/or the administrator/sponsors, i.e. a sponsoring bank.

coincides with a systemic shock, i.e. 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 (2012) and Covitz et al. (2013)) were revealed.

3 Empirical Analysis and Results

3.1 Sample and Descriptive Statistics

Our sample consists of three types of syndicated loan facilities from the DealScan database: revolver facilities, term loan or term loan A, and term loan B. We restrict our sample to DealScan facilities originated between 1999Q3 to 2004Q1, i.e. the 2 years before and 2 years after the collapse of the WorldCom, to capture the effect of the liquidity shock. The data set contains information on borrowers and lenders of syndicated loan deals originated in the US. It also comes with the data on facilities that belong on a deal as each deal contains one or more facilities. Traditionally, banks provide lending for the so-called pro-rata facilities (i.e. credit lines) called revolver facilities or for the amortizing loans called term loan or term loan A. Term loan B (or C, D, and so on) are referred to as institutional facilities, arranged by banks and traditionally syndicated by institutional investors. Typically if a syndicated loan deal contains term loan B, the traditional part of loan is called term loan A and if it does not have term loan B, the traditional part is named term loan. Although the characteristics as traditional loan facilities may be similar in term loan and term loan A, we separate the two types due to the fact that lenders’ interests to participate may be different in them. This is true especially origination of a term loan A is a necessary condition to participate in the origination of term loan B.

Using the data from the DealScan, we classify a facility as a “WorldCom affected” when its lead arranger is a WorldCom affected bank. Lead arranger is a role that is performed by one or a couple of banks in a syndicated loan facility of 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. We first refer to facility-level reported information when available. We look at each bank’s role in each facility and identify main lender of the facility. If the role is not available or multiple banks share the same role, we use a bank’s size of share in

a facility to decide their hierarchy; the bank with highest share in a facility is identified as a main lender. In the cases where shares are missing, we just take multiple banks as lead arrangers.

We then classify the facilities as being originated by an ‘WorldCom affected’ if the lead arranger participated in syndicated loan deals to WorldCom between second quarter of 2001 and the first quarter of 2002 following Lin and Paravisini (2012). There are twenty-eight such banks. We exclude borrowers that belong to the same industry sector as WorldCom, i.e. telecommunications. This was done to avoid the possibility of capturing the effect of telecommunication industry-wide shock rather than banks liquidity shock given that WorldCom was the largest player in the industry. We also exclude financial firms and regulated industries.

We next construct our measure of securitization. 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, administrator, collateral manager and amount issued. Banks are identified as having a direct access to securitization if they are either sponsors, collateral managers or administrative agents of deals according to the Global CDO/CLO list from Capital IQ over the period 1994-2000. This identification is bank-level and time-invariant and proxies the ability and experience of the bank to use or have access to the CLO market for loans securitization. Therefore, we identify facilities arranged by securitizing banks among those affected by the WorldCom bankruptcy.

To clarify, in the paper, 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 paper is only valid to some extent to the Term B tranches, as the other facilities are rarely securitised. In our analysis, all the facilities are expected to be affected by the ability of their lenders to raise liquidity, that may depend on their access the securitization market. We test mainly whether the use of this alternative source of funding, securitization, allows banks to provide more loans compared to the banks that are equally shocked but do not have the securitization market. Whether the type of loans they provide will change due to the fact that they are in liquidity shock is the secondary question.

To address the issue that our measure of securitization may capture other bank-level characteristics unrelated to securitization, i.e. other sources of liquidity, 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 identify securitizing banks also for a control sample of facilities unaffected by the WorldCom collapse and expand the sample by including them together with non-securitizing non-affected banks. By comparing also to unaffected securitizing banks, we also address the concern that securitizing banks may always behave differently from non-securitizing. All specifications also include quarter fixed effects.

Finally, we take into account that affected/unaffected banks as well as securitizing/non-securitizing banks may serve different borrowers. The matching with the Compustat database for borrowers information, however, would have sensibly reduced the number of observations and more importantly introduced a potential selection bias we could not control for. Therefore, we opted for the inclusion of borrowers fixed effects in all our specifications.

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

Our variable of interest is defined as the probability of being the lead arranger of a facility. This measure captures the ability of a bank to participate in the syndicated loan market. In particular, it reflects three different types of bank's ability (or interests) in syndicated loan market: the ability to provide liquidity commitment in the form of a revolver facility or credit lines, the ability to lend a standard loan, and the ability (interest) to arrange a specific type of loan facility that is likely to be bought by institutional investors and securitized. Although a similar and more detailed test can be designed through the use of the lead arranger's share in each loan facility, due to the patchy data for the lender's share variable, the number of observations would be dramatically reduced when the DealScan is used. This issue regarding the lender share variable is addressed by Bruche et al. (2017) in detail. In addition to the issue of large volume of missings, the lender share variable is affected by a potential sample selection issue as reporting

of the information is only voluntary. Hence, we opt for a measure that is unaffected by this issue, which is simply measuring the probability of being lead arranger in different types of loan facilities.

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

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

Panel C reports means and standard deviations for deals' characteristics and facilities originated by all the lenders originating or participating in a syndicated deal in 2001 (Column (1)), by the sub-sample of non-securitizing lenders (Column (2)) and by the sub-sample of securitizing lenders (column 3). Column (4) report the difference in means between the two sub-samples. Among lenders, securitizing lenders grant larger deals, charge a lower spread, participate in syndicates with a higher number of participants. Finally, they are overall more likely to be lead arranger for all the facilities (not only for Term B).

Insert Table 1 here

3.2 Empirical Design

3.2.1 Main Analysis

We study the role of securitization on the ability of lenders to overcome idiosyncratic and unexpected liquidity shocks. We expect affected banks with a direct access to the securitization market to be less affected in the provision of loans thanks to the ability to convert illiquid loans into liquid funds as suggested by Loutskina (2011) and therefore provide more stable lending into the corporate lending market when under distress. To the extent they benefit in terms of liquidity on their balance-sheet, we should expect them to be less shocked than other banks in the ability to provide loans as well. Therefore, we test their ability to participate as a lead arranger in different types of syndicated loan facilities: term loan B, and term loan or term loan A and revolver.³ Term loan B represents the loan facilities that are most likely to be securitized. Term loan A and revolver represent stronger liquidity commitment by lenders. This is due to the fact that, in case of term loan A, lead arranger is expected to hold their shares in the loans for longer and that, in case of revolver facilities, lenders are expected to provide loan (liquidity) at any point in time during the contract when borrower demands so. The main test is to see whether the decision to use this alternative source of funding from securitization activities implies lenders' higher ability to provide traditional illiquid loans (term loan or term loan A and revolver) or to provide loans that are participated by institutional investors that are more likely to be securitized (term loan B).

