Managerial Discretion in Unregulated Lending Institutions: Evidence from the Securitized Loan Market [*]

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Abstract

We explore the extent to which managers of Collateralized Loan Obligations (CLOs) – one of the most important lenders in the syndicated loan market– engage in discretionary reporting and trading to meet regular capital compliance tests. We find that when compliance tests are binding managers manipulate the loans' fair values and strategically rebalance the CLO portfolio to avoid violating the tests. Portfolio rebalancing involves selling higher quality loans, delaying the sale of underperforming loans and selling loans to affiliated entities to obtain higher gains. This trading leads to higher risk and lower CLO future performance. We also document that when managers receive higher performance-linked compensation, are launching new CLOs and are not closely monitored, the positive association between discretionary reporting and trading and the slack of compliance tests is stronger. CLO managers' trading activities are priced negatively by CLO investors in the secondary market for CLO notes.

Keywords: Collateralized loan obligations, syndicated loans, securitization, performance management, performance benchmarks, fair value accounting, trading activity, asset disposition

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1. Introduction

In this paper, we explore whether and how Collateralized Loan Obligations (CLOs) use discretionary reporting and trading to comply with regular capital compliance tests. CLOs are structured finance entities that invest in tranches of high-yield syndicated loans (securitized loans) and use these loans as collateral to issue new debt (CLO notes). Over the past decade, CLOs have become one of the most important type of lenders in the corporate loan market holding currently 70 percent of the high-yield corporate loans with an annual new loan issuance of about $100 billion (Standard and Poor's, 2014). While a large stream of literature examines how banks use discretion to meet regulatory capital adequacy ratios (e.g., Beatty et al. [1995], Beatty and Liao [2014]), empirical evidence on how unregulated lending institutions such as CLOs circumvent binding capital requirements is missing.

A CLO is typically managed by an investment management firm such as a hedge fund or a private equity firm (CLO manager). A CLO manager has two major responsibilities. First, the manager needs to rebalance the loan portfolio of the CLO to mitigate current or future credit risks. Since CLOs invest in tranches of syndicated loans, CLO managers gain access to lead banks' private information on borrowers that can be used to better assess credit risks and trade. Second, the manager is required to provide disclosures to CLO's noteholders regarding the CLO's portfolio structure, trading activities and performance on a monthly basis. For their role, CLO managers are compensated with a base fee and a performance-linked fee that is received only after all CLO's obligations to its noteholders have been fulfilled.

CLOs are required to comply with capital ratios called overcollateralization tests (OC tests) aimed to secure CLOs' overall solvency and soundness. Thus, a CLO needs to have enough loan assets to cover its senior and junior notes respectively. The calculation of the OC tests follows a standardized formula and is based on the ratio of the principal balance of well-performing loans plus the fair value of defaulted and low-rated loans, divided by the principal balance of the CLO's notes. The CLO manager is not responsible for calculating the test but provides all the relevant information to a trustee representing the CLO's noteholders (typically

1

a large bank). The trustee checks the accuracy of the data, calculates the CLO's compliance tests and then prepares and distributes the CLO reports to noteholders.[1]

Relative to banks' capital adequacy tests investigated in prior research, the analysis of OC tests in the case of CLOs provides several advantages and potentially interesting insights. Specifically, while banks disclose only aggregate financial accounting data, CLOs report managers' fair value estimates of low-rated/defaulted loan holdings at the individual loan level. Also, CLOs report all the detailed calculations necessary to estimate the OC test score and slack. In addition, CLOs are required to report new investments and the time when they are executed at the individual loan level. Thus, CLOs provide data on each loan that is purchased, retained or sold in a fiscal month. These granular loan-level disclosures allow us to assess and distinguish the source of managerial discretion, i.e. whether managers manipulate predetermined performance benchmarks (i.e., OC tests) by changing their inputs to loan fair value estimates or their decisions on which assets to trade. Previous papers provided mixed evidence on this issue (e.g., Dechow et al. [2009], Barth and Taylor [2010]).

We examine whether CLO managers use discretion to comply with binding senior and junior OC tests and avoid their violation. Failing to meet the OC test benchmarks decreases CLO managers' performance-linked compensation, because cash flows will be automatically diverted to pay the more senior CLO investors. Also, OC test violations are likely to adversely impact CLO manager's reputation. Therefore, we first posit that CLO managers will inflate the market values of non-performing or low rated loans to avoid an OC test violation. This prediction is not straightforward since CLO managers only provide the relevant information for calculating OC test scores to the trustees who must ensure these inputs are accurate before calculating the OC test scores.

Second, we hypothesize that CLO managers use discretion in their loan trading decisions by "cherry-picking" the loans they sell or retain in the CLO's portfolio. Managers can improve

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[1] Based on interviews with CLO managers, we learned that members of the CLO manager team will coordinate with the trustee to ensure accurate calculations.

the OC test score by selling well-performing loans that trade above their par value and by retaining underperforming loans (i.e., loans that are not in default but whose market value is deteriorating). This is because realized gains obtained from selling well-performing loans increase the numerator in the OC tests. At the same time, the unrealized market losses for underperforming loans are not affecting the numerator since these loans are accounted at their principal value (or historical acquisition cost). However, whether managers engage in such risk-shifting trading behavior is not clear as this trading strategy increases the risk of the portfolio in the current reporting period potentially leading to lower future performance.[2] Moreover, we explore whether CLOs may manipulate OC test scores by selling loans to affiliated CLOs (i.e., other CLOs that share the same manager). Affiliated sales may improve performance with respect to OC tests if managers obtain higher loan prices than the actual market prices.[3]

We test our hypotheses using a novel dataset from Creditflux that provides details on US CLOs' trading activities, loan portfolio holdings, compliance with OC test benchmarks and CLO managers' characteristics (e.g., compensation fees). Our sample includes 6,012 observations at the CLO-month level for 415 US CLOs covering the period from January 2008 to December 2013. We also hand-collect loan-level data on fair value estimates for defaulted and low-rated loans from 3,726 monthly noteholder reports. We capture discretionary market values by comparing the fair values of low-rated or defaulted loans used by a CLO in its OC test calculations to the average market values of the same loans used by other CLOs in the same reporting month.

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[2] While managers secure their performance-linked fee in the short-term, they may risk not receiving the fee in the future. Importantly, managers typically do not change over the life of the CLO, and CLO investors usually have long-term horizons (Taylor and Sansone [2007]). Indeed, by searching articles on Creditflux, an online platform that covers structured finance products, we could identify only two posts related to noteholders' firing a CLO manager. We reach similar conclusions by looking at the number of CLOs managed by an investment management firm: taking into account the dates when CLOs mature and the new CLOs are issued, the number of CLOs administered by a manager is relatively constant over time.
[3] Higher affiliated sale prices can be due to the fact that CLO managers intentionally inflate selling prices but also because managers do not face information asymmetry when trading with an affiliate.

Consistent with our expectations, we find that CLOs inflate the fair value estimates used in their calculations for the overcollateralization performance in months when CLOs are close to violating their OC tests. More specifically, an interquartile increase in discretionary loan market values leads to an approximately 11 percent increase in the probability that the CLO reports low OC test slacks. We reach similar conclusions when we separately examine the relation between discretionary market pricing and low slack on the senior and junior OC tests. Restricting our sample to CLOs that just beat and miss the OC test benchmark, we find that an interquartile increase in discretionary loan market values is associated with a 4 percent increase in the probability of a CLO just beating compared to missing the OC test benchmarks. We also document that increasing discretionary loan market values in months with low OC compliance slack are related to increases in the slacks of both senior and junior OC tests in the current month. Overall, this evidence indicates that CLO managers manipulate fair value estimates to avoid OC test violations and improve the reported OC test slack.

Looking at CLOs' discretionary trading choices, we find strong and consistent evidence that CLOs sell well-performing loans and retain underperforming loans in months when CLOs are close to violating their OC tests. Consistent with our expectations, we also find that CLOs sell loans to other affiliated CLOs at inflated prices when they are close to violating the OC tests. We reach similar conclusions by comparing CLOs with low OC test slack with their peers that just missed the OC test benchmarks. To alleviate reverse causality bias (i.e., that poor performance is the outcome of CLO's trading decisions), we further document that CLOs' increasing discretionary trading in months with low OC test slack is related to increases in the slacks of both senior and junior OC tests in the current month. In addition, we investigate whether CLO managers discretionarily trade loans based on unobservable private information (e.g., CLOs retain bad quality loans because they have private information that these loans will perform better in the future) by assessing the extent to which this discretionary trading activity affects CLO future performance. Consistent with the interpretation that CLO managers make discretionary trading decisions to avoid only short term OC tests, we find that selling winning

4

and holding losing loans adversely affects future OC test performance and portfolio credit riskiness. Overall, our results suggest that CLO managers employ multiple mechanisms to manage the reported scores of binding OC tests.

Next, we investigate the conditions under which CLO managers prefer to manage fair value estimates or to trade strategically to meet the thresholds of OC tests. We first identify months when the CLOs face low or high fair value losses due to defaulting or low-rated loans. We find that when such losses are low, managers prefer accounting discretion over trading discretion. However, when the losses are high, managers complement accounting discretion with strategic trading in order to be able to meet the thresholds of the OC tests. We also identify months with high secondary loan market liquidity (based on the number of trades in the market during that month). We document that during months of high liquidity, CLO managers are more likely to sell winning and retain underperforming loans, potentially because market liquidity allows managers to obtain gains on the well performing loans. However, when the market liquidity is low, the managers prefer to trade with affiliates only. Our findings suggest that CLO managers manage strategically the OC tests depending on the market conditions or the magnitude of losses suffered by the portfolio.

In additional analyses, we examine whether CLO managers' propensity to report strategically to meet binding OC tests is related to their monetary or reputational incentives. First, consistent with managers maximizing their short-term compensation, we find that CLO managers with high performance-linked compensation are more likely to report greater discretionary market values as well as to trade strategically (by selling well performing loans, holding on underperforming loans or selling to affiliated entities) in months when CLOs face more binding OC tests. Second, we provide evidence that CLO managers are more likely to try avoiding an OC test violation via discretionary reporting and trading when they engage in the issuance of a new CLO within the subsequent six months. This finding suggests that CLO managers likely "window-dress" the performance of a CLO to increase the likelihood that funding for a new CLO can be successfully obtained in the near future. Moreover, we explore

5

weak governance mechanisms that likely give rise to opportunities for CLO managerial discretion. Specifically, we investigate whether managers are more likely to engage in discretionary reporting when the monitoring of the trustees is more limited. We find that when trustees are busy (i.e., they monitor more CLOs simultaneously), CLO managers with binding OC tests engage in discretionary reporting and trading to a greater extent to increase the OC tests' slack.

