

# What lies beneath: Is there adverse selection in CLO collateral?

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## Abstract

Since 2000 collateralized loan obligations (CLOs) have been the dominant source of capital for the high-yield corporate loan market. In this paper, we investigate whether securitization was associated with risky lending in the corporate loan market by examining performance of individual loans held by CLOs. We construct a unique dataset that identifies loan holdings for a large set of CLOs. Our results indicate that adverse selection problems in corporate loan securitizations may be less severe than commonly believed. Controlling for borrowers' credit quality, we find that securitized loans perform no worse, and under some criteria better, than unsecuritized loans of comparable credit quality. However, within a CLO portfolio, loans originated by the bank that acts as the CLO underwriter underperform the rest of the loan portfolio. Overall, we argue that securitization of corporate loans is fundamentally different from securitization of other assets classes because securitized loans are fractions of syndicated loans. Therefore, mechanisms used to align incentives in a lending syndicate also reduce adverse selection in the selection of CLO collateral.

Keywords: Structured finance; Collateralized loan obligations (CLOs); CDOs; Syndicated loans

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The financial crisis that began in 2007 brought to a close an extended period of growth in structured finance markets. Collateralized debt obligations (CDOs), special-purpose vehicles created to invest in pools of non-investment grade securities, suffered a major blow to their reputation after a record-breaking wave of downgrades and bank losses tied to CDOs. Global CDO issuance in the first half of 2008 fell to 10% of the amount issued during the same period in 2007.<sup>1</sup>

Loan backed CDOs (CLOs) played a key role in financing billions of dollars of restructuring deals such as stock repurchases, mergers and acquisitions, and leveraged buyouts around the world. 40% of all buyout deals done between 1997 and 2007 took place after 2004 (Kaplan and Strömberg, 2009), a period that coincided with heavy CDO issuance. At the same time, the segment of the loan market backed by CDO funds in general showed an unprecedented relaxation of credit standards. The average size of LBO financing went up from \$154.8 billion in 2001 to \$936.3 billion in the first half of 2007. Covenant-lite financing, barely used before 2006, grew to 19% of all bank debt outstanding before the financial crisis, while the average spread (paid over LIBOR) fell from 332 bps at the beginning of 2004 to 235 bps in the first quarter of 2007.<sup>2</sup> While initial wave of the downgrades affected CDOs collateralized by mortgage-backed securities, by July 2007 there was a lingering concern that strong demand for securitizable assets may have led to risky lending in the corporate sector as well.

*In the old days of relationship banking, banks relied on credit quality control and huge balance sheets to ride out any problems, but CLO investors may be more short-term*

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<sup>1</sup> Securities Industry and Financial Markets Association (SIFMA), Global CDO Market Issuance Data, [http://www.sifma.org/research/pdf/SIFMA\\_CDOIssuanceData2008q2.pdf](http://www.sifma.org/research/pdf/SIFMA_CDOIssuanceData2008q2.pdf).

<sup>2</sup> See “Sponsored Elixir Loses Potency”, *Reuters*, July 2, 2007; “Covenant-Lite Loans Face Heavy Hits”, *Wall Street Journal*, March 18, 2009; “Equity Sponsors: Gatekeepers of the Issuer-Friendly Leveraged Loan Market”, *Reuters*, April 2, 2007.

*oriented. Lack of credit quality control by some managers of CLOs is particularly frightening to veteran private equity investors. "What all of this will show - and it will show more as CLOs become more popular - is that risk management has not been very well practiced," said billionaire financier Wilbur Ross, founder of private equity firm WL Ross & Co. "That's going to hurt a lot of people, and will ultimately explode the bubble."*<sup>3</sup>

In this paper, we investigate whether securitization was associated with risky lending in the corporate loan market by examining the performance of loans held in CLOs' portfolios following securitization. In particular, we focus on two key incentive and informational frictions underlying the loan securitization process that might lead to the selection of loans with worse fundamentals.

We start by examining the role of the CLO manager (usually an investment firm). CLOs are not the only non-bank investors in the loan market; other investors include hedge funds and mutual funds, among others.<sup>4</sup> However, CLO managers may have the weakest incentives to screen and monitor loans for several reasons: (i) CLOs are conduits and not ultimate investors, and the typical CLO manager's compensation does not depend on loan performance; (ii) models used by rating agencies to estimate the default risk of CLO securities rely primarily on credit rating to measure the riskiness of the underlying collateral (see Benmelech and Dlugosz, 2009). In the absence of reputational concerns or independent screening mechanisms, CLO managers

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<sup>3</sup> "Seeds of Credit Crunch Grow in LBO Loan Market," *Reuters*, 19 June 2007. Also, "Easy Money: Behind the Buyout Surge, a Debt Market Booms -- CLOs Spark Worries of Volatility and Risk; Loan Standards Loosen," *The Wall Street Journal*, 26 June 2007: *Investors searching for higher yields have put so much money into CLOs that even weak companies can get loans at relatively low interest rates... These days, banks that arrange large buyout financings hold on to very little of the loans themselves. Bank underwriting standards have slipped as banks have become mere intermediaries.*

<sup>4</sup> Since 2000, CLOs were the largest institutional investor in the leveraged segment of the loan market (S&P Leveraged Lending Review 4Q08). However, even at the peak of the credit cycle, first half of 2007, CLOs purchased only 45% of the primary leveraged loan issuance. 28% of LBO and other highly leveraged loans were funded by banks and 15% by hedge funds.

have an incentive to choose riskier loans within a given credit rating. Focusing on the sample of loans likely to be held by institutional investors, we find that borrowers whose loans are securitized are more leveraged than unsecuritized borrowers at origination. However, controlling for firm characteristics, securitized loans perform better than unsecuritized loans in the year after the loan sale, according to credit ratings and market-assessed probability of default (as reflected by CDS spreads).

The second set of our results investigate the role of the CLO underwriters -- primarily banks. In a typical CLO, both the underwriter and the portfolio manager are responsible for screening the quality of the loans used as collateral, which potentially alleviates the adverse selection problem in the securitization process. However, some banks that underwrite CLOs also arrange loans in the primary market. Underwriting a CLO potentially provides a lending institution with the opportunity to pass bad loans to CLO investors, as there is one less screener of loan quality at the CLO level. By studying loans for which the selling institution is also the underwriter of the CLO to which the loan is being sold, we focus on the CLO market margin that is most prone to adverse selection and agency problems. Within a given CLO portfolio, we find some evidence that loans arranged by the bank that acts as the CLO underwriter underperform other loans in the portfolio. Controlling for observables at the time the loan was purchased, loans originated by the CLO underwriter are significantly more likely to be downgraded and less likely to be upgraded than other loans in the portfolio.

Based on observables, our findings cast doubt on the commonly held belief that corporate loans sold to CLOs are of worse quality than unsecuritized loans. However, we find that agency problems exist for a subset of securitized loans, when a loan is purchased by a CLO underwritten by the loan lead arranger. This suggests that CDO underwriters potentially play an important

role in certifying the quality of assets in securitized pools. While our paper is related to a growing literature that investigates the effect of securitization on screening standards, (Keys, Mukherjee, Seru and Vig (2008), Nadauld (2008) and Drucker and Mayer (2008)), we do not find any evidence that securitization leads to less screening. However, it is important to note that the previous literature focuses on the securitization of mortgage backed securities, while our paper examines corporate loan securitizations.<sup>5</sup> Our results are consistent with Shivdasani and Wang (2009) who examine LBO loans backed CDO funds and found that these deals generated more free cash flows, paid more taxes, and were less risky than LBO deals originated in 1980s.

Our findings provide broader insights about structured finance products. Specifically, they indicate that adverse selection of collateral is not an inevitable consequence of securitization. While previous studies have found that securitized mortgages perform worse than non-securitized mortgages – we find no evidence that loans sold to CLO investors are worse quality than loans sold to other institutional investors. One potential explanation for the different findings across loan and mortgage securitizations has to do with asset size. Since mortgages are much smaller than corporate loans they tend to be sold in one piece to issuers of mortgage-backed-securities. On the other hand, corporate loans are much larger and are typically sliced into multiple pieces that are sold (or syndicated) to other banks and institutional investors, and not only to CLOs.<sup>6</sup> In addition, the bank that originated the loan typically retains a fraction of the loan on its balance sheet (Ivashina, 2009) and each underlying loan is rated. Large corporate loans, therefore, involve multiple screeners who check the loan quality and more market

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<sup>5</sup> Several papers have documented the benefits of securitization. Loutskina (2006) and Loutskina and Strahan (2007) show that securitization decreases the sensitivity of lending to banks' financial conditions.

<sup>6</sup> According to the S&P LCD Quarterly Review, at the peak of the corporate credit boom (the first half of 2007) 28% of leveraged loan volume (including LBOs) was financed by banks. That is, 72% was financed by institutions of which 63% was purchased by CLOs (i.e., 45% of the total volume was financed by CLOs).

participants whose reputation is at stake. In contrast, mortgages can more easily bypass the different monitoring screens imposed by investors as there are fewer of them. These findings have implications for the design of securitized assets, indicating that skin in the game on the part of the originator and distribution among investors may alleviate concerns about adverse selection in collateral pools.

It is worth noting that many CLOs were downgraded or placed on negative credit watch in 2009.<sup>7</sup> These actions were triggered by deterioration in the quality of the underlying loans caused by the broad economic downturn (i.e., an increase in systemic risk). We stress that our findings *do not* imply that securitized loans should perform well in absolute terms, but rather that securitized loans should not perform worse than other non-investment grade loans syndicated to non-banks. This leaves open the possibility that *all* leveraged loans are of an intrinsically worse quality than believed at the time of loan origination and that we will continue seeing defaults. By design, CLOs primarily acquire non-investment grade securities and thus the securitized pool of loans should be expected to underperform the overall population of loans.

More broadly, our paper contributes to the extensive literature on financial intermediation and how loan sales and syndications affect lenders' incentives to screen and monitor borrowers (Diamond and Rajan, 2001; Pennacchi, 1988; Drucker and Puri, 2009; Ivashina, 2009).

The rest of the paper is organized as follows. The first section reviews institutional details on CLOs and the process of securitizing corporate loans, highlighting the key frictions of the process. The second section lays out the testable hypotheses and section three describes the data. Section four presents the empirical results, and section five concludes.

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<sup>7</sup> See "Ratings on 138 Cash Flow CLOs Placed on Negative CreditWatch (S&P)", *Reuters*, March 24, 2009 and "Moody's Completes Stage I of CLO Review", *Reuters*, 27 March 2009.

## I. Background

The first CLO completed by a U.S. bank was structured in late 1997. Since then, the CLO market has experienced explosive growth, reaching \$170 billion in 2006. Table I provides statistics on the size of the CLO market relative to the CDO market as a whole. From 2004 through 2008, 30% of CDOs issued globally were backed by high yield (or leveraged) corporate loans. These CLOs, also known as “cash-flow” or “cash” CLOs, are the focus of our paper.<sup>8</sup>

*[TABLE I]*

To understand potential conflicts of interests underlying securitization it is important to understand the details of the securitization process (see Figure 1). A CLO’s collateral manager, usually an investment management company, sets up a bankruptcy-remote special-purpose vehicle (SPV). The SPV then acquires a portfolio of corporate loans, engages with the credit rating agency to structure and rate the deal, and issues securities to investors backed by the principal and interest payments from the loans. As in other types of CDOs, the distinctive feature of a CLO is the tranching of its liability structure. CLOs have several classes of investors whose claims to the underlying assets are prioritized. Thus, proceeds from principal and interest payments on the underlying loans are distributed to CLO investors in order of seniority. Investors are impacted by defaults in the underlying collateral pool only after subordinate classes have been exhausted.

There are several structural similarities between asset-backed securitizations (ABS) and corporate loans securitizations.<sup>9</sup> However, it is important to stress that unlike ABS corporate loans are only partially securitized. Corporate loans are significantly larger than ABS and,

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<sup>8</sup> Approximately 55 percent of CDO global issuance is backed by collateral that is itself structured (e.g., residential and commercial mortgages-backed securities, asset-backed securities, credit default swaps, or other CDOs). Mortgages are usually pooled into pass-through securities before they are purchased by CDOs.

