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CLO (Collateralized Loan Obligation) Market and Corporate Lending

We investigate whether access to the collateralized loan obligation (CLO) market as collateral managers or underwriters affects lenders' ability to overcome an idiosyncratic adverse shock in the corporate lending market. In a triple difference-in-differences setting, we find that lenders decrease their origination of loans following a negative shock; however, those with CLO access become more likely to arrange deals with securitizable facilities (Term B). Moreover, they choose to arrange deals with smaller size on-balance-sheet lending (Term A). The results suggest that securitization is actively used by lenders to switch to off-balance-sheet lending and to reduce the risk retained on the balance sheet.

JEL codes: G21, G23, G24
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Securitization of loans through collateralized loan obligation (CLO) structures is a key source of funding for the corporate lending market. In contrast to other securitization markets, the CLO market has now fully

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recovered from the shock of the 2008 financial crisis, reaching its highest level since its peak at $256 billion in September 2008, becoming the dominant institutional investor of syndicated loans. In 2018, CLO security issuance in the United States amounted to $125 billion, with the total size of the CLO market estimated at $600 billion.[1] The well-established role of CLOs in the credit market is also confirmed by the recent pandemic. After an initial sell-off in March 2020, the CLO market is recovering, supported by an even stronger demand for AAA-rated securities. Despite this widespread use of CLOs and concerns about financial stability, many aspects of this market have received little attention so far.[2]

Similar to other securitizations, CLOs help banks securitize loans—typically, large corporate loans—off their balance sheets into a special-purpose vehicle (SPV). Despite the traditional view that banks retain the majority of the loans they originate, the adoption of the originate-to-distribute model is widespread, as an increasingly larger share is originated to be sold or transferred to off-balance-sheet entities (see Bord and Santos 2012, Buchak et al. 2018, Blickle et al. 2020, Irani et al. 2020). Recently, the CLO market has become a preferred venue for distributing corporate loans that are originated by banks, which suggests that access to this market may be valuable when banks experience an adverse idiosyncratic shock. The literature on securitization has generally demonstrated the positive effect of securitization on banks' ability to lend by offloading risk from banks' balance sheet and relaxing capital constraints.

However, there is still a lack of understanding of whether and how banks' response to an adverse idiosyncratic shock interacts with their ability to access the securitization market. Financial intermediaries adjust their lending activity in response to shocks depending on key attributes of banks' balance sheet characteristics, such as equity (loss-absorbing capacity), leverage (acting as a constraint imposed by creditors), and their funding sources (Shin 2009). Moreover, banks have lending capacity constraints imposed by regulatory capital requirements, which limit the amount of risk they can take on their balance sheets. Therefore, a shock to the equity represents a challenge for banks that must remain compliant with minimum capital requirements and/or should remain capitalized in line with their peers to avoid the related costs of increased solvency risk (i.e., higher cost of financing, more supervision, etc.). Extensive literature has provided support for banks' reduced lending as a deleveraging response to a negative exogenous shock on their capital (e.g., Bernanke and Lown 1991, Peek and Rosengren 1995). Similarly, more recent literature has shown the impact of the Great Financial Crisis and of more stringent capital requirements on

1. Many of the most dramatic losses announced by large financial intermediaries during 2007 and 2008 were linked to collateralized debt obligation (CDO); meanwhile, CLO-structured loans showed 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, not even during the financial crisis.

2. The contributions of most recent research have been focused on the internal dynamics of the CLO structure, such as their trading, the use of financial covenants, the effect of portfolio constraints, and performance manipulation (Bozanic, Loumioti, and Vasvari 2018, Loumioti and Vasvari 2019, Peristiani and Santos 2019).

lending (e.g., Gambacorta and Marques-Ibanez 2011, Chu, Zhang, and Zhao 2019, for the implications in the syndicated loan market).

In this paper, we explore how banks' access to the securitization market helps them to manage their capital requirements under a negative shock, focusing on the demise of WorldCom in 2002—one of the largest bankruptcies in U.S. history—following Lin and Paravisini (2012). We use WorldCom's failure as an adverse shock to the equity capital of WorldCom's lenders that makes the capital constraints more binding than before and thus reduces the amount of risk that can be taken unless accompanied by an increase in equity capital. At the same time, we predict that, among the shocked WorldCom lenders, those acting as underwriters or collateral managers of CLOs will have direct access to securitization. This CLO access should allow them to deleverage and relax the more binding capital constraints caused by the shock, leading them to arrange deals with a more limited impact on their capital requirements, that is, deals that contain securitizable facilities. Syndicated corporate deals typically contain one or all of the following types of facilities with different features: revolving, Term A and Term B. Revolving facilities are credit lines, meaning that a certain amount of liquidity must be made available to corporate borrowers upon request. In contrast, Term A and Term B facilities are standard long-term loans of fixed amount and set schedule. The key difference is that Term B are facilities structured specifically for—and sold to—institutional investors, such as CLO and structured finance vehicles, whereas Term A is typically retained on the balance sheet.[3] Our main hypothesis is that lenders with direct access to the CLO market will be more likely to arrange deals that contain facilities that can be easily securitized (i.e., Term B) and also choose to originate relatively smaller amortizing loan facilities (Term A) that will typically be retained by the lender.

An alternative response would be to raise additional funds on the market via new equity issuance instead of depending on the deleveraging strategy via securitization. However, Lin and Paravisini (2012) showed that the market reactions to WorldCom's failure were severe, constituting a drop of approximately 10% in market-adjusted returns relative to nonexposed banks. The magnitude of the market reaction is only partial evidence of lenders' direct exposure to the shock because it is influenced by many other factors that are not mutually exclusive, including reputational costs and adjustments in monitoring technology (Lin and Paravisini 2012). Although various tests are provided in the paper to assess the influence of lenders' exposure to the WorldCom shock on their ability to lend, the stock reaction suggests that the market conditions were not favorable for equity issuance by affected banks. Furthermore, equity issuance also carries dilution issues (see Goetz, Laeven, and Levine 2021).

Another alternative to deleveraging via securitization on the lending side may be loan sales, that is, selling existing and performing loans to third-party investors. However, loan sales to a third party are accompanied by several disadvantages relative to

3. If a deal contains only first long-term facility, it is simply called a "Term Loan," instead of "Term A."

securitization. First of all, lenders with direct access to the CLO markets as underwriters or collateral managers can execute loan transactions in a more timely manner by placing their loans in CLO vehicles without depending on third-party demands for their loans. Even if the secondary market for Term B facilities is relatively active, the seller still depends on other institutions' loan demand and timing of transactions if they do not have direct access to CLO.[4]

In our empirical analysis, we first run a preliminary analysis to provide evidence that the WorldCom bankruptcy was a significant negative shock to the balance sheets of the lenders of WorldCom's syndicated loans, to which banks responded by reducing lending. We find a 37.9% decrease in the number of deals arranged by all shocked banks compared to non-WorldCom lenders. This is in line with Lin and Paravisini (2012) that the bankruptcy of WorldCom had a sizable negative impact on the banks that were lending to it and eventually led them to reduce lending to other corporate borrowers up to 2 years after the event. In addition, using the sample of all securitizing lenders, we find that, compared to WorldCom-unaffected lenders with equal access to the CLO market, WorldCom-affected lenders increased their issuance of CLO securities after the shock. Whereas the first test confirms that affected lenders responded to the shock by decreasing lending, the second test confirms that shocked lenders increased their off-balance-sheet activities via the CLO market.

In the main analysis, we explore whether WorldCom lenders with access to the CLO market increased their loan origination of deals that contain securitizable facilities as a response to the negative shock. We adopt a triple difference-in-differences (triple DID) setup, which allows us to compare WorldCom-affected lenders with CLO market access to similarly shocked lenders without access to the CLO market, as well as to the lenders who were not shocked but had access to the CLO market. This is to control for the potential effect that may arise due to being a securitizing bank. Lending behavior is observed in terms of the probability of arranging deals as lead arrangers. We use Standard & Poor's (S&P) Capital IQ and DealScan as sources of data.

Consistent with our hypothesis, we find that securitizing lenders became more active than nonsecuritizing banks in arranging syndicated loan deals that contain securitizable facilities, namely, Term B. However, in other types of deals that contain only those facilities that would be retained on balance sheets, such as long-term amortizing facilities (Term A), we do not find significant differences. These results are confirmed even after controlling for global demand for CLO securities, using a different proxy for securitization (the dollar amount of CLO bonds issued instead of a binary indicator), and controlling for lenders' preshock characteristics. Furthermore, we find that

4. For other types of loans unrelated to securitization activity, the disadvantages are even harsher in that the seller is likely to bear large initial losses, and the transaction may take longer to complete due to the illiquid nature of loans to be traded. Although active trading seen in the Term B transactions reduces the informational gap between the seller and the buyer and makes the price discovery easier, resulting in improved liquidity, for other types of loan sales where active trading is absent, the informational gap is high and the buyer requests a higher discount on the loans, thus inducing a larger loss for the selling bank. Given that such informational gaps—and thus, the discounts on loans—are likely to be larger after revelation on the lender's inability to monitor one of its borrowers (i.e., WorldCom), selling other types of loans to a third party may not be a viable route to take.

securitizing lenders switch not only the type of deals to arrange, but also the structure of deals, such that they choose the deals with smaller-size on-balance-sheet lending facilities (Term A) and larger-size off-balance-sheet lending (Term B). This result supports the deleveraging mechanism among shocked securitizing banks.

Moreover, we find that securitizing lenders' increased interest in securitizable facilities was not necessarily accompanied by changes in certain characteristics of these deals, such as covenants, maturity, or spread. This allows us to rule out the possibility that securitizing lenders can simply take advantage of the profitability of originating deals with securitizable facilities that provide higher fees or spread by expanding their borrower pools. In all analyses, we include lender, time, and borrower's industry-fixed effects. In more stringent specifications, we use lender and borrower industry-fixed as well as time-fixed effects to further account for borrowers' credit demand factors.

In a set of robustness checks that follows, we provide counterevidence to various alternative hypotheses. First, we restrict the analyses to a subsample that includes only those securitizing lenders that are underwriters but not collateral managers of the CLO deals. This test is motivated by the concern that our results may be strongly driven by cases in which the securitizing lender assumes both roles; therefore, the CLO managers' decisions are significantly influenced by the underwriters over CLO portfolio construction. Our results remain robust after eliminating such cases, confirming that CLO underwriters also retain the ability to adjust their lending response by using their access to the CLO market, in line with Chernenko (2017). Second, we also address the concern that the change in lending behavior we observe among securitizing banks is the result of reputational damage. We recognize that reputational issues may affect different types of banks differently. Because securitizing lenders are larger and typically well-established banks, they may be more concerned about their reputation and their capitalization against peers, and thus more prone to deleveraging when shocked. Securitizing lenders typically adopt more market-based funding models and may be more affected by changes in the perceived risk profile of the bank after the shock (higher funding costs) and may, for this reason, decide to deleverage further via the CLO market. To ensure that our results remain valid when taking into account reputational issues, we exclude WorldCom's lead arrangers from the analysis because we expect that they suffered most of the reputation damage caused by WorldCom's demise and find that our results hold.

In the next robustness tests, we exclude the possibility of confounding effects potentially created by two concurrent events: Enron's collapse and the terror attacks of September 11, 2001 (hereinafter "9/11"). We run a test by including the Enron shock in our analysis and another test by excluding the 9/11-affected period from the sample and exclude the possibility of confounding effects. Finally, we verify the generalizability of our findings by testing such lenders' use of the CLO market under a negative shock based on a more recent corporate failure, that of Carillion in the United Kingdom in 2018. Despite a long time lag between the WorldCom and Carillion events, as well as the evolution of banking and the CLO market during that time, we find consistent results showing that Carillion-affected securitizing banks increased their engagement in deals with Term B soon after Carillion's bankruptcy.

Our study makes several contributions to the current literature. First, we enrich the literature on securitization by focusing on the corporate lending market and the role that off-balance-sheet activities can play in times of bank distress. Recent literature focuses on the freeze of the asset-backed security (ABS) market during the crisis and highlights the systemic risks and costs associated with securitization (Carbo-Valverde, Degryse, and Rodriguez-Fernandez 2015, Bonaccorsi di Patti and Sette 2016). Our analysis makes a complementary contribution to this literature in that we focus on an idiosyncratic shock rather than a systemic shock, and we identify a causal relationship between an idiosyncratic shock to lenders' equity and securitizing banks' lending responses for corporate borrowers. Second, we also contribute to the literature on banks' use of off-balance-sheet vehicles (Watson and Carter 2006, Fabozzi, Davis, and Choudhry 2007, Marques-Ibanez and Scheicher 2009, Buchak et al. 2020). Our results confirm that securitization is an integral part of banks' strategy to adapt loan origination in response to shock. Our evidence is also in line with (Buchak et al. 2020), documenting the shift from on-balance-sheet to off-balance-sheet lending for mortgage origination. Third, we contribute to the emerging literature on the CLO market. Whereas recent studies focus on CLOs as stand-alone entities (Benmelech, Dlugosz, and Ivashina 2012, Loumioti and Vasvari 2019, Peristiani and Santos 2019), we focus on the dynamics between the role played by banks in the CLO market and its implications for corporate borrowers. The understanding of these dynamics is important also for further studies on the transmission of shocks from the corporate sector to the CLO market (increasing defaults on leveraged loans) and to the traditional banking sector. To the best of our knowledge, our paper is the first to analyze how shocks to banks affect the financing of corporate activities via the CLO market.