Finally, we investigate whether CLO investors can see through managerial actions and price accordingly these agency costs when trading CLO notes in the secondary market. We find evidence that CLO investors price negatively discretionary trading to meet OC tests in the month when the OC test is binding but fail to price the discretionary reporting behavior associated with the over reporting of fair values for defaulted or low rated loans. This latter result suggests that the information asymmetry about these loans and their low liquidity limit investors' ability to fully incorporate managers' reporting decisions in the pricing of CLO notes (e.g., Bozanic, Loumioti and Vasvari [2015]).

Our paper makes several contributions to the literature. First, we contribute to the well-established literature on financial institutions' use of accounting discretion to manage earnings or to circumvent capital adequacy requirements (e.g., Beatty and Liao [2014]). Prior research documents that bank managers use discretion in setting loan loss provisions to meet binding capital constraints or smooth earnings (e.g., Collins et al. [1995],Beatty et al. [1995], Ahmed et al. [1999], Beatty et al. [2002]). Also, recent studies show that bank managers time their loan investment decisions or manipulate fair value estimates to smooth earnings (e.g., Dechow and Shakespeare [2009], Dechow et al. [2010]). We add to these studies by presenting evidence on the extent to which unregulated financial institutions such as CLOs manage reported performance and that this discretionary behavior is associated with compensation incentives. Taking advantage of the loan-level disclosures by CLOs we are able to delineate the key channels that CLOs use to meet binding capital constraints. Thus, we shed light to the recent

debate on whether managers do actually inflate fair value estimates to meet performance benchmarks (e.g., Barth and Taylor [2010]). Our study further adds to the literature on the influence of governance on managerial discretion in fair value estimates and risk-shifting in financial firms (e.g., Song, Thomas and Yi [2010], Erkens et al. [2012], Armstrong et al. [2015]). We complement these studies by identifying conditions under which external stakeholders to CLOs (i.e., noteholders' trustees) become inefficient in controlling and disciplining managerial discretion.

Second, we contribute to the emerging literature on the role of CLOs, the largest institutional investor in the high-yield corporate loan market, in facilitating banks' shift from the traditional originate-to-hold to the new originate-to-distribute model of lending (e.g., Bord and Santos, 2012). This literature has solely focused on the characteristics of the loans purchased by CLOs. So far, related studies have focused on the quality (Benmelech, Dlugosz and Ivashina [2012]) and pricing of securitized loans (e.g., Nadauld and Weisbach [2011]) purchased by CLOs, suggesting that securitized loans are cheaper and of similar credit risk relative to other institutional loans. However, there is yet no academic evidence on how CLOs reporting constraints affect their investment choices in high-yield loans. We provide unique findings indicating that CLO managers engage in trading activities strategically to meet performance thresholds. This opportunistic trading increases the credit risk of CLO investors as managers avoid selling worse quality corporate loans in months of low compliance slack.

Finally, we add to the empirical literature on the adverse effects of managerial myopia with respect to long-term performance (e.g., Bhojraj and Libby [2005], Bhojraj et al. [2009], Brochet, Loumioti and Serafeim [2014]) and to the theoretical work investigating the relation between benchmarking managers and risk-shifting (e.g., Admati and Pfleiderer [1997], Basak et al. [2007]). We show that CLO managers engage in risk shifting to meet short term performance benchmarks leading to negative consequences with respect to CLOs' future

7

performance. These findings also contribute to the literature which has provided mixed evidence on the relation between active trading by asset managers and performance (e.g., Wermers [2000], Chen et al. [2000], Edelen et al. [2007], Cremers and Petajisto [2009], Gil-Bazo and Ruiz-Verdu [2009], Fama and French [2010]).

2. Institutional background

2.1 CLO STRUCTURE

Collateralized Loan Obligations (CLOs) are structured finance vehicles that invest in a diversified pool of mostly high-yield syndicated loans (securitized loans). CLOs use these loans as collateral to issue new senior, junior and subordinated notes (CLO notes) that are typically purchased by banks and institutional investors. Most CLOs use the interest and principal payments from securitized loans to pay their liabilities to investors in the notes, and are thus typically called "cash-flow" CLOs.[4] The portfolio of a CLO usually includes tranches from 150 to 250 loans (covering borrowers in 15-25 industries) that have an average Standard and Poor's rating of B+ (i.e., non-investment grade) and a minimum LIBOR-spread of 225 basis points. The average CLO size is $450-500 million, and the average loan tranche size purchased by a CLO is $1.5-2.0 million, suggesting that CLO's exposure to an individual corporate loan is relatively low.[5]

The structuring of a CLO involves several key periods. In the first stage, a bank (CLO arranger) and an independent investment management firm (CLO manager) agree to set up a CLO by purchasing tranches of large corporate loans in the primary or secondary loan market. Then, the two parties contact credit rating agencies to obtain ratings for the loans in the portfolio and the CLO notes. Diversification in the portfolio structure mitigates the impact of the

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[4] There are also "market-value" CLOs that are riskier (i.e., generate higher returns). Such CLOs pay back the investors using the loan principal and interest receipts as well as receipts from profitable sales of securitized loans (i.e., from realized capital gains). Market value CLOs are much less common than cash flow CLOs, and are not included in our research sample.
[5] The descriptive statistics are based on the full Creditflux dataset.

idiosyncratic credit risks of individual loans on the performance of the overall portfolio. This feature allows CLOs to price their notes higher than the average price of loans in their portfolios, making CLOs profitable entities (i.e., the average spread paid to CLO note investors is lower than the average spread received from the loans in the portfolio). Appendix A presents details on the structure of a CLO deal.

Once CLO notes are issued,[6] CLO managers are expected to actively manage the loan portfolio for a period of 5 to 7 years (i.e., the "reinvestment period"). As members of bank loan syndicates, CLO managers receive access to private information provided by lead banks in the syndicate, thus facilitating assessments of future credit risk deteriorations. Given that this private information cannot be further disclosed to CLO investors, managers are allowed to exercise considerable discretion with respect to their trading decisions. Importantly, most CLOs prohibit investors in the notes from withdrawing funds for at least 5 years which allows managers to plan for long-term investment periods (Hyder, 2002).

As compensation, CLO managers receive flat senior management fees (10-20 basis points), paid before the most senior tranche of debt receives a return or is repaid, and junior management fees (30-50 basis points), which are paid after the senior and junior debt tranches are paid but before the subordinated note. All fees are computed based on the par value of the securitized loans in the portfolio rather than on their market value. In addition, managers receive incentive fees (up to 20 percent of profits) which are typically paid only after the equity tranche achieves a certain hurdle rate (about 12 percent).

2.2 CLO REPORTING STANDARDS AND CAPITAL PERFORMANCE

CLOs report on a monthly basis by following a standardized format that primarily includes three parts: portfolio structure, portfolio trades and portfolio performance. The portfolio structure part includes data on loan characteristics (loan type, face amount held by the CLO,

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[6] Subordinated notes are usually, but not always, kept by the CLO manager.

loan currency, spread, credit rating by Standard and Poor's, Moody's and/or Fitch, loan maturity and whether the loan is in default) and borrower characteristics (borrower name, country and industry). The reporting on portfolio trades includes information on the direction of each trade (sale or purchase), the date of the trade, the loan face amount traded, the price and loan type as well as the borrower's name. All disclosures are at the loan level, allowing the investors to analyze the impact of each individual securitized loan traded.

The reporting on portfolio performance presents standardized computations of tests that are commonly applied to all CLOs. The performance evaluation of a CLO is based on predetermined compliance tests (i.e., set upon a CLO's origination) that CLOs are required to pass on a monthly basis. These tests cover the loan portfolio's characteristics, riskiness and quality. Tests on portfolio characteristics mainly include benchmarks of average loan characteristics such as average loan maturity, borrower industry diversification, loan rating diversification and average loan interest rate. Tests on the overall portfolio riskiness include benchmarks of average Standard and Poor's and Moody's loan ratings and aim at restricting CLO managers from holding loans whose rating is below a certain threshold. Obviously, the stricter all these tests are (i.e. the more binding their thresholds), the less risky the CLO portfolio.

CLO portfolio quality tests ensure that the CLO has enough funds to cover short- and long-term liabilities. For example, the interest coverage test checks whether the interest cash receipts from the loans in the portfolio can cover the interest payments to note investors. Of particular importance are the overcollateralization tests (OC tests) that describe whether the CLO has enough capital to cover the CLO notes' principal payments. There are two OC tests: the senior and junior OC tests (i.e., whether the CLO has capital to cover its senior and junior principal liabilities respectively). Their importance relies on the fact that failing to meet an OC test benchmark leads to the diversion of CLO's cash flows to pay-down the senior notes and

restricts managers from performance linked compensation. Also, CLO managers cannot reinvest principal payments from the loan portfolio and might need to start deleveraging to reduce the possibility of greater losses in the future, which will also adversely impact their compensation. In addition, missing an OC test may trigger credit rating downgrades. This has potential negative implications in the fundraising market as investors will be less likely to invest in the junior tranches of new CLOs that the manager plans to raise. In case of severe losses in the underlying loan portfolio, a CLO may even be liquidated or its CLO manager may be dismissed (Husson, McCann and Wang [2012]). The OC tests are similar to the capital adequacy ratio tests required for banks to assess their solvency and soundness.

Related to whether CLO managers can use discretion in calculating CLO performance, OC tests are the only tests where CLO managers are called to make some valuation choices on loans in the portfolio, and whose scores rely on whether CLO managers realize cash gains from trading loans. Specifically, the OC test is the ratio of the value of CLO's loans to the principal balance outstanding of the CLO's notes.[7] The value of CLO's loans is equal to the fair value of excess-CCC rated loans (i.e., CCC-rated loans in excess of what is allowed by investors), the lower market or recovery value of defaulted loans,[8] the purchase price of all deep-discount loans,[9] the principal balance outstanding of all well-performing loans (i.e., loans not classified in the above categories) and the cash that a CLO holds from trading activities and that can be used to pay note investors and/or to buy new loans.

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[7] For example, the senior overcollateralization test is computed as the ratio of the value of the loans in the CLO's portfolio to the principal balance outstanding of senior notes. The junior overcollateralization test is the ratio of the value of the CLO's loans to the principal balance outstanding of both senior and junior notes. Thus, by default, the junior overcollateralization score is always lower than the senior one.

[8] Defaulted are considered loans that do not pay principal and/or interest (and a relevant documentation from the collection services of the CLO manager has been obtained). Usually, but not always, defaulted are loans of bankrupt borrowers.

[9] Deep discount are loans purchased at 80% - 85% of par value or below. Looking at a sample of 80 CLO reports, we could only find four reports where CLOs reported deep discount loans.

