Did the rise of CLOs lead to riskier lending?

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Abstract

There is growing evidence that securitization adversely affected the screening incentives of mortgage lenders, contributing to a large increase in delinquencies in the U.S. subprime housing market during the crisis. In this paper we investigate whether the growth of securitization had also affected corporate lending. We find that during the boom years of the CLO business, loans sold to CLOs at the time of their origination underperform similar unsecuritized loans originated by the same bank. Banks account for this difference in performance because they charge higher interest rates on the loans they sell to CLOs than on their unsecuritized loans. The difference in performance between CLO credits and non-CLO credits appear to have resulted from banks' use of laxer standards to underwrite the loans they sell to CLOs. Banks also retain lower "skin in the game" when they sell loans to CLOs, and it appears this too contributed for the underperformance of CLO credits.

1 Introduction

The securitization of corporate loans had experienced spectacular growth in the years that preceded the financial crisis. Prior to 2003, the annual volume of new collateralized loan obligations (CLOs) issued in the U.S. rarely surpassed $20 billion. Since then, this activity grew rapidly, surpassing $180 billion in 2007. The growth of the CLO business is important because it could affect the business of corporate lending. There is growing evidence that securitization adversely affected the screening incentives of mortgage lenders, contributing to a large increase in delinquencies in the U.S. subprime housing market during the crisis.[1] Notwithstanding this evidence and the similarities between mortgage securitization and corporate loan securitization, researchers only recently started to investigate the effects of securitization of corporate loans. We attempt to contribute to this literature by investigating whether corporate loans that are sold to CLOs perform differently from non-securitized loans, and whether banks' loan pricing policies reflect the difference in the performance of these loans. We also attempt to explain the difference in performance between these loans.

Several theoretical studies, including Ramakrishnan and Thakor (1984), Diamond (1984), and Holmstom and Tirole (1993), argue that banks are valuable when there are information asymmetries because they have a comparative advantage in monitoring borrowers. Monitoring includes screening borrowers ex ante in order to identify good credits, as well as preventing borrowers from undertaking opportunistic behavior during the realization of the project, or punishing them when they fail to meet contractual obligations. To accomplish both of these roles properly, it is critical for banks to hold the loans they originate until their maturity.

Indeed, historically banks kept on their books the loans they originated. However, over time banks have increasingly moved away from the originate-to-hold model by syndicating their loans and by selling them in the secondary loan market. In loan syndications, the lead bank usually retains a portion of the loan and places the remaining balance with a number of participant banks that share losses on a pro-rata basis. This is done in conjunction with, and as part of, the loan origination process. In contrast, the secondary loan market is a seasoned market in which a bank, including lead banks and syndicate participants, subsequently can sell an existing loan (or part of a loan).[2] The development of CLOs provided banks with yet another mechanism to move away from the traditional originate-to-hold model of corporate

[1] See DellAriccia et al. (2008), Mian and Sufi (2008), Puranandam (2008) and Keys et al. (2008).

[2] Another important difference is that the syndicated loan market is dominated by loans of firms outside financial distress while the market for loan sales has developed into a market for mostly distressed debt. According to Dahiya, Puri, and Saunders (2003) over half of the firms whose loans are sold file for bankruptcy within 3 years of the initial sale of one of their loans.

lending.

The process by which a CLO is created is similar to CDOs created from other passthrough securities, such as collateralized mortgage obligations. In the case of cash-flow CLOs, which are the subject of our paper, a collateral manager - usually an investment management company – begins by acquiring loans, some at the time of syndication and others in the secondary loan market.[3] The CLO manager needs a sufficient notional value in loans to ensure that the CLO is "overcollateralized", meaning that the principal value of the loans pledged to the CLO exceeds the principal value of the CLO.[4] Once the manager has an adequate notional value of loans, it sets up a bankruptcy-remote special-purpose vehicle (SPV) that references the loans in the "reference portfolio". After that, the SPV engages a rating agency to structure and rate the deal, and issues securities to investors backed by the principal and interest payments from the loans. CLOs have a tranched liability structure whereby the proceeds from principal and interest payments on the underlying loans are distributed to CLO investors in order of seniority. Thus, investors are impacted by defaults in the underlying collateral pool only after subordinate classes have been exhausted.

The CLO market became very appealing to banks because it gave them an opportunity to sell loans off their balance sheet, particularly riskier loans which have been traditionally more difficult to syndicate. According to most analysts, the primary factor that has contributed to the growth in the leveraged loan market and their use in LBOs has been the maturation of the CLO market. During the LBO wave in the 1980s, most of the leveraged loans issued to fund buyouts remained on the issuing banks' balance sheets, which limited the total volume of leverage loans that banks could issue. By selling loans to CLOs, banks could lower the risk on their balance sheets and free up capital for other business.[5]

As with other forms of securitization, however, the CLO market may also be a source of problems. As Pennacchi (1988) and Gorton and Pennacchi (1995) have shown with regard to loan sales, if banks anticipate that they will not retain an exposure to the loans they originate, this will reduce their incentives to screen loan applicants ex ante, and to monitor borrowers during the life of the loan. These problems are likely to be acute when loans are sold to CLOs, particularly if this happens at the time of their origination. One reason is that CLOs acquire

[3]Even though banks could create CLOs using the loans they originate, this does not appear to be a common practice, possibly because of concerns with conflicts of interest. According to the Securities Industry and Financial Markets Association (SIFMA), in 2007, 97% of corporate loan CLOs were structured by financial institutions that did not originate loans.

[4]CLO managers are primarily interested in first-lien secured loans, but a small fraction of the referenced portfolio can be made up of other types of loans such as second-lien loans.

[5]See Kashyap and Stein (2000) and Loutskina and Strahan (2009) for a discussion of the benefits of securitization.

predominantly risky loans and loans of private and often unrated corporations. Another reason is that in a typical loan syndication or loan sale, no new securities are created and there is an institutional investor or a small group of investors on the other side of the transaction, making it easier for them to link the performance of the loan with its originator. In contrast, in a CLO, since the loan is put in the "reference portfolio" together with many other loans, usually originated by different banks, and since CLO investors invest in new securities that depend on the performance of the "reference portfolio", this makes it difficult for them to link the performance of CLOs with the actions of one or more of the loan originators. All of these features of CLOs reduce the incentives of loan originators to properly screen loan applicants and to design the terms of the loan contract. It also reduces their incentives to monitor borrowers after the loan origination.

CLO managers are likely aware of these problems. Assuming that their incentives are aligned with those of CLO investors, they will probably demand that the bank puts in place mechanisms to alleviate these problems. These may include requiring the bank to retain a significant exposure to the loan, or more generally to the borrower of the loan.[6] It may also include requiring the bank to impose tighter covenants on loans, though this is likely less appealing to CLO managers because it is costly to monitor these covenants.[7] CLO managers may choose to avert some of these problems by acquiring loans in the secondary market rather than at the time of their origination. Doing so will not affect ex ante screening incentives of banks, though it will not eliminate the potential effect that their ownership of the credit may have on banks' ex post monitoring incentives.

Following these insights, and the evidence on the adverse effects of securitization on the subprime mortgage market, we start by investigating whether credits originated and sold to CLOs at the time of their origination perform worse than similar credits originated by the same lender. We focus on the period between 2004 and 2008, which coincides with the boom years of the CLO business. We investigate the performance of credits up to three years after the year of origination. Our measure of performance is whether the credit defaults or becomes nonaccrual.[8] We complement this investigation with a study of the rates banks charge on their loans in an attempt to determine if banks expected the loans they sell to CLOs to perform

[6]Recent studies, including Sufi (2007), Ivashina (2009), and Focarelli, Pozzolo, and Casolaro (2008), documents using Dealscan data that lead banks in loan syndicates use the retained share in order to align their incentives with those of syndicate participants and commit to future monitoring.

[7]This may explain why during the boom years of the CLO business there was a large increase in the so called "cov-lite" loans, that is loans with very few covenants.

[8]Credits become nonaccrual when they stop making interest payments for 90 days or the bank does not expect the borrower to repay the principal and interest it owes the bank.

differently from the remaining loans they originate.

The first part of our investigation shows that the loans banks sell to CLOs perform worse than comparable loans originated by the *same* bank. This finding is robust. It holds, for instance, when we account for firm- and loan-specific factors that proxy for the risk of the loan, and when we further control for the bank's "skin in the game", and for portion of the credit acquired by CLOs. Further, it holds when we conduct a matching exercise to account for the endogeneity of banks' selection of credits they choose to sell to CLOs. Banks account for the additional risk of CLO credits because they demand higher spreads on the loans they sell to CLOs than on other loans they also underwrite but do not securitize.

In the second part of our paper, we attempt to explain why loans sold to CLOs perform worse than non-CLO credits. The growth in the demand for credits by CLOs appears to have led banks to use more laxed standards to underwrite the credits they to sell to CLOs because the interest rates they charge on these credits are not as in sync with their risk as in the case of the credits they originate but do not sell to CLOs. The standards banks used to underwrite the CLO credits appear to have been a contributing factor to the worse performance of these credits. The reason is that CLO credits of borrowers to whom banks lent to for the first time during the boom years and borrowers whose credits were sold to CLOs first time during the boom years perform worse than CLO credits of borrowers that had been lent to and had their credits sold to CLOs in the pre-boom years.

We also find supporting evidence for the hypothesis that the sale of loans to CLOs weakened banks' ex post monitoring incentives. We show that banks retain a far lower exposure both to the credits they sell to CLOs and to the borrowers of these credits than to the remaining credits they originate and their borrowers. In addition, we do not detect evidence among the syndicate participants of arrangements to fill in the monitoring vacuum that lead banks created. Banks' monitoring incentives as determined by their "skin in the game" appear to play a role in credit performance because when we expand our sample to include a set of credits CLOs acquire only in the secondary market we find that credits that CLOs acquire at origination (thereby influencing the lead bank's "skin in the game") perform worse than "similar" credits acquired by CLOs after origination, and for which the lead bank retains its exposure. This finding is important for yet another reason. It shows that our key result that CLO credits perform worse than non-CLO credits cannot be entirely explained by the endogeneity choice of the credits banks sell to CLOs.

Our paper is related to the recent literature on the effects of securitization on credit quality. A puzzling result that has emerged in this literature is that studies of mortgages, including Puranandam (2008) and Keys et al. (2008), find that securitization led to excessively poor quality mortgages. In contrast, studies of corporate loans, including Benmelech, Dlugosz,

and Ivashina (2009) and Shivdasani and Wang (2010), find no evidence that securitization led to poor quality loans. Wang and Xia (2010) finds mixed effects. Like the latter studies we too focus on corporate loans, but contrary to them and in line with the mortgage studies, we find that securitization led to poor quality loans.

One potential explanation for the difference in the results of these studies lies in the methodologies they adopt. Like the mortgage studies, we use a loan level measure of performance to identify the effect of securitization on credit quality. In contrast all of the existing studies of loan securitizations try to infer the effect of securitization on credit quality by looking at borrower level measures of performance.[9]

Also, we compare credits that are securitized with credits of the *same* bank that are not securitized. By contrast, Shivdasani and Wang (2010) and Wang and Xia (2010) compare their measures of borrower performance across bank lenders depending on the lenders' use of CDO funding. In this regard, Benmelech, Dlugosz, and Ivashina (2009) is similar to us because they also compare securitized and unsecuritized loans, but their paper differs from ours in many other important aspects. Our sample period coincides with the boom years of the CLO business (2004-2008). Their sample appears to go back to 1997, and thus includes pre-boom years of the CLO business where some of the problems of securitization were less likely. Our sample of CLO credits is larger (1176 credits), and encompasses only credits acquired by CLOs at the time of the credit origination. They consider a sample 302 CLO credits, of which only 188 were exclusively acquired by a CLO at the time of the credit origination. This difference may matter because when we expand our sample to include credits that were only acquired by CLOs in the secondary market, we find that these credits tend to perform better than credits acquired by CLOs at origination.

These sample differences result from the fact that they use LPC Dealscan to identify credits acquired by CLOs at the time of origination and complement this data with information on loan amendments filed with SEC to detect loans acquired by CLOs in the secondary loan market. We rely instead on data from the Shared National Credit (SNC) program. This data fits our objectives well because it contains detailed information on each credit at origination and subsequent years, including the share of the credit held by the lead arranger and by the participants. This information gives us the opportunity to identify credits that are sold to CLOs at the time of their origination. By linking the credits over time we are able to follow

[9]Benmelech, Dlugosz, and Ivashina (2009) relies on the borrower's ROA, CDS spread, and credit rating. Shivdasani and Wang (2010) uses the characteristics of target companies in LBOs, including operating cash flow margin, profitability, growth opportunities and risk to infer the effect of securitization. Finally, Wang and Xia (2010) uses the borrower's stock return volatility, idiosyncratic risk, and the performance of mergers funded with securitized loans.

their performance and to identify, among other things, credits that were not placed in CLOs at the time of their origination, but which were acquired by a CLO at a later time.

Our paper is also related to the recent studies on the effects of securitization on the cost of corporate credit. Shivdasani and Wang (2010) and Nadauld and Weisbach (2010) show that banks with larger CDO underwriting businesses charge lower spreads on leveraged loans. We reach a different conclusion, but our finding that banks charge higher spreads on the loans that they sell to CLOs derives from a comparison between spreads on loans that banks sell to CLOs with spreads on loans the same bank does not securitize.

The remainder of our paper is organized as follows. The next section presents our methodology and data, and characterizes our sample. Section 3 investigates whether credits sold to CLOs perform differently from credits that are not sold to CLOs. Section 4 investigates whether banks take into account the expected difference in the performance of CLO and non-CLO credits when they decide on their interest rates. Section 5 attempts to explain the differences in the performance of CLO credits and non-CLO credits that we unveil in section 3. Section 6 concludes the paper.

2 Data, methodology, and sample characterization

2.1 Data

Our main data source for this project is the Shared National Credit (SNC) program run by the Federal Deposit Insurance Corporation, the Federal Reserve Board, the Office of the Comptroller of the Currency, and the Office of Thrift Supervision. At the end of each year, the SNC program gathers confidential information on all credits that exceed $20 million and are held by three or more federally supervised institutions.[10]

For each credit, the SNC program reports the identity of the borrower, the type of the credit (e.g. term loan, credit line), purpose (e.g. working capital, mergers and acquisitions), amount, maturity date, and rating. Ratings are assigned by banks but they may be adjusted by supervisors at the time of the supervisory exam.[11] In addition, the SNC program reports information on whether the credit became nonaccrual and whether the borrower filed for bankruptcy over the last year. Finally, that program reports information on the lead arranger and syndicate participants, including their identity and the share of the credit that they hold.

[10]The confidential data were processed solely within the Federal Reserve for the analysis presented in this paper.

[11]Each year bank supervisors select a sample of the credits reported by banks for review. These credits may retain the bank rating or their rating may be adjusted by supervisors.