<sup>9</sup> More details on the ABS securitization process can be found in Ashcraft and Schuermann (2008).

therefore, fractions of the same underlying loan are simultaneously held by multiple CLOs, as well as by other institutional investors and banks. In what follows, we refer to loans with CLO investors as securitized loans or loans sold to CLO investors.

*[FIGURE 1]*

The key friction underlying the securitization process is the information asymmetry that exists between the loan originator and the CDO arranger about the quality of the loans. Corporate loans acquired by a CLO are typically syndicated; that is, they are originated by a lead bank which retains a fraction of the loan, and sells the rest to the other banks and institutional investors. CLOs can purchase loans at the time of syndication, or in the secondary market. According to Loan Syndications and Trading Association (LSTA), structured investment vehicles represent approximately 60% of institutional participation in the primary loan market. A lead bank can structure a CLO backed by originated loans to further reduce its risk exposure. However, the Securities Industry and Financial Markets Association (SIFMA) reports that in 2007, 97% of corporate loans CLOs were structured by financial institutions that did not originate loans and instead acquired pieces of loans at syndication or in the secondary market with the purpose of securitization. This type of CLOs is referred to as an “arbitrage CLO.”

In general, loan syndication could lead to weaker screening standards as originating banks have incentives to underwrite marginal loans to bring in lucrative fees – e.g., by generating advisory revenue on mergers and acquisitions (M&A) or leveraged buyouts (LBOs) – and to maintain relationships with important clients, like private equity firms. In addition, reduced risk exposure could diminish banks’ incentives to monitor the loans ex-post. Accordingly, there are several mechanisms that ameliorate asymmetric information problems between the lead bank (the primary information gatherer) and syndicate participants. Such mechanisms include the

reputational concerns of the lead bank and the implicit requirement that the lead bank retain a share of the loan on its balance sheet (Ivashina, 2009).

In this paper, we focus on the relative quality of the syndicated loans acquired by CLOs. In particular, we ask whether loans sold to CLOs perform worse than loans sold to other institutional investors. CLOs differ from other institutions that participate in the high yield loan market because their demand for assets is driven almost solely by credit spread and rating. In arbitrage CLOs, the most junior tranche (equity tranche) is typically sold to investors rather than being retained by the CLO manager (also known as the arranger). Thus, the CLO manager rarely has a stake in the SPV, and instead receives a fixed fee for collateral selection and management. The arbitrage CLO manager's goal, therefore, is to structure a transaction that achieves the minimum cost of funding for the highest-yielding collateral.<sup>10</sup> A CLO's cost of funding is largely determined by the ratings given to the notes that it issues. Rating agency models use only basic indicators of credit quality to assess the default risk of CLOs' underlying collateral.<sup>11</sup> In other words, loans within a given rating class are treated as equally risky. As a result, a CLO manager might end up holding worse quality loans within a given rating class because they offer a higher spread, but do not raise his cost of funding.

Once a deal has been rated and issued, however, the fee-maximizing manager faces two constraints. Deterioration in collateral quality (i.e., downgrades in the collateral) can force the manager to buy new collateral or else pay down notes. Hence a CLO manager cares about deterioration in the ratings of the collateral assets because too many downgrades could lead to

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<sup>10</sup> Benmelech and Dlugosz (2009) show that the median CLO invests in a portfolio of B+ rated loans on average and funds itself with 73% AAA-rated liabilities, 8% unrated equity, and the rest in notes rated AA-BBB. Spreads on B-rated loans have ranged from 250 to 350 basis points over LIBOR in the recent past while the average AAA-rated CLO tranche pays 32 basis points over LIBOR.

<sup>11</sup> At least one rating agency model primarily used rating, maturity, seniority, jurisdiction, and industry to compute an expected loss distribution for the underlying collateral. Benmelech and Dlugosz (2009) and Coval, Jurek, and Stafford (2008) provide extensive detail on rating models.

deal termination. The manager also faces a reputational constraint.<sup>12</sup> When assets in the collateral pool miss payments or default, the deal's equityholders bear the loss. If equityholders do not earn an adequate return, the manager may have difficulty selling the equity tranche in future deals. Both of these constraints should attenuate the conflict of interest between the CLO manager and CLO investors in the selection of the collateral.

In addition to the collateral manager, a CLO has an underwriter (typically a bank) responsible for screening the loan portfolio and working with the rating agencies to get CLO tranches rated, priced, and allocated. In an essence, the role of the underwriter in a CLO is similar to stock or bond issuance underwriting.<sup>13</sup> As compensation, the underwriter receives a fee on the notional value of the deal. While the collateral manager has formal authority over asset selection, the underwriter may exert influence over collateral choice. Presence of an underwriter should improve the screening of the underlying collateral. However, the underwriting banks may use this channel to sell fractions of its riskier loans to CLOs. We estimate that roughly 10% of loans sold to CLOs were originated by the CLO underwriter.

## **II. Testable Hypotheses**

In summary, among institutional investors who buy loans, CLOs potentially have the weakest incentives to screen and monitor borrowers for two reasons: (i) the management fees do not depend on the CLO performance, and (ii) models used to rate the loan portfolio use the most basic indicators of borrower quality, primarily relying on the credit rating of the underlying assets. Loss of reputation, threat of deal termination, and the presence of the CLO underwriter

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<sup>12</sup> In 2008, S&P started to explicitly highlight managers' experience and record as one of the mitigating factors in addressing risks underlying CLO structure (e.g., S&P Harbourmaster CLO 11 B.V. Presale Report).

<sup>13</sup> CLOs are typically underwritten on a best efforts basis (LSTA, 2007).

should counteract the CLO manager's incentive to choose riskier loans within a given credit rating. However, if these mechanisms are not sufficient, we expect that loans sold to CLOs will perform worse than loans sold to other institutional investors, controlling for observables at the time of sale. This leads us to the first hypothesis:

*Hypothesis 1:* If CLOs use more lenient screening standards, they will end up holding worse quality loans than other loan investors.

To test this hypothesis we compare the performance of the loans acquired by CLOs (securitized loans) to loans with similar characteristics that do not have CLO investors (unsecuritized loans). The implied assumption behind our test is that there is no ex-ante unobservable difference between loans with and without CLO investors. To relax this assumption, in an unreported test, we also look *within* the sample of the loans with CLO investors and test whether, controlling for loan size, the number of CLOs in the syndicate or the share of the loan allocated to CLO investors predicts future loan performance. Because corporate loans are not fully securitized and are held by other investors including banks, we expect that larger CLO presence will be associated with worse quality loans. However, the intensity of CLO investment has no predictive power for performance in our regressions.

We use three measures of performance to test the first prediction: (i) borrower accounting performance as measured by return on assets, (ii) credit rating changes, and (iii) changes in market-assessed probability of default as measured by changes in CDS spreads. We look at performance in the two years following the acquisition of the loan by a CLO. Accounting measures are only available for publicly traded companies; however, a large fraction of

securitized loans, and institutional loans in general, are financing LBO transactions for which post transaction accounting data does not exist. To address this issue, we also examine the evolution of the borrower's credit rating. The limitation of the credit rating as a measure of performance is that, when choosing collateral, a CLO manager may try to select loans that are likely to have stable ratings because credit rating deteriorations can trigger additional collateral requirements which would bias against finding any results. Finally, we look at the changes in CDS spreads. CDS quotes are not available for all of the loans in our sample, but they provide us with a forward looking measure of borrower performance not restricted only to publicly traded companies. None of these performance measures is perfect, however taken together the three different measures should capture some aspects of performance.

Our data also allows us to refine the first prediction and focus on loan sales that are especially prone to adverse selection and agency problems. As described in the previous section, some banks participate on both sides of the loan market – originating loans for borrowers, and at the same time, underwriting CLOs that buy them. A bank that underwrites CLOs may find it easier to sell bad loans from its balance-sheet to its own CLOs, as there is one fewer monitor of loan quality at the CLO level. Put differently, even if CLOs do not end up with worse quality loans than other loan investors on average, they may end up with worse quality loans when they buy them from the underwriter of their deal.

*Hypothesis 2:* Among loans purchased by CLOs, those that are arranged by the bank underwriting the CLO are worse quality than other securitized loans.

As before, we test the second hypothesis by using three measures of performance – (i) accounting performance, (ii) credit rating changes, and (iii) changes in CDS spreads. CLOs can buy loans from their underwriter in the primary market (at syndication), or in the secondary market. Since we cannot identify the seller of loans purchased by CLOs in the secondary market, we focus on the sample of the loans acquired on the primary market. In particular, we test whether loans bought at syndication from the CLO underwriter (roughly, 10% of the loan-CLO sample) underperform other loans purchased at syndication.

If CLO collateral managers are aware of the asymmetric information problem, they should adjust the price they are willing to pay for their underwriter’s loans to account for the lemons problem. For example, Kroszner and Rajan (1994), studying securities underwriting prior to the passage of Glass-Steagall in 1933, found that securities underwritten by universal banks were discounted relative to securities issued by pure investment banks due to the conflicts of interest involved when a bank lends to and underwrites securities of the same company. We do not observe transaction prices in the secondary loan market. Restricting the sample to loans purchased at the time of syndication allows us to overcome this problem by controlling for the loan spread.

Finally, we expect to find greater agency problems when the collateral manager is relatively inexperienced or has a weaker relationship with the underwriting bank. We test for these interactions as well.

### **III. Data**

#### *A. Sample construction*

We construct a sample of CLOs by collecting the CLO name, issue date, underwriter, and collateral manager from three sources: (i) Reuters CDO pipeline, (ii) S&P's Quarterly CDO Deal List, and (iii) S&P RatingsDirect. The S&P Deal List and RatingsDirect have substantial overlap but there are some transactions that appear exclusively in one or the other. The Deal List summarizes all global CDOs rated by S&P from September 1994 to March 2007. RatingsDirect is a real-time database of the agency's ratings which allows us to identify more current deals but it drops information on CLOs when they mature or have their ratings withdrawn. Reuters tracks CLOs that invest in loans more generally, regardless of what agency rated them, and is available from 2006 forward.

We assemble a dataset that identifies loans contained in specific CLOs. Our starting sample is all institutional loans to U.S. companies in the Reuters' DealScan loan origination database identified as Term loan B or C.<sup>14</sup> We also include all term-loans that have a credit rating and have non-lending institutions, such as hedge funds, mutual funds, pension fund distressed funds, or structured financial vehicles in the lending syndicate. Generally speaking, there are two distinct investors groups in the loan market: banks (the traditional investors) and institutional investors (LSTA, 2007). Institutional investors, including CLOs, primarily participate in the non-investment grade (leveraged) segment of the loan market and compete for the same loans.<sup>15</sup> Thus, our sample of institutional loans includes loans that are likely to be considered by a CLO investor. Holding non-investment grade loans on the balance sheet is expensive to banks as they are required to put up capital to support their investments on a risk-

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<sup>14</sup> Term loans are installment loans (like mortgages or student loans) typically issued for specific corporate purposes. Term loans B and C are specifically structured for nonbank, institutional investors. These loans are typically fully funded, have longer maturity, and have a credit rating.

<sup>15</sup> For more details see, Ivashina and Sun (2008) and Nini (2009).

adjusted basis. That is the main reason as to why institutional participation is so important for the leveraged loan market.

We use two methods to tie loans to CLOs. First, CLOs often invest in a loan at origination. The list of the original lenders and other information available at the loan origination is collected by DealScan. Thus, we check the names of the syndicate investors to determine if a piece of a given loan was acquired by a CLO. The identity of the investors is cross-checked with our list of CDOs.<sup>16</sup> However, looking at primary market data alone does not allow us to capture all of the loans held by structured financial vehicles, because loans can also be acquired on the secondary loan market. We detect secondary market loan purchases using SEC filings of loan amendments. The amendments are typically disclosed as part of the SEC filings, with signatures and identities of the lenders appearing at the bottom of the document. A material loan amendment, such as change in spread, pricing grid, repayment schedule, maturity or loan amount requires unanimous approval of all lenders.<sup>17</sup> We collect the data for the first material amendment for each loan in our starting sample and search the signers for CLOs. If we do not find any CLO investors in DealScan or on the amendment, a loan is labeled as “unsecuritized.” Loan amendments are available to us from 1997 through 2007; accordingly, we constrain the overall loan sample to this period. When examining performance one or two years after a loan was purchased by a CLO, we have to exclude later years from the sample. We include year dummies throughout the analysis to account for any year specific effect.