To better illustrate the calculation of an OC test, we provide an example in Appendix B. Let's assume CLO A has a portfolio of 100 loans, each with a principal value of $1 million and all purchased at par (i.e., purchase price= 100%). The CLO issues senior notes with principal value of $68.60 million, junior notes with principal value of $19.6 million and subordinated notes of $9.80 million. Note that the total principal balance of the loans is $100 million and the total principal balance of the notes is $98 million, suggesting that 2 percent of the loan principal balance needs to go in default (and the market price of the defaulted loans drops to zero as well) before losses start hitting the subordinated note. The senior overcollateralization is assumed at 138 percent and the junior overcollateralization is 109 percent. The CLO life is 10 years, suggesting that the principal on the notes is paid in 10 years and the average loan maturity is also 10 years.[10] Let's also assume that the maximum amount of CCC-rated loans that this CLO can hold is $5million.

Let's examine the OC test of this CLO one year ahead under a positive scenario (reported in Section A of Appendix B). These are the activities that took place in the CLO: the CLO sold 10 loans on the day after the CLO origination at an average price of 105 percent of par. The CLO received $10.5 million from sales, and used $8 million to buy new loans at an average price of 98 percent of par, thus the principal balance the CLO purchased is about $8.2 million. The manager retains the remaining $2.5million in cash to invest in new loans in the future (eligible investments). There are no defaults or credit deterioration in the portfolio. The senior OC score is now estimated as the sum of the remaining principal balance on the loans ($90m), the principal balance outstanding of the new loans ($8.20m) and the cash holdings ($2.50m) which total $100.7 million, deflated by principal balance of senior notes outstanding ($68.60m).

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[10] For simplicity, we assume that loans will pay off principal at their maturity. This assumption is not a necessary condition nor does it affect the OC score. However, it simplifies our calculations.

Thus, the senior OC score is 147 percent [=100.7/68.6] while the junior OC score is 114 percent [=100.7/(68.6+19.6)]; both tests are passed.

Now let's now examine the OC test performance of this CLO one year ahead under a negative scenario (reported in Section B of Appendix B). Under this scenario, the price of ten loans drops to 80 percent of par with their performance continuing to deteriorate (i.e., prices are anticipated to drop), but the price of ten loans increases to 120 percent of par. However, to calculate the OC test the CLO will use the principal value, thus, the OC test will not be impacted by changes in the market value of these loans. There are another 8 loans that defaulted (e.g., the borrowers stopped paying or went in default), and another 10 loans that are now rated at CCC. Assuming no trades, this is how the numerator for the OC test is calculated. First, we need to find market value of the *excess* CCC-rated loans. To do this, we take the market price of all CCC-rated loans, rank them in a reverse order and take the market value of the lowest rated loans over and above the maximum threshold. In this case, the threshold is $5 million and we have $10m loan balance (=10x$1m), thus, $5m (i.e. five loans) need to be valued at their market price. For liquid loans or loans from liquid borrowers, the manager will use data vendors (such as Markit or Intex) to retrieve the market price. For illiquid securities, the manager needs to use quotes from two independent brokers. Following the assumptions in Appendix B, we estimate that this excess market value of CCC rated loans is $2.05 million. Second, we need to calculate the lower market or recovery rate for defaulted loans. Recovery rates on loans are taken from Moody's and S&P. The value of the defaulted loans is $3.05 million (i.e., the minimum of the minimum recovery rate or the market price).Thus, the total balance of loans is the principal balance of well-performing loans which is 87 million (i.e., loans that did not default or severely dropped in rating over and above the maximum allowance, since loans with decreasing market value are not considered underperforming loans) as well as the market value of the defaulted (3.05 million) and excess CCC rated loans (2.05 million), summing up to

13

$92.10 million. The senior OC score is now 134 percent [=92.1/68.6] and the junior OC score is now 104 percent [=92.1/(68.6+19.6)]; both tests are violated.

A manager can avoid these OC test violations. First, he can increase the market prices used for the calculations of excess CCC rated and defaulted loans. The manager can also sell the loans that over-perform to cash the unrealized gains, since now these loans are traded at 120 percent of par. If the CLO manager cannot find a buyer to pay this price, the manager can sell them to some of the other CLOs that are under his management. Hence the CLO manager is very likely to be successful in selling loans when under pressure. In addition, the manager would want to keep the underperforming loans and try to sell them in the future (i.e., when OC slacks are higher). Doing the calculations (reported in Section C of Appendix B), we find that when a CLO manager uses discretionary reporting or trading he manages to just pass the OC tests. Note that the manager in this case would need to use both discretionary trading and reporting since one of these methods alone would not suffice (e.g., engaging in just discretionary trading gives a senior OC score of 137 percent and a junior OC score of 107 percent of par).[11]

While CLO managers have clear incentives to use discretion in trading and reporting their loans to meet binding CLO overcollateralization tests, it is not clear whether manipulating reported performance as outlined above is feasible in our setting. CLO managers do not prepare the reports or calculate the OC test scores. Rather they provide all relevant data to trustees who are responsible for calculating the OC test performance, prepare the reports and distribute them to noteholders. While the manager works with the trustee to calculate the tests, the CLO trustee needs to ensure that noteholders receive transparent and accurate reports, thus the trustee might

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[11] We acknowledge that this scenario is extreme and was created for illustration purposes. For example, under the negative scenario, 8 percent of the CLO loans are in default which is double the average securitized loan default rate in the loan market. Managers will likely start using their discretion to meet the OC tests by manipulating the market values, and, if this is not sufficient, then they will start selling off good quality loans. Thus, the worse the OC performance, the more techniques managers will likely use to meet or beat an OC benchmark.

uncover managerial reporting and trading discretion. Moreover, as emphasized above, most CLOs prohibit investors from withdrawing funds for at least 5 years thus protecting managers from short-term pressures. Thus, whether CLO managers will risk-shift their loan positions to achieve OC test compliance in the current period by risking greater portfolio underperformance in the future is an empirical question.

3. Data and Sample selection

We hand-collect data on US CLOs' structure, performance and trades from the CLO-i database provided by Creditflux. Creditflux is a global news platform covering structured investment issuance and performance in the corporate loan market since January 2008. Creditflux retrieves this information from monthly CLO financial reports that CLOs disclose to their investors.

Our initial dataset of CLO portfolio holdings includes 7,723 unique borrowers, 571 CLOs and 5,791,930 observations at the CLO-loan tranche-fiscal month level covering the period from January 2008 to December 2013. The average coverage length of a CLO in our sample is 38 months. CLO-i provides complete information on CLO managers, arrangers, notes and monthly portfolio structures. The data on the CLO loan portfolio structure covers borrowers' names as well as loan types, ratings, balances, maturities and default events. The CLO monthly performance dataset includes information on a subset of compliance tests, such as the senior and junior OC tests' slacks. Moreover, since CLO-i also provides details on the thresholds of the OC tests, we can estimate the actual senior and junior OC score reported in a fiscal month. The dataset of CLO transactions covers 302,233 unique loan sales and purchases from January 2008 to December 2013. The transaction data covers loan or tranche characteristics, the direction of the trade (i.e., sale or purchase), the transaction date, the face amount and the transaction price.

We hand match CLO-i with LPC DealScan to identify unique syndicated loans and their

15

tranches in the CLO portfolio. This process yields a sample of 3,557 unique syndicated corporate loans issued by 2,018 unique borrowers. This process restricts our CLO holdings sample to 1,731,793 observations at the CLO-loan-fiscal month level. We merge our CLO holdings sample with the population of CLO trades. Since loan trade dates and CLO portfolio fiscal month end dates are different, we match the loan trade dates to the first portfolio fiscal month end date following the loan trade date. We identify 254,628 unique trades for our final sample of 3,557 syndicated corporate loans for the period 2008-2013.[12] We collapse our merged database at the CLO-fiscal month level and we delete duplicate CLO portfolios that have reports within the same fiscal month. We exclude CLOs with no reported defaulted loans and/or excess CCC-rated loans, since the OC score for these CLOs is not eroded.

Our final sample includes 6,012 observations at the CLO-fiscal month level for a sample of 415 CLOs. Since fair value estimates for the defaulted and excess CCC rated loans are not covered by Creditflux, we hand collect this missing information from CLO reports. We were able to download 3,726 monthly CLO reports with complete data on fair value estimates on low quality or non-performing loans over the period 2008-2013. We summarize the sample selection process and the sample structure over time in Table 1.

4. Variable Definition and Summary Statistics

To test whether CLO managers use discretion to manipulate binding OC test benchmarks, we investigate their reporting and trading choices in months when they report low compliance slack. We define *Low OC Compliance* as an indicator variable that equals one if the CLO passes the OC tests but its senior and/or junior OC slacks are at the bottom quartile compared to other CLOs' reported senior and/or junior OC slacks respectively.[13] In addition, we use an

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[12] It is important to emphasize that in our setting trades do not typically involve selling or buying the entire corporate loan, but only small tranches of the loan.

[13] We do not use an absolute benchmark for both the senior and junior OC test slacks in the main tests. To alleviate the concern that this variable design choice may drive our results, we use absolute benchmarks (i.e., 5% or 3% slack), and our results hold (untabulated results).

indicator variable that equals one if a CLO reports low OC slack (defined similarly as for *Low OC Compliance*), and zero if a CLO just missed the senior and/or junior OC test benchmark (*Just Beat or Miss a Compliance Test*). A "just missed" OC test benchmark occurs when a CLO violates the OC test *and* its OC slack is in the top quartile when ranking the OC slacks of all CLOs that violate their OC tests.

To proxy for discretionary reporting, we take the difference between the market price that a CLO reports on each defaulted and/or excess CCC-rated loan and the average market price of this specific defaulted and/or excess CCC-rated loan reported by other CLOs in the same month. We then average these differences at the CLO-month level (*Discretionary Market value*). We use two proxies for discretionary trading. We first estimate a CLO's propensity to retain underperforming loans and sell good quality loans. To do so, we look at a CLO's trading activity during its fiscal month and identify loans that are sold above par (i.e., their price is higher than 100% of par) to estimate how many good quality loans are sold. We then look at a CLO's holdings at the end of its fiscal month and identify loans kept in the CLO portfolio, but whose market price is deteriorating over the previous six months (underperforming loans).[14] We proxy for the intensity of a CLO's selling overperforming and keeping underperforming loans with the sum of the number of good quality loans sold and the number of underperforming loans that are retained in a CLO portfolio in a reporting month divided by the total number of loans in the CLO portfolio in the same month.

The second proxy for discretionary trading relies on whether a CLO is selling loans to affiliated peers (i.e., CLOs that are managed by the same manager). We posit that affiliated sales can be a form for discretionary trading to the extent that managers can gain more from selling to affiliated CLOs than selling to non-affiliated buyers.[15] To identify affiliated sales, we

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[14] If the specific loan is not traded, we look at the market returns of other liquid loans issued by the same borrower.
[15] The additional gains from selling to affiliated CLOs can be driven by two factors. First, managers can distort market prices by intentionally boosting the selling price. Second, by selling to affiliated CLOs, managers can

merge our samples of loan purchases and sales by exact borrower name, detailed loan purpose, face amount, trade date and loan price. Since a CLO trades (sells or buys) on average one loan tranche with the above characteristics at a given date, we expect that the outcome of our merging process will be accurate. We identify 11,415 affiliated trades over our sample period. Our proxy for affiliated sales is the number of loan sales reported by a CLO with CLOs run by the same manager to total number of trades reported by a CLO in a fiscal month (*Affiliated Sales*). Moreover, we proxy for whether CLOs can realize higher gains from selling to affiliated peers by using the difference between the price of the loans sold to affiliated CLOs and the average market price for the same loans in the period between day -30 and day +30 around the affiliated trade dates (*Discretionary Sale Price to Affiliates*).