We complement the SNC data with information from the Moody's Structured Finance Default Risk Service Database and information from the LPC's Dealscan database. The Moody's database has information on structured finance products including their size, origination date, and their names. We rely on the Moody's database to identify CLOs among the syndicate participants reported in the SNC program that do not have the letters "CLO" in their names. We use the LPC's Dealscan database to complement the loan-level data we gathered from the SNC database with information on the loan's spread over Libor, its seniority status, and information on the loan covenants.

We use these databases to identify credits that are acquired by CLOs at the time of the credit origination, and to track their risk as well as the shares of the credit retained by lead banks and syndicate participants, including CLOs, over time. We rely on this information to compare the performance of credits sold to CLOs (CLO credits) with the performance of credits the same bank originates but does not sell to CLOS (non-CLO credits). We also compare the spreads at origination of CLO credits and non-CLO credits. We describe next the methodology we follow to investigate whether credits sold to CLOs perform differently from the remaining credits. We also present the methodology we use to compare the spreads on these credits.

2.2 Methodology

Our methodology has two parts. Part I investigates whether credits that are sold to CLOs perform differently from credits that are not acquired by CLOs. This part of our methodology also investigates whether these credits carry different loan rates. Part II attempts to explain the credit performance difference we identify in the first part of our methodology.

2.2.1 Do CLO credits perform differently from non-CLO credits?

In order to ascertain whether credits that are sold to CLOs at origination (CLO credits) perform differently from credits which are not acquired by CLOs (non-CLO credits), we consider the following model of credit performance:

$$PERFORMANCE_{c,f,b,t+k} = c + \alpha \cdot CLO_{c,f,b} + \sum_{i=1}^{I} \beta_i X_{i,c,t} + \sum_{j=1}^{J} \gamma_j Y_{j,f,t} + \epsilon_{f,t}, \qquad (1)$$

where $PERFORMANCE_{c,f,b,t+k}$ is a measure of performance of credit c borrowed by firm f from bank b at year t. We consider the performance of each credit during the year following origination as well as in the two subsequent years, $k = 1, 2, 3$. We measure performance by whether the credit defaults or becomes nonaccrual over that period of time. Credits become

nonaccrual if they stop paying interest for 90 days or if the bank does not expect the borrower to repay the loan back.

$CLO_{c,f,b}$ is a dummy variable equal to one if credit c of firm f (or a portion of it) was sold to one or more CLOs at the time of the credit origination, t. This is our key variable of interest as it tells us whether credits that are sold to CLOs perform differently from the remaining credits. We attempt to identify this difference controlling for a set of credit-specific characteristics, X, and a set of borrower-specific characteristics, Y,that may affect the performance of the credit. We measure all of these controls at the time of the credit origination.

We begin by discussing our set of credit-specific controls. Included in this set is the rating of the credit. These ratings are assigned by banks, but as we explained in the data section each year supervisors select a sample of the credits reported by banks for review. These credits may retain the bank's rating or their rating may be adjusted by supervisors. Remaining credits retain the lead bank's rating. Credits are rated into five categories: $PASS$, $SPECIALMENTION$, $SUBSTANDARD$, $DOUBTFUL$, or $LOSS$, with $PASS$ indicating the safest and $LOSS$ the riskiest. These ratings are continuous variables which go from 0 to 100%, with the sum across the five-rating categories equal to 100%. Depending on the structure of the credit, in particular the protection offered by its covenants, different portions of each credit may receive different ratings.

In addition to the credit rating, we control for the size of the credit (measured by $LAMOUNT$, the log of loan amount in thousands of dollars) and for the maturity of the credit (measured by the maturity in years, $MATURITY$). These controls are important because both larger loans and longer maturity loans tend to be granted to safer firms. Since the purpose of a credit constrains information about its risk, we include dummy variables for credits taken out for working capital purposes ($WORK\,CAPITAL$); for mergers and acquisitions ($MERGERS\ ACQ$); for recapitalizations ($RECAPITALIZATION$); for capital expenditures ($CAPITAL\,EXP$); to repay existing debt ($DEBT\,REPAY$); to backup a commercial paper program ($CP\,BACKUP$); and as a stand by letter of credit ($SBY\,LETTER$). For a similar reason, we include dummy variables to account for the type of the credit—whether it is a line of credit ($CREDIT\,LINE$) or a term loan ($TERM\,LOAN$).

Our set of borrower controls, Y, includes dummy variables for the credit rating of the borrower as determined by S&P, and dummy variables for single-digit NAICS industry groups. It is unlikely for credit rating agencies to have information on a borrower that is not available to the bank that has extended a loan to it. However, since rating agencies are in the business of rating firms and thus may have a unique expertise detecting the risks of a firm, their ratings may contain additional information. Likewise, a given industry may face additional risk factors that are not captured by our controls, so the industry-dummy variables allow us to capture

such risk at a very broad level. Since our measure of performance is at the credit level and we control for the risk of the credit as determined by the lender itself, arguably the most important control in our model, we do not limit our analysis to credits of publicly traded borrowers. Doing so would give us the opportunity to consider more firm level information, but at the cost of reducing our sample significantly.

Lastly, we control for firms that have lending relationships with their bank by including the dummy variable $RELATIONSHIP$, which equals to one if the firm borrowed from the same lead arranger in the year prior to the current loan. A relationship is potentially important because it can give the lead bank access to more information on the borrower and through this evaluate its creditworthiness more accurately.

We complement these sets of controls with year dummies to capture any potential effect of the overall economy on the performance of credits. To reduce concerns with endogeneity, we consider only credits that are sold to CLOs in the year of their origination. Further, to reduce concerns with sample selection, we estimate all of our credit performance models with bank-fixed effects. This assures us that any difference we identify on the performance of credits sold to CLOs is bank specific and is not attributable to differences in the loan policies across banks. It is for this reason that we estimate our models with an OLS model, even though our dependent variable is a dummy variable. Throughout, our regression results reflect robust standard errors clustered by bank.

We complement our study of the performance of CLO credits with an investigation on the credit spreads banks charge on these loans in an attempt to see if banks (as well as the other investors in these credits) anticipate the difference in the performance of CLO credits vis-á-vis non-CLO credits. To that end, we estimate the following model of loan spreads on our sample of CLO and non-CLO credits:

$$CSPREAD_{c,f,b,t} = c + \alpha \cdot CLO_{c,f,b} + \sum_{i=1}^{I} \beta_i X_{i,c,t} + \sum_{j=1}^{J} \gamma_j Y_{j,f,t} + \epsilon_{f,t}, \tag{2}$$

where $CSPREAD_{c,f,b,t}$ is the spread over Libor of loan c of firm f from bank b at issue date t. According to Dealscan, our source of loan data, the all-in-drawn spread is a measure of the overall cost of the loan, expressed as a spread over the benchmark London interbank offering rate (Libor), because it takes into account both one-time and recurring fees associated with the loan.

As in the performance model above, $CLO_{c,f,b}$ is a dummy variable equal to one if credit c of firm f (or a portion of it) was sold to CLOs at the time of the credit origination, t. This variable tells us whether credits that are sold to CLOs, and which may perform differently from the remaining credits, carry interest rates which are commensurate with their expected

performance. We attempt to identify this difference in loan spreads controlling for the set of credit-specific characteristics, X, and the set of borrower-specific characteristics, Y, that we used in the performance analysis. We expand the set of credit-specific controls, X, to include information on loan covenants since these may affect the loan spread. We include dummy variables to distinguish loans that are senior ($SENIOR$), secured ($SECURED$), and loans that have dividend restrictions attached ($DIVRESTRICT$).[12] All else equal, any of these features should make the loan safer, decreasing the spread, but it is well known that lenders are more likely to impose these covenants on riskier borrowers (see for example Berger and Udell (1990)), so the relationship may be reversed.

In addition, we control for banks' cost of funding as measured by the 3-month Libor at the time of the loan, $LIBOR$, since they may affect the interest rates banks charge on their loans, and for the cost to access the bond market as measured by the spread between triple-B and triple-A bonds, $BBBSPREAD$, since this an alternative source of funding for some of the firms in our sample. Lastly, as with our performance models, we include in our credit spreads models year dummies, and estimate these models with bank-fixed effects and standard errors clustered by bank.

2.2.2 Why do CLO credits perform differently from non-CLO credits?

In the second part of our methodology, we attempt to explain the main finding of the first part of our methodology showing that CLO credits underperform non-CLO credits. We consider two hypotheses for the worse performance of CLO credits.

Under the first hypothesis, we posit that banks, faced with a strong demand for credits by CLOs, began to use more laxed underwriting standards and began to originate loans to riskier borrowers with the plan of selling them to CLOs. This hypothesis parallels Wagner's (2007) theory that when banks are able to liquify parts of their balance sheet more easily, such as by placing loans in CLOs, they are more willing to originate riskier loans than otherwise.

To ascertain this hypothesis, we first investigate whether the interest rates banks charge on their CLO loans are as closely linked to the observable risk of these credits as in the case of their credits that they do not securitize. If banks use more laxed standards to underwrite the credits they sell to CLOs then, observable risk should be a lesser role on the spreads banks charge on these loans. We also investigate this hypothesis from a different angle — by comparing the performance of CLO credits associated with loans banks extended to new borrowers (that is, borrowers that banks had not lent to in the recent past)with the performance

[12] We do not use these variables in the performance analysis because they are available only for the subset of credits in the SNC database that appear in the LPC Dealscan database, which is our source of information on loan spreads.

of CLO credits associated with loans banks extended to borrowers they had lent before. Again, if banks use more laxed standards to underwrite loans which they sell to CLOs then we should find CLO credits of new borrowers to perform worse.

Our second hypothesis posits that CLO credits perform worse than non-CLO credits because banks have less ex post incentives to monitor credits that they originate and sell to CLOs. To evaluate this hypothesis, we proxy banks' monitoring incentives by their "skin in the game" — defined by the bank's exposure to the credit or by its exposure to the borrower of the credit —- and then investigate if these proxies are lower for CLO credits than non-CLO credits. We complement this investigation by comparing the performance of credits that are acquired by CLOs at the time of their origination with the performance of credits that are acquired by CLOs only at a later date and for which this acquisition did not result in a change in the arranger's "skin in the game".

We describe in more detail the tests we undertake to investigate these two hypotheses at the beginning of each subsection of Section 5, where we report the results of the second part of our methodology.

2.3 Sample characterization

Banks have been selling loans into CLOs at least as far back as the early nineties. This business, however, remained stable until around 2003 (Figure 1). Since then, the CLO business began to increase rapidly stopping only in 2008 with the subprime crisis. Up until 2003, the volume of CLOs originated each year rarely surpassed $20 billion. In 2004, the volume of CLOs originated doubled and since then it continued to grow, surpassing the record $180 billion in 2007.

Our investigation focuses on the period when there was a rapid growth of the CLO business since this is when banks' loan underwriting incentives are more likely to have been affected by the demand for credits by CLOs. We therefore consider credits that were originated in the five-year period between 2004 and 2008. Table 1 characterizes our sample by comparing credits that are sold to CLOs at the time of their origination with credits that were originated during the same time period but were not sold to CLOs at origination or in the three years that follow.[13] A reading of this table reveals several differences between these credits. Most importantly, it shows that CLO credits have worse performance than non-CLO credits. By the end of the first year after the origination date, CLO credits already underperform non-CLO credits. This difference continues to grow and by the end of the third year after origination, CLO credits are twice more likely to default or to stop paying interest, that is to become nonaccrual, than non-CLO credits.

[13]We limit the time horizon to three years because this is the time period we consider to investigate the performance of credits.

This difference in the performance between CLO and non-CLO credits is in line with the ex ante riskiness of these credits. As we can see from panel B of table 1, which compares credits at the time of their origination, on average the spread on CLO credits is equal to 287 bps over Libor. In contrast, the spread on non-CLO credits is only 164 bps. That difference in the riskiness of these credits is also evident on banks' credit ratings. While 95% of the non-CLO credits that banks originate are rated $PASS$, only 77% of the CLO credits are rated $PASS$.[14] The higher incidence of covenants among CLO credits is yet another sign that CLO credits are riskier than non-CLO credits. For instance, CLO credits are more likely to be collateralized than non-CLO credits, and their borrowers are more likely to be subject to dividend restrictions than borrowers of non-CLO credits.

Panel C of table 1, which compares the borrowers of CLO credits with those of non-CLO credits, confirms that borrowers of CLO credits are riskier than those of non-CLO credits. According to S&P ratings, 10% of the non-CLO credits are from borrowers rated investment grade and 7% of them are from borrowers rated below grade. For CLO credits, these percentages are 1 and 21, respectively.

There are other important differences between CLO and non-CLO credits. For instance, as we can see from panel C, CLOs have a stronger preference for term loans over credit lines. CLOs also have a strong preference for loans that banks originate to fund mergers and acquisitions, but interestingly during the sample period they bought almost as many loans that banks originated for working capital purposes. This panel also shows that CLO credits tend to be larger and to have a longer maturity.

Finally, as we can see from panel D, members of loan syndicates tend to retain lower exposures to CLO credits than to non-CLO credits. Lead arrangers are less likely to retain an exposure to CLO credits than non-CLO credits, and they also tend to retain a much smaller share of CLO credits than non-CLO credits. Based on our sample, banks keep an exposure to CLO credits only 54% of the time. On these instances, on average they retain 9% of the credit. For non-CLO credits, these figures are 91% and 26%, respectively. This difference persists when we consider the other exposures that lead arrangers have to the borrowers of these credits and look instead at their exposures to the borrowers of these credits. It is important to consider banks' exposures to the borrowers of these credits because arrangers sometimes do not retain an exposure to a credit that they originate but nonetheless retain an exposure to the borrower of that credit by virtue of other loans they have with them. Note that for 46% of the CLO credits, lead banks sold off their entire share of the credit. However, due to other credits they have extended these borrowers, they have *no* exposure to only 10% of the borrowers of these

[14] Recall that bank ratings indicate the percentage of the credit that is rated $PASS$, $SPECIAL MENTION$, and so forth, with the sum of these percentages equal to 1.

CLO credits. A similar computation for non-CLO credits shows that non-CLO credits banks sell the entire credit for 9% of the credits they originate and that they have *no* exposure to only 7% of the borrowers of the non-CLO credits.

With regard to the participants in the loan syndicate (other than CLOs), on average they invest in 3% of each CLO credit. In contrast, on average they invest in 15% of each non-CLO credit. This difference derives in part from the fact that loan syndicates of non-CLO credits tend to be far bigger than syndicates on CLO credits. On average there are 55 participants (other than CLOs) in CLO credits and 8 participants in non-CLO credits. Each CLO, on average, acquires 0.8% of a credit. There are on average 41 CLOs per credit, and collectively they invest on average in 24% of each credit. However, the median CLO credit has only 28 participants, each with 0.6%.