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<sup>16</sup> We checked the full list of non-bank investors reported in DealScan and not just those that contain “CDO” or “CLO” in the name. For example, we were able to classify “WhiteHorse III, Ltd.” and “Stone Tower VII” as CLO investors although it is not directly implied by the names.

<sup>17</sup> A discussion on the requirements of the syndicate voting and public disclosure of the amendments can be found in Ivashina and Sun (2007). On average, loans have a material amendment 7.5 months after the loan origination.

Overall we identify 302 securitized loans: for 188 (62%) we detect CLO investors *only* through DealScan; for 104 (34%) we find CLO investors through amendments in addition to the CLO investors picked up by DealScan; and for 10 loans we identify CLO investors only through amendments.<sup>18</sup> To examine loan performance after purchase by a CLO, we require that the CLO's issue date be available. We identify 555 unique CLO investors with issue dates available corresponding to 302 securitized loans (3,166 loan-CLO pairs). We define 231 institutional loans that were amended *and* did not have CLO investors at origination or at amendment, as “unsecuritized”; these loans constitute our control group.

On average, we identify 6 loans per CLO. The median size of a CLO issued during that period was \$460 million (Benmelech and Dlugosz, 2009) and the average minimum investment in the institutional loan market is \$5 million, hence, as a lower bound, six loans represent roughly 6% of the collateral pool. While we do not identify a large fraction of each CLO's collateral pool, we identify some loans for approximately 60% of outstanding CLOs. A likely explanation as to why we only observe a fraction of the CLO portfolio is the fact that we do not have continuous data on the secondary market purchases and we cannot detect loan warehousing (i.e., fractions of the loans that are temporarily held by banks or other institutions with a purpose of selling them to a CLO). Also, many CLOs are not 100% invested or hold bonds in addition to corporate loans. We discuss potential biases stemming from data limitations in the following sub-section.

Cash-flow CLOs purchase loans for collateral at various points in their lifecycle. The initial collateral pool is typically in place within six months of the transaction closing. Most CLOs are structured as ‘revolving pools’ that allow the manager to turnover 10 to 20% of the

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<sup>18</sup> Many loans are structured in multiple facilities. There is only one observation per loan in our sample. For the regression analysis, in case of multiple facilities, we look at the largest facility for spread, performance pricing provision, and maturity and we control for the overall loan size.

collateral per year for the first five to seven years of the typical twelve year life of a CLO. 55% of loan-CLO observations in our sample have the loan origination date more than six months after the CLO issue date, indicating that these loans were probably not a part of the original collateral pool.

### *B. Potential selection biases*

The first part of our analysis is based on a comparison of securitized (treatment group) and unsecuritized (control group) loans; therefore, it is important to consider whether our data collection method has introduced any selection biases.

To ensure that loans in the control group were not sold to a CLO in the secondary market, our control group is constrained to loans with amendments.<sup>19</sup> Yet, our treatment group includes loans with and without loan amendments, as long as they had a CLO investor at the origination. If amended and unamended loans are fundamentally different, that could bias the results. However, it is unclear whether the presence of an amendment reflects positive or negative news.<sup>20</sup> If observable amendments are a reflection of successful renegotiations and loans without amendments in fact reflect failed renegotiations, then our control group is on average of better quality. Alternatively, if most of the firms soliciting amendments and receiving amendments are troubled firms, then our treatment group is on average of better quality. We address this issue by re-examining the results in the subsample where treatment and control group were constrained to the sample with loan amendments. The results remain qualitatively the same.

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<sup>19</sup> This is a conservative criterion because all but ten loans that had CLO investors at the loan amendment also had CLO investors at the loan origination; that is, presence of a CLO investor at the loan origination is a reliable proxy of whether the loan is securitized.

<sup>20</sup> Ivashina and Sun (2007) find that on average abnormal return on the stock or secondary loan market around loan amendments is zero as a result of offsetting reactions within the sample.

Although we collect the first amendment for each loan, there is potential concern about misclassifying loans as unsecuritized (type I error) because we only detect CLO ownership when an amendment requires unanimous agreement. Only material loan amendments require the approval of all lenders. A covenant waiver, for example, can be approved by a majority vote. Given that existence of a material loan amendment is likely to be correlated with loan quality, we could experience further selection problems. Specifically, we are concerned that all of the loans in our analysis are eventually securitized, but because some of them do not face a material amendment they are classified as unsecuritized. However, this is unlikely to be the case, given that the majority of our loan-CLO pairs are identified via DealScan rather than loan amendments, which should mitigate selection concerns. In the full sample, 71% of loan-CLO observations come from DealScan data and 29% come from loan amendments. At the loan-level, there are only 10 securitized loans (3%) whose identification as such relies purely on amendment data.

Similarly, it could be case that some of the participants in the lending syndicate are simply “warehousing” loans, that is they acquired loans with the intention of structuring a CLO later. In this case, the original syndicate might not list CLO investors, despite the fact that the loans would ultimately be allocated to a CLO. This again would lead us to misclassify securitized loans as non-securitized loans and would bias against finding differences in performance between the two groups. However, we classify loans as securitized if there is at least one CLO investor in the lending syndicate. Given that loan warehousing is likely to be correlated with a direct investment by a CLO, the selection bias would be reduced. Furthermore, the second part of our analysis compares the quality of securitized loans purchased from the CLO underwriter to securitized loans in general. Since this test is conducted within the subset of securitized loans, it is insulated from selection concerns.

### *C. Summary statistics*

Table II, Panel A presents summary statistics on the loans in our sample. Institutional loans are large loans made to large borrowers; the average loan size is \$617 million and the average borrower has \$2.4 billion in assets and \$1.9 billion in sales at the time of loan origination. Generally speaking, loans purchased by CLOs are non-investment grade loans with ratings in the BB or B range.<sup>21</sup> The securitized loan sample we have collected conforms to that description; the top quartile and median loan rating in our sample is BB- and the bottom quartile is B+. 99% of loans in our sample are senior secured.

There is a close link between institutional loans and LBO activity. Almost 40% of the loans in the sample are used to finance LBOs. Loans with CLO investors are more likely to be LBO loans than loans without CLO investors, but the percentage of loans without CLO investors that finance LBOs is still large at 33%. Overall, securitized loans are not significantly different from institutional unsecuritized loans in terms of loan and borrower characteristics. Securitized loans are smaller than unsecuritized loans on average but loan spreads and borrower ratings are similar across the two subsets. Securitized loans pay an average spread of 304 basis points over LIBOR and unsecuritized loans pay an average of 306 basis points over LIBOR.

Table II, Panel B presents a more extensive description of the borrowers, using Compustat data for the fiscal year ending prior to loan origination. The average borrower in our sample has a leverage ratio of 50% and 12% return on assets. Borrowers whose loans were securitized have significantly higher leverage and lower interest coverage than unsecuritized borrowers. Only interest coverage remains significantly different after industry adjustment.

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<sup>21</sup> Benmelech and Dlugosz (2009) find that CLOs are typically backed by collateral pools with a weighted average rating of BB-/B+/B. Many restrict the amount of securities rated below CCC+ to 5-7 percent of the pool, suggesting that the average loan put in a CLO has a BB or B rating.

[TABLE II]

Table III examines whether ex-ante loan and borrower characteristics can predict securitization; this repeats the analysis in Table II in a multivariate setting. We estimate a probit model where the dependent variable is a dummy equal to one if a loan was securitized and zero otherwise; the independent variables are loan and borrower characteristics at origination. Larger borrowers with higher industry-adjusted leverage are more likely to have a CLO investor. A one standard deviation increase in the log of borrower assets (1.3) is associated with a 9.1 percentage point (16%) increase in the probability of being sold to a CLO. A one standard deviation increase in industry adjusted leverage (0.35) is associated with a 5.3 percentage point (9%) increase in the probability of securitization.

[TABLE III]

In the sample of institutional loans, loan spread and credit ratings are insignificant in predicting the presence of a CLO investor. Loans sold to CLOs appear ex-ante riskier than unsecuritized loans in some respects (higher leverage, lower interest coverage) and less risky in others (larger companies). When we constrain the sample to amended loans, specification (5), leverage at origination is no longer a significant determinant of securitization. LBO loans and M&A loans are no more likely to be securitized, but debt repayment loans are less likely to be securitized. Overall, based on observables, we do not find strong ex-ante differences between loans sold to CLOs and loans sold to other institutional investors. This is consistent with the belief that institutional loans in general are a pool of potential investments for CLOs.

#### **IV. Results**

##### *A. Hypothesis I: Does Securitization Predict Performance?*

Since collateral managers can observe ex-ante loan and borrower characteristics, the results of the previous section do not necessarily suggest an information asymmetry problem. In this section we test whether loans sold to CLOs are unobservably worse quality than loans sold to other institutions. To do this, we examine whether securitization predicts future performance, controlling for observables at the time the CLO buys the loan. The unit of observation for the analysis is a loan-CLO pair because different CLOs can acquire the same loan at different points in time.<sup>22</sup> We set the securitization date for a loan-CLO pair equal to the later of the loan origination date and the CLO issue date. For nearly 70% of loan-CLO observations, the loan began after the CLO was issued, so the securitization date is the same as the loan origination date. To account for multiple observations per loan, the standard errors are clustered at the loan level throughout the analysis.

We match each loan-CLO pair in our data (treatment loans) to comparable unsecuritized loans (control loans) and compare performance around the date the treatment loan was purchased by the CLO. The intuition behind this approach is to compare each loan purchased by a CLO to other loans it might have purchased instead. Our matching process requires the following: (i) the matched loan must be outstanding at the time the treatment loan was securitized; (ii) the matched loan must have similar time-to-maturity remaining ( $\pm 1.5$  years); (iii) the matched loan must have been originated around the same time ( $\pm 2.5$  years).<sup>23</sup> In addition, we require that the matched loan is originated by the same lead arranger as the securitized loan in question. This allows us to control for unobservable originating-bank characteristics. We are able to find at least one matched loan for 2,245 out of 3,166 loan-CLO observations (71% of observations). The

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<sup>22</sup> Because we do not observe the actual date a CLO purchases a loan, so we proxy for it using the loan origination date and the date the CLO was issued.

<sup>23</sup> The results are robust to alternative combinations and ranges of the matching criteria.

median loan-CLO observation is matched to three unsecuritized loans. We refer to the date in which the treatment loan was securitized as the ‘event date’, and we measure the performance of the treatment loan and the control loans in a window around this date.

Table IV compares borrower returns on assets (ROA) around the event date for loans chosen by CLOs and matched loans that could have been chosen instead. ROA is industry-adjusted by subtracting the median ROA of firms within a 2-digit SIC code. Table IV, Panel A reports the univariate results. Borrowers whose loans are sold to CLOs have significantly higher industry-adjusted ROA than the matched loan borrowers in the year of the event and up to two years afterwards.