Although term loan and term loan A are both 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 where there is no other facilities than revolver facilities, and the facilities of same kind is named term loan A if there are additional term loan facilities such as term loan B. Hence the existence of term loan A is conditional on the existence of term loan B in the same deal. Given that we try to observe loan organization behaviour in different types of facilities and compare lenders' choice to be lead arrangers in facilities with high liquidity commitment and the rest, our analyses are done separately for term loans and term loan As.

³Being a lead arranger in a loan facility indicates that the bank provides a fairly high share of fund and has the most negotiation power over the conditions of the loan.

Our baseline specification is the following:

$$\begin{aligned}
LA_{Lender,Borrower,t}^{Fac} = & \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t \\
& + \beta Post_t \cdot Sec_{Lender} + X_t^{Fac} + \epsilon_{Lender,Borrower,t}
\end{aligned} \tag{1}$$

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 that 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 the WorldCom's collapse and whether the lender is a securitizing bank. X_t^{Fac} are vectors of characteristics of the facility, Fac . In particular, they are deal purpose, deal maturity, deal size (amount), loan spread in the facility, number of loan participants in the facility, and the relative size of facility to the deal to which the facility belongs. We run the regression separately for each type of facilities: revolvers, term loan, term loan A, and term loan B.

We then expand our sample to those banks that are not affected by WorldCom bankruptcy and test triple differences using securitizing and non-securitizing banks among non-affected banks. In this analysis, the first difference is the time trend between pre- and post-WorldCom, the second difference is between securitizing banks and non-securitizing banks, and the third difference is between WorldCom and non-WorldCom banks. The most important concern to address in the main DID analysis was the possibility that securitizing banks and non-securitizing banks are fundamentally different from each other in terms of loan organization activities. Using the triple difference set-up where we compare shocked securitizing and non-securitizing banks to non-shocked ones, we can deal with such concern and show that the changes in loan organization in securitizing banks are in fact due to the shock rather than the fact that they do securitization.

The specification of the triple difference is the following:

$$\begin{aligned}
LA_{Lender,Borrower,t}^{Fac} = & \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t + \beta Post_t \cdot Sec_{Lender} \cdot WorldCom_{Lender} \\
& + \gamma Post_t \cdot Sec_{Lender} + \eta Post_t \cdot WorldCom_{Lender} + X_t^{Fac} + \epsilon_{Lender,Borrower,t}
\end{aligned} \tag{2}$$

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 the WorldCom's collapse, in other words, whether the lender was lending to the WorldCom at the time it went bankrupt.

3.2.2 Securitizing Banks' CDO liability issue after the shock

In addition to the main analysis, we explore whether securitizing banks' securitization activity changes when their liquidity is shocked in the syndicated loan market. By observing post-shock securitization activities of banks, we can draw implications on whether securitizing banks' overcome liquidity shock by actually engage in securitizing or simply through more active loan sales. To test, we use the data on the amount of CDO liabilities issued by each bank. The sample is restricted to securitizing banks only in this test and we compare shocked securitizing banks to the rest of the securitizing banks.

The specification for the DID is as follows:

$$Ln(CDO)_{Lender,t} = \alpha + FE_{Lender} + \lambda_t + \beta Post_t \cdot WorldCom_{Lender} + \epsilon_{Lender,t} \quad (3)$$

where $Ln(CDO)_{Lender,t}$ is the log-transformed amount of CDO liabilities issued by a bank, $Lender$, in the quarter, t . The coefficient β captures the change after the shock in the CDO liabilities issued by securitizing banks that were shocked by the WorldCom's collapse relative to those that were equally securitizing banks but not affected by the WorldCom's shock.

The result is expected to show whether securitizing banks actually change their securitizing activities after the shock.

3.2.3 Loan Conditions: Covenant Strictness

When loan organization activities by lenders change due to an exogenous shock as in our study, a question arises whether they also adjust loan conditions. Related to lenders' securitization activities in particular, there is evidence that lenders' monitoring tends to weaken for those loans

that are securitized (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 in our experimental set-up is that lenders may relax the loan conditions when they want to originate certain types of loans more than others. An alternative hypothesis is that they invite lower quality borrowers into their pool of borrowers (loans) and apply more strict loan conditions. This shows whether borrowers absorb part of the lenders' shock due to the reasons that are unrelated to borrowers themselves and whether such effect differs depending on the lenders' type: securitizers and non-securitizers.

To test, 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) and design the following specification for DID regressions:

$$Covenant_{Deal,Borrower,t} = \alpha + FE_{Borrower} + FE_{Lender} + \lambda_t + \beta Post_t \cdot Sec_{Deal} + \epsilon_{Deal,Borrower,t} \quad (4)$$

where $Covenant_{Deal,Borrower,t}$ 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 effect of the shock on the related loan deals' covenant level in the loans that were originated by securitizing banks. And we expand this regression to accommodate triple differences with securitizing and non-securitizing banks that are not affected by the WorldCom shock.

$$\begin{aligned} Covenant_{Deal,Borrower,Lender,t} = & \alpha + FE_{Borrower} + FE_{Lender} + \lambda_t \\ & + \beta Post_t \cdot Sec_{Deal} \cdot WorldCom_{Lender} \\ & + \beta Post_t \cdot Sec_{Deal} + \beta Post_t \cdot WorldCom_{Lender} \\ & + \epsilon_{Deal,Borrower,Lender,t} \end{aligned} \quad (5)$$

3.3 Pre-event Trend Analysis

This section presents the loan origination trends for shocked and non-shocked banks. For our main empirical strategy, differences-in-differences, to work, the parallel pre-trend assumption

should hold. Although there is no direct test for the assumption, we graphically present whether there exists a notably different trend in the pre-shock period.

Figure 3 presents 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 Jan 2001. The WorldCom affected months are shaded in grey. Before the shock, the number of deals originated by the two groups of banks was relatively parallel. Additionally, over the WorldCom trouble months, we can see through the solid line that is for treated (securitizing) banks that the total number of deals originated by securitizing banks show relative increase during the treatment period. In Figure 4, we observe the number of 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.

From Figure 5 to 7, we present the total number of facilities originated for each type of different facilities. Each of the figures corresponds to the number of term loan B, revolver, and term loan A in this order. We can see that overall the origination of each types of loans were more or less parallel over the pre-shock period. Over the shocked period, through Figure 5 we observe that term loan B origination becomes noticeably active for securitizing banks compared what we observe for revolver (Figure 6) or term loan A (Figure 7).

4 Results

4.1 Main Analysis

In this section, we present the result of our main analysis on the probability of being a lead arranger in different types of syndicated loan facilities. In Tables 2 - 6, the columns (1) and (2) report the results from the DID model in equation (1) and the columns (3) and (4) the triple differences results from equation (2).