In the next section, we investigate if CLO credits perform differently than non-CLO credits when we account for the differences between these credits that we highlighted in this section.

3 Do CLO and non-CLO credits perform differently?

Table 2 reports the first set of results of our investigation into the performance of CLO credits. As we mentioned before, our measure of credit performance is whether the credit defaulted or became nonaccrual, which happens when the borrower stops paying interest on the loan. Model 1 investigates whether credits that are sold to CLOs are more likely to become nonaccrual during the first year after origination than non-CLO credits. Recall that by design, we consider only credits that are sold to CLOs at the time of their origination. Models 2 and 3 investigate the performance of CLO credits relative to non-CLO credits in the two and three years after origination, respectively. Models 1 through 3 investigate the performance of CLO credits controlling for our set of credit-specific variables, X, and year dummy variables. Models 4 through 6 expand this set of variables controls to account for our set of borrower-specific variables, Y.

Regardless of the time horizon we consider after the credit origination, and the set of controls we employ, our results show that credits sold to CLOs perform worse than non-CLO credits. The dummy variable CLO is positive and statistically significant in all of the models, indicating that credits sold to CLOs are more likely to default or become nonaccrual than non-CLOs credits. Importantly, since these results are derived with bank fixed effects that difference in performance is not driven by differences across banks. In other words, it arises even when we compare the performance of CLO credits with that of non-CLO credits originated by the *same* bank. According to our results, as time progresses the difference in the

performance between CLO and non-CLO credits increases. Note that the coefficient on the CLO dummy variable increases as we move from model 1 to model 2 and to model 3 (or as we move from model 4 to model 5 and then to model 6), that is as we consider the performance of credits in one year, two years and three years after origination, respectively. Our findings are in line with the recent literature on the effects of securitization on mortgages quality, including Puranandam (2008) and Keys et al. (2008), which documents that securitization led to excessively poor quality mortgages.

With regards to the control variables, they are generally consistent with our expectations. Riskier credits, as determined by the rating of the bank at origination date, are more likely to default or become nonaccrual than safer credits. Compared to credits rated $PASS$, the omitted category, credits rated $SPECIAL\,MENTION$, $SUB\,STANDARD$, $DOUBTFUL$, or $LOSS$ are all more likely to default or become nonaccrual. Longer maturity credits perform better, which is to be expected since these credits are usually extended to safer borrowers. Credits taken out to finance working capital and those taken out to repay existing debt as well as credits to support commercial paper programs also perform better, probably because these credits are more likely to be extended to more creditworthy borrowers. Once we account for the rating of the credit, its size does not appear to help explain its performance afterwards.

Finally, notwithstanding these controls, in particular the credit rating determined by the lead arranger, we find that the S&P rating of the borrower at the time of the credit origination helps explain the future performance of the credit. Again, our results show that credits of borrowers with riskier ratings are more likely to default or become nonaccrual than credits of borrowers with safer ratings.

3.1 Robustness tests

3.1.1 Accounting for the endogeneity of CLO credits selection

The results reported in table 2 assume that the selection of credits which are acquired by CLOs is exogenous. In reality, this selection will be at least in part determined by the lead bank of the syndicate that extend the loan. In order to control for the endogeneity of a bank's decision to sell a credit to a CLO, we implement matching methodology developed in the literature using propensity scores.[15] To create the sample of matched credits, we start with the full sample of credits and estimate the probit model of the probability that a credit generated in each year is placed in a CLO, using as explanatory variables the sets of credit and firm characteristics described above. We construct the propensity score for each credit in each year as the predicted probability of being placed in a CLO. Using this propensity score, we use radius matching to

[15] See, for example, Mayhew and Mihov (2004).

match CLO credits (the treatment group) with non–CLO credits (the control group) that have similar propensity scores and are originated by the same bank. We drop credits, including some that were acquired by CLOs and some non–CLO credits, that did not have close matches and credits for which the propensity score did not lie on the common support of the CLO credits and non–CLO credits propensity score distribution. The remaining credits constitute the matched sample for which we repeat our regression analysis described above.

At the end, we are left with the CLO credits that had close matches (matched CLO sample) and their non-CLO matches (matched control sample). Performing a univariate analysis comparing the likelihood that the credit put into the CLO defaults or is put onto nonaccrual with the likelihood that the non-CLO credit it is matched to goes bankrupt or is put on nonaccrual, we find that in year 1, the difference is 0.015 (t = 1.28). In year 2, the difference is 0.047 (t=2.58) and in year 3 it is 0.047 (t= 2.50).

The results of our matching exercise are reported in table 3. They confirm our earlier finding that CLO credits perform worse than non-CLO credits. In all 3 years, the CLO dummy variable is positive and statistically significant at the 5% significance level in years 2 and 3, confirming that CLO credits are more likely to default or become nonaccrual than non-CLO credits.

3.1.2 Accounting for the lead bank's "skin in the game"

The models reported in table 2 investigate the performance of CLOs controlling for a set of loan-specific factors and a set of borrower-specific factors, but they leave out a potentially important determinant of credit performance, the lead bank's "skin in the game". The lead bank's "skin in the game" is important because it will make the bank use more conservative underwriting standards and it will increase its ex post monitoring incentives, with positive effects on the performance of the credit. On the other hand, since banks usually find it easier to sell safer credits than riskier ones, we may find that credits in which banks have a larger exposure perform worse than those they have a smaller exposure. This discussion highlights the endogeneity of the lead bank's "skin in the game". We do not have good instruments to explain the lead bank's "skin in the game", nonetheless we want to make sure that our finding on the performance of CLO credits continues to hold when we account for this variable.

We report the results of this robustness test in table 4. Models 1 through 3 in the top panel control for the lead bank's "skin in the game" by adding to our set of controls the portion of the credit that the lead bank retains at the time of the credit origination, $BKCREDITSH$. As in our previous analysis, all of the models control for our sets of loan and borrower specific controls, but in the interest of space we leave these controls out of the table. We continue to find that CLO credits perform worse than non-CLO credits when we control for the share of

the credit that the lead bank retains. Interestingly, this share is positive and significant which is consistent with the idea that banks are able to sell larger portions of the safer credits that they originate than of riskier ones.

Since banks may have more than one credit with the same borrower, this can lead to situations in which the lead bank sells its entire exposure to one credit while retaining an exposure to the borrower and consequently incentive to monitor the borrower. For this reason, in models 4 through 6 of the top panel we account for the lead bank's "skin in the game" by controlling for its total exposure to the borrower. We determine the lead bank's total exposure to the borrower at origination by the portion of the borrower's total outstanding credits that the bank owns, $BK\ BORROWER\ SH$. Again, we find that CLO credits perform worse than non-CLO credits. Also as in models 1-3, our control for the lead bank's "skin in the game" is positive and significant, indicating that lead banks tend to retain relatively larger exposures to riskier borrowers than to safer ones.

3.1.3 Accounting for CLOs' investments

Thus far we have shown that our finding that CLO credits perform worse than non-CLO credits continues to hold when we account for the lead bank's "skin in the game". However, in doing so we did not account for the portion of the credit acquired by CLOs.[16] The portion of the credit acquired by CLOs is potentially important because it may, for instance, affect the lead bank's monitoring incentives. It may also proxy for the risk of the CLO credit.

Since each credit tends to be acquired by many different CLOs, we start by investigating whether our finding on the performance of CLO credits continues to hold when we account for the share of the credit acquired by the "median" CLO, $MED\ CLO\ SH$.[17] The results of this investigation, which are reported in the middle panel of table 4, continue to show that CLO credits perform worse than non-CLO credits. According to the p values reported at the bottom of the middle panel, we can reject the hypothesis that $CLO + MED\ CLO\ SH = 0$ in all of the models. The new results further show that the performance of CLO credits is independent from the share of the credit acquired by the median CLO.

We continue our investigation of the importance of CLOs' investment by controlling for the total share of the credit acquired by CLOs, $CLO\ SH$. These results, which are reported in the bottom panel of table 4, by and large confirm our earlier finding that CLO credits perform worse than non-CLO credits. $CLO\ SH$ is negative and significant, but as the p values reported

[16] CLOs' investments in a credit will likely depend on the share of the credit the lead bank retains, but the two variables will nor be perfectly correlated because of the presence of other investors in the loan syndicate.

[17] As we noted in the sample characterization section, the average number of CLOs in each credit is 41 and the median number is 28.

at the bottom of that panel indicate we can reject the hypothesis that $CLO + CLO\,SH = 0$, except for a small portion of the distribution of $CLO\,SH$. Specifically, for values of $CLO\,SH$ above 43% (which corresponds to about 23% of the CLO credits), our findings indicate that CLO credits have a similar performance as non-CLO credits. Since CLOs' credit shares do not vary much across credits, this finding indicates that credits which are acquired by many CLOs on average have a similar performance as non-CLO credits, probably because they are of better credit quality. With regards to the remaining CLO credits, we continue to find that they have a worse performance than non-CLO credits.[18]

3.1.4 Other robustness issues

In addition to the robustness tests reported above, we also investigated the following issues. We documented that our key result that CLO credits perform worse than non-CLO credits when we use a matched sample rather than full set of CLO and non-CLO credits in our sample. This addresses the concern one may have with the selection of credits sold to CLOs, but it reduces our sample significantly. Since most of the credits sold to CLOs are of risky borrowers, we investigated this concern by reestimating our model of loan performance after we drop CLO and non-CLO credits of borrowers rated investment grade. We continue to find that credits originated and sold to CLOs performed worse than similar credits originated by the same banks but which were not sold to CLOs.

Our sample includes both loans of nonfinancial corporations as well as loans of financials. Given the differences that exist between these firms, we repeated our analysis of the performance of CLO credits after we exclude credits of financials. Doing so also does not change our results on the performance of CLO credits in any meaningful way.

Many of the loans that banks sold to CLOs were loans taken out to fund LBOs. These tend to be risky loans. However, as we document in table 1, there are many CLO loans in our sample that are for purposes other than to fund mergers and acquisitions. Estimating our performance model after we drop from our sample LBO loans also does not alter our key finding CLO credits perform worse than non-CLO credits.

Finally, to address concerns with the effect of the crisis on our findings, we have estimated out loan performance model on the credits originated in the 2004-2006 time period and focused on the performance in the first year and in the two years after credits' origination. The two-year window in this exercise will be affected by the events in 2008 in connection with

[18] Investigating the performance of CLO credits for which $CLO\,SH$ is below 43% separately from those for which $CLO\,SH$ is above 43% confirms the results we just reported, and it also shows that $CLO\,SH$ is negative and significant only in the upper part of its distribution. For the credits that CLOs collectively own less than 43%, $CLO\,SH$ is positive but does not help explain their performance.

credits originated in 2006, but the one-year window ends before the crisis. Since we find that CLO credits perform worse than non-CLO credits both when we consider the one-year window and the two-year window, this indicates that the financial crisis alone is not the driver of the difference in the performance between these credits.

4 Do banks charge different rates on CLO loans?

The difference in the ex post performance between CLO and non-CLO credits that we document in the previous section raises an important question – whether banks take that difference into account when they decide on the interest rates they charge on the loans that they originate and sell to CLOs. Note that since we consider only credits acquired by CLOs at the time of the loan origination, banks are aware of this information when they decide on the interest rates they charge. We investigate this question next.

In order to ascertain whether CLO credits carry different interest rates than non-CLO credits, we merge the sample of CLO and non-CLO credits we obtained from the SNC database with the LPC Dealscan database in order to get information on the spreads of these credits at the time of their origination. We also gather information on loan covenants from Dealscan that is pertinent for our investigation of the spreads banks charge on their loans.

We are able to get information in Dealscan for 4041 of the 9004 loans in our sample.[19] Of these 4041 loans, 581 were sold to CLOs at the time of their origination and the remaining syndicated loans were not sold to CLOs. Given the reduction in the number of credits we can use in our analysis of spreads, we investigated the performance of CLO credits based on this smaller sample of credits. The results we reported in tables 2 through 4 also hold in this sample of credits.

According to the univariate analysis we reported in table 1, on average banks charge 287 bps on the syndicated loans they sell to CLOs, 123 bps more than what they charge on the syndicated loans that they originate but do not sell to CLOs. Table 5 reports the results of our multivariate analysis of loan spreads. Model 1 compares the spreads banks charge on CLO credits with the spreads they charge on non-CLO credits controlling for the sets of loan- and firm-specific variables, X and Y, respectively, and year dummy variables that we used in the loan performance models. This model also controls for a set of loan covenants which are known to affect loan spreads.

[19] Part of this difference derives from the fact that the SNC and LPC databases do not match perfectly. The SNC database, for instance, contains information only on credits above $20 million which are held by at least three U.S. supervised institutions. Another part of that difference derives from the fact that we use a conservative criteria to match the credits in the two databases.

Following the approach we adopted in our investigation of loan performance, we examine the robustness of our finding when we control for the lead bank's "skin in the game". To that end, in model 2 we expand our set of controls to account for the lead bank's exposure to the credit, $BK\ CREDIT\ SH$. In model 3, we control instead for the lead bank's exposure to the borrower of the credit, $BK\ BORROWER\ SH$. Models 4 through 7 further expand the controls used in the latter two models to account for the share of the credit held by the median CLO, $MED CLO SH$, (models 4 and 5), and to control for the total share of the credit held by CLOs, $CLO\ SH$ (models 6 and 7). Since these variables are endogenous, as in our investigation of the loan performance, our key objective is not to identify their direct effect on loans' spreads, but instead to ascertain whether controlling for them affects our finding on the difference between the spreads that banks charge on the loans they sell to CLOs and the loans that they do not sell to CLOs. Following our investigation of loan performance, we estimate our loan pricing model with bank fixed effects and standard errors clustered by bank.

A quick look at table 5 shows that the dummy variable CLO is positive and highly significant, and we can reject the hypotheses that $CLO + MED\ CLO\ SH = 0$ and $CLO + CLO\ SH = 0$ for all the usual levels of significance. This shows that banks charge higher spreads on the loans they sell to CLOs. Note also that the size of the coefficient on the CLO variable barely changes when we control for the lead bank's "skin in the game" (models 2 and 3), and when we account for the portion of the credit acquired by CLOs (models 4 though 7). While in the latter case that was to be expected since our controls for CLOs' investments in the credit are not statistically significant, in the former case that is encouraging since both of our controls for the lead bank's "skin in the game" are statistically significant. According to our results, on average the loans that banks sell to CLOs carry a spread that is about 53 basis points higher than the spreads on the loans the same banks originate but do not sell to CLOs.