Our proxies for CLO riskiness include: (i) the percentage of defaulted loans (i.e., loans that do not pay principal and/or interest) to the total number of loans in the CLO portfolio (*Default Bucket*), (ii) the percentage of CCC-rated loans to the total number of loans in the CLO portfolio (*CCC-rated Bucket*), and (iii) the average rating of the loans in the CLO portfolio (*Average Portfolio Credit Rating*) where each individual loan's rating is defined as a scale variable that takes the value of 1 for AAA, 2 for AA+, (…) and 23 for D. Our proxies for CLO performance include: (i) the logarithmic transformation of the senior overcollateralization score in percentage points as reported in CLO monthly reports (*Senior OC*), and (ii) the logarithmic transformation of the junior overcollateralization score in percentage points as reported in CLO monthly reports (*Junior OC*). We also proxy for CLO size using the logarithmic transformation of the aggregate loan principal balance as reported in the CLO trustee reports (*Portfolio Size*). Detailed definitions of the variables are reported in Appendix C.

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avoid a price reduction due to information asymmetries (i.e., a non-affiliated buyer will price in the information asymmetry about the true quality of the loan). Since we cannot empirically disentangle these two mechanisms, we are agnostic about the source of additional gains from selling to affiliated CLOs. However, if these gains exist, they will help CLOs boost their OC test scores. Thus, such trading practices can be discretionarily used by CLOs to avoid breaking an OC test.

We further look at a CLO's and CLO manager's characteristics that likely exacerbate discretionary trading and reporting. We use the logarithmic transformation of the number of CLOs that a CLO trustee controls and supervises in a month as a proxy of how busy the trustee is to complete its fiduciary duties to noteholders (*Busy Trustee*). Moreover, we use the performance-linked fees (*Performance-linked Compensation*) as a proxy for CLO manager's monetary incentives, defined as the junior fees in basis points that CLO managers receive if the CLO passes the senior and junior OC test. We also use the intensity of forthcoming new CLO issuance as a proxy for manager's reputational incentives, defined as the aggregate principal balance of new CLOs issued by a CLO manager in the next 6 months divided by the current aggregate CLOs' balance under his management (*Forthcoming CLO Issuance*).

Panel A of Table 2 reports the summary statistics for the variables. The mean CLO portfolio size is 19.51 or $316 million with a median of $405 million. Looking at CLO's overcollateralization performance, the mean probability of a CLO reporting a low compliance slack is 28.00 percent. We also observe that about twice as many CLOs just pass the tests relative to CLOs that just miss the tests, suggesting that CLOs generally try to avoid an OC test violation. The mean senior OC score reported by CLOs is 4.81 or 125 percent, and the mean junior OC score is 4.63 or 104 percent. Looking at portfolio riskiness, the mean percentage of defaulted (CCC-rated) loans in a CLO portfolio is 4.05 percent (7.57 percent). The mean loan rating in a CLO portfolio is about 15 or B, suggesting that, on average, the loans in a CLO portfolio are non-investment grade.

Looking at discretionary market values of the defaulted and/or CCC-rated loans in a CLO portfolio, we observe that, on average, CLOs do not report different estimates for these loans. However, the standard deviation of the variable *Discretionary Market Value* is about 6 percent of par, suggesting that there is significant cross-sectional variation in the estimates that different CLOs report. Regarding discretionary trades, the mean intensity of selling winning loans and

retaining underperforming loans is 4.56 percent, and the mean intensity of affiliated sales is 5.42 percent. By selling to affiliates, CLOs are able to gain about 2 percent of par more compared to selling this loan to unaffiliated CLOs.

Lastly, the noteholders' trustees in our sample supervise on average 54 CLOs (i.e., its logarithmic transformation is 3.98). Looking at CLO manager's incentives, the mean performance linked compensation is about 35.00 basis points, and the average CLO manager in our sample plans to increase the assets under management by 5 percent over the next 6 months.

In Panel B of Table 2, we compare the mean values of our proxies for CLO portfolio riskiness and discretionary trading and reporting choices between the subsamples of low and high OC compliance CLOs. High OC compliance CLOs are CLOs that pass the OC tests and their OC test scores are ranked in the upper quartile of the CLOs' OC score distribution. In this univariate analysis, we find that CLOs with low OC compliance indeed hold riskier loans, i.e. more defaulted or CCC-rated loans, suggesting that erosion of their overcollateralization performance is primarily driven by these assets. Most importantly, focusing on managers' investment and reporting decisions, we find that managers of CLOs with low OC compliance are likely to report higher fair values for their defaulted and CCC-rated loans, trade more with affiliates and at a higher price as well as risk-shift their portfolios to lower quality loans by selling the overperforming ones.

5. Research Design and Empirical Results

5.1 LOW COMPLIANCE SLACK AND DISCRETIONARY REPORTING

In our first set of multivariate analyses, we test whether CLO managers manipulate the market values of defaulted and/or excess CCC-rated loans to comply with OC test scores using the following probabilistic model, where the dependent variable is the indicator of whether the CLO reports a low OC slack (*Low Compliance Slack*).

20

Probability (*Low Compliance Slack*= 1)   = α +$β_1$*Discretionary Market Value
$\qquad$ +$β_2$*Default Bucket +$β_3$*CCC-rated Bucket
$\qquad$ +$β_5$*Average Loan Rating +$β_5$*Senior OC
$\qquad$ +$β_6$*Junior OC +$β_7$*Portfolio Size
$\qquad$ +$β_8$*CLO Manager FE + $β_9$* CLO Trustee FE
$\qquad$ +$β_{10}$*Fiscal month FE

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ *(Model 1)*

The coefficient of interest, $β_1$, is expected to be positive, i.e. CLO managers will discretionarily increase the market valuation of defaulted /low rated loans when faced with binding OC compliance tests. We control for CLO performance (*Senior OC*, *Junior OC*), portfolio riskiness (*Average Loan Rating*, *CCC-rated Bucket*, *Default Bucket*) and portfolio size (i.e., principal balance) that likely affect the probability of a CLO's reporting low OC compliance slacks. We also control for CLO reporting month fixed effects to control for intertemporal variations in the compliance tests' slack and market valuation differences, and CLO manager and trustee fixed effects to control for inherent characteristics (e.g., style, skills) across different CLO managers and trustees.[16]

Panel A of Table 3 reports the results of the tests. Consistent with our expectations, we find that CLOs inflate the market value estimates used in the calculations for the overcollateralization performance in months when CLOs are close to violating their OC tests. More specifically, an interquartile increase in discretionary loan market values is associated with an approximately 11 percent increase in the probability of a CLO reporting low OC compliance slack. To further investigate whether these results are driven by the senior or junior OC slack, we assess whether managers manipulate fair values when they are close to violating a senior (column II) or a junior (column III) OC test. The results suggest that both tests are taken into consideration by managers when deciding on whether to manipulate fair values for bad quality loans. Specifically, an interquartile increase in discretionary loan market values is

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[16] To avoid bias in our results due to running a probit model with a large number of fixed effects, we repeat this analysis using a linear probability model, and our results remain unchanged (untabulated robustness test).

associated with a 3 (6) percent increase in the probability of a CLO reporting a low senior (junior) OC compliance slack. This finding indicates that meeting the junior OC test is the primary driver for a CLO manager's inflating fair values, potentially driven by concerns from missing his performance-linked compensation. In addition, restricting our sample to CLOs that just beat and miss the OC test benchmark (column IV), we find that an interquartile increase in discretionary loan market values is associated with a 4 percent increase in the probability of a CLO just beating compared to missing the OC test benchmarks.

We directly test whether these discretionary fair value estimates are related to an improvement in the reported junior and senior OC slack by CLOs. Panel B of Table 3 reports the results of the tests. The dependent variables in the first and second specifications are the monthly changes of senior and junior OC scores respectively. We find that CLOs' increasing discretionary loan market values in months with low OC compliance slack are associated with increases in the slacks of both senior and junior OC tests in the current month. More specifically, when fair value estimates on low quality loans increase by an interquartile, a CLO with a low compliance slack reports a higher increase by 2.80 percent (9.00 percent) in its senior (junior) OC slack, compared to the average change in OC slack reported by other CLOs. Our findings indicate that CLO managers manipulate fair value estimates to avoid OC test violation and improve their reported OC slack.

5.2 LOW COMPLIANCE SLACK AND DISCRETIONARY TRADING

Next, we test whether CLO managers will undertake discretionary investment decisions in rebalancing their loan portfolios to comply with OC test scores. We use the following probabilistic model where the dependent variable is an indicator variable that equals to one if the CLO reports a low OC slack.

Probability (*Low Compliance Slack*= 1) $= \alpha + \beta_1 * Discretionary\ Trading$
$+ \beta_2 * Default\ Bucket + \beta_3 * CCC\text{-}rated\ Bucket$
$+ \beta_5 * Average\ Loan\ Rating + \beta_5 * Senior\ OC$
$+ \beta_6 * Junior\ OC + \beta_7 * Portfolio\ Size$
$+ \beta_8 * CLO\ Manager\ FE + \beta_9 * CLO\ Trustee\ FE$

$$+\beta_{10}*\textit{Fiscal month FE}$$

<div align="right">(Model 2)</div>

The coefficient of interest is β_1. We expect it to be positive if CLO managers engage in more discretionary trading when faced with binding OC compliance tests. We use two proxies for discretionary trading: the propensity of a CLO's selling well-performing loans (i.e., at a price higher than par) and retaining underperforming loans (*Sell winners & Hold losers*), and CLO's loan sales to other CLOs run by the same manager (*Affiliated Sales*). The remaining controls are the same ones employed in *Model 1*.