In terms of policy implications, our study speaks to the regulators' initiative aiming to revitalize the securitization market, with an emphasis on simple structure securitization. We base our analysis on the years before 2004, thus focusing on the use of a relatively simple type of securitization—that is, the type that was used before the introduction of the complex structures associated with the build-up of risks in the run-up to the financial crisis.[5] Policymakers clearly distinguish between high-quality securitization that is simple, transparent, and comparable (STC)[6] versus more complex and synthetic securitization. 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

5. In Figures 1 and 2, which illustrate the time trend of the securitization structures, we observe that the complex form of structured financing spiked in volume from the mid-2000s to the time of the financial crisis. During this period, securities began to be backed by fewer, but larger and more heterogeneous assets, including high-yield bonds, leveraged loans, and tranches of other securitization deals, thus becoming a source of risk that triggered the crisis.

6. The Basel Committee on Banking Supervision (Basel III Document, Revisions to the Securitization Framework, July 2016) defines high-quality securitization as STC, where "simplicity" refers to the homogeneity of underlying assets with simple characteristics and transaction structure; "transparent" refers to providing investors with sufficient information on the underlying assets and on the structure of the transaction; and "comparable" refers to the criteria of promoting comparability—that is, the comparison across securitization products within an asset class.

IOSCO 2015), but it becomes a useful tool when it meets certain criteria. Although the more recent literature has focused on securitization during the crisis period, our results are based on lenders' access to a simple type of securitization and corroborate early literature on securitization (Goderis et al. 2007, Duffie 2008, Altunbas, Gambacorta, and Marques-Ibanez 2009, Loutskina 2011, Gorton and Metrick 2013), indicating a beneficial effect of securitization, in line with policymakers' expectations.

The remainder of this paper is organized as follows: Section 1 briefly reviews the structure of CLOs as well as the literature on securitization and corporate borrowers, and our predictions are discussed in Section 2; Section 3 describes our identification strategy and data; Section 4 presents our preliminary tests and parallel trend analysis; Section 5 reports and discusses our main results; Section 6 provides our robustness test results; and Section 7 presents our conclusions.

1. INSTITUTIONAL BACKGROUND FOR THE CLO MARKET

CLOs are SPVs established to hold and manage pools of syndicated corporate loans. Syndicated loans are typically large in dollar amount, serving the financing needs of large corporations, as the syndication process allows multiple banks to jointly provide a significantly larger loan. The syndicated loans are first structured, arranged, and underwritten by one or several banks acting as arrangers before being syndicated to other banks or institutional investors.[7] In a typical syndication, a loan deal is composed of several pieces known as "facilities." As liquidity providers, banks fund the revolving credit facilities (or "revolvers") almost exclusively, and they usually retain only a portion of Term A. The other Term Loans, such as B, C, or D, are distributed among other banks and nonbank institutional investors, including CLOs. Thus, CLOs typically hold fractions of Term B facilities (Benmelech, Dlugosz, and Ivashina 2012) but sell them soon after origination (Blickle et al. 2020).

Structuring a CLO deal requires the involvement of various agents. CLO vehicles are typically established by an investment management company or a bank that acts as a collateral manager, whose role is to construct the CLO loan portfolio by purchasing tranches of syndicated loans. The underwriter and the CLO collateral manager deal with the rating agency to structure, rate, and price the deal until an agreement is reached on terms and allocations. The typical life cycle of a CLO structure features the following phases[8]:

- Warehousing (3–6 months): The CLO manager purchases the initial loans before the closing date. The closing date is the day the CLO comes into legal existence and interest on the notes starts to accrue. The purchase is typically funded with

7. See Bruche et al., (2019) for an overview of the syndication process.

8. More details available in FSB (2019).

interim financing (warehouse financing), usually from a bank, and often in the form of a line of credit (revolving) to the CLO manager. This loan is repaid with the proceeds from the sale of the CLO notes into the capital markets at the closing date.

- Ramp-up (2–4 months): After the closing date, the CLO manager purchases the remaining collateral to complete the original portfolio. The effective date starts when the CLO is fully ramped up.
- Reinvestment (2–5 years): Following the ramp-up period, the manager can reinvest all loan proceeds, such as principal repayments or the proceeds gained from selling loans. The main scope of purchasing and selling loans is to improve the portfolio's asset quality.
- Noncall (first 2 years of reinvestment): To protect investors, the CLO manager is restricted from redeeming or refinancing the issued liabilities during this period. Subsequently, the equity-tranche holders can request that the CLO manager redeem the liabilities by liquidating the portfolio or refinance some or all of the liabilities.
- Repayment and deleveraging (1–4 years): As underlying loans are paid off, the CLO manager pays down the investors in order of seniority and distributes the remaining proceeds to the equity-tranche holders. The manager also performs monthly tests to ensure the portfolio's ability to cover its interest and principal payments.

Unlike other types of securitization, a CLO portfolio is actively managed (Peristiani and Santos 2019). The collateral manager of a CLO buys and sells individual bank loans (up to 20–25% per year) to reconstruct the underlying collateral pool in order to create trading gains and minimize losses from deteriorating credit.[9] This unique feature of the CLO market gives banks greater flexibility in deciding which type of loans to originate—those that they retain on-balance-sheet or transfer off-balance-sheet. This flexibility is derived from the ability to sell securitizable corporate loans (Term B) to existing CLO deals without the need to arrange a new CLO deal, and thus without a need to provide warehouse financing to purchase the initial collateral.

2. RELATED LITERATURE

Based on evidence from the 2008 financial crisis, most recent studies emphasize that securitization provides benefits to banks, but these are associated with a cost for the economy in the form of financial instability (Loutskina and Strahan 2009, Mian and Sufi 2009, Demyanyk and Van Hemert 2011, Financial Crisis Inquiry Commission 2011, Rajan, Seru, and Vig 2015). This is because securitization is

9. S&P Global Market Intelligence (2016) showed that manager trades during the 2008–09 credit crisis reduced potential losses by 10% on average (S&P CLO Spotlight: How Do CLO Managers Perform in Times of Stress?, September 6).

associated with an overextension of banks' balance sheets, which leads them to undertake a lower level of borrower screening and monitoring, thus creating more credit risk (Acharya et al. 2013, Sarkisyan and Casu 2013). Importantly, it is often pointed out that securitization may harm financial stability by increasing the potential for contagion among financial institutions (Allen and Carletti 2006, Efing 2015).

However, academics and policymakers also recognize the benefits of securitization and, thus, its important role in the economy. Liquidity (the ability to raise funding or capital through the market or to reduce financing costs) and regulatory capital arbitrage (capital relief) are the two most important rationales for banks' asset securitization (see Watson and Carter 2006, Fabozzi, Davis, and Choudhry 2007, Buchak et al. 2020, among others). Securitization enables banks to obtain new liquidity from the market through the transfer of credit risk to SPVs, which in turn reduces the need for regulatory capital. This also facilitates risk management in bank balance sheets by modifying the risk profile through the shift from on-balance-sheet to off-balance-sheet lending (Marques-Ibanez and Scheicher 2009, Buchak et al. 2020).

In this regard, securitization allows banks to diversify credit risks among many investors across the financial system and make efficient use of bank capital. Securitization reduces the cost of capital for loan intermediation, thereby reducing the cost of credit (Duffie 2008). As a result, borrowers can anticipate benefits in the forms of increased credit supply, reduced borrowing costs, and credit on more favorable terms (Goderis et al. 2007, Altunbas, Gambacorta, and Marques-Ibanez 2009, Loutskina 2011). To the extent that these benefits are passed on to borrowers in terms of more favorable lending conditions and improved credit availability, the economic benefits of securitization can be transferred to the real economy. These benefits of securitization are also clearly recognized by current policymakers—whose initiatives encouraged the restarting of the securitization market after the dramatic postcrisis decrease—in light of the fact that its revival was considered vital to providing the financial system with liquidity that would eventually boost the economy.

However, due to complexities of identification, it is difficult to empirically assess whether securitization can be beneficial or detrimental to credit availability. It is challenging to disentangle banks' decisions to securitize from other concurrent drivers of banks' lending behavior, especially in the periods of excessive risk-taking leading up to the financial crisis. In this paper, we focus on the precrisis period, when securitization structures were simpler and there were fewer incentives for regulatory arbitrage alongside excessive risk-taking. WorldCom's collapse provides a relatively clean and natural experiment to identify causality in banks' use of the CLO market during a negative shock and its resulting impact on the corporate lending market.

Unlike in previous studies on securitization of corporate loans, which focus on securitizable facilities (Term B) alone, we analyze banks' loan origination at the deal level to show lenders' response to an equity shock. We assume that banks' access to the CLO market encourages them to shift to originating deals with limited impact on their capital, that is, to increase the origination of deals containing facilities that are easier to securitize (Term B) while reducing the amount of loan share to be retained on balance sheet (Term A). Like previous studies in the literature, this study assumes

that securitizing banks are those that are collateral managers or underwriters, as in the studies conducted by Nadauld and Weisbach (2012), Bord and Santos (2015), and Wang and Xia (2014).

Similar to our study are those by Carbo-Valverde, Degryse, and Rodriguez-Fernandez (2015), Bonaccorsi di Patti and Sette (2016), and Buchak et al. (2020). Carbo-Valverde, Degryse, and Rodriguez-Fernandez (2015) analyze the impact of securitization on credit rationing in Spain, comparing normal and crisis periods for two forms of securitization, namely, ABS and covered bonds. The researchers find that banks that are actively involved in securitization (i.e., ABS issuance and covered bonds) impose less stringent credit constraints on their borrowers in normal times; however, during crisis periods, they observe credit rationing to increase proportionally to the amount of ABS issued by banks. In Bonaccorsi di Patti and Sette (2016), the authors analyze the effect of ABS market freeze on the credit supply in Italy and find that banks that were more involved in securitization before the crisis engaged in more credit rationing, imposed higher interest rates, and exhibited a lower probability of accepting loan applications as well as a higher probability of terminating relationships after the crisis. These studies observe crisis periods that coincided with a systemic shock (i.e., the ABS market's collapse after the failure of Lehman Brothers) that revealed the complex interconnections among securitization, regulatory arbitrage, and the shadow banking system (i.e., through asset-backed commercial papers and the repo market; see Gorton and Metrick (2012b) and Covitz, Liang, and Suarez (2013)). Our paper is differentiated in that we observe the effect of securitization on corporate lending in the context of an unexpected, bank-specific idiosyncratic shock. One study that is also closely linked to ours outside a crisis period is Buchak et al. (2020): using mortgage market data in recent years, the authors show that banks use an adaptable business strategy in which they turn from balance sheet lending to mortgage lending when they experience a decline in balance sheet capacity following a negative shock precisely because mortgage loans are easier to sell for securitization and can be taken off-balance sheet. In our paper, we show that a similar strategy is used by banks via their CLO securitization activity.

3. IDENTIFICATION AND DATA

3.1 The Shock

We regard the 2002 demise of WorldCom as an idiosyncratic shock to the equity of its lenders, who responded by reducing lending. The same shock is used in Lin and Paravisini (2012), who present extensive evidence that WorldCom's bankruptcy affected the supply of credit to firms that were borrowing from WorldCom as well. The authors show that, relative to comparable firms that were unrelated to WorldCom lenders, firms that borrowed from WorldCom's lenders experienced a sharp decline in the new syndicated credit amount during the years after the WorldCom bankruptcy and an increase in the cost of borrowing that persisted for more two years.

In contrast to those authors, we directly test the reduction in WorldCom's lenders' credit supply caused by that company's demise (Table 3) and argue that their lending response is motivated by the need to deleverage following the equity shock. The authors suggest multiple nonexclusive channels, namely, lowered liquidity, reputational damage, and increased concerns regarding their monitoring technology. The failure of such a large-scale borrower implies a temporary drop in banks' liquidity due to the losses they sustain as a result of their inability to recover their claims, which hinders their ability to issue new loans. Especially for the lead arrangers, reputational damage from involvement in an accounting scandal may also affect the ability of shocked banks to raise funds on the wholesale market by increasing their external funding costs. Another possible reason is that such a failure raises concerns about banks' abilities to screen and monitor corporate borrowers and induces them to be more stringent in loan origination. We rule out these alternative explanations in our robustness tests.