With regard to our controls, the results are generally consistent with expectations and with those unveiled in other studies of banks' loan pricing policies, and so we leave their discussion out in the interest of space.[20] Our controls are also consistent with the results of our loan performance analysis, perhaps with only two apparent exceptions. The share of the credit acquired by CLOs appears to be related to the performance of CLO credits but it is unrelated to the spreads of these credits. The lead bank's "skin in the game" is positively related with our measure of credit performance, but is negatively related to the loan spread. At first sight these results may appear to be inconsistent, but as we noted when we introduced these controls both of them are endogenous, which may explain the difference between their effect on the credit performance and on its spread. What is most important for our purposes is that accounting for both of these controls does not affect our findings on the performance

[20] See Santos and Winton (2008), Hale and Santos (2009), Schenone (2008), and Santos (2010).

and spreads of CLO credits vis-á-vis non-CLO credits.

Our finding that banks charge higher spreads on the loans they originate and sell to CLOs is consistent with our earlier finding that CLO credits are more likely to default or become nonaccrual than non-CLO credits. Importantly, while the spreads are determined at the time of the loan origination when the bank already knows whether the credit will be sold or not to CLOs, the performance of the credits is only observed at a much later date. Recall that we compare the performance of CLO credits up to three years after their origination. These findings suggest that banks already anticipated the worse performance of CLO credits at the time of their origination.[21]

In sum, the results we unveiled thus far show that loans that banks sell to CLOs at the time of their origination are more likely to default or become nonaccrual in the three years after origination when compared to loans the *same* bank originates but does not sell to CLOs. This finding is robust as it holds when we account for firm- and loan-specific factors that proxy for the risk of the loan, and the economic conditions. It continues to hold when we conduct a matching exercise to account for the endogeneity of banks' selection of credits they choose to sell to CLOs. It also continues to hold when we further expand our controls to account for the bank's "skin in the game" and for portion of the credit acquired by CLOs. Our results further show that banks anticipate the additional risk of CLO credits since they demand higher spreads on the loans they sell to CLOs than on the loans they do not sell to CLOs.

5 Why do CLO credits underperform non-CLO credits?

In this section we attempt to explain why credits originated and sold to CLOs during the boom years of the CLO business perform worse than non-CLO credits. We consider two explanations, one linked to banks' loan underwriting standards and the other related to banks monitoring incentives. In the following subsections, we describe in detail these explanations as well as the results of the tests we undertake to evaluate them.

[21] Our analysis of loan performance revealed that there was a small set of CLO credits, those in which CLOs altogether owned more than 43% of the credit, which had a similar performance than non-CLO credits. This result does not hold in the sample we use in our loan spread analysis. In other words, for this sample the results we unveil on the performance of CLO credits are entirely consistent with those we unveil on the spreads of CLO credits.

5.1 Do banks use different standards to underwrite CLO credits?

5.1.1 A test based on loan interest rates

We start by investigating whether the difference in the performance between CLO and non-CLO credits could derive from a difference in the underwriting standards banks use to originate these sets of credits. We undertake two tests to investigate this hypothesis. Our first test investigates whether observable risk is a less important driver of the interest rates banks charge on the loans they sell to CLOs. If banks use more laxed standards to underwrite the credits they sell to CLOs then we should expect observable risk to play a lesser role on the spreads banks charge on these loans.

To investigate this hypothesis, we begin by predicting the credit's probability of default ($\widehat{PDEFAULT}$) by the third year after origination using the set of loan- and firm-specific controls we use in our loan performance analysis. The distributions of these probabilities for CLO and non-CLO credits, respectively, are reported in figure 2. As one would expect, the distribution on CLO credits is shifted to the right in line with the additional risk of these credits. Next, we identify the range of the predicted probability of default for which we have CLO and non-CLO credits. To reduce concerns with outliers, we drop credits in the lowest decile and in the highest decile of the overlapping region of $\widehat{PDEFAULT}$.

The mean spread of the non-CLO credits left in the common region is 165 bps. The mean spread of the CLO credits left in the common region is 256 bps, which is consistent with our raw data. Estimating our loan spread model on the set of credits in the overlapping region of $\widehat{PDEFAULT}$ and proxying for the credits' risk by $\widehat{PDEFAULT}$ instead of our sets of loan- and firm-specific variables confirms our earlier finding that banks charge higher spreads on credits they sell to CLOs than on their remaining credits. It also confirms that our predicted probability of default is correlated with risk since it comes out positive and highly significant.[22] Thus the result on loan spreads we unveiled for the entire sample continue to hold for the credits in the overlapping region of $\widehat{PDEFAULT}$.

Now that we have established that these credits are representative of our original sample, we undertake our first test on banks underwriting standards by comparing the variability of the spreads banks charge on the CLO and non-CLO credits that fall in the overlapping region of $\widehat{PDEFAULT}$. The idea is that if banks do not give as much consideration to the risk of a loan because they plan to securitize it, then the variance on the spreads banks charge on CLO credits should be lower than the variance on the spreads they charge on non-CLO credits with similar observable risk.

[22] These findings continue to hold when we expand our sets of firm- and loan-specific controls to account for our proxies of banks' "skin in the game" and our controls for CLOs' investments.

The volatility of the spreads (as measured by its standard deviation) is 96.5 bps for non-CLO credits and only 71.3 bps for CLO credits. Importantly, the volatility of $\widehat{PDEFAULT}$ is reversed: it is 2.5 bps for non-CLO credits and 2.7 bps for CLO credits. A Bartlett test for the equality of the variances of spreads shows we can reject the hypothesis that this difference is equal to zero, with a p-value of 0. We can also reject the hypothesis that the difference in the volatility of $\widehat{PDEFAULT}$, but only at a 10% significance level. [23] Thus, even though the risk volatility is higher among CLO credits, the volatility of spreads that banks charge these credits is lower than on non-CLO credits.

This finding holds not only for the volatility of spreads on the overall common distribution, but also within each tercile of the distribution of $\widehat{PDEFAULT}$. At each tercile, we cannot reject the hypothesis that the volatility of $\widehat{PDEFAULT}$ is the same for CLO credits and non-CLO credits. However, in each case, we can reject the hypothesis that the volatility of the spreads is the same for CLO credits and non-CLO credits. As Figure 3 shows, even though CLO credits and non-CLO credits have approximately the same probability of default at each tercile, the spreads on CLO credits are less volatile than the spreads for non-CLO credits. In this analysis, we used the expected probability of default to draw a "common" sample of CLO and non-CLO credits for our investigation of spread volatilities. Doing this exercise with the matching samples we used in section 2 to investigate the performance of CLO credits also shows that the volatility of spreads on CLO credits is significantly lower than the volatility of spreads among non-CLO credits.

Even though on aggregate, banks charger higher rates for CLO credits, when they determine these rates, they do not fine-tune them to correspond to the risk of the credit as much as they do with non-CLO credits. This difference is consistent with banks' using different standards to underwrite the loans they sell to CLOs. These findings, however, do not explain what contribution if any this difference in the underwriting standards had to the performance of CLO credits. We attempt to address this issue with our second test on banks' underwriting standards.

5.1.2 A test based on the performance of CLO credits

The idea of this test is to compare the performance of CLO credits associated with loans banks extended to new borrowers (that is borrowers that banks have not lent to in the recent past)

[23] Because Bartlett's test for the equality of variances is very sensitive to departures from normality, we test the robustness of our conclusions using Levene's test for the equality of variances and Brown and Forsythe's extensions to it that use the median and trimmed mean as well as the mean. In all cases, our conclusions hold and even become stronger: both the equality of variances of $PDEFAULT$ and the equality variances of the spread can be rejected at the 0.1% significance level. See Brown and Forsythe(1974).

with the performance of CLO credits associated with loans banks extended to borrowers they have lent to before. If banks use more laxed standards to underwrite loans which they sell to CLOs then we should find CLO credits of new borrowers to perform worse.

To investigate this hypothesis, we design the following test. We begin by dropping from our sample CLO credits and non-CLO credits of banks with no lending activity in our loan database in the four years (2000-2003) that preceed the sample period (2004-2008). We drop these credits to make sure our findings are not driven by the lending policies of "new" lenders.[24] Next, we classify borrowers in our sample as "new" or "recurring" borrowers, depending on whether they took out loans in the four years that preceeded our sample period. We split "recurring" borrowers into two groups: those that already had credits sold to CLOs in the pre-sample period and those that did not have credits sold to CLOs in the pre-sample period. We distinguish the credits of these borrowers because the credits of the latter borrowers that are sold to CLOs may also be affected by a change in banks' loan underwriting decisions.[25] We use the dummy variables $BRWTH\,CLO\,HST$ and $BRWITHOUT\,CLO\,HST$ to isolate the credits of these two groups of borrowers, respectively.

Using these definitions, we begin by comparing the performance of CLO credits of recurring borrowers with a CLO history ($BRWITH\,CLO\,HST$) with the performance of CLO credits of recurring borrowers that do not have a CLO history ($BR\,WITHOUT\,CLO\,HST$) and with the performance of CLO credits of new borrowers (the base group). We report these results in the top panel of table 6. Next, we repeat this exercise on both the CLO and non-CLO credits. We report these results in the bottom panel of table 6.

If banks used laxer underwriting standards because of the strong demand for credits by CLOs, for example by lending to riskier borrowers than they would otherwise do, and/or by selling the credits of their riskier borrowers to CLOs, then we should find CLO credits of recurring borrowers with CLO history to perform better than CLO credits of recurring borrowers with no CLO history. In addition, we should find that CLO credits of new borrowers to perform worse than the other CLO credits and the non-CLO credits of new borrowers.

Following the approach we adopted in the previous section, we repeat this analysis and compare the spreads banks charge on the credits of these different sets of borrowers to determine whether the loan pricing policies of banks are consistent with the expected performance of the different credits they originate. The results of this analysis are reported in the last column of

[24] We investigated whether the lending policies of these banks were unique and found that the performance of their CLO and non-CLO credits was not different from that of the remaining banks.

[25] Even though banks were already lending to these borrowers before the boom years of the CLO business, back then they chose not to sell them to CLOs. Their decision to start selling their credits to CLOs in the boom years may reflect a change in banks' loan policies.

the two panels of table 6.

The results reported in the top panel of table 6 confirm that CLO credits of new borrowers perform worse than CLO credits of recurring borrowers with a CLO history. Our results also show that CLO credits of "recurring" borrowers without a CLO history perform worse than CLO credits of recurring with a CLO history. Note that $BR\,WITH\,CLO\,HST$ is negative and $BR\,WITHOUT\,CLO\,HST$ is positive and the coefficients on these variables are statistically different from each other. The results reported in the bottom panel show that these insights are robust to the inclusion of non-CLO credits of these sets of borrowers to our sample. We continue to find that CLO credits of new borrowers and CLO credits of recurring borrowers without a CLO history both perform worse than CLO credits of recurring borrowers with a CLO history.[26]

The results in the bottom panel of table 6 also show that CLO credits of new borrowers perform worse than the non-CLO credits of these borrowers. Note that our CLO dummy variable is positive and highly significant in all models. Among recurring borrowers, CLO credits perform worse than non-CLO credits, but in this case we cannot reject the hypothesis that the difference between them is not equal to zero.[27]

Our investigation of loan spreads yields results which are consistent with our findings on loan performance. This is evident in the alignment of the signs in the last two columns of table 6 and in the similarity in the results of the t tests reported at the bottom of both panels.[28] In other words, our results generally indicate that banks charge higher spreads on credits with a worse expected performance.

These results lend important support to idea that banks, faced with a growing demand from CLOs, changed their loan underwriting standards and their criteria to sell credits to CLOs, beginning to underwrite and sell to CLOs riskier credits. Consistent with this idea, we find that both CLO credits of new borrowers and those of recurring borrowers without a CLO history perform worse than CLO credits of recurring borrowers with a CLO history. Also consistent with this idea, we find that CLO credits of new borrowers perform worse than non-CLO credits of these borrowers while among recurring borrowers with a CLO history

[26]The first result builds on the fact that $BR\,WITH\,CLO\,HST + CLO$ x $BR\,WITH\,CLO\,HST$ is positive and statistically significant. The second result builds on the fact that $BR\,WITHOUT\,CLO\,HST + CLO$ x $BRWITHOUTCLOHST$ - $BRWITHCLOHST + CLO$ x $BRWITHCLOHST$ is positive and statistically significant.

[27]Note that we cannot reject the hypothesis that $CLO + CLOxBR\,WITHOUT\,CLO\,HST = 0$ or the hypothesis that $CLO + CLOxBR\,WITH\,CLO\,HST = 0$.

[28]There are exceptions though. For instance, non-CLO credits of recurring borrowers perform better and carry lower spreads than non-CLO credits of "new" borrowers, but only the difference between the performance of these credits is statistically significant.

there is no difference between their CLO and non-CLO credits. Our finding that banks charge higher spreads on credits with a worse expected performance suggests that they anticipated the difference in the performance of these credits. This adds further support to the idea that banks used different standards to underwrite the loans they sold to CLOs during the boom years of the CLO business and that this was a contributing factor for the worse performance of the CLO credits.

5.2 Do banks have less incentives to monitor CLO credits?

The difference in performance between CLO and non-CLO credits could also be the result of a difference between banks' incentives to monitor these credits after their origination. There is evidence suggesting that banks' monitoring incentives are correlated with their exposure to the credit.[29] As we noted in the sample characterization section, on average banks retain a smaller exposure to the credits they sell to CLOs than on the other credits they originate. They also retain a smaller exposure to the borrowers of CLO credits than to the borrowers of the other credits they originate.

These differences suggest that banks have less incentives to monitor the credits they sell to CLOs. A potential problem with this conclusion is that we know from existing studies that the share of the credit the lead arranger retains also varies with other factors, including the size of the credit and its riskiness. To obviate these concerns, we compare the lead bank's exposure to the CLO credits they originate with the exposure to the non-CLO credits that they originate controlling for the sets of firm- and loan-specific factors we use in our investigation of loan performance. We measure the bank's exposures at the time of the credit origination. As in our previous analysis, we also include year dummies in this investigation and estimate the models with bank-fixed effects. The results of our investigation of banks' "skin in the game" are reported in table 7.

Model 1 investigates whether banks are less likely to retain a share of CLO credits than non-CLO credits. Model 2 investigates whether banks are less likely to retain an exposure to the borrowers of CLO credits that they originate. As we noted in the sample characterization section, it is important to consider banks' exposures to the borrowers of the credits they originate because arrangers sometimes do not retain an exposure to a given credit that they originate but nonetheless retain an exposure to the borrower of that credit by virtue of other loans they have with them. Models 3 and 4 repeat this analysis, but this time to investigate the size of the lead bank's exposure to the credit and to the borrower of the credit, respectively.

[29] Recent studies, including Sufi (2007), Ivashina (2009), and Focarelli, Pozzolo, and Casolaro (2008), document that lead banks in loan syndicates use the retained share to align their incentives with those of syndicate participants and commit to future monitoring.