Panel A of Table 4 reports the results of this test. Consistent with our expectations, we find that CLOs risk-shift their portfolios by selling winning loans and holding the underperforming ones in months when CLOs are close to violating their OC tests (column I). More specifically, an interquartile increase in our variable *Sell winners & Hold losers* is associated with a 9 percent increase in the probability of a CLO's reporting low OC compliance slack. Also, we document that CLOs facing binding OC tests will sell more loans to affiliated CLOs (column I). An interquartile increase in affiliated sales is associated with a 2.29 percent increase in the probability of a CLO's reporting low OC compliance slack. To further examine CLO manager's intentions when selling loans to other CLOs that he or she manages, we look at the difference between the sale price of a loan to an affiliated CLO and the market price of the same loan in the same period (*Discretionary Sale Price to Affiliates*). We find that CLOs sell a loan at a significantly higher price to their affiliated peers when faced with binding OC tests. More specifically, an interquartile increase in our proxy for discretionary sale price to affiliates is triggers a 0.5 percent increase in the probability of a CLO's reporting low OC compliance slack (column II). We reach similar findings when we examine CLO's discretionary trading decisions at binding senior and junior OC tests (columns III-VI) or when we restrict our sample to CLOs that just beat and miss the OC test benchmark (column VII-VIII). Similar to the results for discretionary valuation of defaulted and excess-CCC rated loans, we find that CLO manager's

concerns for meeting the junior OC test is primarily related to higher affiliated loan sales and risk-shifting.

To alleviate the concern that this trading behavior leads to worse overcollateralization performance (i.e., our results may suffer from reverse causality bias), we examine whether discretionary trades help managers improve the OC tests' slacks. Panel B of Table 4 reports the results of this test. The dependent variables in the first and second specifications are the monthly changes of senior and junior OC scores respectively. We find that CLOs' increasing risk-shifting and affiliated sales in months with low OC compliance slack are related to increases in the slacks of both senior and junior OC tests in the current month. More specifically, when our variable *Sell winners &Hold losers* increases by an interquartile in months of low reported compliance slack, a CLO reports a higher increase by about 5.00 percent (2.00 percent) in its senior (junior) OC slack compared to the average change in OC slack reported by other CLOs. In addition, we find that affiliated sales help CLO managers to improve their CLOs' junior OC score. Indeed, when affiliated loan sales increase by an interquartile in months of low reported compliance slack, a CLO reports a higher increase by about 2.50 percent in its junior OC slack compared to the average change in OC slack reported by other CLOs. Thus, our results show that CLO managers exercise discretion in their trading decisions to meet binding OC tests.

We mitigate the concern that CLO managers discretionarily trade loans based on some unobservable private information (e.g., CLOs retain bad quality loans because they have private information that these loans will perform better in the future) by investigating the extent to which discretionary trading affects CLO future performance. One the one side, we expect that if CLO managers trade discretionarily on some unobservable private information this trading will likely improve future CLO performance. On the other side, we expect that CLO manager's discretionary trading choices will adversely affect future performance if this discretionary trading behavior aims to meet short-term binding OC tests.

Panel C of Table 4 reports the results of this test. We restrict our sample to CLOs that report a low compliance slack in the current month and examine their overcollateralization performance and portfolio riskiness three and six months ahead. The dependent variables in the first two specifications are the percentage of defaulted loans in a CLO portfolio three and six months ahead. The dependent variables in the next (last) two specifications are the logarithmic transformation of senior (junior) overcollateralization score three and six months ahead. Consistent with the interpretation that CLO managers make discretionary trading decisions to avoid only short term OC tests, we find that CLOs reporting a low compliance slack in the current month and engaging in more discretionary trades have worse junior and senior OC scores three and six months ahead compared to other CLOs that also report a low compliance slack. More specifically, an interquartile increase in our variable *Sell winners &Hold losers* decreases senior OC score three and six months ahead by 6.00 percent and 4.00 percent respectively. In addition, an interquartile increase in our variable *Sell winners &Hold losers* decreases junior OC score three and six months ahead by about 3.00 percent and 2.00 percent respectively. We also find some but weak evidence that selling winners/holding losers increases the default bucket in a CLO's portfolio three months ahead. Moreover, we document that an interquartile increase in *Affiliated Sales* decreases the future junior OC score by 2.40 percent and 3.00 three and six months ahead, respectively. These results collectively suggest that discretionary trading decisions are aimed at increasing the short-term OC scores at the expense of future portfolio performance.

5.3 DISCRETIONARY REPORTING AND TRADING CHOICE

We next investigate the conditions under which CLO managers prefer to manage fair value estimates of low quality loans or trade strategically to meet the thresholds of OC tests. Indeed, a question that may arise is why a CLO manager would engage in discretionary trading activities that damage future performance when manipulation of fair value estimates might be less costly. To do so, we identify two conditions which likely drive managers to choose one type of OC performance manipulation strategy over the other. First, one factor that may

determine a manager's choice of how to exercise discretion when faced with binding OC tests is the amount of fair value losses from excess CCC-rated and defaulted loans. We anticipate that when these losses are low, a CLO manager will prefer to manipulate fair value estimates rather than discretionarily rebalance its portfolio, since the former strategy might be sufficient to pass the OC test. However, when a manager faces high losses he or she might employ multiple practices in a greater effort to pass an OC test. Second, we expect that the market conditions will affect manager's choice of using different discretionary activities. Specifically, when market liquidity is high, the manager can more easily trade portfolio loans and cash unrealized gains. However, when market liquidity is low, the manager will have a more limited set of alternatives to choose from on how to manipulate an OC test, i.e. he will likely manipulate fair value estimates or trade with affiliated parties.

Table 5 reports the results of this test. We measure fair value losses by the difference between the principal balance of underperforming loans (excess CCC-rated and the defaulted loans) and their recovery / market value amount used in the calculations of the OC test in the reporting month. We rank the fair value losses reported by CLOs in quartiles and focus on the upper (high losses) and low quartile (low losses). In addition, we measure market liquidity as the logarithmic transformation of the total number of sales and purchases that take place in a month. Similarly, we rank our proxy for market liquidity in quartiles and focus on the upper (high liquidity) and low quartile (low liquidity). In column I of Table 5, we jointly test whether CLOs engage in discretionary reporting and trading when OC tests are binding. The findings are similar to the ones reported in earlier tests, thus, we find that CLO managers are likely to simultaneously employ multiple practices for avoid an OC test violation. Focusing on the subsample of CLOs with high fair value losses (column II), we find that CLO managers manipulate fair value estimates and engage in discretionary trading to meet an OC test. However, when such losses are low (column III), we find that CLO managers try to avoid an OC test violation by using only fair value manipulations.

Looking at the effect of market liquidity on CLO manager's discretion choices, we document that in months of high liquidity (column IV) CLO managers are more likely to sell winning and retain underperforming loans, potentially because market liquidity allows managers to obtain gains on the well performing loans. However, when the market liquidity is low (column V), the managers prefer to trade with affiliates. Overall, these findings suggest that CLO managers manage strategically the OC tests depending on the market conditions or the magnitude of losses suffered by the portfolio.

5.4 INCENTIVES AND OPPORTUNITIES FOR DISCRETIONARY DECISIONS

Implicit in our hypothesis on higher levels of managerial discretion at low CLO compliance slack levels is that CLO managers have incentives to engage in such behavior. We first focus on managerial monetary incentives and investigate whether performance linked compensation drives the documented discretionary behavior. To do so, we hand collect information on CLOs' junior fees from the Creditflux online platform. The junior fee is paid only if all claims to junior noteholders have been paid (*Performance-linked Compensation*). Panel A of Table 6 reports the results of this test. Consistent with prior studies (e.g., Healy [1985], Dechow and Sloan [1991]), we find that managers receiving higher performance linked compensation are more likely to increase discretionary trading or reporting to avoid missing an OC benchmark.

Other than monetary incentives, CLO managers also face reputational incentives. Since such incentives are generally unobservable, we attempt to identify conditions under which managers will have stronger concerns in retaining or increasing their reputation. We thus examine whether CLO manager engage in discretionary activities to "window dress" around periods of high new CLO issuance. Panel B of Table 6 reports the results of this test. We look at the dollar size of new CLOs that a manager raises over the next 6 months to the dollar size of CLOs under his management in the current month (*Forthcoming CLO Issuance*). Consistent

27

with managers' concerns on boosting their reputation around new CLO issuance, we find that managers issuing new CLOs over the next 6 months are more likely to increase discretionary trading or reporting to avoid missing an OC benchmark.

Lastly, we examine weak governance mechanisms that likely give rise to managerial discretion. In our setting, noteholders' trustee is an important disciplining mechanism for CLO managers since trustees perform their fiduciary duties by checking the accuracy of the data used in calculating the OC score. We anticipate that when such trustees face higher workload they may not efficiently perform their duties. In Panel C of Table 5, we find that busy trustees (defined as the number of CLOs that are supervised by a trustee in a month) are less likely to identify CLO managers' misreporting of fair value estimates. More specifically, we document that managers supervised by busy trustees are more likely to inflate their fair value estimates to avoid missing an OC benchmark. Moreover, the same effect is prevalent for discretionary trading decisions, i.e. managers supervised by busy trustees will engage in more discretionary trading, presumably because CLO managers realize and overall take advantage of the weak control and oversight by noteholders' representatives.

5.5 SUPPLEMENTARY ANALYSIS

We further investigate whether CLO investors price the costs of managerial discretion. If investors can see through the economic costs of managers' trading and reporting decisions to avoid missing performance benchmarks, investors should demand a price premium for holding CLO notes. However, information asymmetry regarding manager's investment strategy and the complexity of a CLO's structure are likely to limit investors' ability to price protect against managerial discretion (Bozanic, Loumioti and Vasvari [2015]). To test the relation between compliance trading and CLO note pricing, we use a sample of 1,078 unique trades of CLO notes with complete information on note price, size, credit rating and trade date issued by 291

unique CLOs. We calculate the average CLO note price at the CLO-fiscal month level (503 observations).[17]

Table 7 reports the results of our tests on the relation between discretionary reporting, discretionary trading and CLO note pricing. The dependent variable is the logarithmic transformation of the average sale price of CLO notes sold during the following CLO fiscal month (*CLO Note Pricing*). While we document that noteholders price CLO manager's discretionary trading decisions, we fail to find evidence that noteholders price discretionary fair value estimates, controlling for note credit rating, size and CLO performance characteristics. This finding suggests that note investors find the information about underperforming loans which are fair valued (i.e., defaulted or excess CCC loans) to be opaque. This is not surprising given that these loans are less likely to trade and have uncertain recovery rates.

6. Conclusions

In this paper we explore the extent to which CLO managers engage in discretionary reporting and trading activities to avoid violating binding capital ratios called overcollateralization tests (OC tests). These tests are required by CLO investors and rating agencies to ensure that a CLO has enough loan assets to cover its principal obligations to noteholders. The failure to meet the OC test benchmarks decreases CLO managers' performance-linked compensation and impacts adversely their reputation.

We find that CLO managers employ multiple mechanisms to manage binding OC tests. We first document that CLOs inflate the market value estimates used in their OC test calculations in months when CLOs are close to violating the tests' thresholds. Second, we find evidence that CLOs also sell well-performing loans and retain underperforming loans during

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[17] We retrieve these data from Creditflux database on BWICs (Bids Wanted In Competition). In a bid-wanted-in-competition situation, a CLO submits its note bid list to various institutional investors that are allowed to make bids on the listed notes. The investors with the highest bids are then contacted to complete the trade.

months when they are close to violating their OC tests. They also sell more loans to affiliated entities. Such trading strategies allow them to increase the OC test slack as the realized gains from selling well performing loans or selling loans to affiliates increase the assets that CLOs have to cover their liabilities to noteholders. We further find that CLO managers make discretionary trading decisions to only avoid short term OC tests, as this trading adversely affects future OC test performance and portfolio credit riskiness. In additional analyses, we document that CLO managers' propensity to meet binding OC tests is related to their monetary or reputational incentives. In a final set of tests, we show that CLO investors can see through managerial trading activities and price negatively these agency costs when buying CLO notes in the secondary market.