Table 2 reports the results for the syndicated loan facilities that require higher liquidity commitment from lenders, which are revolver facilities. The variable of interest is the interaction term between Sec, which is equal to 1 if the bank is a securitizing bank, and Post, which is

equal to 1 if the observation in the post-shock period in the columns (1) and (2). The coefficient captures whether securitizing banks participate in origination of revolver facilities more actively after shocked relative to those equally shocked but non-securitizing banks. In the columns (3) and (4), we interact the variable of interest further with a dummy variable, WorldCom, which is equal to 1 if the bank is WorldCom affected banks. This was done by introducing (adding) the new set of securitizing and non-securitizing banks that are not affected by WorldCom collapse. For revolver facilities, we do not find statistically significant results for the coefficients of interest. This implies that securitizing lenders do not change their loan origination activities regarding the loan facilities that are classified as more liquidity-demanding, while they become more active in those facilities that are likely to facilitate their securitization activities.

Insert Table 2 here

Table 3 to 5 report the results for the facilities that are the most traditional type of loans, which are term loan and term loan A. These are loan facilities that are scheduled to deliver funds to borrowers. Lenders tend to retain this type of facilities until the end of their maturity so these term loans are unlikely to be securitized. Typically, a syndicated loan deal will have a facility referred as 'term loan' without classification of A or B in case the deal does not contain term loan B facilities. If the deal also contains term loan B, this traditional type of facility is named 'term loan A.' Although both term loan and term loan A are similar to each other in their characteristics as most traditional loans, the origination motivation for the two can be different from lenders' perspective given that the origination of term loan A is a necessary condition to originate term loan B within a deal. If a lender is interested in originating term loan B, their participation as a lead arranger in term loan A may also increase within the same deal. If this is true, we should observe different origination patterns in the two types. More specifically, we expect that

In Table 3, we report the probability of being a lead arranger using the sample of both term loan As and term loans. In the next Tables 4 and 5, we split the sample to term loan As and term loans and run the same regressions separately for each sample. As we expect, we observe in Table 4 that securitizing banks become more active in the origination of term loan A and this result holds both in diff-in-diff and triple differences regressions. Additionally we do not observe

the same significance in Tables 3 and 4. It implies that lenders' participation in term loan A becomes active when they are more prone to originate term loan B.

Insert Table 3, 4, and 5 here

In Table 6, we report the results for the term loan B, the type of loan facility that is most likely to be sold off or securitized on. In all regression models, we find positive and significant coefficients for the interaction terms of interest. In the most restricted models in columns (2) and (4), where we include lender, borrower, and time fixed effects as well as deal and facility characteristics as controls, we find that securitizing banks are more likely to be a lead arranger in term loan B compared to non-securitizing banks. In particular, we find that securitizing banks are more likely to be lead arrangers in term loan B when we compare them to equally shocked but non-securitizing banks (DID in column (2)) and are also more likely even in the triple differences (column (3)) where we further compare them to other non-shocked securitizing banks.⁴ The result confirms that when banks have negative liquidity shocks, securitizing banks, they become more actively engaged in originating those facilities that are more likely to be securitized on.

Insert Table 6 here

4.2 Securitizing Lenders: CDO/CLO Issuances

The main findings that securitizing banks participate more often in the relatively easily securitizable loan facilities imply that the securitizing activities by those banks may become more active. In this section, we report an additional test on the amount of CDO liabilities issued, i.e. the total amount of CDO bonds issued by shocked securitizing lenders (treated) relative to that of non-shocked securitizing lenders (control) after the shock. Although we do not have a direct evidence that the Term B facilities that securitizing lenders originate are the ones that are securitized, 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.

⁴We also run a DID regression using securitizing banks only by including the interaction term between *Post* and *WorldCom*, and the coefficient is significantly positive. The result is reported in the appendix.

The results are presented in the Table 7. The sample includes all the securitizing lenders that are either administrator or collateral manager of a CDO/CLO deals. The dependent variable is the total CDO Liabilities issued in each quarter. This variable captures the amount needed to finance new pools of syndicated loans in CDO SPVs, not simply the amount outstanding of CDOs or CLOs. The result is consistently positive and significant in all specifications indicating that shocked securitizing banks increase their CLO/CDO liabilities issued relative to the non-shocked securitizing banks. In the most restricted model in column (3), in which we include time fixed effect and bank fixed effect, we find the strongest effect.

Insert Table 7 here

4.3 Loan Conditions: Covenant Strictness

So far we find evidence that securitizing lenders become more active in securitization activities after they are shocked. In this section, we present whether this is associated with a change in the conditions of syndicated loans given to borrowers, i.e. on covenants. As covenants are only available at deal level, we run our regressions at that level. As suggested by Murfin (2012)⁵, recent defaults inform the lender’s perception of its own screening ability, thereby impacting its contracting behavior so that lenders write tighter contracts. In line with this theory, we should expect that shocked lenders originate deals with stricter covenants than their peers in the syndication lending market. On the other hand, securitization is often associated with lower incentives in monitoring the loans (Wang and Xia (2014)). However, to the extent that securitizing lenders invite lower quality borrowers into their pools, they may opt to apply more strict loan conditions.

Table 8 presents the regression results of the syndicated loan covenant strictness on the interaction term between post-shock period and securitizing banks. In all 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 the liquidity shock imposed on lenders. However, we recognize that the deal-level analyses may be not be able to capture the different behaviours of shocked lenders for different facilities, as discussed before. To better link the covenants to previous results on the increase of the prob-

⁵We use a different measure of covenants strictness based on Bradley and Roberts (2015), as we cannot rely on borrowers data for our analysis and we decide to include borrower fixed effects

ability of being lead arranger for the Term B facility of securitizing lenders, in the appendix we report the results of the same specifications only for the sub-sample of securitizing lenders. We find that shocked securitized lenders impose stricter covenants than other securitizing lenders - even after controlling for the borrowers' riskiness (borrowers fixed effects). This result is in line with Murfin (2012) and suggest that even though securitizing lenders become more active in loan origination of facilities more likely to be securitized, they do not reduce their monitoring effort but instead they increase it as they adjust their contracting behavior based on the default of WorldCom.

Insert Table 8 here

5 Concluding Remarks

This paper aims to examine whether the use of simple securitization plays a role as a risk management tool for banks by allowing them to manage their liquidity provision and lending in an important market such as the corporate lending market. We identify lenders that experienced a liquidity shock due to the WorldCom's collapse and test whether securitizing lenders show different ability to retain their lending activities than non-securitizing lenders after the shock in a difference-in-differences set-up.