Table IV, Panel B explores this comparison in a multivariate setting. The dependent variable is post-event industry-adjusted ROA and the key explanatory variable is a dummy indicating whether the borrower’s loan was sold to a CLO. All regressions control for loan and borrower characteristics that were observable at the time of the sale. Although the coefficients are statistically insignificant, the sign of the estimates consistently indicates that borrowers whose loans were sold to CLOs outperform borrowers in the control sample in each of the three years after the event date.<sup>24</sup> In the first year, borrowers whose loans were sold to CLOs have industry adjusted ROA that is 0.2 percentage points (7%) higher than borrowers in the control sample on average. The outperformance of the securitized group is larger in each of the following two years; on average, securitized borrowers have industry adjusted ROA that is 1 percentage point (33%) higher than unsecuritized borrowers in each of the next two years. The

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<sup>24</sup> The 95% confidence interval for the “in CLO” coefficient in each these regressions is: [-0.01, 0.01], [-0.007, 0.03], and [-0.01, 0.03], respectively. While underperformance of loans sold to CLOs is possible (there are some negative values within the confidence intervals), overall it appears that outperformance is more likely. The t+1 and t+2 coefficients are more likely to be positive than negative. In future regressions, we do not discuss confidence intervals because of the difficulty in aggregating them over multiple specifications, i.e. the union of several 95% confidence intervals is not a 95% confidence interval.

difference in performance between the second and third years should be interpreted carefully because of survivor bias; companies that perform better are more likely to have ROA information available over a longer horizon. The number of observations drops from 9,136 at time  $t$  to 8,471 at  $t+1$ , to 7,325 at  $t+2$ . We obtain similar results after limiting the sample to amended loans (see Appendix).

Overall, borrowers whose loans are purchased by CLOs outperform matched loan borrowers unconditionally, and there is weak evidence of outperformance after controlling for observables. Taken together, and contrary to the first hypothesis, our results suggest that borrowers with securitized loans do not underperform borrowers with unsecuritized loans as measured by ROA.

[TABLE IV]

Next, we examine whether securitization can predict downgrades or upgrades in borrowers' credit ratings. Credit ratings of the underlying collateral are central to the CLO model used by rating agencies. A CLO that experiences too much deterioration in the ratings of its underlying assets could run into trouble for several different reasons. Rating agencies periodically monitor the credit quality of CLOs' underlying assets by re-running the rating model at regular intervals after issuance. In addition, most CLOs include covenants that restrict the manager's asset allocation by credit rating.<sup>25</sup> Violating these covenants or failing a ratings test can trigger accelerated pay-down of the notes or require the manager to adjust the collateral pool through sales and purchases. Using credit rating as a measure of future performance potentially introduces a bias against finding downgrades for the securitized loans as CLO managers might pick borrowers that are likely to have stable ratings. In Table V, we look separately at upgrade

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<sup>25</sup> Covenants may take the form of weighted-average rating requirements or basket-type allocation requirements, e.g., no more than 7% of the portfolio can be rated CCC+ or lower.

and downgrade frequency and compare loans sold to CLOs with unsecuritized matched loans. The data comes from Reuters Gold Sheets and covers period between 2002 and June of 2009. Rating changes are measured based on a scale that combines Moody's and S&P senior secured ratings for the borrowers. Our rating scale incorporates credit watches so that 'downgrades' include placements onto negative credit watch and 'upgrades' include placements onto positive credit watch.<sup>26</sup>

Table V, Panel A presents the univariate results. We find that securitized loans are more likely to be upgraded than unsecuritized matched loans but the evidence on downgrades is mixed. Securitized loans appear more likely to be downgraded at short horizons and less likely to be downgraded at long horizons. Once we control for loan and borrower characteristics at the event date (Table V, Panel B), we find little support for the hypothesis that securitization predicts credit rating changes in either direction. Securitized loans are significantly less likely to be downgraded than unsecuritized loans in one specification. The first regression suggests that being purchased by a CLO decreases the probability that a loan is downgraded within the next year by 7 percentage points. However, the coefficient loses significance after controlling for the components of the Z-score (Altman, 1968).<sup>27</sup> The difference in results between Panels A and B is not driven by the sub-sample of firms with available accounting information.

[TABLE V]

Our third approach for measuring performance is to use CDS spreads. CDS data was provided by Markit for the period between 2003 and June 2009. CDS prices measure the cost an investor would have to pay to insure against a company's default. As a company's default risk

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<sup>26</sup> Letter ratings have been converted into a numerical scale (1=AAA, 2=AA+, 3=AA, etc.) where credit watch negative or positive counts at + or - 0.5, respectively. Borrowers are considered to be "downgraded" or "upgraded" when the numerical rating changes.

<sup>27</sup> The results are qualitatively the same when we constrain the sample to amended loans (see Appendix A).

risers, its CDS spread increases. The advantage of CDS data over accounting data is that CDS contracts will often continue to trade if a company is taken private. A large fraction of the loans in our sample are LBO loans, so measuring borrower performance with accounting returns in a long-term window introduces a severe constraint. Using CDS prices as a measure of performance reduces survivor bias; however, it limits analysis to the largest companies in the sample because only large companies have liquid CDS contracts. We use daily quotes for the CDS corresponding to the 5-year insurance on senior secured debt. For each of the borrowers in our sample that have CDS data, we calculate the percentage change in borrower's CDS spreads in a two year window after a given CLO acquired the loan. We use first and last CDS quotes in the event window to construct our measure.

Panel A of Table VI, compares the change in CDS spreads for securitized and unsecuritized borrowers in a univariate setting. Borrowers whose loans were sold to CLOs experience significantly larger increases in CDS spreads in the year after securitization, but there is no significant difference between the subsamples in the following year. Panel B presents the multivariate results. The dependent variable is the percentage change in CDS spreads over a given window following the event date. The central explanatory variable is a dummy indicating whether the loan was sold to a CLO. Controlling for the borrower's credit rating and lagged CDS volatility (calculated in the six months prior to the event date), we find that borrowers with securitized loans experience significant improvement in credit quality one year after the securitization as compared to borrowers with unsecuritized loans. The average increase in CDS spreads is between 72 and 85 percentage points lower for securitized borrowers than for unsecuritized borrowers, depending on the specification.<sup>28</sup> This is economically large, given that

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<sup>28</sup> Some of the borrowers in our sample experienced extremely large increases in their CDS spreads during the evaluation period. Since we are relatively confident in the quality of the Markit data, we present results that use the

the average percentage change in CDS spreads over this window is a 20% increase (the standard deviation is 99%). This result goes in the same direction as the downgrade result and rejects our first hypothesis. The results remain qualitatively the same when we limit the sample to amended loans (see Appendix).

[TABLE VI]

In summary, controlling for observables at the time of the loan acquisition by a CLO, securitized loans outperform similar loans from the same lead arranger that are unsecuritized in the year following the event. They are less likely to be downgraded and they experience larger decreases in CDS spreads. This finding contradicts our prior and leads us to reject the hypothesis that loans sold to CLOs, on average, perform worse than institutional loans without CLO investors. The results indicate that agency problems in securitization may be less important than commonly believed. Despite the fact that CLOs are subject to additional layers of agency and adverse selection problems, their investment choices appear no different than the investment choices of other non-lending institutions (in terms of ex-post performance). Naturally, this result relies on the assumption that securitized and unsecuritized loans are an apples-to-apples comparison.

*B. Hypothesis II: When the CLO Underwriter is a Loan Arranger*

In this section, we examine the performance of a subset of securitized loans for which we expect agency problems to be particularly pronounced. Some CLO underwriters participate on both sides of the loan market – arranging loans and underwriting (and sometimes managing)

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data as-is. However, the results are qualitatively unchanged if we winsorize the CDS spreads at the 1% or 5% levels. Winsorizing at the 1% level produces the following coefficients and t-statistics for the in CDO dummy in the four specifications, respectively: -0.63 (1.77), -0.63 (3.38), 0.54 (0.52), 0.82 (0.87). Winsorizing at the 5% level: -0.09 (0.03), -0.33 (1.96), 0.05 (0.43), 0.11 (0.95).

CLOs that purchase loans for collateral. This presents the greatest opportunity for a bank to sell poor quality loans to a CLO, because there is one fewer monitor of loan quality at the CLO level. A bank that underwrites CLOs and arranges loans faces a conflict of interest between its duty to the collateral manager and its desire to find investors for its syndicates. It would be easiest for the bank to deceive its own CLOs (the CLOs it has underwritten) about loan quality, rather than other CLOs whose independent underwriters will be assessing the loans.

We test whether loans bought at syndication from the CLO underwriter underperform other loans purchased at syndication. Since we cannot identify the seller of the loan in secondary market purchases, we limit the sample to primary market purchases for this part of the analysis.<sup>29</sup> We separate primary market purchases of loans by CLOs into two groups: cases where the loan arranger is the CLO underwriter (*same bank*) and cases where the loan arranger is different from the CLO underwriter (*different bank*). Then we compare post-securitization borrower performance across the two types of loans, within a given CLO portfolio, using our three different performance measures. Given that our comparison is between two groups of securitized loans, it is unlikely that the results are driven by unobservable factors that might explain why some loans are securitized. Additionally, we only include CLOs that have a clearly identified underwriter. Thus, by studying the intensive margin of securitization we alleviate some of the concerns about the endogeneity of the securitization decision itself.

Table VII examines borrower ROA in the three years following securitization. Panel A shows no significant performance difference between the two groups, except that borrowers whose loans were sold to a CLO underwritten by their lead arranger (*same bank*) perform unconditionally better than other securitized borrowers in the third year after securitization.

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<sup>29</sup> This ensures that the arranging bank is selling the loan to the CLO.

Although there is no reason why survivor bias would favorably affect the *same bank* loans, we should note that the sample size drops from 1,817 at the time of securitization to only 1,586 by year three. We will re-examine long-term performance more carefully using a measure that should have less survivor bias – CDS spreads.

In Panel B of Table VII, we examine post-securitization borrower ROA in a multivariate setting. We regress borrowers' ROA (industry adjusted) on a dummy indicating whether their loan was sold to any CLOs underwritten by the lead arranger (*same bank*), controlling for observable characteristics at the time the loan was sold. These regressions, and all other regressions in this section, include CLO fixed effects so that we compare the performance of loans within a given CLO portfolio, depending on whether they were purchased from the CLO underwriter. We find that *same bank* borrowers perform worse than other borrowers in the two years following securitization, but this result is not statistically significant. Consistent with the univariate results, in the third year following securitization, loans originated by the CLO underwriter outperform the rest of the CLO portfolio but the coefficient is not statistically significant.

[TABLE VII]

Table VIII examines whether securitization by lead arranger predicts borrower downgrades or upgrades after securitization. Panel A presents the unconditional downgrade and upgrade frequencies. Borrowers whose loans are sold to CLOs underwritten by their lead arranger are significantly less likely to be downgraded or upgraded than other securitized borrowers at some horizons. Table VIII, Panel B presents the multivariate results. After controlling for loan and borrower characteristics at the time of securitization, we find that *same bank* borrowers are significantly more likely to be downgraded and less likely to be upgraded

one to two years after securitization than other loans within the CLO portfolio. While the regression result for downgrades goes in the opposite direction from the univariate statistics on downgrades, this reversal not driven by the availability of accounting data. The univariate results are qualitatively the same whether we condition on the availability of accounting data or not.

[TABLE VIII]

In Table IX, we examine the post-securitization change in borrowers' credit quality using CDS spreads. Because of the small number of observations, we eliminate industry fixed effects in the first two specifications. Controlling for the borrower's credit rating at the time of the loan sale and lagged CDS volatility, we find no significant difference in performance between the two sub-groups.<sup>30</sup>

[TABLE IX]

Our results provide some support for our second hypothesis and suggest that conflicts of interest may exist when banks that arrange loans also underwrite CLOs. Loans purchased from the CLO underwriter at syndication perform significantly worse than other loans (in the same CLO portfolio) purchased at syndication according to credit ratings, but not accounting returns or CDS spreads. If the explanation for this finding is that lending banks use their position as CLO underwriter to offload loans for which they have a private negative signal of quality, the agency problem should be more pronounced when the CLO manager is inexperienced. In the Appendix (Table VIII-A), we examine the interaction effect between the same bank dummy and CLO manager experience. The results indicate that while same bank loans are more likely to be

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<sup>30</sup> As before, the results in Table IX use the Markit data as-is but they are qualitatively unchanged if we winsorize the CDS spreads at the 1% or 5% levels. Winsorizing at the 1% level produces the following coefficients and t-statistics on the same bank dummy for the four specifications, respectively: -0.00 (0.31), -0.27 (0.67), -0.11 (1.13), -0.11 (1.42). Winsorizing at the 5% level: -0.00 (0.30), -0.28 (0.68), -0.10 (1.10), -0.11 (1.41).

downgraded, loans bought by experienced managers are less likely to be downgraded. Same bank loans are also less likely to be upgraded but manager experience seems to mitigate that in some specifications.