Looking at the first row of table 7, we find two important results. First, banks are less likely to retain an exposure to the CLO credits than to the non-CLO credits that they originate. Also, on average they retain a smaller share of the CLO credits. Second, this result holds when we account for the other credits that banks have with the borrowers of CLO credits because we find that banks are less likely to have an exposure to borrowers of their CLO credits than to their remaining borrowers. Further, on average, banks retain smaller exposures to the borrowers of CLO credits.

With regards to the controls we use in our investigation of banks' "skin in the game", they show that banks tend to have lower exposures to safer credits and to the borrowers of safer credits, probably because it is easier for them to "motivate" other institutions to invest in the credits of these borrowers. The same is true of larger credits and longer maturity credits, probably because these tend to be extended to safer borrowers. Interestingly, our results also show that banks tend to have lower exposures to credits of borrowers they have a lending relationship with. This could be because banks tend to establish these relationships predominantly with safer borrowers.

The findings of our multivariate analysis confirm the insights of the univariate analysis — banks tend to retain a lower exposure to CLO credits and their borrowers than non-CLO credits and their borrowers, respectively. Since these differences likely provided banks with less incentives to monitor the credits they originate and sell to CLOs, a natural question to ask is whether other arrangements that promote the monitoring of credits emerged to make up for this difference in bank monitoring.

5.2.1 Do syndicate participants have more incentives to monitor CLO credits?

One possibility could be for syndicate participants (other than CLOs) to make up for the "shortage" of bank monitoring of CLO credits. These investors usually do not have incentives to monitor the credits they invest in because they tend to hold only a small share of the credit, but nonetheless we investigate whether they have more incentives to monitor CLO credits than non-CLO credits.

We consider three proxies for the monitoring incentives of syndicate participants that are not CLOs. Our first proxy is the share of the credit held by the median syndicate participant. The second proxy is the largest share held by these participants. Our final proxy is the concentration among the syndicate participants, which we measure by the Hirfindahl index of their credit shares, deflated by the maximum value of 10,000 to make the coefficients more comparable.[30] Everything else equal, the larger these proxies are the bigger the monitoring

[30]This proxy follows Sufi (2007) who also documents the monitoring incentives of loan syndicates by their concentration.

incentives of syndicate participants. Models 1 through 3 of the top panel of table 8 investigate whether these proxies are higher for CLO credits than non-CLO credits, distinguishing whether the bank retained an exposure to the credit. Models 4 though 6 repeat this analysis, but this time we control for the share of the credit the bank retains. As in our previous analysis, we investigate these issues controlling for our sets of firm- and loan specific controls, X and Y, and year dummy variables.

According to our results, syndicate participants do not have more incentives to monitor CLO credits and non-CLO credits. Models 1 through 3 show that the credit share held by the median syndicate participant, the largest share held by a syndicate participant, and the concentration among the syndicate participants are all lower for CLO credits than non-CLO credits.[31] These models further show that our proxies for the monitoring incentives of syndicate participants are all lower for CLO credits in which the bank has *no* exposure than for the non-CLO credits in which the bank has *no* exposure (the dummy variable CLO is negative and highly significant in all models).

The aforementioned differences are not as striking when we control for the share of the credit that the bank retains (models 4 though 6), but once again we do not find evidence that syndicate participants have more incentives to monitor CLO credits than non-CLO credits. We continue to find that neither one of our proxies for the monitoring incentives of syndicate participants is higher for CLO credits than non-CLO credits.[32] Further, we still do not find evidence that syndicate members have more incentives to monitor CLO credit than non-CLO credits when we account for the credit share that the lead bank retains. Note that CLO x $BK\,CREDIT\,SH$ is not statistically significant in any of the three models we report.

These findings lead us to yet another possibility: whether CLOs themselves could "complement" lead banks' monitoring. If that is the case, we should see our proxies for monitoring incentives when applied to the CLOs to vary inversely with the lead bank's monitoring incentives. As we can see from the bottom panel of table 8, there is no evidence that CLOs perform this role. To the contrary, our results indicate that when banks do not retain and exposure to the credit or keep only a smaller exposure, CLOs tend to follow suit and do not acquire big shares of the credits. Models 1 through 3 show that when the lead bank has no exposure to the CLO credit, and thus has the least incentive to monitor the credit, the share of the median CLO, the largest share held by a CLO, and the concentration among CLO holdings

[31] Note that the t test for the hypothesis that $CLO + CLO$ x $BK\,CREDIT\,EXP = 0$ is rejected in the three models.

[32] In this case we can only reject the hypothesis that there is no difference between CLO and non-CLO credits in model 4. In other words, in models 5 and 6 our proxies may not be different between CLO and non-CLO credits.

are all lower when compared to the CLO credits in which the bank retains a credit exposure. A similar insight emerges from models 4 through 6 because $BK\,CREDIT\,SH$ is positive and highly significant in all these models.

In sum, we have shown that during the boom years of the CLO business, banks had lower incentives to monitor the credits they originated and sold to CLOs than the remaining credits their originated. The reason was that their "skin in the game" was lower for CLO credits — they retained a lower exposure to the credits they originated and sold to CLOs and to the borrowers of these credits. We also document that syndicate participants, including CLOs, did not make up for the monitoring slack banks created in CLO credits. It remains to be seen, however, whether the difference in 'skin in the game" banks retained vis-á-vis CLO and non-CLO credits was a contributing factor to the difference in the performance of these credits. We attempt to answer this question next.

5.2.2 The importance of banks' "skin in the game"

We investigate the importance of the lead banks' "skin in the game" for the performance of CLO credits by comparing the performance of credits which are acquired by CLOs at the time of their origination, with the performance of a set of credits that are acquired by CLOs *only* after their origination in the secondary market. In an attempt to isolate the importance of the lead bank's "skin in the game", we identify CLO credits acquired in the secondary market for which there was no change in the lead banks' exposure to the credit at the time of that acquisition. We identify these credits with the dummy variable $SECONDARY\,SAME$.[33] We identify the remaining credits acquired by CLOs in the secondary market with the dummy variable $SECONDARY\,OTHER$.

If the lead bank's "skin in the game" has no effect on the performance of CLO credits, then we should expect CLO credits which are acquired in the secondary market and for which there is no change in the lead bank's share at the time of the CLO acquisition to have a similar performance (after the acquisition by the CLO) as credits which are acquired by CLOs at their origination. Note the important difference between these CLO credits — the bank's share of the former credits does not reflect the presence of CLOs among the credit investors because CLOs' acquisition of the credit happened only after the credit origination date. In contrast, the bank's share of the latter will reflect the presence of CLOs among the credit investors

[33]For these credits, at the end of the year when the CLO acquired a portion of the credit, there was no change in (a) the absolute credit holding of the lead bank, (b) the share of the credit held by the lead bank, and (c) no change in the total amount of the CLO credit at the time of the CLO acquisition. Redefining $SECONDARY\,SAME$ to include credits only for which the lead bank still had the same credit amount and the same share of the credit as in the previous year yields similar results.

because the bank sold part of the credit CLOs at the time of its origination.

The results of this investigation are reported in table 9. The top panel considers only CLOs credits. The bottom panel expands this set of credits to include non-CLO credits. Looking at the top panel, we see that $SECONDARY\ SAME$ is negative and statistically significant, indicating that credits acquired by CLOs in the secondary market for which there is no change in the lead bank's "skin in the game" perform better than credits acquired by CLOs at the time of their origination. Interestingly, credits acquired in the secondary market and for which there is a change in the lead bank's "skin in the game" at the time of the CLO acquisition have a similar performance that credits acquired by CLOs at origination ($SECONDARY\ OTHER$ is negative but is not statistically significant). These findings continue to hold when we expand our sample of CLO credits to include non-CLO credits extended by banks in our sample (bottom panel of Table 9).

These findings suggest that the lead bank's' 'skin in the game" for CLO credits plays a role in their future performance. This interpretation, of course, depends on the assumption that the set of credits acquired by CLOs at the time of their origination is "similar" to the set of credits acquired by CLOs in the secondary market, in particular the set of credits for which there is no change in the lead bank's credit exposure at the time of the CLO acquisition. To be more precise, the interpretation lies on the assumption that the two sets of credits are "similar" at the time CLOs acquire them. As we can see from the last column of table 9, according to the spreads banks charge at origination, on average the credits acquired by CLOs at origination have the same risk of default as the credits CLOs aquire in the secondary market for which there is no change in the lead bank's credit exposure at that time.

In conclusion, the results we report in this section support the hypothesis that the strong demand for credits by CLOs induced banks to lower the underwriting standards they used to originate credits to sell to CLOs. One reason is that CLO credits of borrowers whose credits had not been securitized in the pre-boom years (whether they were lent to by the bank or not) perform worse than CLO credits of repeated borrowers that already had credits sold to CLOs in the pre-boom years.

We also provide supporting evidence to the hypothesis that banks had less incentives to monitor the credits they sold to CLOs and this likely contributed to a decline in the performance of these credits. A reason is that banks retain a far lower exposure both to the credits they sell to CLOs and to the borrowers of these credits than to the remaining credits they originate and their borrowers. In addition, we do not detect evidence among the syndicate participants, including CLOs, of arrangements to fill in the monitoring vacuum that lead banks created. Lastly, banks' monitoring incentives as determined by their "skin in the game" do appear to play a role on credit performance. Credits acquired by CLOs after origination and for which

the lead bank retained its exposure perform better (after the CLO acquisition) than similar credits that CLOs acquired at the time of their origination (and for which securitization may have impacted the choice of how much exposure to the credit to maintain).

6 Final remarks

We use in this paper a unique data source, the Shared National Credit Program, to investigate whether the rise of the CLO business contributed to risky lending. Consistent with evidence from studies on the effects of securitization of other asset classes, in particular mortgages, we find that credits acquired by CLOs perform worse than non-CLO credits originated by the same bank in the sense that they are more likely to default or become nonaccrual in the three years after origination.[34] This difference in the performance of CLO and non-CLO credits appears to derive from banks' increased willingness to underwrite riskier credits that they sell to CLOs and from their lower incentives to monitor CLO credits after their origination. Importantly, our results show that banks and syndicate participants expected CLO credits to perform worse than non-CLO credits. This is evidenced in the higher spreads than banks charge on the loans they originated and sold to CLOs than on their remaining loans. It is also evidence on the lower stakes that syndicate participants took on CLO credits than on non-CLO credits.

An interesting subject for future research is to investigate whether lead banks also adjusted other elements of the loan contract, in particular the set of covenants, in response to the presence of CLOs in the loan syndicate. Also, following the ongoing debate on whether securitization has made it more difficult to renegotiate mortgage, it would be interesting to investigate if borrowers whose credits were sold to CLOs encountered more difficulties in renegotiating their loans and whether the lead bank's "skin in the game" alleviates these difficulties.[35]

[34] See footnote (1) for studies of the effects of securitization on mortgages.

[35] Piskoski et al. (2010) show that the foreclosure rate was higher for mortgages that have been securitized than those kept on banks' balance sheets, and argue that securitization hinders renegotiation of credits.

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Figure 1: Volume of CLOs originated by year (billions U.S. dollars)

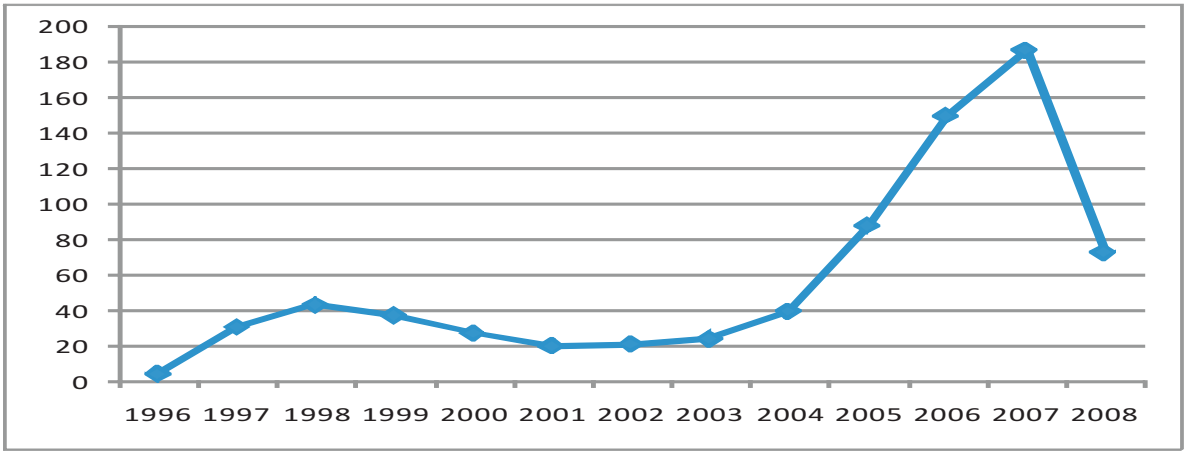

Table 1. Sample characterization[a]

Variables	Credits		Difference	T-stat
	Held by CLOs	Not held by CLOs		
Panel A: Credit performance				
$NONACCRUALYEAR1$	0.072	0.027	0.045	5.73***
$NONACCRUALYEAR2$	0.096	0.042	0.054	6.06***
$NONACCRUALYEAR3$	0.108	0.049	0.059	6.30***
Panel B: Loan controls				
$PASS$	0.772	0.946	-0.173	13.84***
$SPECIAL MENTION$	0.118	0.025	0.091	9.57***
$SUB STANDARD$	0.096	0.026	0.069	7.96***
$DOUBTFUL$	0.007	0.002	0.005	2.39**
$LOSS$	0.008	0.001	0.007	2.99***
$AMOUNT$	12.382	11.620	0.766	20.11***
$MATURITY$	6.021	4.237	1.788	37.26***
$WORK CAPITAL$	0.246	0.397	-0.147	10.69***
$MERGERS ACQ$	0.335	0.062	0.273	19.43***
$RECAPITALIZATION$	0.105	0.016	0.090	9.94***
$CAPITAL EXP$	0.022	0.015	0.006	1.34
$DEBT REPAY$	0.092	0.027	0.064	7.44***
$CP BACKUP$	0.000	0.019	-0.019	12.24***
$SBY LETTER$	0.012	0.018	-0.007	1.92*
$CREDIT LINE$	0.133	0.666	-0.533	47.44***
$TERM LOAN$	0.840	0.218	0.624	53.60***
$CSPREAD^b$	287.005	164.245	122.761	21.71***
$REFINANCE^b$	0.552	0.561	0.023	1.05
$SECURED^b$	0.764	0.295	0.481	25.69***
$SENIOR^b$	1.000	0.999	-0.001	0.51
$DIVIDEND REST^b$	0.449	0.327	0.146	6.84***
Panel C: Borrower controls				
$RELATIONSHIP$	0.338	0.314	0.023	1.59
AAA	0.000	0.002	-0.002	4.25***
AA	0.000	0.005	-0.005	6.10***
A	0.000	0.033	-0.033	16.23***
BBB	0.010	0.065	-0.055	14.02***
BB	0.101	0.043	0.057	6.34***
B	0.103	0.022	0.079	8.85***
CCC	0.002	0.001	0.001	0.86
$BELOWCC$	0.003	0.000	0.002	1.64
$AGRIMINING$	0.033	0.054	-0.022	3.75***
$UTILITIES$	0.037	0.055	-0.017	2.85***
$CONSTRUCTION$	0.032	0.094	-0.062	10.21***
$MANUFACTURING$	0.292	0.212	0.082	5.82***
$TRADE$	0.079	0.104	-0.026	3.05***
$TRANSPORTATION$	0.038	0.035	0.004	0.66
$INFORMATION$	0.182	0.058	0.122	10.62***
$FINANCIALS$	0.041	0.096	-0.056	8.30***
$REALESTATE$	0.029	0.114	-0.086	14.31***
$RENTAL$	0.021	0.013	0.008	1.80*
$SERVICES$	0.217	0.165	0.053	4.15***

[a] Continues on the next page.