We find that securitizing lenders become more active in originating those facilities that are more likely to be securitized, namely Term loan B, compared to non-securitizing lenders after the liquidity shock. 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. Our results show that securitizing lenders are indeed more able to provide loans after the liquidity shock, meaning they tend to recover more quickly. However, their loan origination after shock is clustered only around easily securitizable facilities.

By showing that by shocked lenders increases their issuance of CDO/CLO securities relatively more compared to the non-shocked securitizing lenders after the shock, we demonstrate that shocked lenders become more active in securitizing activities at the same time, i.e. they finance a higher amount of new pools of syndicated loans that other lenders active on the se-

curitization market but not shocked by the default of WorldCom. This result reinforces our hypothesis that lenders may better manage idiosyncratic liquidity shock by increasing their participation in securitizing activities. However, it also demonstrate that their higher resilience to the shock is intertwined with a higher reliance on the financing obtained via financial markets, i.e. the CLO/CDO market.

Additionally we test whether there is a relative change in loan covenant strictness after the shock and we do not find difference in covenants between deals provided by securitizing and non-securitizing lenders. Our findings show that even though securitizing banks adjust their behavior in loan market due to idiosyncratic shocks, the effect is not reflected in the loan conditions. However, when we test covenants specifically for securitizing lenders, we find that shocked lenders increase the strictness of their covenants after the shock, as the default force them to revise their ability to screen borrowers.

By highlighting a key role of the securitization in lending and liquidity provision, our paper speaks to the current debate on the revitalization of the ABS market and whether regulation should favor its use by banks or discourage it by imposing higher capital charges. As the current regulatory framework (Basle III) as well as policy makers have approached the revision of the securitization rules with the objective to create incentives for simpler securitization and to eliminate regulatory loopholes, our results can provide novel evidence based only on the simpler securitization structures, as they dominated the market in our period of investigation when CLOs primarily invested in investment-grade loans than leveraged loans.

The focus of our study is not on answering the question whether securitization made banks more vulnerable to the 2007 crisis when the securitization market collapse, which was a systemic event. We limit our interpretation to the evidence that securitization make lenders more resilient to idiosyncratic liquidity shocks and thus more likely to lend more to corporate borrowers, but in a way that confirm the strong dependence of lenders adopting an originate-to-distribute model on the functioning of the securitizing market.

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

Panel A: WorldCom Lenders: Non-Sec and Sec Lenders									
	(1)		(2)		(3)		(4)		
	WorldCom-Sec Lender		WorldCom-NonSec Lender		WorldCom-Sec Lender				
	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)
Deal Purpose: LBO	0.02	0.14	0.01	0.12	0.02	0.15	-0.01		(-1.29)
Deal Purpose: Debt Repay	0.15	0.35	0.16	0.37	0.14	0.35	0.02		(1.03)
Deal Purpose: Recap	0.00	0.02	0.00	0.00	0.00	0.02	-0.00		(-0.60)
Spread in Term Loan A	212.06	114.70	174.17	109.99	223.27	113.77	-49.10***		(-4.47)
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)
% of Term Loan Originated as Lead Arranger	3.43	2.91	1.07	0.40	4.30	2.95	-3.23***		(-29.48)
% of Term Loan A Originated as Lead Arranger	4.07	3.22	0.54	0.39	5.16	2.92	-4.61***		(-31.28)
% of Term Loan B Originated as Lead Arranger	4.46	3.57	0.77	0.42	5.60	3.33	-4.84***		(-28.79)
% of Revolver Facilities Originated as Lead Arranger	5.62	4.95	1.70	1.11	6.83	5.05	-5.12***		(-20.01)
Observations	2305		609		1696		2305		
Panel B: Non-WorldCom Lenders and WorldCom Lenders									
	(1)		(2)		(3)		(4)		
	All		Non-WorldCom Lender		WorldCom Lender				Diff.
	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)
Deal Purpose: LBO	0.03	0.16	0.03	0.17	0.02	0.14	0.01*		(1.84)
Deal Purpose: Debt Repay	0.17	0.38	0.19	0.40	0.15	0.35	0.05***		(4.59)
Deal Purpose: Recap	0.00	0.04	0.00	0.05	0.00	0.02	0.00*		(1.87)
Spread in Term Loan A	220.95	122.89	228.69	129.19	212.06	114.70	16.64**		(2.43)
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)
% of Term Loan Originated as Lead Arranger	1.66	2.31	0.59	0.64	3.43	2.91	-2.85***		(-63.35)
% of Term Loan A Originated as Lead Arranger	2.39	2.65	1.28	1.32	4.07	3.22	-2.78***		(-38.78)
% of Term Loan B Originated as Lead Arranger	2.54	2.98	1.28	1.50	4.46	3.57	-3.19***		(-39.89)
% of Revolver Facilities Originated as Lead Arranger	2.98	4.02	1.24	1.75	5.62	4.95	-4.38***		(-40.82)
Observations	5520		3215		2305		5520		
Panel C: Non-Sec Lenders and Sec Lenders									
	(1)		(2)		(3)		(4)		
	All		Non-Sec Lender		Sec Lender				Diff.
	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)
Deal Purpose: LBO	0.03	0.16	0.02	0.15	0.03	0.17	-0.01**		(-2.12)
Deal Purpose: Debt Repay	0.17	0.38	0.19	0.40	0.15	0.36	0.04***		(3.95)
Deal Purpose: Recapitalization	0.00	0.04	0.00	0.04	0.00	0.04	-0.00		(-0.42)
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)
% of Term Loan Originated as Lead Arranger	1.66	2.31	0.51	0.49	3.08	2.83	-2.57***		(-56.55)
% of Term Loan A Originated as Lead Arranger	2.39	2.65	0.68	0.74	4.06	2.78	-3.38***		(-53.67)
% of Term Loan B Originated as Lead Arranger	2.54	2.98	0.67	0.67	4.38	3.20	-3.71***		(-51.79)
% of Revolver Facilities Originated as Lead Arranger	2.98	4.02	0.80	0.83	5.11	4.71	-4.31***		(-41.13)
Observations	5520		2837		2683		5520		

This table reports summary statistics for syndicated loan deal characteristics in the year 2001 (before the treatment). Panel A is for the differences in syndicated loan deal characteristics. Panel B presents differences in syndicated loan deal characteristics in Non-WorldCom lenders and WorldCom lenders. Panel C presents differences in syndicated loan deal characteristics in Non-Securitizing banks and Securitizing banks. Deal amount is the total size of a syndicated loan deal expressed in millions of US dollars. Maturity is the number of months between deal start and end dates. Deal purposes are dummy variables that is equal to 1 if the loan purposes is LBO, Debt Repayment, or recapitalization. Loan spread is expressed in basis points, and total loan spread is the sum of the spreads in Term Loan A and B. N of loan participants is the total number of banks that participated in one deal. % of facilities originated as lead arranger is percentage of the facilities in the all sample that was originated as a lead arranger by each type of banks, for example, WorldCom-Sec or WorldCom-NonSec lenders in Panel A.