The remaining question is one of interpretation. If loans purchased from the CLO underwriter are worse quality, do CLO managers overpay for these loans or are they aware of the conflict of interest? If CLO collateral managers are aware of the agency problem, they would rationally demand a lemons discount on loans purchased from their underwriter. Borrowing terms from Kroszner and Rajan, who studied conflicts of interest in security issuance by universal banks in the 1920s, are CLO managers “naïve investors” or are they “rational discounters”? Our finding that manager experience matters suggests that the former interpretation may be the correct one.

## **V. Conclusion**

The collapse in credit ratings of mortgage-backed securities in 2007-2008 brought structured finance issuance to a halt. Although most of the downgrades and defaults of highly-rated CDO securities were concentrated among ABS CDOs, investors emerged wary of CDOs in general. While many factors contributed to the problems in the structured finance market, recent evidence for the mortgage-backed CDOs indicates that adverse selection of collateral by structured investment vehicles played a role. Our paper examines whether securitization led to risky lending in the corporate loan market. This is the first paper to test for adverse selection problems in securitization using data that identifies the individual assets used as collateral in a CDO. Contrary to expectations, we find no evidence that loans sold to CLO investors were worse quality than loans sold to other institutional investors. In fact, borrowers whose loans were

sold to CLOs perform better than comparable unsecuritized loans in terms of credit ratings and CDS spreads in the year after the loan sale. However, we do find evidence of agency problems in a particular set of transactions. When a CLO purchases loans arranged by its underwriter, those loans underperform relative to other securitized loans, controlling for observables at the time of the purchase. Our results provide broader insights about structured finance products and suggest that securitization by itself does not necessarily lead to adverse selection of collateral. We highlight important institutional differences in the securitization of corporate loans and mortgages that could explain why our findings on CLOs differ from previously documented findings on mortgage-backed structured products.

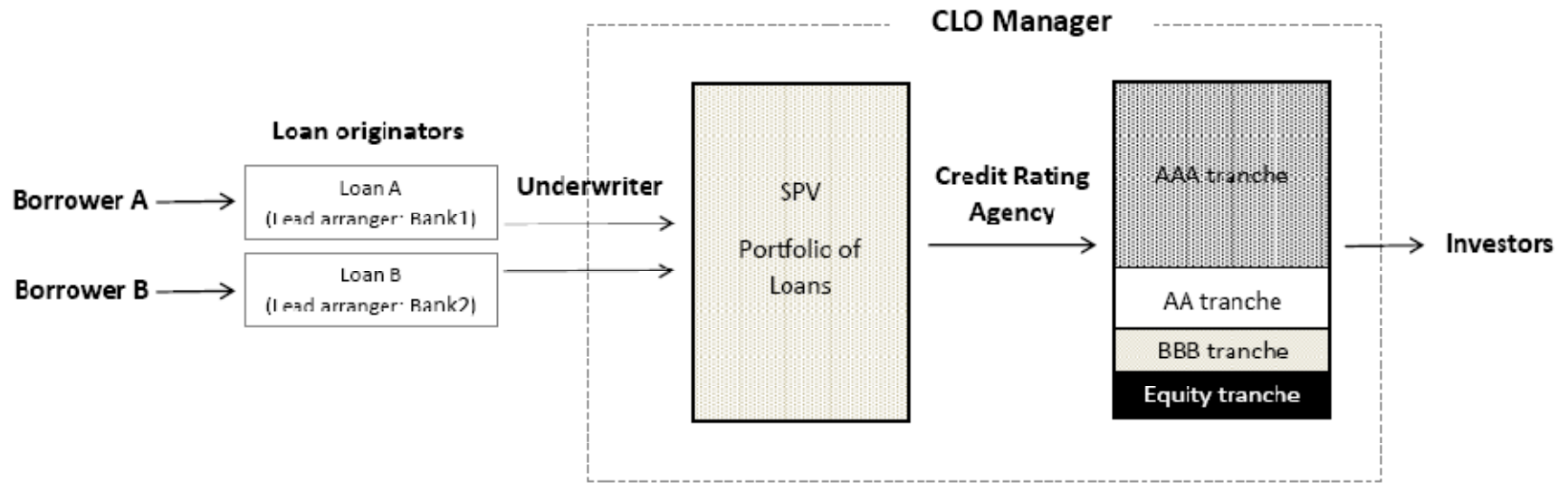
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### FIGURE I CLO STRUCTURING

This figure illustrates different steps involved in securitization of the corporate loans and highlights involvement of different agents (CLO manager, Underwriter, etc.) during the separate stages of the process.



**TABLE I**  
**GLOBAL CDO MARKET ISSUANCE BY UNDERLYING COLLATERAL**

This table provides statistics on CDO issuance by type of underlying collateral. The data comes from Securities Industry and Financial Markets Association (SIFMA). If a CDO has 51% or more of its portfolio invested in a single type of collateral, it goes into that bucket otherwise it is deemed a 'mixed collateral' CDO. High yield loans are borrowers with senior unsecured ratings below Baa3 from Moody's or BBB- from S&P. Structured Finance CDOs are backed by structured collateral, i.e., these are portfolios of portfolios of securities. Most mortgage-backed CDOs (or collateralized mortgage obligations) fall into this category because mortgages are typically pooled into pass-through securities, which are then purchased as collateral by CDOs. This table collapses some of the SIFMA categories at a higher level: our category 'other' is the sum of SIFMA categories 'mixed collateral', 'other swaps', and 'other'.

	Total issuance \$MM	By underlying collateral:									
		High yield loans		High yield bonds		Investment grade bonds		Structured finance		Other	
		\$MM	%	\$MM	%	\$MM	%	\$MM	%	\$MM	%
2004	157,821	32,192	20	8,019	5	11,606	7	83,261	53	22,743	14
2005	251,265	69,441	28	1,413	1	3,878	2	157,572	63	18,961	8
2006	520,645	171,906	33	941	0	24,865	5	307,704	59	15,229	3
2007	481,600	138,827	29	2,151	0	78,571	16	259,183	54	2,869	1
2008	61,887	26,527	43	0	0	15,955	26	18,442	30	962	2
Total	1,473,218	438,893	30	12,524	1	134,875	9	826,164	56	60,764	4

**TABLE II**  
**SUMMARY STATISTICS: UNSECURITIZED VS. SECURITIZED LOANS**

Loan variables are constructed using DealScan. Same bank indicates the subsample of loans where CLO underwriter and loan originator are the same bank. The assignment minimum is a minimum investment for the syndicate participants. Borrower's sales at close is taken at the time the loan closed. Implied leverage is the size of the loan divided by the borrower's sales at close. All-in-drawn spread is defined as total (fees and interest) annual spread paid over LIBOR for each dollar drawn down from the loan net of upfront fees. Senior debt rating and loan rating are S&P ratings. For the regression analysis, the ratings were coded on a numeric scale where AAA is 1, AA+ is 2, etc., hence the 25<sup>th</sup> percentile corresponds to a higher credit rating than the 75<sup>th</sup>. The performance pricing dummy indicates that the spread on the loan is tied to the firm's financial indicators like leverage and/or interest coverage. The LBO, debt repayment, and M&A dummies indicate the purpose of the loan. In Panel B, financial data corresponds to the fiscal year that ended just prior to loan origination. Industries are measured at the 2-digit SIC code level and industry adjusted figures have the industry median subtracted for the corresponding fiscal year. Compustat variables: Leverage is Total Long-Term Debt plus Debt in Current Liabilities divided by Total Assets. Loan size-to-assets is the deal size from DealScan divided by Compustat's Total Assets. Interest coverage is EBITDA divided by Interest and Related Expense. Return on assets is EBITDA/Assets. Q is calculated as [Assets + Market Value of Equity – Book Value of Equity – Deferred Taxes]/Assets. Z-score is 1.2\*[Working Capital/Assets] + 1.4\*[Retained Earnings/Assets] + 3.3\*[EBIT/Assets] + 0.6\*[Market Value of Equity/Book Value of Liabilities] + 0.999\*[Sales/Assets]. Return on equity is Income Before Extraordinary Items divided by Common Equity. All dollar figures are measured in millions. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Loan terms*

	Full Sample	Unsecuritized Loans	Securitized Loans	Diff. <i>t</i> -stat	Securitized Loans		
					Different bank	Same bank	Diff <i>t</i> -stat
Number of loans	533	231	302		198	104	
Deal size – mean	617	741	522	2.99 ***	474	614	2.61 ***
Assignment min. – mean	3.4	3.3	3.5	1.02	3.8	3.1	2.42 **
Borrower's sales at close–mean	1,767	1,741	1,788	0.18	1,831	1,711	0.30
Implied leverage – mean	0.78	0.86	0.72	1.58	0.73	0.70	0.35
All-in-drawn spread (bps)							
Mean	305	306	304	0.13	313	289	1.62
25 <sup>th</sup> percentile	225	225	225		250	225	
Median	275	275	275		300	275	
75 <sup>th</sup> percentile	350	350	350		350	338	
Senior debt rating of borrower							
Mean	B+/B	B+/B	B+/B	1.08	B+/B	B+	1.79 *
25 <sup>th</sup> percentile	BB-	BB-	BB-		B+	BB-	
Median	B+	B+	B+		B+	B+	
75 <sup>th</sup> percentile	B	B/B-	B		B-	B	
Loan rating							
Mean	BB-/B+	BB-/B+	BB-/B+	1.01	BB-/B+	BB-/B+	0.91
25 <sup>th</sup> percentile	BB-	BB-	BB-		BB-	BB-	
Median	BB-	BB-	BB-/B+		B+	BB-	
75 <sup>th</sup> percentile	B+	B+	B+		B+	B+	
Perf. pricing (dummy) – mean	0.39	0.40	0.38	0.51	0.36	0.41	0.95
LBO loan (dummy) – mean	0.39	0.33	0.44	2.65 ***	0.43	0.45	0.38
Debt repayment loan (dummy) – mean	0.12	0.15	0.09	1.95 *	0.12	0.05	1.94 *
M&A loan (dummy) – mean	0.14	0.17	0.13	1.40	0.12	0.14	0.70

**TABLE II - continued**

*Panel B: Borrower characteristics*

	Full sample (Sample matched to Compustat)				Unsecuritized loans				Securitized loans				Mean diff.
	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD	<i>t</i> -stat
Total assets	421	913	2,419	4,832	201	845	2,676	5,793	220	944	2,184	3,742	1.04
Net sales	417	740	1,902	3,111	199	692	1,769	2,754	218	782	2,022	3,406	0.83
Market cap.	314	592	1,246	2,113	161	638	1,342	2,024	153	576	1,144	2,206	0.83
Loan size/Assets	421	0.43	0.59	0.56	201	0.45	0.63	0.61	220	0.42	0.55	0.50	1.56
Leverage	421	0.46	0.50	0.34	201	0.42	0.46	0.32	220	0.51	0.53	0.36	2.28 **
Interest coverage	404	2.90	8.82	39.0	191	3.09	12.4	55.1	213	2.78	5.60	11.9	1.75 *
Return on assets	411	0.12	0.12	0.08	196	0.11	0.13	0.09	215	0.12	0.12	0.07	0.27
Z-score	288	2.24	6.47	28.2	145	2.32	8.76	36.8	143	2.12	4.15	14.7	1.39
Q	286	1.41	1.54	0.71	154	1.43	1.57	0.77	132	1.33	1.50	0.62	0.82
Return on equity	417	0.07	0.20	2.73	199	0.07	0.41	3.73	218	0.07	0.01	1.23	1.53
PPE/Assets	415	0.43	0.51	0.36	197	0.43	0.50	0.35	218	0.44	0.52	0.36	0.66
Leverage (ind. adj.)	421	0.21	0.25	0.35	201	0.18	0.23	0.32	220	0.23	0.27	0.37	1.38
Interest coverage (ind. adj.)	404	-0.12	5.44	38.7	191	-0.01	8.92	54.7	213	-0.31	2.30	11.7	1.72 *
Return on assets (ind. adj.)	411	0.04	0.06	0.11	196	0.03	0.06	0.11	215	0.04	0.05	0.10	0.37
Z-score (ind. adj.)	288	-1.12	2.73	28.2	145	-1.26	4.68	36.8	143	-0.92	0.71	14.8	1.19