Table 1 (Continued)[a]

Variables	Credits		Difference	T-stat
	Held by CLOs	Not held by CLOs		
Panel D: Lead arranger controls				
$BK\ CREDIT\ EXP$	0.544	0.912	-0.364	24.48***
$BK\ CREDIT\ SH$	0.091	0.263	-0.172	32.49***
$BK\ OTHER\ EXP$	0.285	0.022	0.260	19.65***
$BK\ OTHER\ SH$	0.045	0.091	-0.046	6.89***
$BK\ BORROWER\ EXP$	0.829	0.934	-0.104	9.18***
$BK\ BORROWER\ SH$	0.075	0.246	-0.171	52.26***
$MED\ CLO\ SH$	0.021			
$CLO\ SH$	0.241			
$MED\ PARTICIPANT\ SH$	0.029	0.153	-0.124	65.76***
Observations[b]	1176	7828		

[a] $NONACCRUAL\ YEARi$ percentage of the credits that become nonaccrual or default at the end of year i after origination; $PASS$ average percentage of the credit banks rate as $PASS$; $SPECIAL\ MENTION$ average percentage of the credit banks rate as $SPECIAL\ MENTION$; $SUB\ STANDARD$ average percentage of the credit banks rate as $SUB\ STANDARD$; $DOUBTFUL$ average percentage of the credit banks rate as $DOUBTFUL$; $LOSS$ average percentage of the credit banks rate as $LOSS$; $LAMOUNT$ (log of) average size of the credit at origination in thousands of dollars; $MATURITY$ average maturity of the credit at origination in years; $WORK\ CAPITAL$ percentage of credits for working capital purposes; $MERGERS\ ACQ$ percentage of credits for mergers and acquisitions; $RECAPITALIZATION$ percentage of the credits for recapitalization; $CAPITAL\ EXP$ percentage of the credit for capital expenditure; $DEBT\ REPAY$ percentage of the credit for debt repayments; $CP\ BACKUP$ percentage of the credits to back up commercial paper programs; $SBY\ LETTER$ percentage of the credits that are stand by letters of credit; $CREDIT\ LINE$ percentage of the credits that are credit lines; $TERM\ LOAN$ percentage of the credits that re term loans; $SPREAD$ spread over Libor at the time of the loan origination; $REFINANCE$ dummy variable equal to one for refinancing loans; $SECURED$ dummy variable equal to one for loans secured with collateral; $SENIOR$ dummy variable equal to one for senior loans; $DIVIDEND\ REST$ dummy variable equal to one for borrowers that face dividend restrictions when they take out the loan; $RELATIONSHIP$ percentage of the credits of borrowers that had credits with the bank the previous year; AAA percentage of the credits of borrowers rated AAA; AA percentage of the credits of borrowers rated AA; A percentage of the credits of borrowers rated A; BBB percentage of the credits of borrowers rated BBB; BB percentage of the credits of borrowers rated BB; B percentage of the credits of borrowers rated B; CCC percentage of the credits of borrowers rated CCC; CC percentage of the credits of borrowers rated CC; $BELOW\ C$ percentage of the credits of borrowers rated C or below; $AGRI\ MINING$ percentage of credits of borrowers in the agriculture and mining businesses; $UTILITIES$ percentage of credits of utility companies; $CONSTRUCTION$ percentage of credits of constructions companies; $MANUFACTURING$ percentage of credits of manufacturing companies; $TRADE$ percentage of credits of borrowers in the trading business; $TRANSPORTATION$ percentage of credits of transportation companies; $INFORMATION$ percentage of credits of information companies; $FINANCIALS$ percentage of credits of financial companies; $REAL\ ESTATE$ percentage of credits of borrowers in the real estate business; $RENTAL$ percentage of credits of rental companies; $SERVICES$ percentage of credits of borrowers in services. $BK\ CREDIT\ EXP$ dummy variable equal to one when the lead bank retains a portion of the credit at the time of origination; $BK\ CREDIT\ SH$ average percentage of the credit that the lead bank retained at origination; $BK\ OTHER\ EXP$ dummy variable equal to one when the lead bank does not retain a portion the credit it originates ($BK\ CREDIT\ EXP = 0$), but it still has an exposure to the borrower as a result of other credits the bank extended to it; $BK\ OTHER\ SH$ average percentage of the "other credits", the lead bank had; $BK\ BORROWER\ EXP$ dummy variable equal to one when the lead bank has an exposure to the borrower, that is $BK\ CREDIT\ EXP = 1$ or $BK\ OTHER\ EXP = 1$; $BK\ BORROWER\ SH$ average percentage of all the credit the lead bank extended to the borrower that it holds; $MED\ CLO\ SH$ average of the median share that CLOs hold in each credit; $CLO\ SH$ average percentage of the credit that is held by CLOs; $MED\ PARTICIPANT\ SH$ average of the median share that syndicate participants (other than CLOs) hold in each credit.

[b] These variables are computed on the 4041 of the 9004 credits in our sample that we are able to merge with the LPC Dealscan database. Of these 4041 loans, 581 were sold to CLOs at the time of their origination and the remaining syndicated loans were not sold to CLOs.

Table 2. Performance of CLO credits vs. non-CLO credits.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
CLO	0.015**	0.031***	0.036***	0.015**	0.030***	0.035***
	(2.03)	(3.02)	(3.34)	(2.06)	(2.93)	(3.11)
SPECIAL MENTION	0.100***	0.107***	0.098***	0.100***	0.106***	0.097***
	(3.29)	(3.88)	(3.61)	(3.23)	(3.84)	(3.53)
SUB STANDARD	0.294***	0.311***	0.302***	0.297***	0.310***	0.300***
	(12.26)	(10.45)	(10.04)	(12.38)	(10.82)	(10.37)
DOUBTFUL	0.828***	0.802***	0.791***	0.833***	0.802***	0.790***
	(11.16)	(11.29)	(11.14)	(11.10)	(11.09)	(10.95)
LOSS	0.629***	0.629***	0.610***	0.636***	0.628***	0.609***
	(3.09)	(3.29)	(3.30)	(3.15)	(3.29)	(3.31)
LAMOUNT	-0.001	-0.003	-0.003	-0.000	-0.002	-0.002
	(0.37)	(0.99)	(1.05)	(0.16)	(0.70)	(0.72)
MATURITY	-0.002**	-0.003**	-0.003**	-0.002**	-0.003**	-0.003**
	(2.02)	(2.08)	(1.99)	(2.04)	(2.12)	(2.03)
WORK CAPITAL	-0.015***	-0.021***	-0.014**	-0.015***	-0.021***	-0.014**
	(3.04)	(3.48)	(2.33)	(3.11)	(3.61)	(2.38)
MERGERS ACQ	0.009	-0.002	-0.002	0.008	-0.003	-0.003
	(0.76)	(0.23)	(0.30)	(0.73)	(0.26)	(0.36)
RECAPITALIZATION	-0.003	-0.004	-0.012	-0.002	-0.004	-0.012
	(0.14)	(0.18)	(0.54)	(0.08)	(0.18)	(0.54)
CAPITAL EXP	-0.013	0.001	0.007	-0.013	0.001	0.007
	(1.13)	(0.04)	(0.31)	(1.13)	(0.03)	(0.30)
DEBT REPAY	-0.024***	-0.039***	-0.034**	-0.022***	-0.040***	-0.035**
	(3.12)	(2.95)	(2.29)	(2.83)	(3.30)	(2.55)
CP BACKUP	-0.010*	-0.011*	-0.012**	-0.008	-0.010*	-0.010**
	(1.73)	(1.76)	(2.23)	(1.57)	(1.68)	(2.31)
SBY LETTER	-0.016	-0.021	-0.022	-0.016	-0.021	-0.022
	(1.49)	(1.32)	(1.18)	(1.52)	(1.33)	(1.19)
CREDIT LINE	0.011	-0.002	-0.004	0.011	-0.002	-0.004
	(1.12)	(0.14)	(0.32)	(1.11)	(0.13)	(0.32)
TERM LOAN	0.003	-0.014	-0.014	0.003	-0.014	-0.014
	(0.35)	(1.32)	(1.32)	(0.30)	(1.34)	(1.34)
RELATIONSHIP	-0.000	-0.004	-0.007	-0.000	-0.003	-0.006
	(0.05)	(0.53)	(0.88)	(0.01)	(0.40)	(0.73)
AAA				-0.022***	-0.025**	-0.027***
				(2.69)	(2.58)	(2.78)
AA				-0.007	-0.010**	-0.012**
				(1.22)	(2.11)	(2.17)
A				-0.006	-0.009**	-0.013***
				(1.53)	(2.22)	(2.85)
BBB				-0.006	-0.010***	-0.012**
				(1.65)	(2.87)	(2.16)
BB				-0.003	-0.005	-0.010*
				(1.05)	(0.97)	(1.87)

[a] Continues on the next page.

Table 2. Continued[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
B				0.004	-0.005	0.004
				(0.17)	(0.20)	(0.15)
CCC				-0.292***	0.006	0.013
				(4.31)	(0.03)	(0.07)
$BELOW\ CC$				-0.010	-0.034***	-0.054***
				(1.40)	(4.34)	(5.53)
CONSTANT	0.012	0.055**	0.076**	0.006	0.048**	0.067**
	(0.38)	(2.42)	(2.55)	(0.21)	(2.13)	(2.25)
Observations	8966	9004	9004	8966	9004	9004
R^2Adjusted	0.24	0.26	0.24	0.25	0.26	0.24

[a] Dependent variable is a dummy variable indicating if the credit defaulted or became nonaccrual during the first year after the loan origination (model 1), or during the first two years after the loan origination (model 2), or during the first three years after the loan origination (model 3). CLO Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. See Table 1 for the definitions of the remaining variables. Models include year dummies and dummy variables to control for the sector of activity of the borrower. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3. Performance of CLO and non-CLO credits: Matching exercize.[a]

Variables	(1)	(2)	(3)
	Year 1	Year 2	Year 3
CLO	0.012	0.038**	0.038**
	(0.71)	(2.17)	(2.29)
SPECIAL MENTION	0.208***	0.193***	0.195***
	(3.40)	(3.57)	(3.60)
SUB STANDARD	0.372***	0.358***	0.335***
	(4.71)	(4.70)	(4.33)
DOUBTFUL	0.053*	0.108***	0.101**
	(1.94)	(3.16)	(2.65)
LOSS	2.546***	2.563***	2.587***
	(21.69)	(20.94)	(20.03)
LAMOUNT	0.007	0.009	0.011**
	(1.55)	(1.63)	(2.20)
MATURITY	-0.008	-0.01	-0.009
	(1.32)	(1.40)	(1.33)
WORK CAPITAL	0.011	-0.001	-0.008
	(0.57)	(0.06)	(0.30)
MERGERS ACQ	0.002	-0.016	-0.005
	(0.10)	(0.84)	(0.34)
RECAPITALIZATION	-0.014	-0.013	-0.015
	(0.48)	(0.47)	(0.41)
CAPITAL EXP	0.131	0.061	0.067
	(0.81)	(0.46)	(0.48)
DEBT REPAY	-0.035	-0.059	-0.06
	(0.68)	(1.73)	(1.46)
SBY LETTER	-0.003	-0.03	-0.03
	(0.29)	(1.65)	(1.07)
CREDIT LINE	-0.036	-0.058	-0.051
	(0.85)	(1.02)	(0.91)
TERM LOAN	-0.021	-0.055	-0.04
	(0.79)	(1.25)	(1.01)
RELATIONSHIP	-0.026	-0.021	-0.025
	(1.42)	(0.94)	(1.01)
AAA	-0.037	-0.01	-0.003
	(1.14)	(0.22)	(0.07)
AA	-0.084***	-0.106*	-0.082
	(3.21)	(1.87)	(1.42)
A	-0.009	-0.017	-0.017
	(0.30)	(0.52)	(0.54)
BBB	0.03	0.02	0.01
	(1.43)	(0.97)	(0.46)
BB	0.005	0.002	-0.004
	(0.29)	(0.16)	(0.23)
B	-0.022	-0.042*	-0.047*
	(0.85)	(1.76)	(1.74)
CONSTANT	0.018	0.003	0.158
	(0.12)	(0.02)	(1.54)
Observations	596	596	596
R^2Adjusted	0.29	0.33	0.30