Whereas Lin and Paravisini (2012) focuses primarily on the average effect for all WorldCom-affected lenders, we observe the differences in loan origination among four subgroups: shocked banks with and without access to securitization (securitizing lenders) and nonshocked banks with and without such access (nonsecuritizing lenders). Our main hypothesis predicts that the negative shock from WorldCom's bankruptcy on bank lending will be weaker for securitizing lenders. This assumption is founded on the benefits they derive from having direct access to the CLO market, which allows them to deleverage and alleviate the more binding capital constraints caused by the equity shock. This translates into securitizing lenders originating more deals that include Term B facilities and within these deals, a smaller amount of on-balance-sheet term loans. This means that access to the CLO market has the effect of enabling lenders to adapt more flexibly to the negative shock by increasing their off-balance-sheet activities. We additionally explore whether this origination activity is associated with changes in loan conditions such as covenants, maturity, and spreads.

Unlike many studies in the securitization literature that focus primarily on the institutional facilities (Term B) and leveraged loans, we investigate bank lending in the form of syndicated loans at the overall deal level and explore different effects of the shock on deals both with and without Term B. The inclusion of Term B facilities in deals have different implications for a bank's balance sheet compared to deals without Term B. Term B facilities are often originated for securitization activities; therefore, they are structured to meet the needs of institutional investors and are more transferable off-balance sheet. On the other hand, Term Loans and Term As are standard amortizing loans that remain on bank balance sheets and represent the ability to lend an amount for a set period of time, typically around 5 years.[10] Given the difference,

10. Revolving facilities are credit lines that can be seen as banks' liquidity commitment and are almost always retained by the bank. However, how much a bank lends in the form of a revolving facility depends on the demand of the borrower; therefore, we exclude syndicated loan deals that contain only revolving facilities from our analysis.

the inclusion of Term B facilities represents lenders' interests in taking some portion of the loans they originated off of their balance sheets.

We focus on the probability of a bank being the lead arranger in a syndicated loan deal after a shock. Being a lead arranger captures a bank's ability to participate in the syndicated loan market as a main provider and negotiator of loans tasked with monitoring the borrowers. Although a test could be designed using the lead arranger's share in each deal and facility, due to patchy and biased data on the lender's share variable, as Bruche, Malherbe, and Meisenzahl (2020) and Blickle et al. (2020) explain in depth, the number of observations would be dramatically reduced if the lender's share variable were used and would lead to distorted results. This effect would be further exacerbated by the time period on which we focus.[11] Therefore, we opt to employ a measure that is unaffected by this issue, which entails measuring the probability that a bank will be a lead arranger of deals with and without Term B facilities.

3.2 Data

To gather data, we use DealScan, which contains information on borrowers and lenders of syndicated loan deals as well as deal characteristics. To capture the effect of the shock, we restrict our sample to deals that originated between 2000 Q2 and 2004 Q1—that is, 2 years before and 2 years after the collapse of WorldCom. Because securitizing banks tend to be larger and to originate larger loans, we also restrict our sample to deals in the top 75th percentile in terms of size; this is to ensure that our set of loans issued by nonsecuritizing banks is comparable to our set of loans issued by securitizing banks. Given that WorldCom was the largest player in its industry, we exclude borrowers who belonged to the same industry sector as WorldCom, that is, the telecommunications industry; this is to avoid capturing the effect of the industrywide shock rather than the shock faced by banks in the corporate lending market. We also exclude financial firms and regulated industries. We classify a deal as "WorldCom-affected" if its lead arranger participated in the WorldCom loans that were outstanding at the time of its collapse.[12] The role of lead arranger is performed by one or more lenders in a syndicated loan deal, and lead arrangers tend to exert the most influence on the conditions (i.e., amount, fees, spread, and covenants) of a syndicated loan. We consider the lender that retains the "lead arranger credit" to be the lead arranger of the deal. In cases where multiple banks possess the lead arranger credit, we designate multiple lenders as the lead arrangers. Using the information

11. This information is available only for 290 and 45 observations for Term A and Term B facilities, respectively, which is about 5–10% of the total observations used in our sample. Both Bruche, Malherbe, and Meisenzahl (2020) and Blickle et al. (2020) raised serious concerns about using this variable, confirming that—even when available—the lender share at origination reported in DealScan is biased.

12. Twenty-eight lenders were affected by WorldCom; however, in our analysis, two lenders are eliminated during the data-cleaning process.

from DealScan, we classify all deals into those that contain securitizable facilities (Term B) and those that do not contain Term B.[13]

Our identification of each bank's access to the CLO market is based on a unique data set of CLO/CDO deals from the S&P Capital IQ database. S&P Capital IQ preserves the list of global CLO deals that are rated by the rating agency S&P's, reporting their origination date, type, underwriter, collateral manager, and amount issued. From these data, we identify underwriters and collateral managers that arranged CLO deals in the period before the WorldCom shock.

Although the collateral manager has the formal role of constructing and managing the CLO loan portfolio, our assumption is that both the collateral manger and the underwriter play roles in influencing the CLO, as suggested by (Chernenko 2017), as well as in the active trading decisions. Therefore, we assume that both have preferred access to the securitization market when they need to manage their response to a negative shock. Our proxy for access to the CLO market is defined at the lender level; thus, regardless of whether they are securitized, all loans from securitizing lenders are considered "treated" because the lender's whole balance sheet may be affected. This alleviates concerns about cherry-picking loans to securitize (Wang and Xia 2014). To clarify, in this study, we do not automatically assume that the deals we observe are securitized simply because the lead arranger is a securitizing lender. In this way, our study is different from most previous studies that endeavored to identify securitized loans. Our study is simply based on the fact that a loan is more likely to be securitized when a deal contains Term B facilities, given that other types of facilities are rarely securitized.

Table 1 reports summary statistics for the syndicated loan deals in the analysis for the preshock period, that is, 2001. Panel A reports the means and standard deviations for the characteristics of deals originated by all lenders participating in a syndicated deal in 2001 (column (1)), the subsample of WorldCom-affected lenders (column (2)), and the subsample of lenders not affected by WorldCom (column (3)). Column (4) reports the differences between the two subsamples in terms of means. Banks that lent to WorldCom before the collapse tended to grant larger deals with longer maturity. However, in other aspects, they were not necessarily differentiated from unaffected lenders. Panel B reports the characteristics of deals originated by the subsample of securitizing lenders (column (2)) and nonsecuritizing lenders (column (3)). Column (4) reports the differences between the two subsamples in terms of means. Among all lenders, securitizing lenders tend to grant larger deals and deals with relatively smaller-sized Term A, reduced covenant strictness, longer maturity, and lower spreads. Since securitizing lenders' deals tend to be larger, in the regression analysis, we limit the sample to more comparable loans by removing small size deals (bottom quartile). Panel C reports the characteristics of the deals provided by

13. We exclude the deals that are constructed solely with revolving facilities (credit lines) from our analysis because the structure, purpose, and maturity of these deals are not necessarily comparable to those of deals with amortizing term loans such as Term A and Term B. In the event that a deal is structured with a mix of revolving facilities and other term loans facilities, it remains in our sample.

TABLE 1

SUMMARY STATISTICS I: DEAL AND FACILITY CHARACTERISTICS BEFORE THE SHOCK

	Panel A: All lenders: WorldCom lenders vs. Non-WorldCom lenders							
	All		WorldCom lenders		Non-WorldCom lenders		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal size (bn)	854.28	1226.69	921.77	1334.86	809.48	1147.69	−112.30**	(−1.97)
Term A/Deal size	0.34	0.15	0.35	0.15	0.33	0.15	−0.02	(−1.28)
Term B/Deal size	0.30	0.17	0.29	0.17	0.30	0.18	0.01	(0.49)
Term A/Term B	1.87	1.50	1.96	1.55	1.82	1.48	−0.13	(−0.83)
Covenant strictness	2.46	2.20	2.57	2.17	2.38	2.22	−0.19	(−1.16)
Deal maturity	62.12	39.64	56.73	35.34	65.69	41.88	8.96***	(4.88)
Deal total spread	206.43	275.49	199.53	255.65	211.02	287.92	11.49	(0.89)
Observations (Deal)	1,920		766		1,154			

(*Continued*)

TABLE 1
(CONTINUED)

	Panel B: All lenders: Lenders with CLO access vs. without CLO access							
	All		With CLO access		Without CLO access		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal size (bn)	854.28	1226.69	1047.94	1451.62	645.53	879.14	−402.41***	(−7.28)
Term A/Deal size	0.34	0.15	0.34	0.15	0.34	0.16	0.00	(0.16)
Term B/Deal Size	0.30	0.17	0.29	0.18	0.31	0.17	0.01	(1.10)
Term A/Term B	1.87	1.50	2.08	1.75	1.58	1.02	−0.50***	(−3.33)
Covenant strictness	2.46	2.20	2.77	2.22	2.15	2.13	−0.61***	(−3.76)
Deal maturity	62.12	39.64	58.13	34.12	66.41	44.45	8.29***	(4.60)
Deal total spread	206.43	275.49	234.05	284.99	176.66	261.78	−57.39***	(−4.58)
Observations	1,920		996		924			

(*Continued*)

TABLE 1
(CONTINUED)

	Panel C: WorldCom lenders: With CLO access vs. without CLO access							
	WorldCom lenders		WorldCom with CLO access		WorldCom without CLO access		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Deal size (bn)	921.77	1334.86	1013.34	1433.51	542.62	691.02	−470.72***	(−3.90)
Term A/Deal size	0.35	0.15	0.34	0.16	0.37	0.09	0.02	(0.86)
Term B/Deal size	0.29	0.17	0.30	0.18	0.26	0.10	−0.03	(−1.09)
Term A/Term B	1.96	1.55	2.05	1.72	1.62	0.65	−0.43	(−1.33)
Covenant strictness	2.57	2.17	2.61	2.18	2.37	2.10	−0.24	(−0.68)
Deal maturity	56.73	35.34	55.30	31.63	62.66	47.43	7.36**	(2.29)
Deal total spread	199.53	255.65	209.01	263.37	160.25	217.27	−48.76**	(−2.09)
Observations (Deal)	766		617		149			

NOTE: This table reports summary statistics for syndicated loan deal characteristics in the year of 2001 (before the treatment). The classification of the loans deals into WorldCom-affected or non-WorldCom-affected and/or into with or without CLO Access is done according to the deals' lead arranger's classification. Panel A presents the differences in syndicated loan characteristics between lenders with CLO access and without CLO access among the WorldCom-affected lenders. Panel B presents differences between WorldCom-affected lenders and unaffected lenders. Panel C presents differences between lenders with CLO access and lenders without. In Panels B and C, the sample is all lenders including WorldCom-affected and unaffected lenders. Column (1) is for all sample used in each panel, while columns (2) and (3) are for split samples following the separation rule defined in each panel. 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 U.S. dollars. Maturity is the number of months between the deal start and end dates. Number of participants is the number of lenders involved in the deal. Deal spread is the sum of spreads in the facilities that belong to the deal expressed in basis points. Covenant strictness is the level of covenant imposed on the deal measured by the Bradley–Roberts index. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 2

SUMMARY STATISTICS II: LENDER CHARACTERISTICS IN 2001(PRETREATMENT)

	Panel A: WorldCom and Non-WorldCom lenders							
	All lenders		WorldCom lenders		Non-WorldCom lender		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Lender total assets	379.51	250.54	409.55	255.90	367.86	250.13	−41.69	(−0.61)
Lender equity over TA	0.05	0.02	0.06	0.03	0.05	0.02	−0.01	(−1.06)
Lender ROA (%)	0.78	0.59	1.01	0.85	0.69	0.44	−0.32**	(−2.06)
Lender deposit over TA	0.57	0.16	0.55	0.19	0.58	0.14	0.03	(0.75)
Lender liquidity over TA	0.60	0.17	0.57	0.19	0.61	0.16	0.04	(0.92)
Observations	68		19		49			
	Panel B: Lenders with CLO access and without CLO access							
	All lenders		With CLO access		Without CLO access		Diff.	
	(1)		(2)		(3)		(4)	
	Mean	SD	Mean	SD	Mean	SD		
Lender total assets	379.51	250.54	537.47	195.09	308.93	241.66	−228.53***	(−3.81)
Lender equity over TA	0.05	0.02	0.04	0.02	0.06	0.02	0.01**	(2.01)
Lender ROA (%)	0.78	0.59	0.56	0.31	0.88	0.66	0.32**	(2.09)
Lender deposit over TA	0.57	0.16	0.53	0.19	0.59	0.14	0.06	(1.44)
Lender liquidity over TA	0.60	0.17	0.56	0.20	0.62	0.15	0.06	(1.38)
Observations	68		21		47			

NOTE: This table reports lender (bank) characteristics in the year 2001 (before the treatment). Panel A reports comparison between WorldCom-affected lenders and the others. Panel B compares lenders with CLO access and lenders without. Column (1) is for all samples, while columns (2) and (3) are for separate samples according to the split rule in each panel. Column (4) reports *t*-statistics between the two groups of sample. Lender Total Assets is in billions of US dollars. Lender Equity is total shareholder's equity. Lender ROA is net income over total assets. Lender Deposit is total deposit from customers. Lender Liquidity is total cash holdings held by banks. Lender Equity, Deposit, and Liquidity are scaled by total assets. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

the WorldCom-affected lenders (column (1)), the subsample of lenders that were not actively involved in securitization (column (2)), and the subsample of lenders that were actively involved in securitization. Column (4) reports the differences between the two subsamples in terms of means. Among affected lenders, securitizing banks grant larger deals and charge higher spreads on Term A. Otherwise, there were no significant differences in loan characteristics before the shock.