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

Table 2: Probability(Lead Arranger) in Revolver Facility

	Lead Arranger			
	DD		DDD	
	(1)	(2)	(3)	(4)
Sec X Post	-0.016 (0.015)	-0.018 (0.016)	-0.010 (0.010)	-0.005 (0.010)
Sec X Post X WorldCom			-0.001 (0.017)	-0.003 (0.017)
Post X WorldCom			0.023** (0.010)	0.022** (0.010)
Deal Purpose: LBO		-0.001 (0.045)		-0.012 (0.015)
Deal Purpose: Debt Repay		0.042*** (0.012)		0.005 (0.006)
Deal Purpose: Recap		0.001 (0.071)		0.008 (0.029)
Maturity<= 3years		-0.005 (0.014)		0.007 (0.006)
Ln(Deal Amount)		-0.008 (0.012)		0.005 (0.007)
Total Loan Spread		0.000 (0.000)		0.000*** (0.000)
Ln(N of Loan Participants)		-0.100*** (0.018)		-0.089*** (0.011)
Ln(Facility Amount over Deal Amount)		0.001 (0.017)		0.016* (0.009)
Observations	13163	12329	56599	51443
Adjusted R^2	0.246	0.244	0.215	0.213
Lender, Borrower & Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports the regression results from Equation 1 and 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after they are shocked. The sample of loan facilities are revolver facilities. Columns (1) and (2) are results from the differences-in-differences model (Equation 1) in which only WorldCom affected banks are used for regression. Columns (3) and (4) are triple results of the differences model (Equation 1) in which the sample includes non-WorldCom affected banks. 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. For definitions for control variables, see the note for Table 1.

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

Table 3: Probability(Lead Arranger) in Term Loan & Term Loan A

	Lead Arranger			
	DD		DDD	
	(1)	(2)	(3)	(4)
Sec X Post	0.010 (0.027)	0.030 (0.028)	-0.019 (0.015)	-0.008 (0.016)
Sec X Post X WorldCom			0.043 (0.027)	0.045 (0.028)
Post X WorldCom			0.009 (0.015)	0.004 (0.016)
Deal Purpose: LBO		-0.100 (0.063)		-0.051** (0.025)
Deal Purpose: Debt Repay		0.009 (0.029)		-0.021 (0.014)
Deal Purpose: Recap		-0.009 (0.081)		-0.007 (0.040)
Maturity <= 3years		-0.020 (0.043)		-0.004 (0.014)
Ln(Deal Amount)		0.016 (0.032)		0.039** (0.018)
Loan Spread in Term A		-0.000 (0.000)		0.000* (0.000)
Ln(N of Loan Participants)		-0.102** (0.040)		-0.106*** (0.026)
Ln(Facility Amount over Deal Amount)		0.010 (0.027)		-0.022 (0.018)
Observations	6134	5234	38393	28103
Adjusted R^2	0.322	0.318	0.270	0.257
Lender, Borrower & Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports the regression results from Equation 1 and 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after they are shocked. The sample of loan facilities are term loan and term loan A facilities. Columns (1) and (2) are results from the differences-in-differences model (Equation 1) in which only WorldCom affected banks are used for regression. Columns (3) and (4) are triple results of the differences model (Equation 1) in which the sample includes non-WorldCom affected banks. 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. For definitions for control variables, see the note for Table 1.

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

Table 4: Probability(Lead Arranger) in Term Loan A

	Lead Arranger			
	DD		DDD	
	(1)	(2)	(3)	(4)
Sec X Post	0.103*	0.110**	0.001	-0.005
	(0.054)	(0.055)	(0.030)	(0.030)
Sec X Post X WC			0.130**	0.141**
			(0.056)	(0.057)
Post X WC			-0.044	-0.044
			(0.028)	(0.028)
Deal Purpose: LBO		-0.143		-0.210***
		(0.103)		(0.053)
Deal Purpose: Debt Repay		0.164***		0.031
		(0.039)		(0.038)
Deal Purpose: Recap		0.142		-0.230***
		(0.104)		(0.055)
Maturity<= 3years		0.028		-0.002
		(0.018)		(0.010)
Ln(Deal Amount)		-0.939***		-0.102
		(0.081)		(0.063)
Loan Spread in Term A		-0.001		0.001*
		(0.001)		(0.000)
Ln(N of Loan Participants)		-0.026		-0.069***
		(0.028)		(0.020)
Ln(Facility Amount over Deal Amount)		0.006		-0.029
		(0.025)		(0.023)
Observations	1113	1100	6352	6254
Adjusted R^2	0.359	0.360	0.267	0.272
Lender, Borrower & Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports the regression results from Equation 1 and 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after they are shocked. The sample of loan facilities are term loan A facilities. Columns (1) and (2) are results from the differences-in-differences model (Equation 1) in which only WorldCom affected banks are used for regression. Columns (3) and (4) are triple results of the differences model (Equation 1) in which the sample includes non-WorldCom affected banks. 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. For definitions for control variables, see the note for Table 1.

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

Table 5: Probability(Lead Arranger) in Term Loan

	Lead Arranger			
	DD		DDD	
	(1)	(2)	(3)	(4)
Sec X Post	-0.015 (0.031)	0.012 (0.033)	-0.037** (0.017)	-0.024 (0.018)
Sec X Post X WC			0.032 (0.030)	0.031 (0.033)
Post X WC			0.022 (0.018)	0.019 (0.019)
Deal Purpose: LBO		-0.260*** (0.063)		-0.277*** (0.098)
Deal Purpose: Debt Repay		-0.000 (0.034)		-0.028 (0.018)
Maturity<= 3years		-0.048 (0.062)		-0.047** (0.023)
Ln(Deal Amount)		0.034 (0.045)		0.054** (0.026)
Loan Spread in Term A		0.000 (0.000)		0.000*** (0.000)
Ln(N of Loan Participants)		-0.195*** (0.049)		-0.169*** (0.034)
Ln(Facility Amount over Deal Amount)		-0.002 (0.021)		-0.022 (0.016)
Observations	5001	4113	31664	21476
Adjusted R^2	0.325	0.320	0.277	0.264
Lender, Borrower & Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports the regression results from Equation 1 and 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after they are shocked. The sample of loan facilities are term loan facilities. Columns (1) and (2) are results from the differences-in-differences model (Equation 1) in which only WorldCom affected banks are used for regression. Columns (3) and (4) are triple results of the differences model (Equation 1) in which the sample includes non-WorldCom affected banks. 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. For definitions for control variables, see the note for Table 1.