[a] Dependent variable is a dummy variable indicating if the credit defaulted or became nonaccrual during the first year after the loan origination (model 1), or during the first two years after the loan origination (model 2),

or during the first three years after the loan origination (model 3). Models estimated on the sample of CLO credits for which we find a matching non-CLO credit. We select matching credits using propensity scores. *CLO* Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. See Table 1 for the definitions of the remaining variables. Models include year dummies and dummy variables to control for the sector of activity of the borrower. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4. CLO and non-CLO credits' performance accounting for the bank's "skin in the game".[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Panel A: Controlling for the lead bank's "skin in the game"						
CLO	0.019***	0.035***	0.040***	0.018**	0.034***	0.039***
	(2.74)	(3.56)	(3.63)	(2.57)	(3.49)	(3.57)
$BK\ CREDIT\ SH$	0.056***	0.061***	0.057***			
	(2.99)	(3.21)	(2.68)			
$BK\ BORROWER\ SH$				0.052***	0.064***	0.059***
				(2.76)	(3.15)	(2.63)
Constant	-0.039	0.001	0.023	-0.030	0.006	0.028
	(1.16)	(0.02)	(0.64)	(0.93)	(0.24)	(0.79)
Observations	8966	9004	9004	8966	9004	9004
Adjusted R-squared	0.25	0.26	0.24	0.25	0.26	0.24
Panel B: Controlling for the credit share of the median CLO						
CLO	0.013*	0.035***	0.040***	0.016**	0.034***	0.039***
	(1.79)	(3.02)	(3.19)	(1.99)	(2.95)	(3.14)
$BK\ CREDIT\ SH$	0.050***	0.061***	0.057***			
	(2.89)	(3.21)	(2.68)			
$BK\ BORROWER\ SH$				0.052***	0.064***	0.059***
				(2.76)	(3.14)	(2.62)
$MED\ CLO\ CREDIT\ SH$	0.017	0.011	-0.017	0.054	0.014	-0.014
	(0.18)	(0.09)	(0.15)	(0.68)	(0.12)	(0.12)
Constant	-0.037	0.001	0.024	-0.031	0.005	0.029
	(1.13)	(0.01)	(0.64)	(0.97)	(0.23)	(0.79)
Observations	8966	9004	9004	8966	9004	9004
Adjusted R-squared	0.25	0.26	0.24	0.25	0.26	0.24
p vale for $H_0 : CLO + MED\ CLO\ CREDIT\ SH = 0$						
p50	0.060	0.002	0.001	0.036	0.002	0.001
p75	0.046	0.001	0.001	0.023	0.001	0.001
p90	0.026	0.000	0.000	0.004	0.000	0.000
Panel C: Controlling for CLOs' credit share						
CLO	0.034***	0.066***	0.086***	0.035***	0.067***	0.087***
	(2.78)	(3.40)	(4.03)	(2.83)	(3.47)	(4.08)
$BK\ CREDIT\ SH$	0.053***	0.056***	0.049**			
	(2.80)	(2.81)	(2.23)			
$BK\ BORROWER\ SH$				0.051***	0.061***	0.056**
				(2.67)	(2.96)	(2.44)
$CLO\ SH$	-0.058**	-0.117***	-0.173***	-0.064**	-0.123***	-0.178***
	(2.12)	(2.85)	(4.11)	(2.41)	(3.07)	(4.33)
Constant	-0.039	0.003	0.027	-0.031	0.006	0.028
	(1.15)	(0.12)	(0.73)	(0.95)	(0.24)	(0.80)
Observations	8966	9004	9004	8966	9004	9004
Adjusted R-squared	0.25	0.26	0.24	0.25	0.26	0.24
p vale for $H_0 : CLO + CLO\ SH = 0$						
p50	0.012	0.001	0.001	0.006	0.001	0.001
p75	0.118	0.019	0.056	0.208	0.033	0.080
p90	0.594	0.526	0.459	0.866	0.720	0.268

[a] Dependent variable is a dummy variable indicating if the credit defaulted or became nonaccrual during the first year after the loan origination (model 1), or during the first two years after the loan origination (model 2), or during the first three years after the loan origination (model 3). CLO Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination; $BK\ CREDIT\ SH$ average percentage of the credit that the lead bank retained at origination; $BK\ BORROWER\ SH$ average percentage of all the

credit the lead bank extended to the borrower that it holds; $MED\,CLO\,SH$ average of the median share that CLOs hold in each credit; $CLO\,SH$ average percentage of the credit that is held by CLOs. Models include all of the controls we use in table 2 models. See Table 1 for the definitions of the remaining variables. p50, p70 and p90 indicates the 50th, 75th and 90th decile of the distribution. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5. Loan spreads of CLO and non-CLO credits.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CLO	57.411***	54.532***	54.677***	53.858***	54.156***	54.055***	53.220***
	(10.48)	(8.61)	(9.52)	(10.13)	(11.44)	(12.69)	(12.64)
BK CREDIT SH		-39.374**		-39.358**		-39.261**	
		(2.58)		(2.58)		(2.41)	
BK BORROWER SH			-69.603***		-69.557***		-69.514***
			(4.64)		(4.61)		(4.57)
MED CLO SH				23.442	18.172		
				(0.39)	(0.31)		
CLO SH						1.834	5.523
						(0.07)	(0.24)
LIBOR	-8.363***	-8.269***	-8.259***	-8.281***	-8.268***	-8.269***	-8.257***
	(4.37)	(4.34)	(4.42)	(4.37)	(4.45)	(4.34)	(4.42)
BBB SPREAD	25.131***	25.853***	26.604***	25.853***	26.603***	25.858***	26.622***
	(8.13)	(8.19)	(8.20)	(8.21)	(8.21)	(8.21)	(8.23)
REFINANCE	-15.300***	-15.850***	-15.886***	-15.841***	-15.879***	-15.853***	-15.901***
	(4.84)	(5.26)	(5.38)	(5.27)	(5.38)	(5.24)	(5.34)
SECURED	42.522***	41.782***	39.879***	41.802***	39.895***	41.776***	39.856***
	(12.48)	(11.97)	(11.63)	(11.96)	(11.61)	(12.01)	(11.67)
SENIOR	-202.790***	-203.401***	-203.806***	-203.438***	-203.835***	-203.379***	-203.746***
	(24.73)	(37.56)	(41.62)	(37.21)	(41.41)	(37.99)	(41.95)
DIVIDEND REST	-21.834***	-21.842***	-21.708***	-21.819***	-21.691***	-21.831***	-21.677***
	(5.21)	(5.28)	(5.40)	(5.28)	(5.40)	(5.31)	(5.43)
SPECIAL MENTION	36.884***	37.627***	36.560***	37.576***	36.521***	37.633***	36.585***
	(6.37)	(6.40)	(5.99)	(6.40)	(6.00)	(6.38)	(5.98)
SUB STANDARD	57.541***	58.361***	58.178***	58.390***	58.200***	58.406***	58.318***
	(7.68)	(8.04)	(7.97)	(8.01)	(7.93)	(7.63)	(7.58)
DOUBTFUL	44.356*	43.008*	36.751	43.318**	36.995	42.815*	36.169
	(1.92)	(1.96)	(1.58)	(1.99)	(1.60)	(1.82)	(1.47)
LOSS	-5.503	-4.587	-14.210	-4.227	-13.925	-4.422	-13.692
	(0.10)	(0.08)	(0.25)	(0.08)	(0.24)	(0.08)	(0.23)
LAMOUNT	-28.492***	-30.410***	-31.168***	-30.346***	-31.117***	-3.407***	-31.173***
	(13.97)	(12.17)	(13.84)	(11.83)	(13.43)	(12.06)	(13.88)
MATURITY	1.891***	1.751***	1.605***	1.752***	1.606***	1.750***	1.601***
	(2.98)	(3.22)	(3.47)	(3.22)	(3.46)	(3.21)	(3.43)
WORK CAPITAL	-0.616	-0.635	-0.577	-0.621	-0.566	-0.633	-0.571
	(0.25)	(0.27)	(0.25)	(0.26)	(0.24)	(0.27)	(0.24)
MERGERS ACQ	23.710***	23.724***	23.696***	23.765***	23.728***	23.720***	23.686***
	(3.29)	(3.33)	(3.32)	(3.34)	(3.33)	(3.32)	(3.31)
RECAPITALIZATION	12.835*	12.362*	12.248*	12.431*	12.301*	12.363*	12.247*
	(1.84)	(1.77)	(1.82)	(1.80)	(1.84)	(1.77)	(1.82)
CAPITAL EXP	-7.165	-7.053	-6.523	-7.025	-6.502	-7.035	-6.468
	(0.67)	(0.67)	(0.63)	(0.66)	(0.63)	(0.67)	(0.63)
DEBT REPAY	0.824	1.260	2.380	1.331	2.434	1.292	2.477
	(0.11)	(0.15)	(0.29)	(0.16)	(0.29)	(0.15)	(0.29)
CP BACKUP	-14.286	-14.465	-14.178	-14.491	-14.199	-14.467	-14.188
	(1.48)	(1.55)	(1.52)	(1.55)	(1.52)	(1.54)	(1.52)

[a] Continues on the next page.

Table 5 (Continued).[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SBY LETTER	-2.445	-2.691	-2.078	-2.719	-2.100	-2.698	-2.103
	(0.33)	(0.37)	(0.30)	(0.37)	(0.30)	(0.36)	(0.30)
CREDIT LINE	-23.880**	-24.324**	-25.625**	-24.395**	-25.678**	-24.323**	-25.621**
	(2.53)	(2.52)	(2.60)	(2.53)	(2.61)	(2.52)	(2.60)
TERM LOAN	-9.440	-11.156	-11.747	-11.115	-11.714	-11.195	-11.876
	(1.02)	(1.19)	(1.20)	(1.19)	(1.20)	(1.18)	(1.20)
RELATIONSHIP	-9.760***	-10.416***	-11.120***	-10.423***	-11.124***	-10.411***	-11.108***
	(3.59)	(3.83)	(4.13)	(3.83)	(4.13)	(3.82)	(4.12)
AAA	-13.406*	-12.519*	-12.713*	-12.651*	-12.815*	-12.522*	-12.716*
	(1.81)	(1.67)	(1.84)	(1.67)	(1.83)	(1.67)	(1.83)
AA	-30.837***	-29.536***	-29.087***	-29.619***	-29.151***	-29.536***	-29.077***
	(8.96)	(8.76)	(9.31)	(8.86)	(9.46)	(8.77)	(9.33)
A	-40.222***	-39.991***	-40.565***	-40.082***	-40.635***	-39.990***	-40.559***
	(7.91)	(7.92)	(7.71)	(8.18)	(7.95)	(7.90)	(7.67)
BBB	-22.489***	-22.994***	-23.979***	-23.072***	-24.038***	-22.985***	-23.952***
	(5.53)	(5.43)	(5.39)	(5.57)	(5.53)	(5.34)	(5.31)
BB	10.977*	10.205*	9.143	10.212*	9.149	10.223*	9.193
	(1.97)	(1.81)	(1.63)	(1.80)	(1.63)	(1.76)	(1.60)
B	32.964***	32.353***	31.480***	32.424***	31.536***	32.368***	31.524***
	(5.61)	(5.39)	(5.08)	(5.32)	(5.01)	(5.26)	(4.97)
CCC	22.926	23.467	26.505	23.460	26.498	23.583	26.855
	(0.73)	(0.72)	(0.78)	(0.72)	(0.78)	(0.75)	(0.82)
BELOW CC	111.281***	112.933***	116.609***	113.250***	116.852***	113.052***	116.974***
	(3.45)	(3.38)	(3.26)	(3.41)	(3.28)	(3.50)	(3.41)
CONSTANT	729.183***	761.196***	777.413***	760.554***	776.894***	761.099***	777.335***
	(25.98)	(22.58)	(26.52)	(22.25)	(26.08)	(22.17)	(26.38)
Observations	4041	4041	4041	4041	4041	4041	4041
R^2Adjusted	0.61	0.61	0.62	0.61	0.62	0.61	0.62
p vale for $H_0 : CLO + CLO\,CREDIT\,SH = 0$							
p50	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p75	0.000	0.000	0.000	0.000	0.000	0.000	0.000
p90	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[a] Dependent variable is the loan's all-in-drawn spread over libor at origination. *CLO* Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination; *BK CREDIT SH* average percentage of the credit that the lead bank retained at origination; *BK BORROWER SH* average percentage of all the credit the lead bank extended to the borrower that it holds; *MED CLO SH* average of the median share that CLOs hold in each credit; *CLO SH* average percentage of the credit that is held by CLOs. See Table 1 for the definitions of the remaining variables. Models include year dummies and dummy variables to control for the sector of activity of the borrower. p50, p70 and p90 indicates the 50th, 75th and 90th decile of the distribution. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 2: Density functions of expected default probabilities for CLO and non-CLO credits)

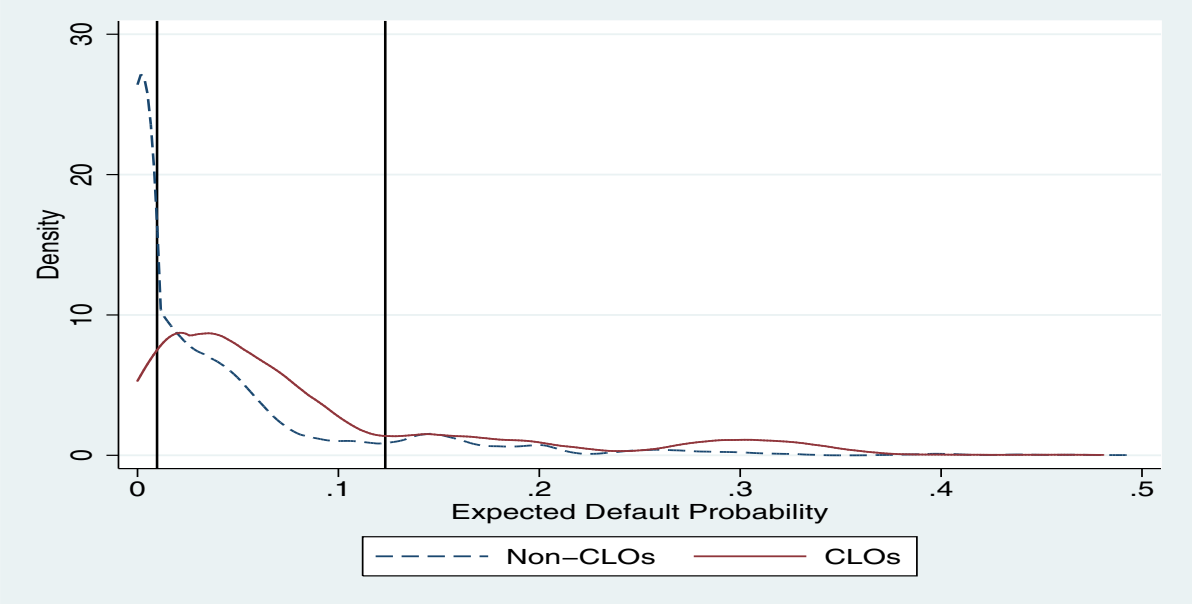

Figure 3: Volatility of spreads among non-CLO and CLO credits)