Table 2 reports summary statistics for the characteristics of lenders in the syndicated loan market for which the balance sheet data are available before the shock. Panel A compares WorldCom-affected lenders to unaffected lenders, which generally present similar characteristics in terms of size, capitalization, performance, and

balance sheet construction. Panel B compares securitizing lenders to nonsecuritizing lenders. In our sample, the securitizing lenders are larger in size and have higher capital and deposits. Due to these inherent differences between securitizing and nonsecuritizing banks shown in Tables 1 and 2, we include the non-WorldCom-affected securitizing banks in our analysis to control for the characteristics of securitizing banks.

4. PRELIMINARY ANALYSIS

4.1 Testing the Shock

Before we proceed with the main analysis, we first test whether the WorldCom collapse had an impact on the loan arranging activities of WorldCom-affected lenders. This test is necessary to confirm that the syndicated lending activity of WorldCom-affected lenders has, to some extent, been impaired because of the shock. Second, we test whether the WorldCom collapse had an impact on the CLO issuance of securitizing WorldCom-affected banks. The purpose of this test is to garner evidence to support the underlying assumption that securitizing lenders make use of their access to the CLO market to mitigate the impact of the shock and deleverage the pressure on their capital.

To test the average impact of the shock on all WorldCom-affected banks' lending activities, we run the following DID regressions:

$$Y_{Lender,t} = \alpha + \lambda_t + FE_{Lender} + \beta Post \cdot WorldCom_{Lender} + \epsilon_{Lender,t}, \quad (1)$$

where $Y_{Lender,t}$ is the number of deals or facilities in which a lender participates as a lead arranger, and the explanatory variable is an interaction term between *Post* and *WorldCom*. *Post* is 1 for observations after the shock and 0 otherwise, and *WorldCom* is 1 for WorldCom-affected banks and 0 for others. β captures the effect of the shock on the affected banks' ability to arrange loans in the corporate lending market; it is expected to be negative.

To further test whether lenders with access to the CLO market would be differentiated from those without access, we run the following triple DID model:

$$\begin{aligned} Y_{Lender,t} \quad = \quad & \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t + \beta Post \cdot CLO\ Access_{Lender} \\ & + \gamma Post \cdot LenderControl_{Pre} + \epsilon_{Lender,Borrower,t}, \end{aligned} \quad (2)$$

where the interaction term is further interacted with *CLO Access*, which is 1 if the lender has direct access to the CLO market as an underwriter or collateral manager, and 0 otherwise. The coefficient β for the triple interaction term captures whether loan arranging activities for the shocked banks with CLO access are different from the loan arranging activities of shocked banks without access.

Table 3 shows a clear and significant shock on the affected lenders in terms of the number of deals or facilities they can get involved in as lead arrangers. After the shock, as shown in column (1), WorldCom-affected banks reduce the number of

TABLE 3

THE IMPACT OF WORLDCOM DEMISE ON LOAN ORIGINATION

	(1)	(2)	(3)	(4)
	Ln(Number of Deals)		Ln(Number of Facilities)	
	DD	DDD	DD	DDD
Post × WorldCom	**−0.379*****	−0.243***	**−0.419****	−0.211*
	(0.124)	−(0.074)	**(0.170)**	(0.124)
CLO Access × Post × WorldCom		**−0.338**		**−0.367**
		(0.287)		**(0.364)**
CLO Access × Post		0.071		−0.133
		(0.144)		(0.141)
Observations	2,834	2,834	2,722	2,722
Adjusted R^2	0.762	0.762	0.689	0.690
Time & Lender FE	Y	Y	Y	Y

NOTE: This table reports the impact of WorldCom's collapse on the syndicated loan origination by the affected lenders. The dependent variables are log-transformed number of deals or facilities that a lender participated as a lead arranger. The explanatory variable is the interaction between WorldCom that is equal to 1 for WorldCom's lending banks (and 0 otherwise), Post that is equal to 1 if the observation is in the postcollapse period, and CLO Access that is equal to 1 if a lender has a direct access to the CLO market. Columns (1) and (3) report differences-in-differences (DD) results for WorldCom-affected lenders relative to other lenders in the postshock period relative to the preshock period. Columns (2) and (4) report triple difference-in-difference (triple DID) results for WorldCom-affected lenders with CLO market access in the postshock period. Time and lender fixed effects are included in all specifications. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

deal arrangement by as much as 37.9% relative to unaffected banks. However, in the triple interaction model in column (2), we do find that the effect of the negative shock is not necessarily different on those banks with access to CLO market compared to those without, because the triple interaction term does not appear to be statistically significant. This test shows the primary results indicating that WorldCom's demise functioned as a negative shock on all of its lending banks.

Next, we attempt to support our hypothesis that lenders' lending origination is affected by their access to the CLO market by demonstrating that lenders become more active in securitization after the shock. We thus explore the effect of the shock on the total amount of CLO liabilities (bonds) issued by lenders' CLO vehicles. The sample comprises all the securitizing lenders that were active on the CLO market, and we compare the WorldCom-affected securitizing lenders to the rest of the securitizing lenders.

The specification for this test is as follows:

$$Ln(Issuance\ of\ CLO)_{Lender,t} = \alpha + FE_{Lender} + \lambda_t + \beta Post \cdot WorldCom_{Lender} + \epsilon_{Lender,t}, \quad (3)$$

where $Ln(Issuance\ of\ CLO)_{Lender,t}$ is the log-transformed total amount of CLO securities issued by lenders' CLO vehicles (*Lender*) in the quarter t. The coefficient β captures the change after the shock in the CLO liabilities issued by WorldCom-affected lenders relative to the postshock change in CLO liabilities issued by unaffected lenders.

TABLE 4

THE IMPACT OF WORLDCOM DEMISE ON CLO MARKET

	Ln(CLO Issuance)		
	(1)	(2)	(3)
Post × 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

NOTE: This table reports the regression results of equation (2). The sample consists of lenders with CLO access only, therefore, WorldCom affected banks with CLO access and unaffected banks with CLO access. The explanatory variable is the interaction between WorldCom that is equal to 1 for WorldCom's lending banks, and 0 otherwise, and Post that is equal to 1 if the observation is in the postcollapse period. The dependent variable is log of the amount of CLO liabilities issued by the lenders. Time and lender fixed effects are included. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

The results are presented in Table 4. The coefficient is consistently positive and significant in all specifications, indicating that the shocked securitizing banks increased their CLO issuance compared to the nonshocked securitizing banks. We find the strongest effect in the most restricted model in column (3), where we include time-fixed effects as well as lender-fixed effects. Overall, this preliminary evidence substantiates our hypotheses regarding the negative effect of WorldCom's collapse on the syndicate lending market and securitizing lenders' use of the CLO market in reaction to the shock.

4.2 Parallel Trends

The most critical assumption for a causal inference in our analysis is that, before the shock, there was no notable difference between securitizing and nonsecuritizing lenders in terms of loan origination trends. Accordingly, we present parallel trends for the number of deals and facilities provided by different types of lenders.

First, in Figure 3, we provide a monthly graph that plots the number of deals originated by two subsamples of WorldCom-affected lenders: securitizing and nonsecuritizing. The number of deals in the graph is normalized to 100 in January 2001. The WorldCom-affected months are shaded in gray. We observe that the numbers of deals originated by the two groups of lenders were relatively parallel before the shock. In addition, the solid line denoting the securitizing banks reflects an increase in the total number of deals originated by securitizing banks relative to the total number of deals originated by nonsecuritizing lenders during the treatment period.

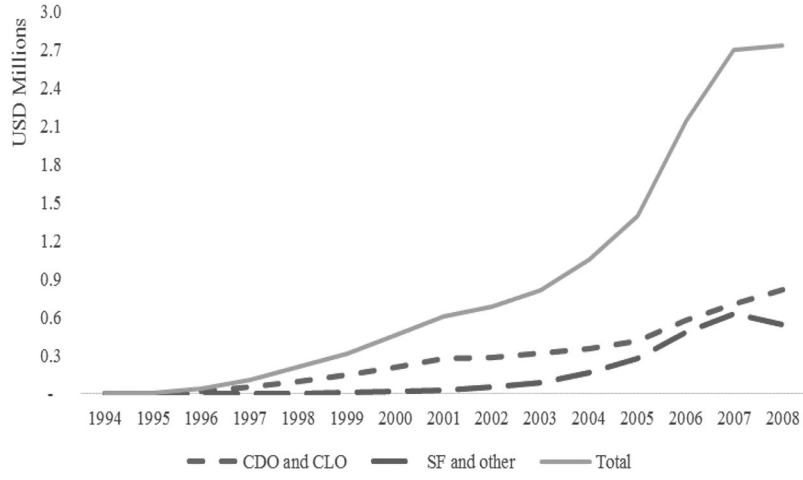

Fig 1. Source: SIFMA.

NOTES: 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.

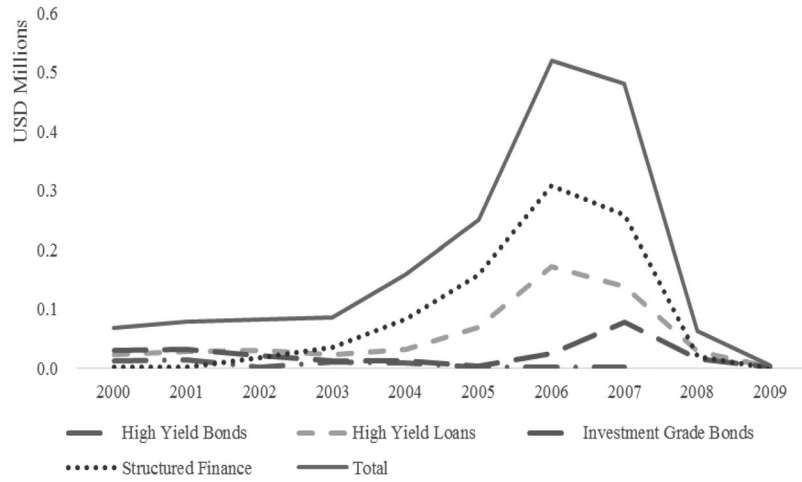

Fig 2. Source: SIFMA.

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

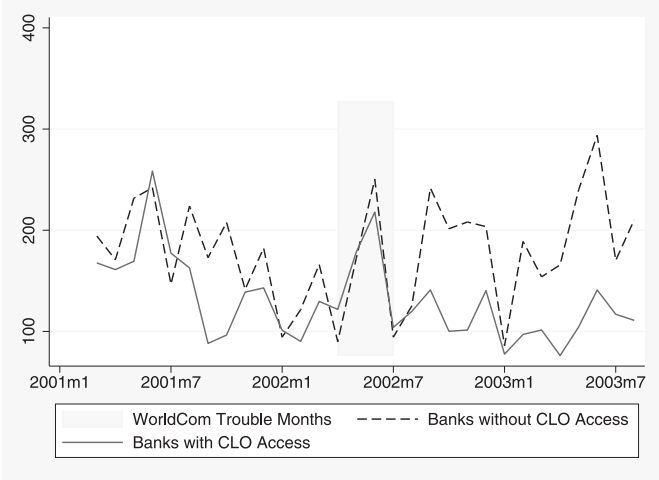

Fig 3. The Graph Plot Presents the Monthly Trends in the Number of Syndicated Loan Deals Originated by Securitizing Banks Relative to Nonsecuritizing Banks among the Worldcom-Affected Banks.

NOTES: The *Y*-axis denotes the monthly average number of syndicated loan deals (normalized at 2000m1=100), and the *x*-axis represents months. The solid line stands for securitizing banks, while the dashed line stands for nonsecuritizing banks.

Next, we explore trends in the origination of different types of facilities between lenders with and without CLO market access, using the following dynamic DID regressions:

$$\begin{aligned} NDeal_{Lender,t} \quad = \quad & \alpha + \sum_{\tau=2001Q2}^{2002Q1} \gamma_\tau CLO\ Access_{Lender} \mathbf{1}(t=\tau) \\ & + \sum_{\tau=2002Q3}^{2003Q2} \gamma_\tau CLO\ Access_{Lender} \mathbf{1}(t=\tau) + FE_{Lender} \\ & + \lambda_t + \epsilon_{Lender,t}, \end{aligned} \tag{4}$$

where *NDeal* represents the number of deals originated by the *Lender* in quarter t, *CLO Access* is a dummy variable that identifies securitizing lenders, and τ is a dummy variable that stands for each quarter. γ_τ is a quarterly coefficient that captures the relationship between *NDeal* and *CLO Access* relative to 2002 Q2.