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

Table 6: Probability(Lead Arranger) in Term Loan B

	Lead Arranger			
	DD		DDD	
	(1)	(2)	(3)	(4)
Sec X Post	0.117** (0.047)	0.125*** (0.048)	-0.014 (0.020)	-0.013 (0.020)
Sec X Post X WorldCom			0.131*** (0.046)	0.137*** (0.046)
Post X WorldCom			-0.011 (0.025)	-0.018 (0.025)
Deal Purpose: LBO		-0.042 (0.064)		-0.038** (0.016)
Deal Purpose: Debt Repay		0.003 (0.063)		-0.008 (0.015)
Deal Purpose: Recap		-0.267*** (0.094)		-0.055** (0.024)
Maturity<= 3years		0.117* (0.066)		0.004 (0.021)
Ln(Deal Amount)		0.066 (0.050)		0.012 (0.014)
Loan Spread in Term B		-0.001** (0.000)		-0.000 (0.000)
Ln(N of Loan Participants)		0.027 (0.022)		-0.004 (0.006)
Ln(Facility Amount over Deal Amount)		-0.055 (0.099)		0.025 (0.026)
Observations	1536	1508	13298	13014
Adjusted R^2	0.338	0.346	0.343	0.347
Lender, Borrower & Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports the regression results from Equation 1 and 2 that measure whether a securitizing bank is more likely to be a lead arranger in a facility after they are shocked. The sample of loan facilities are term loan B facilities. Columns (1) and (2) are results from the differences-in-differences model (Equation 1) in which only WorldCom affected banks are used for regression. Columns (3) and (4) are triple results of the differences model (Equation 1) in which the sample includes non-WorldCom affected banks. 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. For definitions for control variables, see the note for Table 1.

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

Table 7: CDO Liabilities Issued after WorldCom event: Securitizing Banks Only Sample

	(1)	(2)	(3)
	Ln(CDO Liabilities Issued)		
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
Bank (Underwriter) FE	N	N	Y

This table reports the regression results of Equation 3 that measures whether WorldCom affected banks increase CDO liability issue after the shock. The dependent variable is the amount of CDO liabilities issues log-transformed. The explanatory variable is the interaction between WorldCom that is equal to 1 if the bank is affected by WorldCom and Post that is equal to 1 if the observation is in the post-shock period.

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

Table 8: Loan Conditions: Covenant Strictness

	(1)	(2)	(3)	(4)
	Covenant Strictness			
Post X Sec	0.112 (0.226)	0.154 (0.237)		
Sec X Post X WorldCom			0.181 (0.206)	0.288 (0.211)
Post X WorldCom			0.063 (0.177)	-0.007 (0.183)
Deal Purpose: LBO		-0.235 (0.762)		-0.242 (0.315)
Deal Purpose: Debt Repay		0.053 (0.214)		0.142 (0.110)
Deal Purpose: Recapitalization				0.418 (0.645)
Total Loan Spread		0.003** (0.001)		0.002*** (0.000)
Ln(Deal Amount)		0.466*** (0.145)		0.453*** (0.057)
Maturity <= 3years		0.130 (0.217)		0.130 (0.084)
Observations	860	748	3989	3128
Adjusted R^2	0.613	0.606	0.618	0.565
Borrower FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Controls	N	Y	N	Y

This table reports regression results from Equation 4 and 5. The columns (1) and (2) are from the diff-in-diff model in Equation 4 and the columns (3) and (4) report the results of the triple difference model in Equation 5. The dependent variable, Covenant Strictness, 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 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. For definitions for control variables, see the note for Table 1.

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

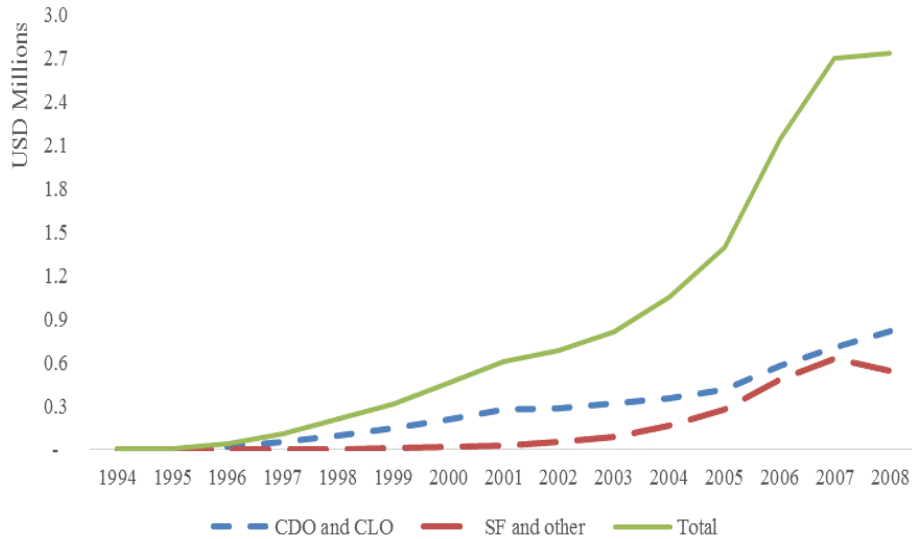


Figure 1: Source: SIFMA. CDO is a generic category of CDOs that includes CBOs, inclusive of early EM CBOs, unknown collateral, mixed collateral, trust-preferred CDOs, certain public finance/infrastructure backed debt. CLO includes certain middle market CLOs, corporate loan CLOs, leveraged loan CLOs (depending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

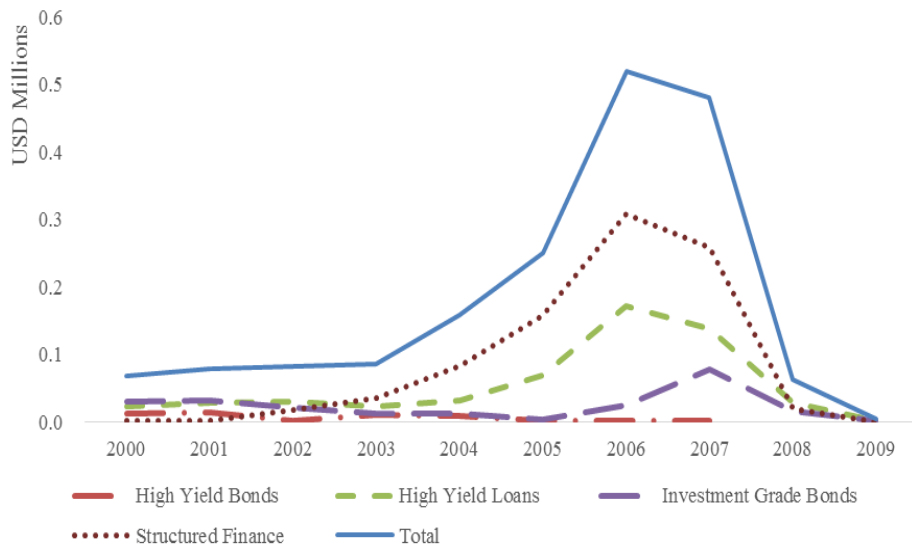


Figure 2: Source: SIFMA. Investment grade loans are defined as loans with ratings at or above Baa3 from Moodys or BBB- from Standard & Poors. High Yield loans are defined as transactions of borrowers with senior unsecured debt ratings at financial close below Moodys or BBB- from SP. Investment grade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