**TABLE III**  
**DETERMINANTS OF SECURITIZATION:**  
**LOAN AND BORROWER CHARACTERISTICS AT ORIGINATION**

This table examines the impact of loan and borrower characteristics on the probability that a loan is sold to a CLO. The dependent variable is a dummy that equals 1 if a loan was sold to a CLO and 0 if not. Borrower financials are taken from Compustat for the fiscal year ending prior to loan origination and industry adjustment is done at the 2-digit SIC level. Variable definitions are the same as in Table II. Z1-Z5 are components of the Z-score as defined in Altman (1968): Z1 is Working Capital/Assets, Z2 is Retained Earnings/Assets, Z4 is Market Value of Equity/Book Value of Liabilities, and Z5 is Sales/Assets. We exclude Z3, EBIT/Assets, since it is redundant with return on assets. Specification (5) is a robustness check, constraining the sample to amended loans. Year fixed effects control for the year of loan origination. The coefficients shown are marginal effects. Standard errors are clustered by loan lead arranger in all specifications. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

	(1)		(2)		(3)		(4)		(5)	
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
Borrower characteristics:										
Log(assets)	0.07**	3.90	0.08***	3.94	0.05*	1.66	0.10***	3.15	0.07**	2.03
Senior debt rating	-0.00	0.12	-0.00	0.15	-0.00	0.26	-0.01	0.43	0.01	0.56
Return on assets (ind. adj.)	0.07	0.20	0.09	0.23	0.44	1.52	0.51	1.03	0.10	0.29
Leverage (ind. adj.)	0.15**	2.00	0.16**	1.99					-0.08	0.68
Z-score (ind. adj.)					-0.00	1.08				
Z1 (ind. adj.)							-0.23	1.05		
Z2 (ind. adj.)							0.13	0.94		
Z4 (ind. adj.)							0.02**	2.17		
Z5 (ind. adj.)							-0.04	0.44		
Loan characteristics:										
Maturity	-0.06**	2.41	-0.06**	2.39	-0.05**	2.05	-0.05*	1.78	-0.05*	1.84
Log(Deal size)	-0.13**	2.42	-0.14**	2.94	-0.10*	1.74	-0.14***	2.54	-0.12**	2.52
All-in-drawn spread (bps)	-0.00	0.10	-0.00	0.09	0.00	0.29	0.00	0.11	0.00	0.02
Perf. pricing dummy	-0.01	0.22	-0.01	0.11	-0.03	0.47	-0.01	0.24	-0.02	0.44
LBO dummy			0.02	0.29	-0.02	0.25	0.03	0.38	0.06	0.61
Debt repayment dummy			-0.13*	1.76	-0.05	0.61	-0.16**	2.33	-0.03	0.22
M&A dummy			0.03	0.29	0.06	0.55	-0.01	0.06	0.13	1.31
Year Fixed Effects	Yes		Yes		Yes		Yes		Yes	
Pseudo R-squared	0.12		0.12		0.10		0.12		0.06	
Observations	332		332		231		317		229	

**TABLE IV**

**DOES SECURITIZATION PREDICT FUTURE ACCOUNTING PERFORMANCE? (H1)**

This table compares ex-post accounting performance of borrowers whose loans were securitized and borrowers whose loans were not securitized. Each loan-CLO pair is matched to a set of unsecuritized loans from the same lead arranger that could have been sold to the CLO instead. The event date for the group is the date the securitized loan was sold to the CLO.  $t$  is the fiscal year end of the event date. Panel A is a univariate comparison of securitized and unsecuritized borrower performance following the event date. The last column indicates  $t$ -statistic for difference between the means of the two subsamples. Panel B presents the multivariate results. In Panel B, the dependent variable is industry-adjusted return on assets. Data comes from Compustat and goes through July 2008. Variable definitions are the same as in Table II. Standard errors are clustered by loan. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Univariate Results*

	Securitized Loans				Unsecuritized (matched) loans				Diff.
	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD	$t$ -stat
ROA, $t$ (ind. adj.)	2,028	0.02	0.05	0.002	8,742	0.01	0.03	0.00	10.4 ***
ROA, $t+1$ (ind. adj.)	1,928	0.02	0.06	0.09	8,184	0.01	0.02	0.11	14.6 ***
ROA, $t+2$ (ind. adj.)	1,618	0.02	0.07	0.13	7,314	0.01	0.03	0.09	16.7 ***

*Panel B: Multivariate Results*

Dependent variable:	(1)		(2)		(3)	
	<i>Ind. adj. ROA, <math>t</math></i>		<i>Ind. adj. ROA, <math>t+1</math></i>		<i>Ind. adj. ROA, <math>t+2</math></i>	
	Coeff.	$t$ -stat	Coeff.	$t$ -stat	Coeff.	$t$ -stat
In CLO dummy	0.002	0.34	0.01	1.22	0.01	1.08
Lagged borrower characteristics:						
Senior debt rating	-0.00	0.51	-0.00	0.05	-0.00	0.83
Log(assets), $t-1$	0.01***	2.31	0.01*	1.69	0.01	1.18
Leverage, $t-1$ (ind. adj.)	0.01	0.75	-0.00	0.08	0.02	0.84
ROA, $t-1$ (ind. adj.)	0.85***	13.4	0.90***	10.2	0.87***	8.31
Loan characteristics:						
Loan maturity	-0.00	1.13	-0.00	0.24	-0.00	0.80
Log(deal size)	-0.01	1.47	-0.01	1.33	-0.01	0.72
All-in-drawn spread (bps)	-0.00	0.55	0.00	0.74	0.00	0.68
Performance pricing (dummy)	-0.00	0.79	-0.02*	1.82	-0.02*	1.81
LBO dummy	0.01	1.40	0.02	1.26	0.01	0.75
Debt repayment dummy	0.02*	1.88	0.03***	2.39	0.03	1.54
M&A dummy	0.01	0.65	0.02	1.06	0.01	0.25
Year fixed effects	Yes		Yes		Yes	
Adjusted $R$ -squared	0.73		0.64		0.57	
Observations	9,136		8,471		7,325	

**TABLE V**  
**DOES SECURITIZATION PREDICT FUTURE RATING CHANGES? (H1)**

This table compares the downgrade and upgrade frequency of securitized loans and a matched sample of unsecuritized loans. Each loan-CLO pair is matched to a set of unsecuritized loans from the same lead arranger that could have been chosen instead. The event date for each matched group is the date the securitized loan was purchased by the CLO. Ratings data comes from Reuters Gold Sheets and covers the period 2002 through June 2009. We use Gold Sheets' data on S&P and Moody's ratings to construct a combined rating scale for senior secured obligations of the borrowers in our sample. Panel A is a univariate comparison of downgrade and upgrade frequencies. *t*-statistics correspond to the difference in frequencies of downgrades and upgrades between unsecuritized and securitized loans. Panels B and C examine credit rating changes in a multivariate setting. The dependent variable in the regressions is a dummy that indicates whether a loan was downgraded or upgraded in a given period after the event date. Panel B examines downgrades in a one-year and two-year window. Panel C examines upgrades in a one-year and two-year window. Variable definitions are the same as in Table II. The coefficients are marginal effects. Multivariate results include year and industry fixed effects throughout. Standard errors are clustered by loan. Significance at the 1, 5, and 10 percent levels is indicated by <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup>, respectively.

*Panel A: Univariate Results*

Window (months)	Full sample	Downgrade frequency				Upgrade frequency						
		Unsecuritized	In CLO	Diff.	<i>t</i> -stat	Full sample	Unsecuritized	In CLO	Diff.	<i>t</i> -stat		
[0, 6]	0.09	0.09	0.12	0.03	4.43	<sup>***</sup>	0.27	0.27	0.26	0.01	1.00	
[0, 12]	0.08	0.08	0.09	0.01	1.23		0.25	0.25	0.26	0.01	0.94	
[0, 18]	0.17	0.18	0.17	0.01	1.02		0.31	0.31	0.32	0.01	0.90	
[0, 24]	0.14	0.13	0.15	0.02	1.99	<sup>**</sup>	0.30	0.30	0.34	0.05	3.68	<sup>***</sup>
[0, 30]	0.23	0.23	0.20	0.04	3.18	<sup>***</sup>	0.33	0.33	0.36	0.03	2.35	<sup>**</sup>
[0, 36]	0.20	0.20	0.20	0.00	0.07		0.36	0.36	0.41	0.06	4.59	<sup>***</sup>

**TABLE V – continued**

	1-year horizon						2-year horizon					
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
<i>Panel B: Multivariate results, Downgrades</i>												
In CLO dummy	-0.07*	1.86	-0.05	1.02	-0.07	1.52	-0.08	0.94	-0.04	0.30	-0.06	0.62
Borrower characteristics:												
Senior debt rating	0.05***	4.70	0.03***	3.02	0.05***	4.35	0.05**	2.57	0.07***	3.12	0.06***	2.83
Log(assets)	-0.05	1.53	-0.04	0.98	-0.04	1.40	-0.07	1.41	-0.04	0.47	-0.08	1.21
Return on assets (ind. adj.)	-0.13	0.40	-0.67*	1.77	-0.24	0.57	0.81	1.52	0.49	0.61	0.72	0.94
Leverage (ind. adj.)	-0.09	0.92					-0.20	1.16				
Interest coverage (ind. adj.)	0.005*	1.78					0.005	0.79				
Z-score (ind. adj.)			0.001	1.52					0.004	0.61		
Z1 (ind. adj.)					1.35	1.49					-0.62	0.47
Z2 (ind. adj.)					-0.33	1.12					-0.24	0.48
Z3 (ind. adj.)					-1.43	1.48					0.35	0.23
Z4 (ind. adj.)					0.03	1.59					-0.01	0.23
Z5 (ind. adj.)					0.46*	1.73					0.47	0.85
Pseudo R-squared	0.28		0.31		0.29		0.36		0.39		0.38	
Observations	5,951		5,012		5,676		6,839		5,244		6,406	
<i>Panel C: Multivariate results, Upgrades</i>												
In CLO dummy	-0.04	1.43	-0.01	0.13	-0.004	0.16	-0.04	0.48	0.09	0.79	-0.01	0.09
Borrower characteristics:												
Senior debt rating	0.02***	2.61	0.02**	2.49	0.02***	2.87	0.04**	2.16	0.04**	2.24	0.03**	2.34
Log(assets)	-0.01	0.75	0.03	0.96	-0.01	0.66	-0.02	0.54	0.03	0.65	-0.01	0.16
Return on assets (ind. adj.)	0.74**	2.31	1.09***	2.84	0.00	0.00	0.35	0.61	0.93	1.29	-0.73	1.19
Leverage (ind. adj.)	-0.21***	2.62					-0.32**	2.11				
Interest coverage (ind. adj.)	-0.01	1.56					-0.01**	2.19				
Z-score (ind. adj.)			-0.001	1.27					-0.004	1.19		
Z1 (ind. adj.)					-2.10***	4.42					-1.81*	1.71
Z2 (ind. adj.)					-0.66***	2.86					-0.53	1.06
Z3 (ind. adj.)					2.91***	4.92					2.20*	1.71
Z4 (ind. adj.)					0.03**	2.49					0.03	0.81
Z5 (ind. adj.)					-0.13	0.97					0.14	0.47
Pseudo R-squared	0.33		0.34		0.38		0.28		0.31		0.32	
Observations	6,489		5,061		5,843		7,005		5,340		6,624	