Figure 4 plots the coefficients from the dynamic DID in equation (3), which is run to ascertain the number of each of the following types of deals: all deals, deals with Term B, and deals without Term B. We find no noticeable preshock differences between securitizing and nonsecuritizing lenders in terms of loan origination evolution (2002 Q2, denoted as 0 on the *x*-axes); this supports the parallel trend assumption. Although we find no postshock differences between securitizing and nonsecuritizing lenders in terms of trends for all deals on average, nor for deals without Term B, we find that the origination of deals with Term B increased noticeably among the

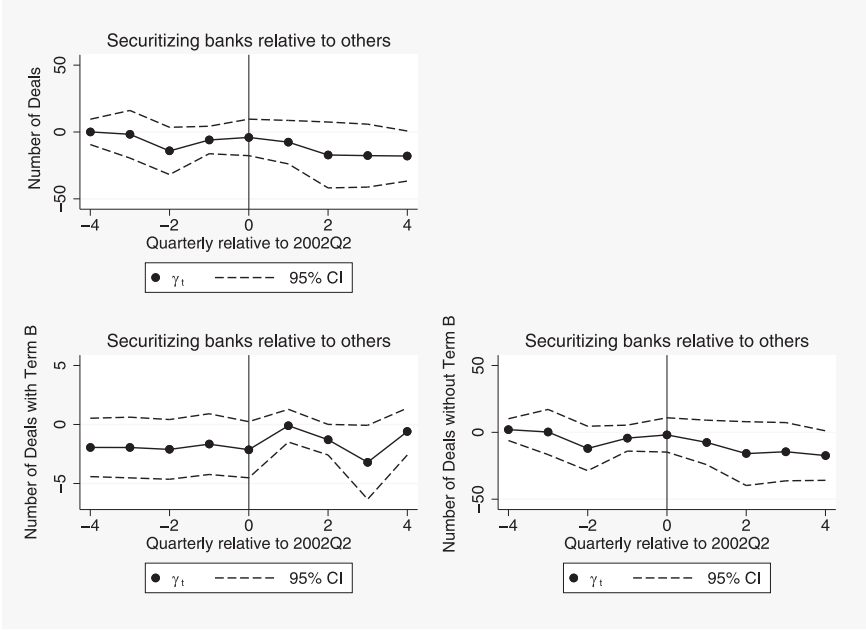

Fig 4. The Graph Plots the Quarterly Deal Origination Trends by Worldcom-Affected Securitizing Lenders Relative to Worldcom-Affected Nonsecuritizing Lenders and Relative to Time 0.

NOTES: The *Y*-axis denotes the quarterly average number of deals originated and the *X*-axis represents quarters with 0 being 2002Q2.

securitizing lenders relative to the nonsecuritizing lenders immediately after the shock. We elaborate our analysis of this observation in the next section.

5. MAIN ANALYSIS

5.1 Main Findings

In this section, we analyze whether, among WorldCom-affected banks, those with access to CLO market would focus on arranging syndicated loan deals which contain securitizable facilities using triple DID setup. When hit by a negative shock on equity capital, inclusion of securitizable facilities in a deal implies that certain portion of the deal will be offloaded from banks' balance sheet soon after origination and allow banks to deleverage. On the other hand, those loans without Term B will remain entirely on banks' balance sheet. Given that the "offloadability" of Term B is an attractive characteristic for those banks that are under more binding capital constraint following a negative shock, a bank may arrange deals with securitizable portions more frequently after a negative shock, and this effect should be amplified if the banks are

already acting as underwriters or collateral managers in the securitization market, given the control they have over the loans' destinations.

The natural concern that arises when comparing the two types of banks—that is, those with and without CLO market access—is that there may be fundamental differences between them and that our findings would be attributable to those differences rather than to lenders' different intentions after the shock. For example, as shown in the summary statistics in Panel A of Tables 1 and 2, securitizing lenders are, on average, larger and more prone to engage in the arrangement of larger-sized loans; thus, this natural concern is legitimate. To address it, we include the sample of banks that are not affected by the collapse of WorldCom; these too can be divided into lenders with and without CLO market access. This enables us to set up a triple DID regression. The first difference is between the pre- and postshock periods; the second difference is between securitizing lenders and nonsecuritizing lenders; and the third difference is between securitizing lenders that are shocked and securitizing lenders that are not shocked. The third difference allows us to address the part of the coefficient that results from fundamental differences between securitizing lenders and nonsecuritizing lenders.

Our baseline triple DID specification is as follows:

$$\begin{aligned} LA^{Deal}_{Lender,Borrower,t} \quad = \quad & \alpha + FE_{Lender} + FE_{Borrower} + \lambda_t \\ & + \beta CLO\ Access_{Lender} \cdot Post \cdot WorldCom_{Lender} \\ & + \gamma CLO\ Access_{Lender} \cdot Post \\ & + \eta Post \cdot WorldCom_{Lender} + \epsilon_{Lender,Borrower,t}, \end{aligned} \tag{5}$$

where the dependent variable ($LA_{Lender,Borrower,t}$) is a binary variable that indicates whether the bank (*Lender*) is a lead arranger of the deal (*Deal*), which is originated in the quarter t. FE_{Lender}, $FE_{Borrower}$, and λ_t represent lender (bank), borrower's industry classification, and time-(quarter) fixed effects, respectively. The binary variable *CLOAccess* is equal to 1 if a bank has an access to the CLO market and 0 otherwise. A *Post* value of 1 indicates the time period after WorldCom's collapse. *WorldCom* is equal to 1 if the bank has access to the CLO market. We initially run the regression using a sample of all deals and, subsequently, using deals without Term B and deals with Term B. The level of observation is deal-participation bank pairs. The coefficient of interest is the triple interaction term among *CLOAccess*, *Post*, and *WorldCom*, which captures whether shocked securitizing banks are more likely to be lead arrangers of syndicated loan deals on average and whether the effect is concentrated on the type of deals that contain securitizable facilities, that is, Term B.

Table 5 reports the results. Depending on the model, we include either lender, borrower's industry, and time-fixed effects or lender-fixed effects and borrower-industry and time-fixed effects. Although we uncover no significant differences in the likelihood of being a lead arranger when we analyze the pooled sample of all deals, we find positive and significant coefficients for deals with Term B when we separate them from deals without Term B, as illustrated in columns (5) and (6). Specifically, compared to lenders without access to the CLO market, lenders with direct access

TABLE 5

PROBABILITY OF BEING LEAD ARRANGER IN SYNDICATED LOAN DEALS: TRIPLE DIFFERENCE-IN-DIFFERENCE

	Prob(Lead arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post X WC	0.038	0.041	0.009	0.006	0.114**	0.111**
	(0.031)	(0.030)	(0.032)	(0.032)	(0.051)	(0.053)
CLO Access × Post	−0.013	−0.012	−0.034*	−0.036*	0.000	−0.002
	(0.017)	(0.017)	(0.019)	(0.020)	(0.020)	(0.020)
Post × WC	0.020	0.017	0.029	0.032*	0.003	0.004
	(0.014)	(0.014)	(0.018)	(0.018)	(0.034)	(0.035)
Observations	39,326	39,326	24,025	24,025	14,817	14,817
Adjusted R^2	0.172	0.175	0.141	0.135	0.275	0.272
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table reports the regression results from the triple difference-in-difference model in equation (4). The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. The triple interaction term measures whether a WorldCom-affected lender with CLO access is more likely to be a lead arranger in a syndicated loan deal after the shock, not only relative to those that do not have access to CLO but also relative to those that have access to CLO but were not affected by WorldCom. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

to the CLO market are approximately 11% more likely to serve as lead arrangers of deals that contain Term B after the shock. The results indicate that, compared to similarly shocked nonsecuritizing banks, securitizing banks increase their lending only when the deal contains securitizable facilities.

We apply the following variations to the model to confirm the result from the main specification. First, to account for the growing demand for CLOs over the period, we control for the change in the global issuance of CLOs and confirm that the magnitude and significance of the results remain unchanged from the main regression, as shown in Table 6. Also, we test whether the intensity of banks' participation in the CLO market is relevant by using an alternative proxy for securitization participation, namely, *CLO Issuance*, the log-transformed dollar amount of CLO securities issuance.[14] To avoid endogeneity issues arising from possible concurrent changes in the amount of postshock CLO issues, we fix the amount to the total amount of CLOs issued in the time period before the shock. As reported in Table 7, the triple interaction term presents significant and positive coefficients for columns (5) and (6). This means that lenders with higher amounts of preshock CLO security issuance exhibit a tendency to become more active in the origination of deals with Term B after the shock. This complements our main finding by confirming that the intensity of securitization

14. To avoid taking the logarithm of 0, 1 is added in the case of nonsecuritizing lenders, which eventually return the value of 0 after log-transformation.

TABLE 6

PROBABILITY OF BEING LEAD ARRANGER CONTROLLING FOR THE GLOBAL CLO DEMAND

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	0.028	0.041	−0.004	0.009	0.111**	0.114**
	(0.030)	(0.030)	(0.033)	(0.032)	(0.053)	(0.051)
CLO Access × Post	−0.004	−0.012	−0.028	−0.034*	−0.002	0.000
	(0.017)	(0.017)	(0.020)	(0.019)	(0.020)	(0.020)
Post × WC	0.030**	0.017	0.042**	0.028	0.004	0.003
	(0.014)	(0.014)	(0.018)	(0.018)	(0.035)	(0.034)
Δ Global CLO	0.256	0.191	0.017	−0.132	0.294	0.463
	(0.316)	(0.828)	(0.452)	(1.023)	(1.146)	(1.218)
Observations	39,276	39,276	23,975	23,975	14,817	14,817
Adjusted R^2	0.171	0.175	0.133	0.141	0.272	0.275
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table reports the regression results from the triple difference-in-difference model in equation (4). The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. The triple interaction term measures whether a WorldCom-affected lender with CLO access is more likely to be a lead arranger in a syndicated loan deal after the shock, not only relative to those that do not have access to CLO but also relative to those that have access to CLO but were not affected by WorldCom. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 7

PROBABILITY OF BEING LEAD ARRANGER IN SYNDICATED LOAN DEALS—SUBSAMPLE OF SECURITIZING BANKS

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Issuance × Post × WC	0.001	0.001	0.001	0.001	0.004**	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CLO Issuance × Post	0.002*	0.002	−0.001	−0.002	0.002*	0.003**
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Observations	8,220	8,217	4,847	4,843	3,360	3,357
Adjusted R^2	0.156	0.157	0.107	0.112	0.268	0.273
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table reports the regression results from the triple difference-in-difference model in equation (4). The explanatory variable is the triple interaction term among CLO issuance amount, Post, and WorldCom-affected lender. CLO issuance amount is the amount of CLO securitization that a bank was involved in the quarter. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. The triple interaction term measures whether a WorldCom-affected lender with higher amount of CLO securitization activity is more likely to be a lead arranger in a syndicated loan deal after the shock, not only relative to those that had lower CLO amount but also relative to those that were not affected by WorldCom with similar level of CLO activity. The sample in this table is limited to those banks that have positive value of CLO issuance amount to measure the effect of the level of securitization activity on loan origination. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. $^* p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 8

PROBABILITY OF BEING LEAD ARRANGER IN SYNDICATED LOAN DEALS: CONTROLLING FOR PRESHOCK LENDER CHARACTERISTICS

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	0.084**	0.083**	0.024	0.036	0.158*	0.163**
	(0.042)	(0.041)	(0.050)	(0.055)	(0.084)	(0.078)
CLO Access × Post	−0.057	−0.047	−0.071	−0.072	0.001	0.013
	(0.044)	(0.041)	(0.049)	(0.051)	(0.080)	(0.069)
Post × WC	0.001	−0.005	0.016	0.005	−0.032	−0.029
	(0.028)	(0.030)	(0.037)	(0.038)	(0.071)	(0.065)
Ln(Lender Size) × Post	0.039**	0.038**	0.030	0.027	0.030	0.027
	(0.015)	(0.015)	(0.021)	(0.023)	(0.025)	(0.021)
Lender Equity Ratio × Post	1.352**	1.316*	1.139	1.053	0.279	0.903
	(0.633)	(0.679)	(0.984)	(1.071)	(1.005)	(0.970)
Lender ROA × Post	2.672	2.139	1.341	0.661	9.614	7.972
	(3.609)	(3.681)	(4.756)	(5.123)	(6.246)	(5.782)
Lender Liquidity × Post	0.100**	0.112**	0.099	0.098	0.049	0.060
	(0.049)	(0.046)	(0.066)	(0.083)	(0.095)	(0.089)
Observations	5,803	5,796	3,826	3,819	1,966	1,956
Adjusted R^2	0.094	0.100	0.051	0.056	0.232	0.261
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table repeats the regression results from Table 5 controlling for bank characteristics in the preshock period. The dependent variable—Prob(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. CLO Access is a binary variable that is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock 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. All lender control variables are preshock period average values. Columns (1), (3), and (5) include lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) include lender and industry-time fixed effects. Standard errors are clustered at the facility level and lender level and are in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

activity, as well as the lender's access to the securitization market, are indeed relevant. These two tests mitigate the concern that the results may be driven by demand rather than supply shock.