We contribute to the literature on financial institutions' use of accounting discretion to manage earnings or to circumvent capital adequacy requirements (e.g., Beatty and Liao [2014]) by documenting how managers of unregulated financial institutions manipulate fair value estimates and change their trading choices to meet binding capital compliance tests. While our findings provide direct evidence of how managers in CLOs manipulate reporting standards to improve short-term capital compliance tests, we refrain from policy implications of whether and how reporting standards for CLOs should change. Indeed, we find that to meet binding capital tests CLO managers shift to more risky assets to realize cash gains from selling well-performing loans that are recognized at their principal values for the purpose of computing OC tests. At the same time, CLO managers also overstate the fair value inputs for loans they are required to mark-to-market. Thus, it seems that CLO managers find ways to manipulate reported numbers independent of the reporting standards (Barth and Taylor [2010]) and weak governance mechanisms.

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31

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APPENDIX A

Structure of a Collateralized Loan Obligation (CLO)

CLO

CLO manager

Assets | Liabilities

Syndicated Loan A

CLO arranger

Syndicated Loan B

Loans

Senior Note

Junior Note

Subordinated

Noteholders
(Banks and institutional investors)

- Credit rating agencies
- Noteholders' trustee
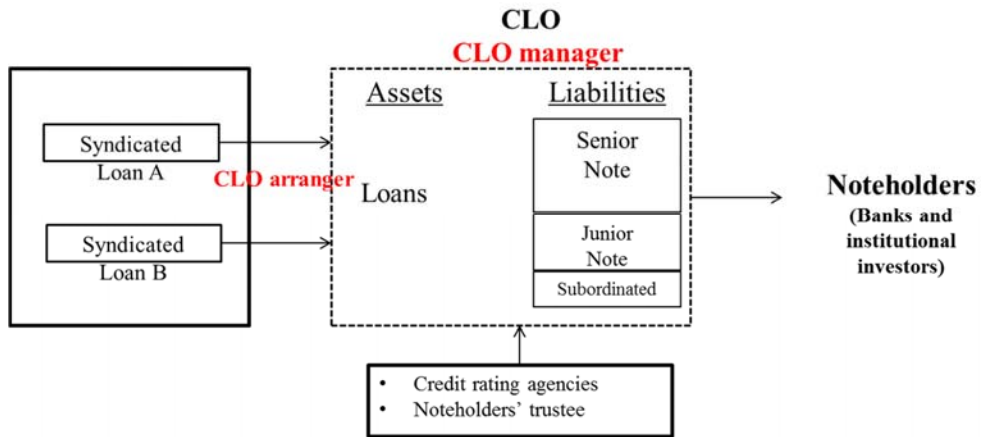
APPENDIX B

Example of Calculating Overcollateralization Performance

Key CLO characteristics upon origination:

T=0	
CLO A	
	($m)
Principal balance of loans:	100.00
Principal balance of senior notes:	68.60
Principal balance of junior notes:	19.60
Principal balance of subordinated notes:	9.80
Average maturity:	10 years
Senior OC trigger	138%
Junior OC trigger	109%
Max. CCC-rated loans	5 million or 5%

Section A

CLO Overcollateralization performance one year ahead: Positive scenario

T=1			
Positive scenario			
CLO A			
	($m)		
Principal balance of loans:			
Beg. Balance	100.00		
Principal balance sold at 105% of par	-10.00	(cash received= $10.5m)	
Principal balance purchased at 98 % of par	8.20	=$8m/0.98	
End Balance	98.20		
Cash Holdings	2.50	=$10.5m-$8m	
Total Capital:	**100.70**	**(A)**	
Principal balance of senior notes:	68.60	(B)	
Principal balance of junior notes:	19.60	(C)	
Senior OC score=	**147%**	**(A)/(B)**	**PASSED**
Junior OC score=	**114%**	**(A)/[(B)+(C)]**	**PASSED**

Section B:

CLO Overcollateralization performance one year ahead: Negative outcome

T=1 Negative scenario (No discretionary trades or reporting) CLO A			
	($m)		
Principal balance of performing loans:	87.00		
Plus:			
Defaulted Loans	3.05	Section B.2	
Excess CCC rated	2.05	Section B.3	
Total Balance	**92.10**	(A)	
Principal balance of senior notes:	68.60	(B)	
Principal balance of junior notes:	19.60	(C)	
Senior OC score=	**134%**	**(A)/(B)**	**FAILED**
Junior OC score=	**104%**	**(A)/[(B)+(C)]**	**FAILED**

Section B.2

Defaulted loans

Defaulted Loans	Principal balance ($m)	Market price (% of par)	Recovery rate by S&P (% of par)	Recovery rate by Moody's (% of par)	Lower Market or Recovery (% of par)	Value of Defaulted Loans ($m)
1	1.00	30%	40%	40%	30%	0.30
2	1.00	40%	50%	45%	40%	0.40
3	1.00	50%	50%	45%	45%	0.50
4	1.00	50%	60%	60%	50%	0.50
5	1.00	20%	40%	40%	20%	0.20
6	1.00	50%	50%	45%	45%	0.45
7	1.00	30%	40%	40%	30%	0.30
8	1.00	60%	40%	40%	40%	0.40
Total	**8.00**					**3.05**

Section B.3

Excess CCC-rated loans

CCC-rated loans	Principal balance ($m)	Market price	Excess CCC-rated	Principal balance of excess CCC-rated ($m)	Market value of Excess CCC-rated
1	1.00	30%	YES	1.00	0.30
2	1.00	35%	YES	1.00	0.35
3	1.00	40%	YES	1.00	0.40
4	1.00	45%	YES	1.00	0.45
5	1.00	55%	YES	1.00	0.55
6	1.00	59%	NO		
7	1.00	70%	NO		
8	1.00	70%	NO		
9	1.00	80%	NO		
10	1.00	80%	NO		
Total	**10.00**			**5.00**	**2.05**

Section C:

CLO Overcollateralization performance one year ahead: Negative outcome & Discretionary decisions

T=1 Negative scenario Discretionary trades or reporting CLO A			
	($m)		
Principal balance of performing loans:	77.00		
Plus:			
Cash from selling 10 loans at 120% of par	12.00		
Defaulted Loans	3.50		
Excess CCC rated	2.80		
Total Balance	**95.30**	**(A)**	
Principal balance of senior notes:	68.60	(B)	
Principal balance of junior notes:	19.60	(C)	
Senior OC score=	**139%**	**(A)/(B)**	**PASSED**
Junior OC score=	**108%**	**(A)/[(B)+(C)]**	**PASSED**

Section C.2
Defaulted loans

Defaulted Loans	Principal balance ($m)	Market price (% of par)	Recovery rate by S&P (% of par)	Recovery rate by Moody's (% of par)	Lower Market or Recovery (% of par)	Value of Defaulted Loans ($m)
1	1.00	40%	40%	40%	40%	0.40
2	1.00	50%	50%	45%	45%	0.45
3	1.00	50%	50%	45%	45%	0.45
4	1.00	50%	60%	60%	50%	0.50
5	1.00	40%	40%	40%	40%	0.40
6	1.00	50%	50%	50%	50%	0.50
7	1.00	40%	40%	40%	40%	0.40
8	1.00	60%	40%	40%	40%	0.40
Total	**8.00**					**3.50**

Section C.3
Excess CCC-rated loans

CCC-rated loans	Principal balance ($m)	Market price	Excess CCC-rated	Principal balance of excess CCC-rated ($m)	Market value of Excess CCC-rated
1	1.00	50%	YES	1.00	0.50
2	1.00	50%	YES	1.00	0.50
3	1.00	50%	YES	1.00	0.50
4	1.00	60%	YES	1.00	0.65
5	1.00	65%	YES	1.00	0.65
6	1.00	70%	NO		
7	1.00	70%	NO		
8	1.00	70%	NO		
9	1.00	80%	NO		
10	1.00	80%	NO		
Total	**10.00**			**5.00**	**2.80**

Variable Definition

Variable	Definitions
Low OC Compliance	Binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise.
Just Beat or Miss a Compliance Test	Binary variable that equals one if a CLO reports a *Low OC Compliance* score, and zero if the OC tests are violated and the slacks a CLO reports is in the top quartile of the OC slacks of other CLOs that violated the test.
Discretionary Market Value	The difference between the market price of defaulted or excess CCC-rated loans (i.e., CCC-rated loans that a CLO holds over and above the maximum allowance for CCC-rated loan holdings) minus the market price that other CLOs use for these specific loans, averaged at the CLO-month level.
Sell winners & Hold losers	The percentage of loans sold above par and underperforming loans retained by a CLO, divided by the number of loans in a CLO portfolio. To identify loans not sold by a CLO, we compare the current CLO portfolio with the CLO portfolio in the last fiscal month. Underperforming are the loans with negative returns over the past 180 days prior to a CLO reporting date. If the loan is not traded, we use the average returns of all liquid loans issued by the same borrower.
Affiliated Sales	The percentage of loan sales to affiliated CLOs divided by total loan trades over the last reporting month.
Discretionary Sale Price to Affiliates	The average price of loans sold to affiliated CLOs minus the average market price of these loans in the same trading period, i.e. (-30 days, +30 days) around the affiliated trade date. Affiliated are CLOs that share the same collateral manager.
Default Bucket	The percentage (%) of defaulted loans to total number of loans in the CLO portfolio.
CCC-rated Bucket	The percentage (%) of CCC-rated loans to total number of loans in the CLO portfolio.
Average Portfolio Credit Rating	The average rating of the loans in a CLO portfolio. A loan's rating is defined as a scale variable that equals 1 for AAA, 2 for AA+, (…), and 23 for D.
Senior OC	The logarithmic transformation of senior overcollateralization score in percentage points.
Junior OC	The logarithmic transformation of junior overcollateralization score in percentage points.
Portfolio size	The logarithmic transformation of CLO principal balance outstanding.
Busy Trustee	The logarithmic transformation of the number of CLOs that a CLO trustee controls and supervises in a month.
Performance-linked Compensation	CLO junior fees in basis points.
Forthcoming CLO issuance	The ratio of the dollar size of new CLOs that a manager raises over the next 6 months to the dollar size of CLOs under his management in the current month.
CLO Note Pricing	The logarithmic transformation of the average sale price of CLO notes sold during the following CLO fiscal month.