**TABLE VI**  
**DOES SECURITIZATION PREDICT FUTURE CDS SPREAD INCREASES? (H1)**

This table compares the change in CDS spreads for securitized loan borrowers with that of unsecuritized borrowers. CDS data comes from Markit and corresponds to 5-year contracts. CDS quotes are available for the period of 2003 through June 2009. Each loan-CLO pair is matched to a set of unsecuritized loans from the same lead arranger that could have been sold to the CLO instead. The event date for the group is the date the securitized loan was sold to the CLO. Panel A presents the univariate results. *t*-statistics correspond to difference in means between unsecuritized and securitized loans. Panel B presents the multivariate results. The dependent variable in the Panel B regressions is the percentage change in a borrower's CDS spread in a given period after the event date. We control for borrower financials in the fiscal year ending before the event date. Standard errors are clustered by loan. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Univariate Results*

Window (months)	Securitized				Unsecuritized				Diff.	<i>t</i> -stat
	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD		
[0, 12]	61	0.74	0.41	0.60	372	-0.21	0.17	1.04	0.24*	1.78
[13, 24]	114	-0.14	0.23	1.01	410	0.03	1.04	7.81	0.81	1.10

*Panel B: Multivariate Results*

	0-12 months post-event				13-24 months post-event			
	(1)		(2)		(3)		(4)	
	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat
In CLO dummy	-0.85**	2.16	-0.72***	3.28	0.73	0.51	1.07	0.82
Borrower characteristics:								
Senior debt rating	0.01	0.19	-0.04	0.52	0.64	0.63	0.90	1.06
Lagged CDS vol.	0.00	0.01			0.16	0.65		
Realized CDS vol.			0.01**	2.24			0.04	0.41
Year fixed effects	Yes		Yes		Yes		Yes	
Industry fixed effects	Yes		Yes		Yes		Yes	
Adjusted <i>R</i> -squared	0.84		0.88		0.26		0.24	
Observations	293		335		414		421	

**TABLE VII**  
**DOES SECURITIZATION BY LEAD ARRANGER PREDICT FUTURE ACCOUNTING PERFORMANCE? (H2)**

This table compares the post-securitization accounting performance of borrowers whose loans were sold to a CLO underwritten by their lead arranger with other borrowers whose loans were securitized. The sample is limited to loans purchased by CLOs in the primary market. *Same bank* equals 1 when the loan lead arranger is the same as the CLO underwriter. Time *t* is the securitization date and *t-1* financials are from the fiscal year ending just prior to securitization. Panel A presents the univariate performance comparison. *t*-statistics correspond to differences between Same bank and Different bank loans. Panel B presents the multivariate results, controlling for pre-securitization borrower characteristics. The dependent variable in the regressions is industry-adjusted return on assets. Data comes from Compustat and goes through July 2008. Variable definitions are the same as in Table II. Standard errors are clustered by loan. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Univariate Results*

	Diff bank				Same bank				Diff. <i>t</i> -stat
	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD	
ROA, <i>t</i> (ind. adj.)	1,817	0.01	0.04	0.11	125	0.01	0.06	0.13	1.33
ROA, <i>t+1</i> (ind. adj.)	1,773	0.02	0.05	0.11	119	0.02	0.07	0.13	1.28
ROA, <i>t+2</i> (ind. adj.)	1,586	0.03	0.06	0.12	103	0.04	0.10	0.16	3.00 ***

*Panel B: Multivariate Results*

Dependent Variable:	(1)		(2)		(3)	
	<i>Ind. Adj. ROA, t</i>		<i>Ind. Adj. ROA, t+1</i>		<i>Ind. Adj. ROA, t+2</i>	
	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat
Same bank (dummy)	-0.005	0.98	-0.005	0.65	0.009	0.80
Lagged borrower characteristics:						
Senior debt rating	-0.00	0.15	0.00	0.13	-0.00	0.59
Log(assets), <i>t-1</i>	0.01 **	2.18	0.01 **	2.00	0.01	1.20
Leverage, <i>t-1</i> (ind. adj.)	0.04 ***	4.22	0.04 **	1.99	0.09 ***	3.34
ROA, <i>t-1</i> (ind. adj.)	0.91 ***	20.5	0.90 ***	14.6	0.90 ***	9.95
Loan characteristics:						
Loan maturity	0.00	0.11	0.01 **	2.16	0.01 ***	3.03
Log(deal size)	-0.01	1.22	-0.00	0.54	0.01	0.91
All-in-drawn spread (bps)	0.00	0.90	0.00	1.02	0.00	1.17
Performance pricing (dummy)	0.00	0.51	0.01	1.33	0.01	1.85
LBO dummy	0.01	1.07	-0.00	0.15	-0.02	1.35
Debt repayment dummy	0.04 ***	3.15	0.02	1.33	0.01	0.27
M&A dummy	-0.00	0.01	-0.01	0.60	-0.03 *	1.66
Year fixed effects	Yes		Yes		Yes	
CLO fixed effects	Yes		Yes		Yes	
Adjusted <i>R</i> -squared	0.91		0.85		0.79	
Observations	1,747		1,660		1,459	

**TABLE VIII**

**DOES SECURITIZATION BY LEAD ARRANGER PREDICT FUTURE RATING CHANGES? (H2)**

This table compares the difference in downgrade and upgrade rates for loans securitized by their lead arranger and other securitized loans. The sample is limited to loans purchased by CLOs in the primary market. Same bank equals 1 for a loan-CLO pair if the loan’s lead arranger is the same entity as the CLO underwriter. Rating changes are measured in a window around the securitization date. Ratings data comes from Reuters Gold Sheets and covers the period 2002 through June 2009. We use Gold Sheets’ data on S&P and Moody’s ratings to construct a combined rating scale for senior secured obligations of the borrowers in our sample. Ratings correspond to senior secured debt. Panel A is a univariate comparison of downgrade and upgrade frequencies. *t*-statistics correspond to difference in frequencies of downgrades and upgrades between Same bank and Different bank loans. Panels B and C examine rating changes in a multivariate setting. The dependent variable is a dummy that indicates whether a given loan was downgraded or upgraded in a given period after it was securitized. Panel B examines downgrades in a one-year and two-year window. Panel C examines upgrades in a one-year and two-year window. We control for borrower financials in the fiscal year ending before the securitization date. Variable definitions are the same as in Table II. Standard errors are clustered by loan. The coefficients are marginal effects. Multivariate results include year, industry, and CLO fixed effects throughout. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Univariate Results*

Window (months)	Downgrade frequency					Upgrade frequency				
	All securitized loans	Different bank	Same bank	Diff.	<i>t</i> -stat	All securitized loans	Different bank	Same bank	Diff.	<i>t</i> -stat
[0, 6]	0.12	0.12	0.13	0.002	0.06	0.30	0.31	0.29	0.02	0.42
[0, 12]	0.13	0.13	0.02	0.12	3.43 ***	0.28	0.29	0.19	0.10	2.20 **
[0, 18]	0.18	0.18	0.17	0.01	0.30	0.37	0.37	0.38	-0.01	0.27
[0, 24]	0.18	0.18	0.06	0.13	3.32 ***	0.37	0.38	0.26	0.12	2.47 **
[0, 30]	0.24	0.24	0.20	0.03	0.73	0.40	0.40	0.39	0.01	0.23
[0, 36]	0.23	0.23	0.13	0.10	2.35 **	0.43	0.44	0.30	0.14	2.85 ***

TABLE VIII – *continued*

	1-year horizon						2-year horizon					
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
<i>Panel B: Multivariate results, Downgrades</i>												
Same bank dummy	0.01	1.34	0.01**	2.07	0.26***	2.73	0.13	1.24	0.42***	2.75	0.31***	3.08
Borrower characteristics:												
Senior debt rating	0.01	1.06	0.00	0.91	-0.01	0.23	-0.02	0.93	0.05	1.23	-0.02	0.77
Log(assets)	-0.02	1.42	0.00	1.15	-0.02	0.36	0.002	0.03	0.15*	1.67	0.004	0.05
Return on assets (ind. adj.)	-1.24***	3.64	-0.002	0.28	-1.39	1.51	-2.03	1.63	3.56**	2.24	1.31	1.16
Leverage (ind. adj.)	0.08	1.12					0.24	0.57				
Interest coverage (ind. adj.)	0.04***	3.94					0.08***	3.56				
Z-score (ind. adj.)			-0.00	0.20					-0.004	1.49		
Z1 (ind. adj.)					1.07	1.02					1.49	0.94
Z2 (ind. adj.)					0.66	0.93					0.002	0.00
Z3 (ind. adj.)					-1.93	-1.19					-2.71	1.28
Z4 (ind. adj.)					-0.13**	-2.54					-0.14***	2.90
Z5 (ind. adj.)					0.59	0.99					1.44**	2.32
Pseudo R-squared	0.61		0.58		0.54		0.46		0.41		0.44	
Observations	671		482		671		869		604		867	
<i>Panel C: Multivariate results, Upgrades</i>												
Same bank dummy	-0.16***	4.73	-0.37***	3.89	-0.20***	4.57	-0.12	1.25	-0.43**	2.39	-0.16	1.58
Borrower characteristics:												
Senior debt rating	-0.01	0.41	-0.25***	2.65	0.002	0.07	0.01	0.26	-0.09	1.45	0.02	0.75
Log(assets)	0.03	0.37	-0.08	0.38	0.07	0.89	0.02	0.25	0.37**	2.02	0.09	1.40
Return on assets (ind. adj.)	2.32*	1.74	6.74	1.62	2.28**	1.98	0.57	0.31	14.3***	2.94	0.24	0.24
Leverage (ind. adj.)	0.99***	3.05					1.00***	3.04				
Interest coverage (ind. adj.)	-0.01	0.75					-0.01	0.87				
Z-score (ind. adj.)			-0.37***	3.60					-0.71***	5.85		
Z1 (ind. adj.)					-3.54	0.88					-3.98	1.33
Z2 (ind. adj.)					0.69	0.62					0.59	0.62
Z3 (ind. adj.)					3.06	0.62					1.36	0.38
Z4 (ind. adj.)					-0.20***	2.75					-0.10*	1.88
Z5 (ind. adj.)					0.32	0.43					2.10***	2.67
Pseudo R-squared	0.58		0.66		0.57		0.55		0.72		0.55	
Observations	595		357		595		781		403		781	

**TABLE IX**  
**DOES SECURITIZATION BY LEAD ARRANGER PREDICT**  
**FUTURE CDS SPREAD INCREASES? (H2)**

This table compares the post-securitization change in CDS spreads for borrowers whose loans were securitized by their lead arranger and other securitized loans. CDS data comes from Markit and corresponds to 5-year contracts. CDS quotes are available for the period of 2003 through June 2009. The sample is limited to loans purchased by CLOs in the primary market. Same bank equals 1 for a loan-CLO pair if the loan's lead arranger is the same as the CLO underwriter. Panel A presents the univariate results. *t*-statistics correspond to differences between Same bank and Different bank loans. Panel B presents the multivariate results. The dependent variable in the Panel B regressions is the percentage change in a borrower's CDS spread in a given period after securitization. An observation is a loan-CLO pair. We control for borrower financials in the fiscal year ending before the securitization date. Standard errors are clustered by loan. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

*Panel A: Univariate Results*

Window (months)	Securitized, Different bank				Securitized, Same bank				Diff.	<i>t</i> -stat
	Obs.	Median	Mean	SD	Obs.	Median	Mean	SD		
[0, 12]	127	-0.04	0.05	0.55	5	-0.34	-0.28	0.13	0.33	1.34
[13, 24]	241	-0.14	3.93	12.2	14	-0.14	0.19	0.66	3.74	1.14

*Panel B: Multivariate Results*

	0-12 month post-securitization				13-24 month post-securitization			
	(1)		(2)		(3)		(4)	
	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat
Same bank dummy	0.00	0.32	-0.26	0.67	-0.11	1.13	-0.11	1.42
Borrower characteristics:								
Senior debt rating	-0.48***	20.2	-0.24***	4.09	-0.03	0.19	0.03	0.14
Lagged CDS vol.	0.01	0.32			0.00	0.04		
Realized CDS vol.			0.01***	6.43			-0.001	0.30
Loan orig. aft. CLO (dummy)	1.98***	5.81	0.34	1.16	-0.04	0.30	-0.03	0.33
Year fixed effects	Yes		Yes		Yes		Yes	
Industry fixed effects <sup>^</sup>	No		No		Yes		Yes	
CLO fixed effects	Yes		Yes		Yes		Yes	
Adjusted <i>R</i> -squared	0.99		0.95		0.99		0.99	
Observations	84		132		233		255	

<sup>^</sup> We eliminate industry fixed effects in the first two specifications because the number of observations with same bank=1 is small.