To more carefully account for potential preshock differences among lenders, we modify the main specification to include control variables on lender characteristics from the preshock period. The characteristics controlled for are: bank size, which is proxied by a log of total assets; capital, which is the banks' equity; return on assets, which is a proxy for the banks' profitability; deposit, which is the banks' total deposits from customers; and liquidity, which is the banks' cash-equivalent holdings. These characteristics may be affected by the shock; thus, to avoid endogeneity resulting from concurrent changes in these variables, we fix the levels at the preshock period levels instead of allowing them to vary with time. By including continuous variables that represent banks' financial status in the preshock period, we further exclude the possibility that the resulting significance in the coefficients in our main specification may stem from differences in bank characteristics rather than differences in lenders' access to the securitization market. Table 8 confirms the results. Although the lenders

with CLO access appear to increase their lead arranger activities for all types of deals, we find that the significant increase is mainly for the deals with Term B.

5.2 Relative Facility Size

The finding that lenders with CLO access develop greater interest in deals with Term B after a negative shock leads us to the next test on the size of different types of facilities within the deals arranged by securitizing lenders. If securitizing banks' purpose in arranging the deals with Term B is to deleverage through offloading loans from their balance sheet, they may also have interest in getting involved in those deals with smaller-size Term A facilities that are likely to remain on the bank balance sheet until maturity. On the other hand, they would be less concerned that the Term B size is larger in the loan they arrange because it does not require a long-term lending commitment that puts pressure on capital. Typically, lead arranger banks are expected to make the largest contribution to the lending amount among all participating banks in syndicated loan deals (Sufi 2007). It stands to reason that this would provide banks with incentive to choose deals with certain facility size characteristics, when possible.

We test this hypothesis using our baseline triple DID setup as the following:

$$\begin{aligned} RelativeFacSize^{Deal}_{Lender,Borrower,t} &= \alpha + FE_{Lender} + FE_{Borrower} \\ &\quad + \lambda_t + \beta CLO\ Access_{Lender} \\ &\quad \cdot Post \cdot WorldCom_{Lender} \\ &\quad + \gamma CLO\ Access_{Lender} \cdot Post \\ &\quad + \eta Post \cdot WorldCom_{Lender} \\ &\quad + \epsilon_{Lender,Borrower,t}, \end{aligned} \tag{6}$$

where *RelativeFacSize* represents the relative sizes of Term A and Term B in a deal. We use Term A's size relative to the total deal size, Term B's size relative to the total deal size, and Term A's size relative to Term B's size in the same deal. This analysis is performed limiting the deal–lender pair observations to lead arrangers only, because we seek to identify whether lenders with CLO access actively pursue deals with particular characteristics of facility size if they will be the lead arrangers of the deal. We also limit the sample to those deals that contain both Term A and Term B facilities, because their size relative to each other within a deal can be measured only when both types are present. Term sizes are scaled up by 10 times for readability of the coefficients.

As predicted, the shocked lenders with CLO market access tend to choose to arrange deals with smaller-size Term As after the shock compared to the preshock period as well as to banks without CLO market access (Table 9, columns (1) and (2)). At the same time, they experience an increase in the size of Term Bs in the deals they arrange (Table 9, columns (3) and (4)), although this trend is only weakly significant. When we adopt the relative size between Term A and Term B in Table 9, columns (5) and (6), the coefficient for the triple interaction term is again negative and significant. This evidence from the facilities' relative sizes provides robust support for the

TABLE 9

Relative Size of Term A and Term B

	Term A/Deal size		Term B/Deal size		Term A/Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	−1.074**	−1.368**	0.870	1.377*	−1.879*	−1.553*
	(0.445)	(0.597)	(0.676)	(0.650)	(0.899)	(0.812)
CLO Access × Post	0.390	0.502	−0.261	−0.183	0.953	0.706
	(0.464)	(0.535)	(0.313)	(0.382)	(0.567)	(0.663)
Post × WC	0.300	0.410	−0.567	−0.874*	1.169	1.100*
	(0.439)	(0.438)	(0.428)	(0.436)	(0.675)	(0.585)
Observations	1,783	1,781	1,783	1,781	1,783	1,781
Adjusted R^2	0.354	0.525	0.422	0.557	0.158	0.234
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

Note: This table presents the changes in the relative size of Term A and Term B in the loans that are originated by the WorldCom-affected lenders with CLO access. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable is the size of Term A scaled by total size of the deal in columns (1) and (2), the size of Term B scaled by total size of the deal in columns (3) and (4), and the size of Term A relative to the size of Term B in columns (5) and (6). Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

notion that lenders with access to CLO market develop strong incentives to engage in securitization when they feel the need to deleverage due to a negative shock.

5.3 Deal Conditions

A potential alternative explanation for our main results is that they are driven by shocked lenders' increased interest in originating deals with Term B due to the higher fees (and thus, greater profitability) entailed, rather than for its contribution to their deleveraging strategy. In this section, we explore the characteristics of syndicated loan deal contracts arranged by WorldCom-affected securitizing banks. The aspects we focus on are covenant strictness, maturity, and spread.

The results for loan conditions provide counterevidence against the alternative explanation that our main results are driven solely by shocked lenders' increased interest in originating loan tranches that carry higher profits, rather than by any securitization-related benefit. If this were the case, we would expect to observe more lenient conditions in these loans; covenants would be weakened, loan maturity would be longer, and loan spread would be higher. Because our results fail to substantiate this alternative argument, we conclude that the higher profits linked with Term Bs are not the main motive for shocked securitizing lenders to arrange them.

As suggested by Murfin (2012),[15] recent borrower defaults inform the lenders of their own screening ability, thereby influencing their contracting behavior in future

15. We use a different measure of covenant strictness based on Bradley and Roberts (2015) because our analysis occurs at the loan-deal level, whereas Murfin (2012)'s analysis focuses on the borrower level.

deals and inducing the lenders to impose tighter contracts. In line with this theory, we should expect that lenders facing shocks will originate deals with stricter covenants than their peers in the syndication lending market. At the same time, securitization is often associated with lower incentives to monitor the loans (Wang and Xia 2014); therefore, we should expect shocked securitizing lenders to draft more lenient contracts compared to shocked nonsecuritizing lenders.

In Table 10, Panel A, we assess whether the strictness of covenants changes after the shock depending on lenders' access to the securitization market. We adopt the baseline triple DID model and replace the dependent variable with covenant strictness. Because our main analysis revealed securitized lenders' increased involvement in the origination of deals containing Term B, we seek to determine whether the covenants in these deals are affected differently.

We find a weakly significant increase in covenant strictness among the deals that are arranged by WorldCom-affected lenders after the shock ($beta = 0.584$*), thus supporting the findings in Murfin (2012). However, the deals arranged by shocked lenders with CLO access evinced a significant decline in covenant strictness. Even when considering the total effect on covenant strictness among securitizing banks after the shock, this trend remains negative (total effect $= -0.974 + 0.584 = -0.39$) supporting the hypothesis of Wang and Xia (2014) and Keys et al. (2010), that is, that securitizing banks reduce monitoring when they arrange loan deals with the intention of securitizing. When we split the sample into deals with and without Term B, although the decrease of covenant strictness is amplified among securitizing banks ($beta = -1.172$), the coefficient is not statistically significant. Overall, we find some evidence of covenant change that is consistent with previous findings; however, the effect was not necessarily concentrated among the deals involved in securitization.

We then proceed to analyze whether the deals arranged by shocked securitizing banks are associated with different loan characteristics. In a triple DID specification similar to that used in our main analysis, we test whether shocked securitizing lenders arrange deals with different levels of maturity and spreads compared to nonsecuritizing lenders after the shock. When lenders experience capital constraints and turn to securitization, they may become involved in loans with longer maturity and higher spreads. Longer maturity implies higher fees, given that fees are often proportional to loan maturity (Gottesman and Roberts 2004), and high spreads imply rapid expansion of the borrower pool through inviting a wider range of borrowers into lending (potentially subprime borrowers). In Table 10, Panels B and C report the results of our tests for deal characteristics and illustrate that securitizing lenders' deals do not entail significantly different loan characteristics in terms of maturity and spread.

The results for loan conditions provide counterevidence against the alternative explanation that our main results are driven solely by shocked lenders' increased interest in originating loan tranches carrying higher profits, rather than by any securitization-related benefit. If this were the case, we would expect the loans to entail more lenient

TABLE 10

DEAL CONDITIONS: COVENANT, MATURITY, AND SPREAD

	Panel A: Covenant strictness		
	(1) All deals	(2) Without Term B	(3) With Term B
CLO Access × Post × WC	−0.974**	−0.101	−1.172
	(0.457)	(0.456)	(0.764)
CLO Access × Post	0.258	−0.441	0.203
	(0.311)	(0.312)	(0.443)
Post × WC	0.584*	0.317	0.342
	(0.313)	(0.353)	(0.690)
Observations	1,458	604	771
Adjusted R^2	0.519	0.538	0.243
Lender FE & borrower industry-Time FE	Y	Y	Y
	Panel B: Maturity		
	(1) All deals	(2) Without Term B	(3) With Term B
CLO Access × Post × WC	−0.026	−0.079	0.087
	(0.095)	(0.129)	(0.125)
CLO Access × Post	0.031	0.037	−0.071
	(0.051)	(0.081)	(0.061)
Post × WC	−0.004	0.044	−0.119
	(0.076)	(0.084)	(0.115)
Observations	4,774	3,296	1,378
Adjusted R^2	0.222	0.257	0.217
Lender FE & borrower industry-Time FE	Y	Y	Y
	Panel C: Spread		
	(1) All deals	(2) Without Term B	(3) With Term B
CLO Access × Post × WC	0.052	0.245	−0.202
	(0.158)	(0.193)	(0.280)
CLO Access × Post	0.262**	0.028	0.084
	(0.114)	(0.161)	(0.145)
Post × WC	−0.020	−0.221	0.261
	(0.129)	(0.151)	(0.261)
Observations	3,664	2,227	1,366
Adjusted R^2	0.364	0.328	0.195
Lender FE & borrower industry-Time FE	Y	Y	Y

NOTE: This table reports the regression results from the triple difference-in-difference model that test whether the WorldCom-affected banks with CLO access change the deal conditions after the shock. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable is covenant strictness measured following Bradley-Roberts (2015) in Panel A, deal maturity measured in months and log-converted in Panel B, or deal spread measured by weighted average of facility spreads in the same deal expressed in percentages in Panel C. Column (1) presents the results for all deals, column (2) for deals without Term B facilities, and column (3) for deals with Term B facilities. Lender fixed effects and (borrower industry × time) fixed effects are included. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

conditions; covenants would be weakened, loan maturity would be longer, and loan spread would be higher. Because our results fail to substantiate this alternative argument, we conclude that higher profits in Term Bs are not the main motive for shocked securitizing lenders to arrange them.

6. ROBUSTNESS TEST

In this section, we run the baseline specification in equation (4) with various modifications for robustness checks. The main purpose is to address various concerns that may arise within the interpretation of our main finding. We further probe the identification method adopted, and we also provide evidence to rule out other potential alternative explanations.

6.1 CLO Underwriter–Collateral Manager Relationship

In this section, we modify the methods we employed to identify securitizing lenders and their implications for our main finding. In the main analysis, we identified a lender as a securitizing lender if it acted as an underwriter or collateral manager in a CLO deal at some point before the shock. In theory, the collateral manager of a CLO deal—who has control over portfolio construction and the monitoring of portfolio performance—is supposed to be independent from the underwriter of the CLO deal. This means that underwriters do not influence collateral managers' decisions regarding which loans will be purchased by the CLO vehicle they are managing—that is, securitizing lenders that are underwriters, but not collateral managers, cannot exert full control over the securitization process. In practice, however, collateral managers and underwriters may interact in various ways. One possibility is that large investment banks acting as underwriters establish or purchase smaller financial institutions, which they appoint as collateral managers for their own securitization vehicles. In this type of relationship, underwriters are more likely to possess negotiation power over CLO deal-related decisions, including collateral composition, due to their preexisting relationship and strong influence with the collateral manager. Even if underwriters and collateral managers are not strongly bound by such a relationship (via ownership), there is evidence that underwriters of CLO deals do indeed exert influence over portfolio constructions because they are, in general, larger and more influential than the collateral managers with whom they share interwoven interests (Chernenko 2017).

Nonetheless, a relevant concern for our case is the possibility that our results may be driven entirely by such cases where underwriters and collateral managers are connected, and that the results do not hold for more common cases where the collateral managers are independent. To determine whether lenders that are underwriters without connections to collateral managers also originate more Term B after the shock, we run a regression that excludes cases in which the CLO underwriter has close ties to the collateral manager of the same CLO deal via a parent company. For example, we would exclude cases in which the underwriter is Goldman Sachs International and the collateral manager is Goldman Sachs Asset Management.