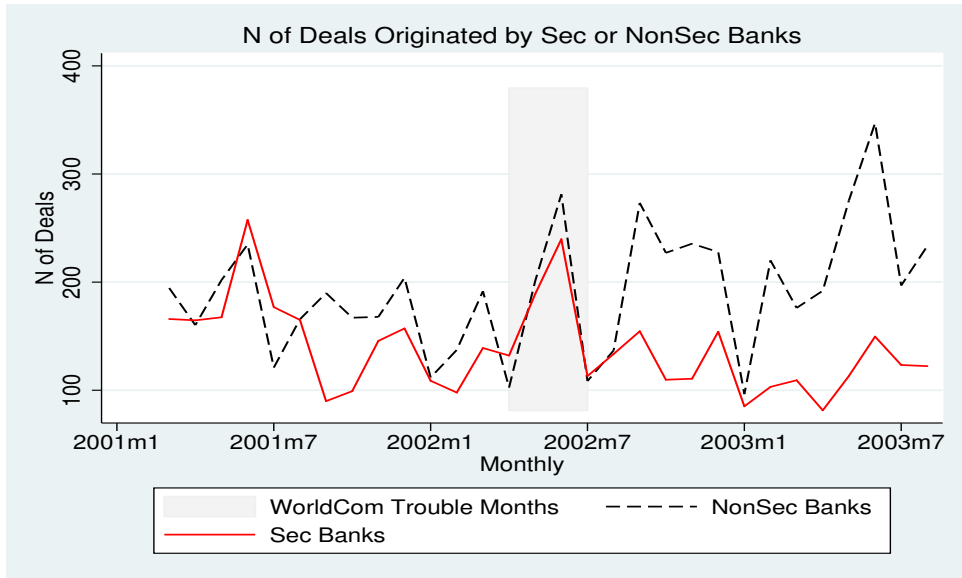


Figure 3: The graph plot presents the monthly trends in the number of syndicated loan deals originated by securitizing banks relative to non-securitizing banks among the WorldCom affected banks. The y-axis is monthly average number of syndicated loan deals (normalized at 2000Q1=100) and the x-axis is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

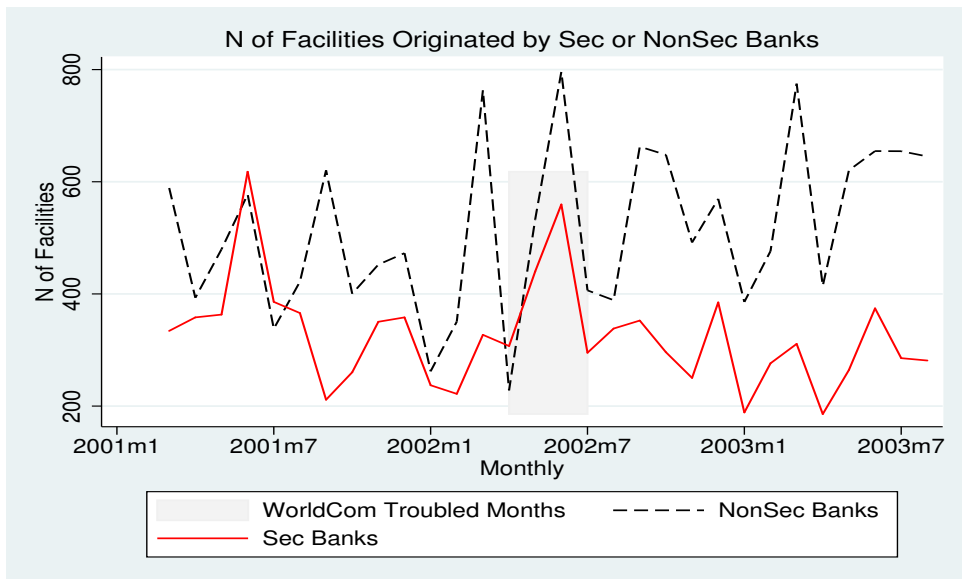


Figure 4: The graph plot presents the monthly trends in the number of facilities originated by World-Com affected lenders. The y-axis is monthly average number of facilities (normalized at 2000Q1=100) originated and the x-axis is months. The solid line is for securitizing banks while the dashed line is for non-securitizing banks.

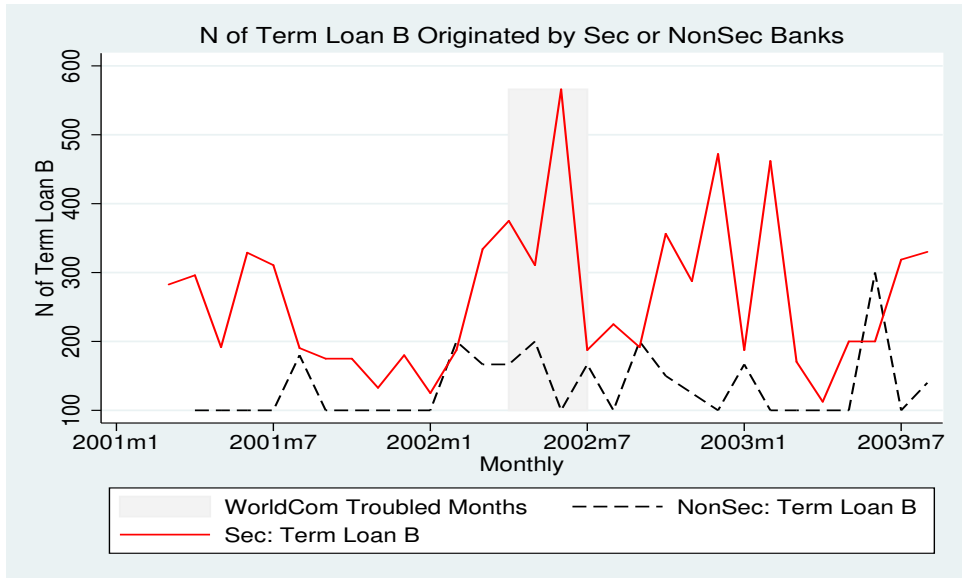


Figure 5: The graph plot presents the monthly trends in the number of term loan B originated by WorldCom affected lenders. The y-axis is monthly average number of term loan B (normalized at 2000Q1=100) originated and the x-axis is months. The solid line is for securitizing banks while the dashed line is for non-securitizing banks.