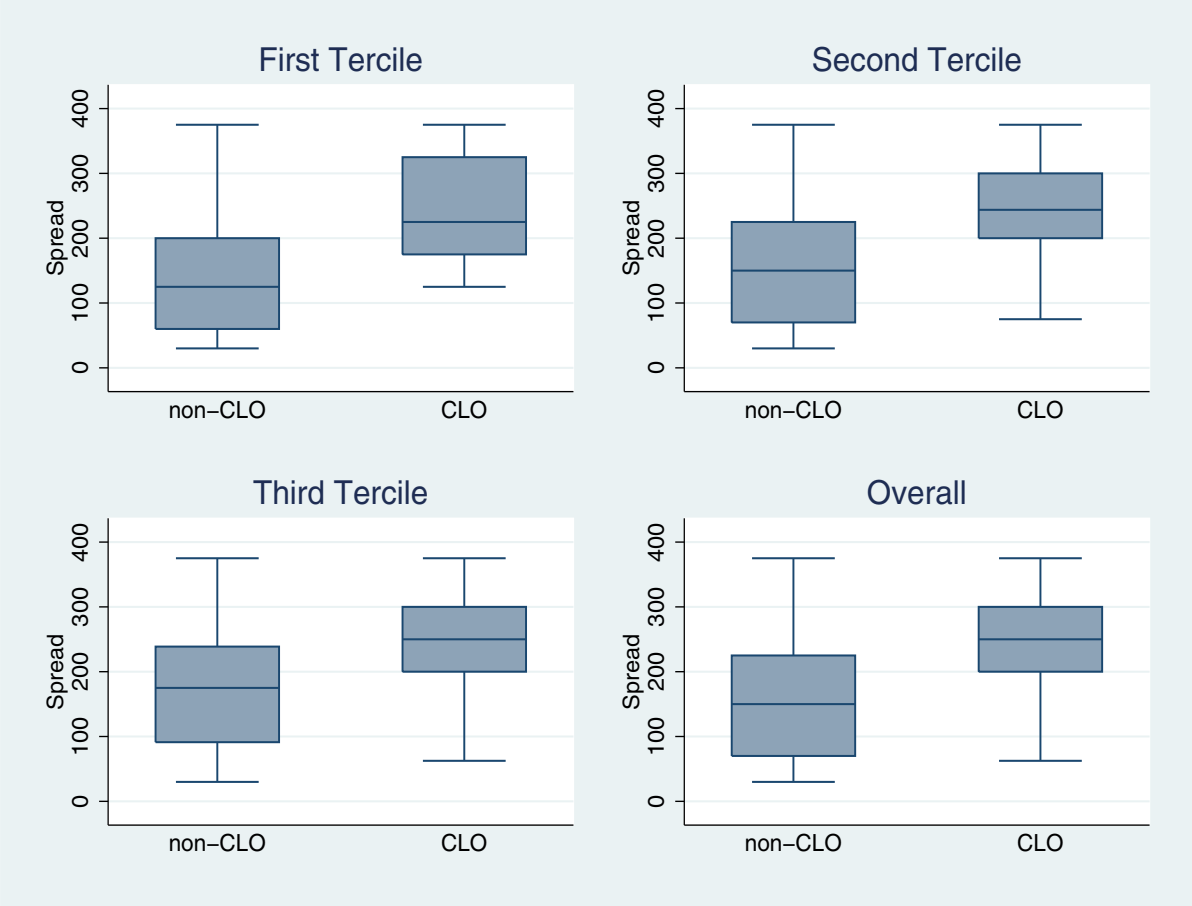

Table 6. Performance and spreads of CLO credits of "new" and "recurring" borrowers.[a]

Variables	Loan performance			Spreads
	Year 1	Year 2	Year 3	
Panel A: CLO credits only				
$BRWITHCLOHST$	-0.056**	-0.079**	-0.100**	-33.514*
	(2.05)	(2.41)	(2.41)	(1.76)
$BRWOUTCLOHST$	0.049	0.070	0.054	23.128
	(0.80)	(0.91)	(0.65)	(0.67)
$CONSTANT$	-0.108	-0.152	-0.149	620.167***
	(0.84)	(0.84)	(0.79)	(6.76)
Observations	1081	1100	1100	542
R^2Adjusted	0.31	0.28	0.26	0.27
p-value for H_0 :				
$BRWITHHST = BRWOUTHST$	0.0094	0.0063	0.0032	0.019
Panel B: CLO and non-CLO credits				
CLO	0.021***	0.033***	0.034***	79.639***
	(3.49)	(3.40)	(2.82)	(12.56)
$BRWITHCLOHST$	0.005	-0.013*	-0.020***	-8.876
	(0.43)	(1.88)	(2.72)	(0.69)
$BRWOUTCLOHST$	-0.006*	-0.015***	-0.021***	-14.907***
	(1.76)	(2.74)	(3.11)	(2.75)
CLO x $BRWITHCLOHST$	-0.053**	-0.058**	-0.062**	-34.853
	(2.19)	(2.25)	(2.32)	(1.34)
CLO x $BRWOUTCLOHST$	0.038	0.059	0.054	31.784
	(0.70)	(0.86)	(0.77)	(1.05)
$CONSTANT$	0.039	0.094***	0.108***	559.264***
	(1.12)	(2.94)	(2.86)	(21.12)
Observations	7944	7982	7982	3840
R^2Adjusted	0.21	0.20	0.18	0.53
p-value for H_0 :				
$CLO + CLO$ x $BRWITHHST = 0$	0.1991	0.3545	0.2736	0.152
$CLO + CLO$ x $BRWOUTHST = 0$	0.2773	0.1763	0.1904	0.291
$BRWITHHST + CLO$ x $BRWITHHST = 0$	0.0217	0.004	0.0019	0.0131
$BRWOUTHST + CLO$ x $BRWOUTHST = 0$	0.5714	0.5446	0.6532	0.605
$BRWITHST + CLO$ x $BRWITHHST=$				
$BRWOUTHST + CLO$ x $BRWOUTHST$	0.0427	0.0305	0.031	0.008

[a] Dependent variable is a dummy variable indicating if the credit defaulted or became nonaccrual during the first year after the loan origination (model 1), or during the first two years after the loan origination (model 2), or during the first three years after the loan origination (model 3). CLO Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. $BRWITHCLOHST$ Dummy variable equal to one for credits of borrowers that took out loans both during the sample period (2003-2008) and the years before (2000-2003) from the same bank, and had loans sold to CLOs in both periods. $BRWOUTCLOHST$ Dummy variable equal to one for credits of borrowers that took out loans both during the sample period (2003-2008) and the years before (2000-2003) from the same bank, and had loans sold to CLOs in the early years only. Models include all of the controls we use in table 2 models. See Table 1 for the definitions of the remaining variables. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7. Do banks retain less "skin in the game" when they sell credits to CLOs?[a]

Variables	(1)	(2)	(3)	(4)
	Credit dummy	Borrower dummy	LCredit share	LBorrower share
CLO	-0.260***	-0.025*	-0.072***	-0.052***
	-4.9	-1.88	-8.72	-6.88
SPECIAL MENTION	0.022	0.007	0.003	-0.01
	-0.84	-0.33	-0.37	-1.41
SUB STANDARD	0.007	-0.016	-0.001	-0.003
	-0.21	-0.72	-0.1	-0.32
DOUBTFUL	0.151	0.005	-0.023	-0.047*
	-1.28	-0.06	-0.72	-1.71
LOSS	-0.162	-0.273	-0.012	-0.045
	-0.86	-1.3	-0.26	-1.55
AAA	-0.116	-0.123	-0.018	-0.024
	-0.94	-0.95	-0.93	-1.4
AA	-0.06	-0.044	-0.006	-0.008
	-1.51	-0.97	-0.7	-1.02
A	0.005	0.01	-0.009**	-0.012***
	-0.38	-0.87	-2.21	-3.1
BBB	0.006	0.006	-0.024***	-0.026***
	-0.27	-0.31	-3.84	-3.41
BB	0	0.008	-0.032***	-0.039***
	0	-0.59	-5.91	-6.99
B	-0.047*	-0.014	-0.025***	-0.030***
	-1.82	-0.76	-4.92	-3.98
CCC	-0.019	-0.092	-0.001	-0.027
	-0.16	-0.65	-0.04	-0.67
BELOW CC	-0.025	0.01	-0.012	0.083**
	-0.26	-0.47	-1.57	-2.19
LAMOUNT	0.008	-0.003	-0.035***	-0.028***
	-1.2	-0.69	-11.52	-8.21
MATURITY	-0.004	-0.002	-0.004**	-0.004**
	-1.39	-0.72	-2.09	-2
WORK CAPITAL	0.016	0.005	-0.001	-0.004
	-1.59	-0.79	-0.37	-1.11
MERGERS ACQ	-0.024**	-0.002	-0.012***	-0.016***
	-2.08	-0.22	-2.68	-3.96
RECAPITALIZATION	0.029	-0.005	-0.025***	-0.021***
	-1.63	-0.27	-3.82	-3.58
CAPITAL EXP	-0.009	0.005	-0.02	-0.017
	-0.23	-0.13	-1.28	-0.98
DBT REPAY	0.002	-0.008	-0.008	-0.007
	-0.13	-0.48	-1.03	-1.05
CP BACKUP	-0.031	-0.040**	0	0.003
	-1.47	-2.17	-0.08	-0.55
SBY LETTER	0.039*	0.004	0	-0.006
	-1.89	-0.22	-0.03	-0.48

[a] Continues on the next page.

Table 7. (Continued)[a]

Variables	(1)	(2)	(3)	(4)
	Credit dummy	Borrower dummy	LCredit share	LBorrower share
CREDIT LINES	0.021	0.001	-0.011	-0.020***
	-1.31	-0.06	-1.59	-3.27
TERM LOANS	-0.011	-0.003	-0.030***	-0.020***
	-0.55	-0.23	-3.65	-2.96
RELATIONSHIP	0.006	0.040***	-0.018***	-0.020***
	-0.8	-2.66	-5.27	-7.49
CONSTANT	0.797***	0.946***	0.623***	0.539***
	-9.28	-20.39	-13.9	-10.9
Observations	9004	9004	9004	9004
R^2Adjusted	0.39	0.42	0.50	0.52

[a] Dependent variable in model 1 is a dummy variable equal to one if the lead arranger retained a share of the credit it extended to the borrower. $BK CREDIT EXP = 1$. Dependent variable in model 2 is a dummy variable equal to one if the lead arranger retained a share of the credit it extended to the borrower or it had another credit with that same borrower, $BK\ BORROWER EXP = 1$. Dependent variable in model 3 is the log of the share of the credit that the lead bank kept, $L\ BK\ CREDIT\ SH$. Dependent variable in model 4 is the log of the share of the total exposure the lead bank has to the borrower, $L\ BK\ BORROWER SH$. (model 3). *CLO* Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. See Table 1 for the definitions of the remaining variables. Models include year dummies and dummy variables to control for the sector of activity of the borrower. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8. Do syndicate participants account for banks' "skin in the game"?[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Syndicate participants other than CLOs						
	Median share	Largest share	HHI	Median share	Largest share	HHI
CLO	-0.109***	-0.149***	-0.067**	-0.051***	-0.047***	-0.017
	(6.12)	(4.24)	(2.42)	(5.25)	(3.13)	(1.08)
BK CREDIT EXP	-0.035*	-0.114***	-0.008			
	(1.68)	(3.16)	(0.26)			
CLO x *BK CREDIT SH*	0.044**	0.109***	0.020			
	(2.21)	(2.82)	(0.63)			
BK CREDIT SH				0.210***	0.094*	0.455***
				(4.75)	(1.66)	(6.14)
CLO x *BK CREDIT SH*				-0.111**	-0.031	-0.003
				(2.37)	(0.48)	(0.03)
CONSTANT	0.678***	0.786***	0.990***	0.488***	0.621***	0.630***
	(14.89)	(17.74)	(17.67)	(10.19)	(13.46)	(11.16)
Observations	9004	9004	9004	9004	9004	9004
R^2Adjusted	0.44	0.36	0.47	0.49	0.34	0.57
p-value for H_0 :						
$CLO + CLO$ x $BK\ CRDT\ EXP = 0$	0.000	0.000	0.000			
$CLO + CLO$ x $BK\ CRDT\ SH = 0$				0.000	0.187	0.778
Panel B: CLOs						
	Median share	Largest share	HHI	Median share	Largest share	HHI
BK CREDIT EXP	-0.001	-0.006	0.094***			
	(0.38)	(1.29)	(4.47)			
BK CREDIT SH				0.051**	0.032	0.807***
				(2.10)	(1.46)	(4.33)
CONSTANT	0.158***	0.241***	0.901***	0.152***	0.246***	0.836***
	(5.61)	(8.92)	(3.39)	(6.21)	(9.23)	(3.36)
Observations	1176	1176	1176	1176	1176	1176
R^2Adjusted	0.29	0.30	0.34	0.30	0.30	0.38

[a] Dependent variable in models 1 and 4 is the median credit share of syndicate participants, other than CLOs. Dependent variable in models 2 and 5 is the largest credit share of syndicate participants, other than CLOs. Dependent variable in models 3 and 6 is the Hirfindahl index of the credit shares of syndicate participants, other than CLOs. *CLO* Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. *BK CREDIT EXP* is a dummy variable equal to one if the lead arranger retained a share of the credit it extended to the borrower. *BK CREDIT SH* is the share of the credit that the lead bank retained. See Table 1 for the definitions of the remaining variables. Models include year dummies and dummy variables to control for the sector of activity of the borrower. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 9. Performance of credits acquired by CLOs at origination vs credits acquired in the market[a]

Variables	(1)	(2)	(3)	(4)
	CLO credits only			
	Credit performance			All-in
	Year 1	Year 2	Year 3	drawn
SECONDARY SAME	-0.040*	-0.084**	-0.088**	-14.374
	(1.74)	(2.46)	(2.28)	(0.78)
SECONDARY OTHER	0.028	0.036	0.043	-30.446
	(0.92)	(0.85)	(0.90)	(1.65)
CONSTANT	0.086	0.074	0.134	543.488***
	(0.67)	(0.39)	(0.69)	(6.78)
Observations	1310	1332	1332	674
R^2Adjusted	0.28	0.27	0.26	0.31
	All credits			
	Credit performance			All-in
	Year 1	Year 2	Year 3	drawn
CLO	0.014**	0.031***	0.036***	71.363***
	(2.09)	(2.91)	(3.16)	(14.07)
CLO SECONDARY SAME	-0.051***	-0.085***	-0.095***	-20.025
	(2.67)	(3.67)	(3.75)	(1.37)
CLO SECONDARY OTHER	0.016	0.022	0.024	-26.603**
	(0.60)	(0.62)	(0.56)	(2.62)
CONSTANT	0.012	0.023	0.033	764.403***
	(0.42)	(0.73)	(0.85)	(26.81)
Observations	9119	9160	9160	4136
R^2Adjusted	0.25	0.26	0.24	0.56

[a] Dependent variable is a dummy variable indicating if the credit defaulted or became nonaccrual during the first year after the loan origination (model 1), or during the first two years after the loan origination (model 2), or during the first three years after the loan origination (model 3). *CLO* Dummy variable equals to one for credits that the lead bank sells to CLOs at the time of their origination. *CLO SECONDARY SAME* Dummy variable equal to one for credits not sold to CLOs at their origination but which were acquired by a CLO at a later date, and for which no change occurred (a) in the lead bank total exposure to the credit and (b) the share of the credit the lead bank retains at the time of the CLO acquisition. *CLO SECONDARY OTHER* Dummy variable equal to one for the remaining credits not acquired by CLOs at their origination but which were acquired by a CLO at a later date. Models include all of the controls we use in table 2 models. See Table 1 for the definitions of the remaining variables. Models estimated with bank fixed effects and errors clustered by bank. T statistics reported in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.