By presenting the results in Table 11, we confirm that our main result is not wholly reliant on cases in which underwriters exert a more direct influence over collateral managers. We find positive and significant coefficients for our variable of interest in columns (5) and (6). This, in turn, indicates that even in cases where the collateral manager is ostensibly more independent, the underwriter nevertheless exerts some

TABLE 11

PROBABILITY OF BEING LEAD ARRANGER: SUBSAMPLE OF CLO UNDERWRITERS THAT ARE NOT COLLATERAL MANAGERS

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	0.059*	0.062**	0.005	0.009	0.139**	0.140**
	(0.030)	(0.029)	(0.026)	(0.025)	(0.061)	(0.060)
CLO Access × Post	−0.021	−0.020	−0.020	−0.020	−0.016	−0.016
	(0.020)	(0.019)	(0.019)	(0.017)	(0.024)	(0.024)
Post × WC	0.020	0.017	0.032*	0.028	0.004	0.004
	(0.014)	(0.014)	(0.018)	(0.018)	(0.035)	(0.035)
Observations	36,932	36,932	22,545	22,545	13,907	13,907
Adjusted R^2	0.162	0.165	0.129	0.135	0.245	0.246
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table repeats the regression analysis in Table 5 by excluding those deals in which the same bank undertakes CLO underwriter role and collateral manager role. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

degree of control over the CLO loan purchase, and furthermore, that the underwriter changes its loan origination behavior in response to increased interest in arranging deals with Term B facilities.

6.2 Reputational Effect

In this section, we construct a test that addresses the concern that the WorldCom lenders' negative reputations may influence their lending behavior and are thus the principal driver of our main findings. It is important to show that, even if reputation damage can be discussed as an alternative explanation for changing lending behavior as pointed out by Lin and Paravisini (2012), it is not the sole cause of our result it.

To conduct this test, we exclude from our main analysis those lenders whose reputations suffered the most serious damage from WorldCom's collapse, namely, those who were acting as lead arrangers for WorldCom's outstanding deals at the time of its collapse. Lead arrangers' reputations suffer the most at the time of borrower collapse, given that principal screening and monitoring duties lie with them. Based on all U.S. bankruptcies between 1990 and 2005, Gopalan, Nanda, and Yerramilli (2011) demonstrate that large-scale bankruptcies engender reputation damage mostly for the lead arrangers. As a result, the lead arrangers are less likely to arrange loans, must retain larger fractions, and are less likely to attract participant lenders. Excluding the lead arrangers of the WorldCom deals should mitigate the concern that our results are driven by a reputation shock. When excluding the lead arrangers, we also observe

TABLE 12

PROBABILITY OF BEING LEAD ARRANGER: SUBSAMPLE EXCLUDING DEALS BY WORLDCOM'S LEAD ARRANGERS

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	0.034	0.037	0.013	0.019	0.098**	0.100**
	(0.030)	(0.030)	(0.033)	(0.033)	(0.047)	(0.049)
CLO Access × Post	−0.017	−0.016	−0.037*	−0.035*	−0.006	−0.005
	(0.019)	(0.018)	(0.020)	(0.019)	(0.024)	(0.025)
Post × WC	0.011	0.008	0.028	0.023	−0.018	−0.018
	(0.016)	(0.016)	(0.021)	(0.022)	(0.028)	(0.028)
Observations	33,023	33,023	21,657	21,656	10,875	10,875
Adjusted R^2	0.167	0.170	0.138	0.144	0.268	0.272
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table repeats the regression analysis in Table 5 by excluding those deals whose lead arranger is identified as the lead arranger of the WorldCom syndication deals that were outstanding at the time of the WorldCom demise. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

that they are securitizing lenders. Their exclusion addresses the concern that they may behave differently in both the syndicated lending market and the CLO market after the shock.

The results in Table 12 are in line with our main evidence, indicating an increase in securitizing lenders arranging deals with Term B after a shock. The coefficients in columns (5) and (6) are positive and significant, although the magnitude is slightly lower. This lends additional support to the assumption that our results are not driven purely by a reputational shock.

Although reputational damage is not the main driver of our results, we recognize that reputational issues may affect different types of banks differently. Because securitizing lenders are larger and typically well-established banks, they may be more concerned about their reputation and their capitalization against peers, and thus more prone to deleveraging when shocked. Securitizing lenders typically adopt more market-based funding models and may be more affected by changes in the bank's perceived risk profile after the shock (higher funding costs). However, consistent with our mechanism, we should expect these lenders with more reputational challenges to have greater incentive to deleverage, making them likely to offload more risk at the margin when shocked.

An additional piece of counterevidence to the effect of reputational damage is that the securitizing lenders could significantly increase their issuance of CLO securities after the shock, as shown in Table 4. If a bank's reputation is damaged, the harm will likely extend to all areas of business the bank is involved with, including CLO market

activities. Therefore, the fact that these banks were able to continue strengthening their positions in the CLO market indicates that they were not seriously impacted by reputational damage.

6.3 Adjacent Events: Enron's Collapse and the 9/11 Terror Attacks

In December 2001, shortly before the WorldCom event, Enron filed for bankruptcy under Chapter 11 of the U.S. Bankruptcy Code; at the time, it was the largest corporate bankruptcy filing in the U.S. history. In this section, we address the collapse of Enron due to its adjacent timeline (Enron preceded WorldCom in bankruptcy by just 6 months) and similarities in the events (fraudulent accounting and abrupt bankruptcy).

Enron's effect on securitizing banks' CLO activities can either reinforce CLO activities for the same reason in our WorldCom hypothesis or it can do the opposite, for the following reasons. Unlike the WorldCom case, in which the accounting book was simply fraudulently recorded, Enron's collapse rose out of accounting fraud based on special-purpose entities, highlighting the negative role of corporations' off-balance-sheet activities (Loutskina 2011). As a result, Enron-induced regulatory discussions were meant to introduce more stringent rules about (off-)balance-sheet management, eventually causing the securitization market to stall, given that CLO syndication is based mainly on the syndicators' off-balance-sheet activities. The banks may have felt pressure from such policy debates, even if the actual policy were never implemented, and thus temporarily reduced their CLO activities. At the same time, it may have taken time for the effect of the new policy discussion to materialize.

To address the potential confounding effect of Enron's collapse on our preshock period, we run an additional analysis by including Enron's lenders and their loan origination activities in the regression. Half of the WorldCom lenders were also Enron lenders. Because it is impossible to separate the Enron analysis from the WorldCom analysis, due to wide overlap in the time periods, we combine the two events as follows: (i) collate all lenders of Enron and WorldCom, (ii) identify securitizing lenders and nonsecuritizing lenders and their loans, (iii) drop the observations between the Enron and WorldCom collapses (December 2001–June 2002) to avoid any confounding effects in the interim term, and (iv) set the pre-Enron period as the preevent period and the post-WorldCom period as the postevent period. The results we find from this analysis are consistent with our analysis of WorldCom alone (Table 13) with similar magnitude and significance level for the coefficient. Thus, even if Enron could influence our analysis, this would be in line with the WorldCom results.

Another significant event included in our sample period is the 9/11 terror attacks in the United States in 2001. Although it is no straightforward matter to predict the direct effect of 9/11 on the securitizing lenders' securitization or lending activities—given that this was a global shock of unprecedented proportions that could have shifted the daily practices in every aspect of society, even if only temporarily—we run a robustness test that excludes this period from the preshock period. As in Table 14, we

TABLE 13

PROBABILITY OF BEING LEAD ARRANGER IN SYNDICATED LOAN DEALS: ENRON AND WORLDCOM

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
Sec × Post × Enron	0.023	0.023	−0.031	−0.028	0.120**	0.114**
	(0.033)	(0.033)	(0.037)	(0.038)	(0.049)	(0.049)
Sec × Post	0.012	0.015	0.009	0.004	0.018	0.020
	(0.024)	(0.024)	(0.031)	(0.031)	(0.029)	(0.029)
Post × Enron	−0.023	−0.022	−0.002	−0.004	−0.056**	−0.054**
	(0.016)	(0.016)	(0.019)	(0.019)	(0.025)	(0.025)
Observations	33,736	33,736	20,870	20,870	12,395	12,395
Adjusted R^2	0.173	0.177	0.146	0.139	0.273	0.268
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table reports the regression results from the triple difference-in-difference model that measures whether lenders with CLO access are more likely to be a lead arranger in a syndicated loan deal after a shock. The treated (shocked) banks are those that were lending to Enron and WorldCom at the time of their demises. The loans originated in the period between the collapse of the two firms are excluded from the sample. The explanatory variable is the triple interaction term among CLO access, Post, and Enron & WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. Enron-WorldCom is equal to 1 if the lender is affected by Enron or WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 14

PROBABILITY OF BEING LEAD ARRANGER: EXCLUDING POST-9/11 PERIOD FROM THE PRESHOCK PERIOD

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × WC	0.043	0.046	0.020	0.021	0.107**	0.108**
	(0.030)	(0.029)	(0.031)	(0.030)	(0.053)	(0.052)
CLO Access × Post	−0.017	−0.016	−0.051**	−0.049**	0.011	0.014
	(0.018)	(0.018)	(0.021)	(0.020)	(0.023)	(0.023)
Post × WC	0.017	0.015	0.022	0.020	0.012	0.012
	(0.015)	(0.014)	(0.018)	(0.018)	(0.033)	(0.033)
Observations	36,035	36,035	21,555	21,555	14,011	14,011
Adjusted R^2	0.173	0.176	0.133	0.139	0.276	0.277
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table repeats the regression analysis in Table 5 excluding post-9/11 from the preshock period, therefore excluding deals originated between September 11, 2001 and March 31, 2002. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

TABLE 15

CARILLION: PROBABILITY(LEAD ARRANGER) IN SYNDICATED LOAN DEALS

	Prob(Lead Arranger)					
	All deals		Deals without Term B		Deals with Term B	
	(1)	(2)	(3)	(4)	(5)	(6)
CLO Access × Post × Carillion	0.024*	0.027**	0.023	0.026	0.023*	0.024*
	(0.013)	(0.012)	(0.021)	(0.020)	(0.014)	(0.015)
CLO Access × Post	−0.007	−0.009	−0.003	−0.005	−0.011	−0.010
	(0.009)	(0.009)	(0.012)	(0.012)	(0.009)	(0.009)
Post × Carillion	−0.025***	−0.027***	−0.021***	−0.023***	−0.028***	−0.029***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.010)	(0.011)
Observations	168,024	168,024	131,088	131,088	36,638	36,637
Adjusted R^2	0.370	0.372	0.337	0.339	0.342	0.354
Lender, borrower industry, & time FE	Y	N	Y	N	Y	N
Lender FE & borrower industry-Time FE	N	Y	N	Y	N	Y

NOTE: This table repeats the regression in Table 5 by replacing the shock from WorldCom's collapse to Carillion's bankruptcy. The explanatory variable is the triple interaction term among CLO access, Post, and WorldCom-affected lender. CLO Access is equal to 1 if the lender was CLO underwriter or manager before the shock. Post is equal to 1 if the observation is in the postshock period. WorldCom is equal to 1 if the lender is affected by WorldCom, and 0 otherwise. The dependent variable—Prob(Lead Arranger)—is a binary variable that is equal to 1 if the lender is a lead arranger in the loan deal, and 0 otherwise. Columns (1) and (2) present the results for all deals, columns (3) and (4) for deals without Term B facilities, and columns (5) and (6) for deals with Term B facilities. Columns (1), (3), and (5) are using lender, borrower industry, and time fixed effects. Columns (2), (4), and (6) are using lender fixed effects and (borrower industry × time) fixed effects. *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

find consistent results of unchanged magnitude and significance, even after excluding those samples that could have been affected by 9/11.

6.4 Recent Shock: Carillion's Bankruptcy

In this section, we implement the main analysis using a more recent bankruptcy case. WorldCom was one of largest and most unexpected bankruptcies in history, thus providing a clean setup to test banks' response. Furthermore, the documentation by Lin and Paravisini (2012) of WorldCom's strong negative impact on banks encouraged further probing into the incident. However, some may raise concerns about the validity of the results within the context of more recent years' CLO market activities.

To address this concern, we repeat our analysis using Carillion's 2018 bankruptcy in the United Kingdom. By selecting a recent default event, we ensure that the default is unexpected and the defaulting company is large enough to influence its lenders in the syndication lending market. In addition, the defaulting company's lenders must include an adequate number of securitizing banks. Based on these criteria, we select the collapse of the United Kingdom's largest construction firm, Carillion. Although the firm had reported warnings about its profitability since July 2017, its bankruptcy filing came as a surprise to most because of the company's strong ties with the UK government, which ultimately refused to bail it out.

According to the DealScan data, during the 2 years leading up to its bankruptcy, Carillion had eight syndicated loan deals outstanding. Eighteen banks were involved

in these deals, supposedly being negatively affected by Carillion's bankruptcy; seven of them were securitizing banks. The rest of the analysis follows the steps of the triple DID analysis in our WorldCom case.

The results from the Carillion case are presented in Table 15. The results from Carillion's lenders also suggest that securitizing banks are more likely to be lead arrangers in deals with Term B after the collapse of Carillion. We find a significant positive increase in all deals' arrangements by securitizing lenders. However, the significant increase is concentrated only in those banks' involvement in deals with Term B when we separate these samples from the deals without Term B. This is consistent with our findings in the WorldCom case and indicates that, even after a long period of evolution in the CLO market, CLO remains a means for banks to adapt to a negative shock, thus aiding in their deleveraging strategies.