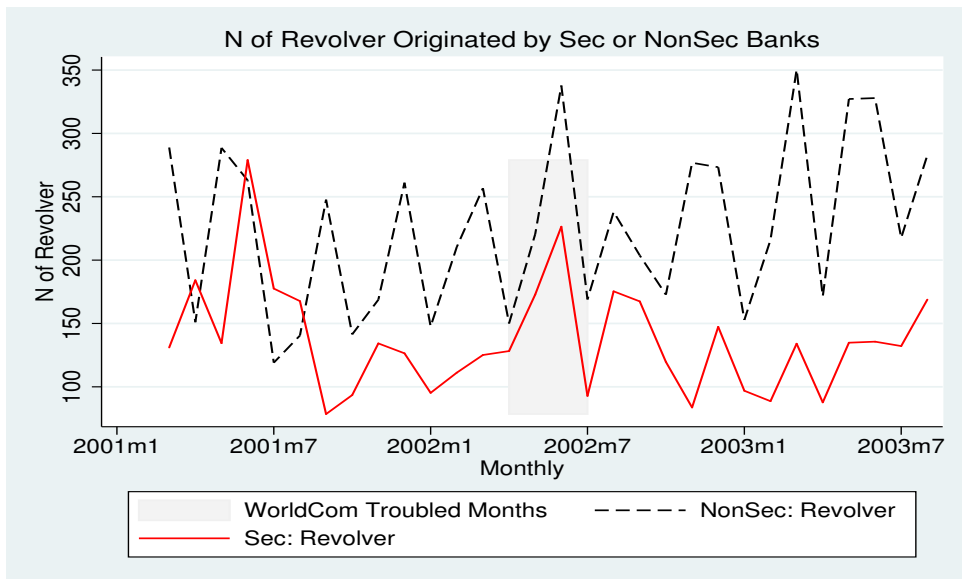


Figure 6: The graph plot presents the monthly trends in the number of revolver facilities originated by WorldCom affected lenders. The y-axis is monthly average number of revolver facilities (normalized at 2000Q1=100) originated and the x-axis is months. The solid line is for securitizing banks while the dashed line is for non-securitizing banks.

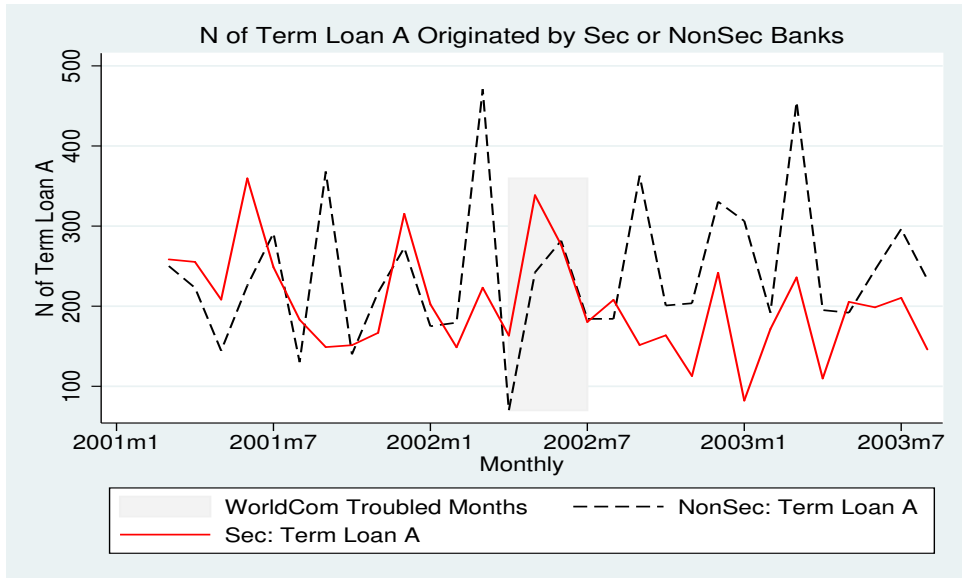


Figure 7: The graph plot presents the monthly trends in the number of term loan A originated by WorldCom affected lenders. The y-axis is monthly average number of term loan A (normalized at 2000Q1=100) originated and the x-axis is months. The solid line is for securitizing banks while the dashed line is for non-securitizing banks.

Appendix A Additional Analyses - Securitizing Lenders Sub-Sample

Table A.1: Probability(Lead Arranger) in Term Loan B: Securitizing Lenders Sub-Sample

	Prob(Lead Arranger)	
	(1)	(2)
Post X WorldCom	0.109** (0.047)	0.114** (0.047)
Deal Purpose: LBO		-0.058 (0.036)
Deal Purpose: Debt Repay		-0.078* (0.042)
Deal Purpose: Recap		-0.127** (0.055)
Maturity <= 3years		-0.051 (0.046)
Ln(Deal Amount)		-0.028 (0.039)
Loan Spread in Term B		-0.000** (0.000)
Ln(N of Loan Participants)		0.019 (0.016)
Ln(Facility Amount over Deal Amount)		-0.042 (0.070)
Observations	2922	2869
Adjusted R^2	0.317	0.322
Lender, Borrower & Time FE	Y	Y
Controls	N	Y

This table reports the regression reports

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

Table A.2: Loan Conditions: Covenant Strictness - Securitizing Lenders Sub-Sample

	Covenant Strictness	
	(1)	(2)
Post X WorldCom	0.332** (0.157)	0.257* (0.134)
Deal Purpose: LBO		0.184 (0.768)
Deal Purpose: Debt Repay		0.157 (0.276)
Deal Purpose: Recapitalization		0.000 (.)
Total Loan Spread		0.004*** (0.001)
Ln(Deal Amount)		0.496*** (0.171)
Maturity <= 3years		0.031 (0.252)
Observations	628	552
Adjusted R^2	0.598	0.593
Borrower FE	Y	Y
Time FE	Y	Y
Controls	N	Y

This table reports regression results from Equation 4 by replacing the sample to securitizing banks only sample and by replacing the variable of interest to the interaction between Post and WorldCom. The dependent variable, Covenant Strictness, 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 WorldCom is a binary variables that are equal to 1 if the lender is a WorldCom affected bank. Post is equal to 1 if the observation is in the post-shock period. For definitions for control variables, see the note for Table 1.

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