TABLE 1

Sample Selection

Panel A: Sample selection processes followed to identify a sample of CLOs holding syndicated loans and reporting at least one defaulted loan or a loan in the excess CCC-rated bucket

	Number of CLOs	Number of CLO-months	Number of loans
CLO-I universe	571	15,529	
CLO-I –DealScan merge	493	9,045	3,557
CLOs with defaulted and/or low-rated loans (CCC and below)	415	6,012	3,400
CLOs with investor reports	145	3,726	

Panel B: Number of CLO-reporting months by year

Year	All sample CLOs	CLOs with investor reports
2008	157	138
2009	1,307	840
2010	1,471	935
2011	1,170	671
2012	1,148	670
2013	759	472
Total	6,012	3,726

TABLE 2

Summary statistics

Panel A: Descriptive statistics for the variables used in our analysis

Variable	No. of Obs.	Mean	STD	25th Percent	Median	75th Percent
CLO performance						
Low OC Compliance	6,012	0.28	0.47	0.00	0.00	1.00
Just Beat or Miss a Compliance Test	2,520	0.68	0.47	0.00	1.00	1.00
Default Bucket (%)	6,012	4.05	3.76	1.41	2.81	5.34
CCC-rated Bucket (%)	6,012	7.57	4.31	4.80	6.95	8.40
Average Portfolio Credit Rating	6,012	15.06	0.66	14.58	14.91	15.41
Senior OC	6,012	4.81	0.33	4.76	4.80	4.90
Junior OC	6,012	4.63	0.09	4.50	4.62	4.71
Portfolio Size	6,012	19.51	1.01	18.16	19.81	20.03
CLO discretionary reporting and trading choices						
Discretionary Market Value	3,726	0.25	6.08	-1.25	0.25	3.11
Sell winners & Hold losers (%)	6,012	4.56	2.62	2.74	4.48	6.01
Affiliated Sales (%)	6,012	5.42	8.96	0.00	2.00	6.57
Discretionary Sale Price to Affiliates	2,253	1.80	1.98	0.10	0.80	1.60
CLO manager's incentives and opportunities for discretion						
Performance-linked Compensation (b.p.)	5,593	34.92	8.59	30.00	35.00	40.00
Forthcoming CLO Issuance	6,012	0.05	0.07	0.00	0.03	0.08
Busy Trustees	6,012	3.98	1.30	3.18	4.98	5.00

Variables are described in the appendix. The values of continuous variables are winsorized at 1% and 99%.

TABLE 2 (Continued)

	Low OC Compliance	High OC Compliance	t-statistic
CLO performance			
Default Bucket (%)	4.53	3.06	12.38***
	(0.06)	(0.11)	
CCC-rated Bucket (%)	8.12	7.31	5.37***
	(0.11)	(0.08)	
Average Portfolio Credit Rating	15.18	15.23	-1.50
	(0.01)	(0.02)	
CLO discretionary reporting and trading choices			
Discretionary Market Value	2.28	-0.99	12.13***
	(0.35)	(0.40)	
Sell winners & Hold losers (%)	4.57	3.78	9.22***
	(0.06)	(0.06)	
Affiliated Sales (%)	5.23	4.78	1.99**
	(0.20)	(0.28)	
Discretionary Sale Price to Affiliates	2.12	1.00	2.88***
	(0.60)	(0.98)	

Panel B of Table 2 reports the mean values (standard errors in parentheses) of our proxies for CLO portfolio riskiness and discretionary reporting and trading decisions. The last column reports t-statistics for the difference in means. All variables are defined in Appendix C. Continuous variables are winsorized at the 1% and 99% levels. ***Significant at 1%, ** 5% and * 10% level.

TABLE 3

Reporting Discretion and Low Compliance Slack

Panel A: Discretionary reported loan market values at Low OC Compliance slack

	Low OC Compliance	Low Senior OC Compliance	Low Junior OC Compliance	Just Beat or Miss the OC test
Discretionary market value	**0.025***	**0.007****	**0.013***	**0.008****
	(4.92)	**(2.30)**	**(3.95)**	**(2.21)**
Default Bucket	-0.024**	-0.010	-0.024***	-0.040***
	(-2.13)	(-1.04)	(-2.60)	(-2.64)
CCC-rated Bucket	0.101***	0.165*	-0.158	0.152
	(2.43)	(1.88)	(-0.70)	(0.39)
Average Portfolio Credit Rating	-0.119	-0.104*	0.029	-0.019
	(-1.09)	(-1.89)	(0.71)	(-0.54)
Senior OC	-0.152*	-0.154***	-0.198	0.043*
	(-1.62)	(-2.55)	(-1.10)	(1.78)
Junior OC	-0.073***	-0.153***	-0.132**	0.188***
	(-2.38)	(-6.73)	(-2.32)	(2.67)
Portfolio Size	0.030	-0.081	-0.122	0.128**
	(0.24)	(-0.49)	(-1.02)	(2.14)
No. of Obs.	3,726	3,726	3,726	1,469
Pseudo R^2	43.09%	49.16%	33.71%	46.06%

Table 3 reports the results for the tests that corroborate whether CLO managers will inflate fair value estimates for defaulted and excess CCC-rated loans at low OC slack levels. The dependent variable in Column I is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). In Column II (Column III), the dependent variable is binary variable that equals one if the senior (junior) OC test is passed and the senior (junior) slack a CLO reports is in the bottom quartile of the senior (junior) OC slack of other CLOs that also passed the test, and zero otherwise. In the last column, the dependent variable is one if a CLO reports a *Low OC Compliance* score, and zero if the OC tests are violated and the slacks a CLO reports is in the top quartile of the OC slacks of other CLOs that violated the test (*Just Beat or Miss the OC test*). The independent variable of interest is *Discretionary market value*, defined as the difference between the market price of defaulted or excess CCC-rated loans (i.e., CCC-rated loans that a CLO holds over and above the maximum allowance for CCC-rated loan holdings) minus the market price that other CLOs use for these specific loans, averaged at the CLO-month level. All other independent variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z-statistics are in parentheses. CLO reporting month, manager and trustee fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 3 (Continued)

Panel B: Discretionary reported loan market values at Low OC Compliance slack and monthly improvements in CLO capital adequacy slack

	Δ(Senior OC)$_{m-1,m}$	Δ(Junior OC)$_{m-1,m}$
Δ(Discretionary market value)$_{m-1,m}$	-0.003	-0.002
	(-0.60)	(-1.45)
Low OC Compliance$_m$	-0.005***	-0.003*
	(-3.23)	(-1.79)
Δ(Discretionary market value)$_{m-1,m}$ *Low OC Compliance$_m$	**0.018***	**0.010****
	(1.86)	**(2.15)**
Default Bucket	0.094**	-0.004
	(2.10)	(-0.59)
CCC-rated Bucket	1.283	-0.400
	(0.37)	(1.05)
Average Portfolio Credit Rating	0.144***	-0.001
	(4.11)	(-0.07)
Senior OC		0.134***
		(2.79)
Junior OC	3.014***	
	(3.71)	
Portfolio Size	1.637***	-0.077
	(5.56)	(-1.03)
No. of Obs.	1,856	1,856
R^2	26.77%	28.78%

Panel B of this Table 3 reports an analysis that investigates whether increasing discretionary reporting in months with low OC compliance slack helps CLOs improve their overcollateralization scores. In the first (last) two columns, the dependent variable is *Δ(SnrOC)* (*Δ(JnrOC)*), defined as the contemporaneous changes in the senior (junior) overcollateralization slack. All variables are defined in Appendix C. We use OLS regressions to estimate the models, and coefficient *t*-statistics are in parentheses. Standard errors are clustered at the CLO level and corrected for heteroskedasticity. The values of the continuous variables are winsorized at 1% and 99%. CLO month, manager and trustee fixed effects are included for each model but not tabulated. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 4

Loan Trading Discretion and Capital Adequacy Compliance

Panel A: Discretionary loan trading choices at Low OC Compliance slack

	Low OC Compliance		Low Senior OC Compliance		Low Junior OC Compliance		Just Beat or Miss the Capital Adequacy	
Sell winners &Hold losers	0.028***		0.016***		0.033***		0.027***	
	(5.11)		(6.23)		(3.32)		(2.84)	
Affiliated Sales	0.007***		0.000		0.004***		0.005**	
	(4.40)		(0.11)		(3.05)		(1.97)	
Discretionary Sale Price to Affiliates		0.003***		0.002*		0.020*		0.003***
		(3.24)		(1.91)		(1.86)		(2.71)
Default Bucket	-0.004	-0.010	-0.016**	-0.036***	-0.003	-0.001	-0.030***	-0.021*
	(-0.47)	(-0.83)	(-2.06)	(-2.84)	(-0.43)	(-0.09)	(-2.68)	(-1.67)
CCC-rated Bucket	0.088**	0.109**	0.073	0.144	-0.129	-0.186	-0.104	-0.192
	(1.99)	(2.16)	(0.16)	(1.12)	(-1.15)	(-0.49)	(-1.34)	(-1.39)
Average Portfolio Credit Rating	-0.067	-0.145**	-0.060*	-0.104**	-0.024	-0.034	0.017	0.045
	(-1.56)	(-2.10)	(-1.79)	(-2.10)	(-1.33)	(-0.82)	(0.60)	(1.22)
Senior OC	-0.153***	-0.111**	-0.110***	-0.190**	-0.118***	-0.142	0.148***	-0.196***
	(-5.50)	(-2.00)	(-9.93)	(-1.99)	(-3.76)	(-1.29)	(2.40)	(-2.93)
Junior OC	0.160	-0.107**	0.158	-0.130***	0.148	0.161	0.171**	0.170
	(0.64)	(-2.56)	(0.79)	(-2.87)	(1.28)	(0.49)	(2.31)	(1.29)
Portfolio Size	-0.005	-0.002	0.048	-0.157**	0.045	0.069**	0.158***	0.154*
	(-0.07)	(-0.02)	(0.63)	(-2.01)	(1.20)	(2.07)	(2.83)	(1.74)
No. of Obs.	6,012	2,253	6,012	2,253	6,012	2,253	2,520	889
Pseudo R^2	34.82%	27.81%	40.16%	34.80%	17.23%	22.32%	43.16%	48.82%

Panel A of Table 4 reports the results for the tests that corroborate whether CLO managers will strategically trade the loans in their portfolios at low OC slack levels. The dependent variable in Column I is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). In Column II (Column III), the dependent variable is binary variable that equals one if the senior (junior) OC test is passed and the senior (junior) slack a CLO reports is in the bottom quartile of the senior (junior) OC slack of other CLOs that also passed the test, and zero otherwise. In the last column, the dependent variable is one if a CLO reports a *Low OC Compliance* score, and zero if the OC tests are violated and the slacks a CLO reports is in the top quartile of the OC slacks of other CLOs that violated the test (*Just Beat or Miss the OC test*). The first independent variable of interest is *Sell winners &Hold losers,* defined as the percentage of loans sold above par and underperforming loans retained by a CLO, divided by the number of loans in a CLO portfolio. The second independent variable of interest is *Affiliated Sales*, defined as the percentage of loan sales to affiliated CLOs divided by total loan trades over the last reporting month. The third independent variable of interest is *Discretionary Sale Price to Affiliates*, defined as the average price of loans sold to CLOs run by the same manager minus the average market price of these loans in the same trading period, i.e. (-30 days, +30 days) around the affiliated trade date. All other independent variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z- statistics are in parentheses. CLO reporting month, manager and trustee fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 4 (Continued)