7. CONCLUSION

Our study aims to examine whether lenders' direct access to the CLO market enables them to respond to a negative shock to their balance sheet capacity in a way that differs from the responses of other shocked lenders who do not have direct access to the securitization market. We document that, compared to nonsecuritizing lenders, securitizing lenders more frequently arrange deals with easy-to-sell Term B facilities after experiencing a negative shock. This supports our hypothesis that these banks switch their loan origination model from on-balance-sheet lending to off-balance-sheet lending when they experience more binding capital constraints due to a negative shock.

We identify lenders that experienced a shock due to WorldCom's collapse. In the CLO market, we find that the shocked securitizing lenders increased their CLO issuance after the shock, compared to other securitizing lenders that were unaffected by WorldCom's demise. In the syndicated lending market, we find that shocked securitizing lenders became more actively engaged than shocked nonsecuritizing banks in arranging deals that contain facilities more likely to be securitized, namely, Term B. For those deals that do not contain securitizable facilities, we do not find significant differences between the two types of lenders. Our findings are generated by a triple DID setup in which we compare shocked securitizing banks not only to shocked nonsecuritizing banks but also to nonshocked securitizing banks. Furthermore, these results are robust to various tests, such as controlling for the increasing demand for CLOs, adopting a different securitization proxy, and controlling for lenders' preshock characteristics. In addition, we find that the securitizing lenders also adjust their choice of deals according to the size of the facilities within the deal. In line with their goal to arrange more deals with offloadable facilities, the securitizing lenders choose deals with smaller-sized on-balance-sheet facilities (Term A) and larger-sized off-balance-sheet facilities (Term B).

Beyond the main findings, we find no significant differences between the deals arranged by securitizing lenders and the deals arranged by nonsecuritizing lenders in terms of covenant strictness, maturity, or spread. These findings indicate that, although securitizing lenders shift their lending strategy toward off-balance-sheet lending to cope with shocks, their reactions are limited to changes in the types of deals they arrange.

Through various robustness checks, we rule out the alternative hypothesis that our results are valid only for lenders with strong ties to the CLO collateral managers (and thus to their portfolio) and/or the possibility that lenders' specific type of deal arrangement is related to the reputational damage associated with the shock created by WorldCom's collapse, rather than direct access to the CLO market. We also exclude the possibility that the findings contain confounding effects from the 9/11 terror attacks or Enron's collapse–two events that occurred during our sample period. Finally, we demonstrate that our results hold in the recent CLO market by showing that similar results are found for a comparable recent shock in the syndicated loan market, namely, the collapse of the United Kingdom's largest construction firm, Carillion.

Overall, our paper demonstrates that lenders actively leverage their role as collateral manager or underwriter in the CLO market when they are negatively shocked. The overall impact on loan supply is consistent with our hypothesis that banks adapt their lending strategy (on-balance-sheet versus off-balance-sheet) depending on their capital requirement or deleveraging needs.

The interplay between securitizing lenders and corporate borrowers in the CLO market is a topic of increasing relevance for policymakers, because both lenders and corporate borrowers are becoming increasingly dependent on this market. Our results contribute to revealing an important channel through which lenders can minimize the effects of an idiosyncratic shock by increasing their reliance on the securitization market. Our main contribution is in providing evidence for banks' use of simple securitization structures in a time of a well-functioning securitization market, rather than addressing complex deals in distressed market conditions.

LITERATURE CITED

Acharya, Viral, Philipp Schnabl, and Gustavo Suarez. (2013) "Securitization without Risk Transfer." *Journal of Financial Economics*, 107, 515–36.

Allen, Franklin, and Elena Carletti. (2008) "Credit Risk Transfer and Contagion." *Journal of Monetary Economics*, 53, 89–111.

Altunbas, Yener, Leonardo Gambacorta, and David Marques-Ibanez. (2009) "Securitization and the Bank Lending Channel." *European Economic Review*, 53, 996–1009.

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.

Benmelech, Efraim, Jennifer Dlugosz, and Victoria Ivashina. (2012) "Securitization without Adverse Selection: The Case of CLOs." *Journal of Financial Economics*, 106, 91–113.

Bernanke, Ben S., Cara S. Lown, and Benjamin M. Friedman. (1991) "The Credit Crunch." *Brookings Papers on Economic Activity*, 205–39.

Blickle, Kristian, Quirin Fleckenstein, Sebastian Hillenbrand, and Anthony Saunders. (2020) "The Myth of the Lead Arranger's Share." Federal Reserve Bank of New York Staff Reports, No. 922.

Bonaccorsi di Patti, Emilia, and Enrico Sette. (2016) "Did the Securitization Market Freeze Affect Bank Lending during the Financial Crisis? Evidence from a Credit Register." *Journal of Financial Intermediation*, 25, 54–76.

Bord, Vitaly, and Joao A. C. Santos. (2012) "The Rise of the Originate to Distribute Model and the Role of Banks in Financial Intermediation." *Economic Policy Review*, 18, 21–34.

Bord, Vitaly, and Joao A. C. Santos. (2015) "Does Securitization of Corporate Loans Lead to Riskier Lending?" *Journal of Money, Credit and Banking*, 47, 415–44.

Bozanic, Zahn, Maria Loumioti, and Florin P. Vasvari. (2018) "Corporate Loan Securitization and the Standardization of Financial Covenants." *Journal of Accounting Research*, 56, 45–83.

Bradley, Michael, and Michael R. Roberts. (2015) "The Structure and Pricing of Corporate Debt Covenants." *Quarterly Journal of Finance*, 5, 1550001.

Bruche, Max, Frederic Malherbe, and Ralf R. Meisenzahl. (2020) "Pipeline Risk in Leveraged Loan Syndication." *Review of Financial Studies*, 33, 5660–705.

Buchak, Greg, Gregor Matvos, Tomasz Piskorski, and Amit Seru. (2018) "Fintech, Regulatory Arbitrage, and the Rise of Shadow Banks." *Journal of Financial Economics*, 130, 453–83.

Buchak, Greg, Gregor Matvos, Toma Piskorski, and Amit Seru. (2020) "Beyond the Balance Sheet Model of Banking: Implications for Bank Regulation and Monetary Policy." National Bureau of Economic Research Working Paper No. 25149.

Carbo-Valverde, Santiago, Hans Degryse, and Francis Rodriguez-Fernandez. (2015) "The Impact of Securitization on Credit Rationing: Empirical Evidence." *Journal of Financial Stability*, 20, 36–50.

Chernenko, Sergeys. (2017) "The Front Men of Wall Street: The Role of CDO Collateral Managers in the CDO Boom and Bust." *Journal of Finance*, 72, 1893–936.

Chu, Yongqiang, Donghang Zhang, and Yijia Zhao. (2019) "Bank Capital and Lending: Evidence from Syndicated Loans." *Journal of Financial and Quantitative Analysis*, 54, 667–94.

Covitz, Daniel, Nellie Liang, and Gustavo Suarez. (2013) "The Evolution of a Financial Crisis Collapse of the Asset-Backed Commercial Paper Market." *Journal of Finance*, 68, 815–48.

Demyanyk, Y, and Otto Van Hemert. (2011) "Understanding the Subprime Mortgage Crisis." *Review of Financial Studies*, 24, 1848–80.

Duffie, Darrell (2008) "Innovations in Credit Risk Transfer: Implications for Financial Stability." BIS Working Papers 255, Bank for International Settlements.

Efing, Matthias. (2015) "Arbitraging the Basel Securitization Framework: Evidence from German ABS Investment." Discussion Papers 40, Deutsche Bundesbank, Research Centre.

Fabozzi, Frank J., Henry A. Davis, and Moorad Choudhry. (2007) "Credit-Linked Notes: A Product Primer." *Journal of Structured Finance*, 12, 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." https://www.gpo.gov/fdsys/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf.

Financial Stability Board. (2019) "Vulnerabilities Associated with Leveraged Loans and Collateralised Loan Obligations." December. https://www.fsb.org/wp-content/uploads/P191219.pdf.

Gambacorta, Leonardo, and David Marques-Ibanez. (2011) "The Bank Lending Channel: Lessons from the Crisis." *Economic Policy*, 26, 135–82.

Goderis, Benedikt, Ian W. Marsh, Judit Vall Castello, and Wolf Wagner. (2007) "Bank Behaviour with Access to Credit Risk Transfer Markets." Research Discussion Papers 4/2007, Bank of Finland.

Goetz, Martin, Luc Laeven, and Ross Levine. (2021) "Do Bank Insiders Impede Equity Issuances?" ECB Working Paper, No. 2511.

Gopalan, Radhakrishnan, Vikram Nanda, and Vijay Yerramilli. (2011) "Does Poor Performance Damage the Reputation of Financial Intermediaries? Evidence from the Loan Syndication Market." *Journal of Finance*, 66, 2083–120.

Gorton, Gary, and Andrew Metrick. (2012a) "Securitization." In *Handbook of the Economics of Finance*, Vol. 2, pp. 1–70. Oxford: North-Holland, Elsevier.

Gorton, Gary, and Andrew Metrick. (2012b) "Securitized Banking and the Run on Repo." *Journal of Financial Economics*, 104, 425–51.

Gottesman, Aron A., and G. S. Roberts. (2004) "Maturity and Corporate Loan Pricing." *Financial Review*, 39, 55–77.

Irani, Rustom M., Rajkamal Iyer, Ralf R. Meisenzahl, and Jose-Luis Peydro. (2020) "The Rise of Shadow Banking: Evidence from Capital Regulation." *Review of Financial Studies*, 34, 2181–235.

Jiangli, Wenying, Matt Pritsker, and Peter Raupach. (2007) "Banking and Securitization." EFA 2007 Ljubljana Meetings Paper.

Keys, Benjamin J., Tanmoy Mukherjee, Amit Seru, and Vikrant Vig. (2010) "Did Securitization Lead to Lax Screening? Evidence from Subprime Loans." *Quarterly Journal of Economics*, 125, 307–62.

Lin, Huidan, and Daniel Paravisini. (2012) "The Effect of Financing Constraints on Risk." *Review of Finance*, 17, 229–59.

Loumioti, Maria, and Florin P. Vasvari. (2019) "Portfolio Performance Manipulation in Collateralized Loan Obligations." *Journal of Accounting and Economics*, 67, 438–62.

Loumioti, Maria, and Florin P. Vasvari. (2019) "Consequences of CLO Portfolio Constraints." Working Paper.

Loutskina, Elena. (2011) "The Role of Securitization in Bank Liquidity and Funding Management." *Journal of Financial Economics*, 100, 663–84.

Loutskina, Elena, and Philip E. Strahan. (2009) "Securitization and the Declining Impact of Bank Finance on Loan Supply: Evidence from Mortgage Originations." *Journal of Finance*, 64, 861–89.

Marques-Ibanez, David, and Martin Scheicher. (2009) "Securitization: Instruments and Implications." In *The Oxford Handbook of Banking*, 1st ed., edited by A. Berger, P. Molyneux, and J. Wilson. Oxford; New York, NY, Oxford University Press.

Murfin, Justin. (2012) "The Supply-Side Determinants of Loan Contract Strictness." *Journal of Finance*, 67, 1565–601.

Mian, Atif, and Amir Sufi. (2009) "The Consequences of Mortgage Credit Expansion: Evidence from the U.S. Mortgage Default Crisis." *Quarterly Journal of Economics*, 124, 1449–96.

Nadauld, Taylor D., and Michael S. Weisbach. (2012) "Did Securitization Affect the Cost of Corporate Debt?" *Journal of Financial Economics*, 105, 332–52.

Peek, Joe, and Eric Rosengren. (1995) "The Capital Crunch: Neither a Borrower nor a Lender Be." *Journal of Money, Credit and Banking*, 27, 625–38.

Peristiani, Stavos, and Joao A. C. Santos. (2019) "CLO Trading and Collateral Manager Bank Affiliation." *Journal of Financial Intermediation*, 39, 47–58.

Rajan, Uday, Amit Seru, and Vikrant Vig. (2015) "The Failure of Models that Predict Failure: Distance, Incentives, and Defaults." *Journal of Financial Economics*, 115, 237–60.

Sarkisyan, Anna, and Barbara Casu. (2013) "Retained Interest in Securitizations and Implications for Bank Solvency." Working Paper Series 1538, European Central Bank.

Shin, Hyung Song. (2009) "Securitization and Financial Stability." *Economic Journal*, 119, 309–32.

Sufi, Am. (2007) "Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans." *Journal of Finance*, 62, 629–68.

Wang, Yihui, and Han Xia. (2014) "Do Lenders Still Monitor When They Can Securitize Loans?" *Review of Financial Studies*, 27, 2354–91.

Watson, Rick, and Jeremy Carter. (2006) "Asset Securitization and Synthetic Structures: Innovations in the European Credit Markets." London: Euromoney Books.