## APPENDIX: ROBUSTNESS CHECK

The first three tables in this appendix reproduce the regressions used to test Hypothesis I, a comparison of the performance of securitized and unsecuritized loans, constraining the sample to amended loans only. The fourth table is a refinement of the second hypothesis. It examines whether CLO manager experience mitigates information asymmetry problems that can occur when purchasing loans that were arranged by the CLO's underwriter. Table numbers correspond to the original table numbers; captions are the same.

**TABLE IV-A**  
**DOES SECURITIZATION PREDICT FUTURE ACCOUNTING PERFORMANCE? (H1)**

*Panel B: Multivariate Results*

Dependent variable:	(1)		(2)		(3)	
	<i>Ind. adj. ROA, t</i>		<i>Ind. adj. ROA, t+1</i>		<i>Ind. adj. ROA, t+2</i>	
	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat
In CLO dummy	0.001	0.09	0.01	1.01	0.01	0.62
Lagged borrower characteristics:						
Senior debt rating	0.00	0.04	0.00	0.07	0.00	0.35
Log(assets), t-1	0.01**	2.16	0.01	1.52	0.01	1.01
Leverage, t-1 (ind. adj.)	0.00	0.02	-0.00	0.18	0.02	0.81
ROA, t-1 (ind. adj.)	0.83***	12.3	0.84***	9.24	0.78***	6.70
Loan characteristics:						
Loan maturity	-0.00	1.02	-0.00	0.13	-0.00	0.92
Log(deal size)	-0.01	1.24	-0.01	1.50	-0.01	0.73
All-in-drawn spread (bps)	-0.00	0.51	0.00	0.77	0.00	0.80
Performance pricing (dummy)	-0.01	1.12	-0.02**	2.03	-0.03**	2.25
LBO dummy	0.01*	1.73	0.02	1.31	0.01	0.84
Debt repayment dummy	0.02**	2.35	0.04**	2.64	0.04*	1.76
M&A dummy	0.01	0.95	0.01	1.25	0.01	0.33
Year fixed effects	Yes		Yes		Yes	
Adjusted <i>R</i> -squared	0.75		0.62		0.52	
Observations	6,453		6,044		5,198	

**TABLE V-A: DOES SECURITIZATION PREDICT FUTURE RATING CHANGES? (H1)**

	1-year horizon						2-year horizon					
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
<i>Panel B: Multivariate results, Downgrades</i>												
In CLO dummy	-0.05	0.95	-0.08	1.00	-0.09	1.15	-0.02	0.13	-0.08	0.53	-0.01	0.05
Borrower characteristics:												
Senior debt rating	0.05***	4.32	0.05***	3.00	0.06***	4.37	0.05**	2.09	0.09***	3.81	0.06**	2.32
Log(assets)	-0.06	1.16	-0.07	1.06	-0.05	1.01	-0.07	1.28	-0.06	0.64	-0.11	1.33
Return on assets (ind. adj.)	0.04	0.07	-1.09	1.53	-0.06	0.13	0.62	0.91	-1.28	1.22	0.73	0.79
Leverage (ind. adj.)	-0.16	0.99					-0.21	1.05				
Interest coverage (ind. adj.)	0.00	0.06					0.003	0.39				
Z-score (ind. adj.)			0.02	0.99					0.09***	2.86		
Z1 (ind. adj.)					2.46**	2.05					-0.19	0.11
Z2 (ind. adj.)					-0.62	1.11					-0.24	0.34
Z3 (ind. adj.)					-3.11**	2.53					-0.24	0.12
Z4 (ind. adj.)					0.06*	1.78					-0.02	0.44
Z5 (ind. adj.)					1.27**	2.66					0.66	0.91
Pseudo R-squared	0.32		0.32		0.35		0.36		0.40		0.36	
Observations	4,059		3,008		3,651		4,639		3,340		4,128	
<i>Panel C: Multivariate results, Upgrades</i>												
In CLO dummy	-0.03	0.92	-0.02	0.29	0.01	0.23	0.03	0.21	0.12	0.77	0.07	0.63
Borrower characteristics:												
Senior debt rating	0.02**	2.36	0.03**	2.16	0.02***	2.68	0.04	1.49	0.04*	1.70	0.04**	2.00
Log(assets)	-0.03	1.12	0.03	0.77	-0.03	1.31	-0.04	0.73	0.04	0.60	-0.02	0.37
Return on assets (ind. adj.)	1.04**	2.52	1.63***	3.45	0.52	1.50	0.97	1.15	1.76**	1.97	-0.21	0.24
Leverage (ind. adj.)	-0.13	1.21					-0.34	1.33				
Interest coverage (ind. adj.)	-0.00	0.52					-0.02	1.27				
Z-score (ind. adj.)			-0.002	0.46					-0.01	0.61		
Z1 (ind. adj.)					-2.30***	4.31					-1.87*	1.09
Z2 (ind. adj.)					-0.60**	2.36					-0.20	-0.27
Z3 (ind. adj.)					2.94***	4.37					2.02	1.01
Z4 (ind. adj.)					0.04**	2.17					0.05	1.01
Z5 (ind. adj.)					0.04	0.18					0.28	0.47
Pseudo R-squared	0.39		0.37		0.43		0.28		0.31		0.30	
Observations	4,539		3,379		4,055		4,556		3,533		4,072	

**TABLE VI -A**  
**DOES SECURITIZATION PREDICT FUTURE CDS SPREAD INCREASES? (H1)**

*Panel B: Multivariate Results*

	0-12 months post-event				13-24 months post-event			
	(1)		(2)		(3)		(4)	
	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat	Coeff.	<i>t</i> -stat
In CLO dummy	-0.15	0.55	-0.44**	1.98	21.9	1.09	15.2	1.26
Borrower characteristics:								
Senior debt rating	0.00	0.07	-0.15*	1.95	6.39	1.27	4.72	1.62
Lagged CDS vol.	0.00	0.04			-0.31	1.16		
Realized CDS vol.			0.02***	2.79			-0.26***	4.36
Year fixed effects	Yes		Yes		Yes		Yes	
Industry fixed effects	Yes		Yes		Yes		Yes	
Adjusted <i>R</i> -squared	0.77		0.92		0.35		0.26	
Observations	77		114		191		198	

**TABLE VIII-A**  
**THE ROLE OF CLO MANAGER EXPERIENCE**

As in Table VIII, this table compares the difference in downgrade and upgrade rates for loans securitized by their lead arranger and other securitized loans. The focus is on the interaction term between Same bank and Manager experience. Same bank equals 1 for a loan-CLO pair if the loan's lead arranger is the same entity as the CLO underwriter. CLO manager experience is measured as years in the market at the time of the loan purchase. Rating changes are measured in a window around the securitization date. The sample is limited to loans purchased by CLOs in the primary market. Ratings data comes from Reuters Gold Sheets and covers the period 2002 through June 2009. We use Gold Sheets' data on S&P and Moody's ratings to construct a combined rating scale for senior secured obligations of the borrowers in our sample. Ratings correspond to senior secured debt. The dependent variable is a dummy that indicates whether a given loan was downgraded or upgraded in a given period after it was securitized. Panel B examines downgrades in a one-year and two-year window. Panel C examines upgrades in a one-year and two-year window. We control for borrower financials in the fiscal year ending before the securitization date. Variable definitions are the same as in Table II. Standard errors are clustered by loan. The coefficients are marginal effects. Multivariate results include year, industry, and CLO fixed effects throughout. Significance at the 1, 5, and 10 percent levels is indicated by \*\*\*, \*\*, and \*, respectively.

	1-year horizon						2-year horizon					
	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat	Coeff.	z-stat
<i>Panel B: Multivariate results, Downgrades</i>												
Same bank dummy	0.12**	2.30	0.01*	1.92	0.81***	3.97	0.66***	4.03	0.63***	3.06	0.63***	3.52
CLO mgr. experience	-0.03	1.41	-0.002	1.41	-0.27**	2.11	-0.27	1.42	-0.26	0.94	-0.61***	2.58
Same bank * mgr. experience	-0.01*	1.93	-0.00	1.11	-0.09**	2.72	-0.13***	4.08	-0.06*	1.86	-0.09**	2.52
Borrower characteristics:												
Senior debt rating	0.00	0.97	0.00	0.61	-0.02	0.92	-0.03	1.09	0.04	0.93	-0.03	1.27
Log(assets)	-0.02*	1.72	0.00	0.28	-0.06	1.62	-0.03	0.48	0.12	1.33	-0.08	1.14
Return on assets (ind. adj.)	-0.84***	3.60	-0.004	0.70	-1.31**	2.08	-1.98	1.59	3.56**	2.17	0.76	0.69
Leverage (ind. adj.)	0.03	0.59					0.09	0.23				
Interest coverage (ind. adj.)	0.03***	3.99					0.08***	3.78				
Z-score (ind. adj.)			0.00	0.13					-0.00	1.22		
Z1 (ind. adj.)					1.17*	1.82					2.41	1.48
Z2 (ind. adj.)					0.62	1.17					0.30	0.45
Z3 (ind. adj.)					-2.28**	2.11					-4.43**	2.17
Z4 (ind. adj.)					-0.11**	2.56					-0.17***	3.23
Z5 (ind. adj.)					0.98***	2.64					2.19***	3.69
Pseudo R-squared	0.63		0.59		0.60		0.48		0.41		0.48	
Observations	657		477		656		851		597		848	

TABLE VIII-A – *continued*

	<i>Panel C: Multivariate results, Upgrades</i>											
Same bank dummy	-0.20 <sup>***</sup>	2.58	-0.36 <sup>***</sup>	3.82	-0.34 <sup>***</sup>	3.90	-0.19	1.26	-0.39 <sup>***</sup>	4.27	-0.27 <sup>**</sup>	2.48
CLO mgr experience	0.73 <sup>***</sup>	3.28	0.55	1.29	-0.03	0.07	-0.26	0.97	-0.38	1.31	-0.69 <sup>**</sup>	2.52
Same bank*mgr. experience	-0.03	0.55	0.10 <sup>*</sup>	1.81	0.05	1.07	0.00	0.04	0.89 <sup>***</sup>	3.34	0.07 <sup>**</sup>	2.20
Borrower characteristics:												
Senior debt rating	-0.01	0.41	-0.20 <sup>*</sup>	1.95	0.01	0.29	0.00	0.12	-0.06	0.94	0.02	0.52
Log(assets)	0.03	0.37	0.15	0.72	0.09	0.75	-0.01	0.14	0.70 <sup>***</sup>	4.29	0.05	0.57
Return on assets (ind. adj.)	2.32 <sup>*</sup>	1.74	15.0 <sup>***</sup>	3.53	3.39 <sup>**</sup>	2.05	0.42	0.18	23.0 <sup>***</sup>	5.10	-0.14	0.12
Leverage (ind. adj.)	0.99 <sup>***</sup>	3.05					1.31 <sup>***</sup>	3.22				
Interest coverage (ind. adj.)	-0.01	0.75					-0.01	0.81				
Z-score (ind. adj.)			-0.52 <sup>***</sup>	4.21					-0.84 <sup>***</sup>	7.72		
Z1 (ind. adj.)					-6.10	0.95					-5.34	1.16
Z2 (ind. adj.)					0.98	0.58					1.48	1.22
Z3 (ind. adj.)					6.32	0.81					-0.06	0.01
Z4 (ind. adj.)					-0.27 <sup>**</sup>	2.54					-0.19 <sup>***</sup>	2.70
Z5 (ind. adj.)					-0.00	0.00					4.49 <sup>***</sup>	3.36
Pseudo R-squared	0.67		0.72		0.61		0.57		0.80		0.59	
Observations	557		307		557		732		340		732	