Panel B: Discretionary loan trading choices at Low OC Compliance slack and monthly improvements in CLO capital adequacy slack

	Δ(Senior OC)$_{m-1,m}$		Δ(Junior OC)$_{m-1,m}$	
Δ(Sell winners &Hold losers)$_{m-1,m}$	-0.017***		-0.000	
	(-2.83)		(-0.08)	
Δ(Affiliated Sales)$_{m-1,m}$		-0.032***		-0.001
		(-2.74)		(-0.68)
Low OC Compliance$_m$	-0.015***	-0.007***	-0.008***	-0.006***
	(-4.61)	(-4.54)	(-2.70)	(-2.84)
Δ(Sell winners &Hold losers)$_{m-1,m}$ *Low OC Compliance$_m$	**0.043***		**0.012****	
	(1.92)		**(1.98)**	
Δ(Affiliated Sales)$_{m-1,m}$ *Low OC Compliance$_m$		**-0.005**		**0.016****
		(-0.73)		**(3.00)**
Default Bucket	0.111***	0.112***	0.002	0.003
	(4.53)	(4.63)	(0.46)	(0.62)
CCC-rated Bucket	1.685	1.737	-0.318	-0.126*
	(1.11)	(1.15)	(-1.17)	(-1.84)
Average Portfolio Credit Rating	0.070	0.071*	0.006*	-0.002
	(1.62)	(1.71)	(1.71)	(-0.13)
Senior OC			1.383*	0.074**
			(1.65)	(1.97)
Junior OC	0.416	0.122		
	(0.10)	(0.03)		
Portfolio Size	-0.235	-0.226	-0.020	-0.012
	(-1.50)	(-1.49)	(-0.59)	(-0.34)
No. of Obs.	4,781	4,781	4,781	4781
R^2	18.80%	18.66%	25.93%	24.90%

Panel B of this Table 4 reports an analysis that attempts to alleviate the concern that CLO's discretionary trading activity deteriorates reported OC slack. In the first (last) two columns, the dependent variable is Δ(SnrOC) (Δ(JnrOC)), defined as the contemporaneous changes in the senior (junior) overcollateralization slack. All variables are defined in Appendix C. We use OLS regressions to estimate the models, and coefficient t-statistics are in parentheses. Standard errors are clustered at the CLO level and corrected for heteroskedasticity. The values of the continuous variables are winsorized at 1% and 99%. CLO month, manager and trustee fixed effects are included for each model but not tabulated. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 4 (Continued)

Panel C: Discretionary loan trading choices for CLOs with Low OC Compliance slack in the current month and future CLO performance

	Portfolio Risk			Portfolio Quality		
	Default Bucket$_{m+3}$	*Default Bucket$_{m+6}$*	*Senior OC$_{m+3}$*	*Senior OC$_{m+6}$*	*Junior OC$_{m+3}$*	*Junior OC$_{m+6}$*
Sell winners & Hold losers$_m$	**0.071***	**0.032**	**-0.015***	**-0.010***	**-0.007***	**-0.004****
	(1.91)	**(0.77)**	**(-4.69)**	**(-3.30)**	**(-1.90)**	**(-2.21)**
Affiliated sales$_m$	**0.013**	**0.006**	**0.004**	**0.003**	**-0.004***	**-0.005****
	(1.16)	**(0.77)**	**(0.42)**	**(0.93)**	**(-1.88)**	**(-2.14)**
Default Bucket	0.760***	0.232***	0.001	0.001	0.001	0.000
	(5.15)	(3.81)	(1.22)	(0.94)	(0.15)	(0.43)
CCC-rated Bucket	0.056	2.735	0.021	-0.002	-0.058***	-0.049***
	(0.34)	(1.28)	(0.27)	(-0.04)	(-3.05)	(-2.80)
Avg. Portfolio Credit Rating	0.205	0.637***	-0.041*	0.002	-0.000	-0.001
	(0.81)	(3.41)	(-1.85)	(0.38)	(-0.71)	(-0.77)
Senior OC	0.171	-0.849**	0.667***	0.469***	0.047***	0.053***
	(0.08)	(-2.35)	(5.97)	(5.38)	(3.79)	(2.88)
Junior OC	-0.085**	-0.139*	-0.004	0.030	0.550***	0.401***
	(-1.93)	(-1.68)	(-0.24)	(0.23)	(2.82)	(2.72)
Portfolio Size	0.154	0.512*	-0.017**	-0.030**	-0.009**	-0.010**
	(0.33)	(1.82)	(-2.10)	(-2.38)	(-2.02)	(-2.24)
No. of Obs.	1,442	1,008	1,442	1,008	1,442	1,008
R^2	71.51%	73.59%	56.72%	56.99%	57.56%	56.76%

Panel C of Table 4 reports an analysis of the relation between discretionary trading and future CLO performance. We restrict our sample to CLOs reporting a low OC compliance slack in the current month. The dependent variable in the first two columns is the percentage of defaulted loans in the CLO portfolio three and six months ahead. The dependent variable in the next two columns is the natural logarithm of the CLO senior overcollateralization ratio three and six months ahead. The dependent variable in the last two columns is the natural logarithm of the CLO junior overcollateralization ratio three and six months ahead. All other variables are defined in Appendix C. We use OLS regressions to estimate the models, and coefficient t-statistics are in parentheses. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. The values of the continuous variables are winsorized at 1% and 99%. CLO month, manager and trustee fixed effects are included for each model but not tabulated. ***, **, and * denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 5

Discretionary reporting and loan trading decision choices

	All sample	High fair value losses	Low fair value losses	High market liquidity	Low market liquidity
			Dep. Var.= *Low OC Compliance*		
Discretionary market value	0.012***	0.010***	0.028***	0.010***	0.029***
	(2.62)	(5.10)	(3.61)	(6.02)	(4.45)
Sell winners & Hold losers	0.036***	0.046***	0.001	0.044***	0.003
	(3.48)	(2.74)	(0.05)	(2.92)	(1.53)
Affiliated sales	0.009***	0.024***	0.004	0.004***	0.025***
	(2.95)	(3.80)	(1.10)	(2.58)	(2.46)
Default Bucket	0.001	-0.005	0.021	0.001	-0.002
	(0.08)	(-0.34)	(1.55)	(0.05)	(-0.33)
CCC-rated Bucket	0.138***	0.105*	0.184*	0.195	0.153***
	(2.87)	(1.86)	(1.63)	(1.37)	(3.58)
Average Portfolio Credit Rating	0.152**	0.187	0.104***	0.131*	0.080**
	(2.29)	(1.50)	(3.33)	(1.69)	(2.43)
Senior OC	-0.111***	-0.183***	0.027	-0.134***	-0.180***
	(-3.76)	(-2.44)	(0.48)	(-2.93)	(-4.42)
Junior OC	-0.141*	-0.181	-0.197**	0.096	-0.166**
	(-1.71)	(-0.49)	(-2.44)	(0.55)	(-1.99)
Portfolio Size	-0.075	0.083	0.181*	-0.114	0.070
	(-0.47)	(0.25)	(1.89)	(-0.99)	(0.81)
Statistical difference of coefficients:					
Discretionary market value		chi2= 14.82, Prob.>chi2= 0.01		chi2= 5.02, Prob.>chi2= 0.12	
Sell winners & Hold losers		chi2= 47.82, Prob.>chi2= 0.00		chi2= 35.22, Prob.>chi2= 0.00	
Affiliated sales		chi2= 34.05, Prob.>chi2= 0.00		chi2= 12.44, Prob.>chi2= 0.00	
No. of Obs.	3,726	927	970	927	970
Pseudo R²	40.95%	52.28%	45.01%	46.74%	53.23%

Table 5 reports the results for the tests that corroborate the conditions under which CLO managers will prefer discretionary trading to discretionary reporting at low OC compliance levels. In columns II and III, we run a subsample analysis for CLOs that report high (top quartile) and low (bottom quartile) fair value losses used in the calculations of the OC slack and related to CLO's defaulted and excess CCC-rated loans. In columns IV and V, we run a subsample analysis for reporting months with high (top quartile) and low (bottom quartile) market liquidity, defined as the number of the loan sales and purchases that CLOs report in a month. The dependent variable across all specifications is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). All other variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z- statistics are in parentheses. CLO reporting month, manager and trustee fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 6

Incentives and opportunities for discretionary reporting and loan trading decisions

Panel A: CLO manager's performance-linked compensation and discretionary reporting and loan trading choices

	Low OC Compliance		
Discretionary market value	0.023**		
	(2.35)		
Sell winners & Hold losers		0.020**	
		(2.39)	
Affiliated sales			0.011***
			(3.95)
Performance-linked Compensation	-0.012*	0.001	-0.002
	(-1.78)	(-0.21)	(-0.51)
*Discretionary market value*Performance-linked Compensation*	**0.021****		
	(2.16)		
*Sell winners & Hold losers*Performance-linked Compensation*		**0.019****	
		(2.06)	
*Affiliated sales*Performance-linked Compensation*			**-0.027**
			(-0.78)
Controls	Yes	Yes	Yes
No. of Obs.	1,149	2,910	2,910
Pseudo R²	63.94%	58.98%	59.18%

Panel A of Table 6 reports the results for the tests that corroborate whether CLO managers' performance linked compensation exacerbate discretionary trading and reporting at low OC compliance levels. *Performance linked compensation* is defined as the junior fees (in basis points) paid to a CLO manager only if both senior and junior OC tests are passed. The dependent variable across all specifications is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). All other variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z- statistics are in parentheses. CLO reporting month, manager and trustee fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 6 (Continued)

Panel B: Discretionary reporting and loan trading choices for CLO managers with heavy CLO volume issuance over the next six months

	Low OC Compliance		
Discretionary market value	0.016***		
	(5.55)		
Sell winners & Hold losers		0.018***	
		(3.29)	
Affiliated sales			0.010***
			(4.68)
Forthcoming CLO issuance	0.450	0.580	0.640
	(1.28)	(0.91)	(1.08)
Discretionary market value*Forthcoming CLO issuance	**0.054****		
	(1.95)		
Sell winners & Hold losers*Forthcoming CLO issuance		**0.220****	
		(2.17)	
Affiliated sales*Forthcoming CLO issuance			**0.068*****
			(3.29)
Controls	Yes	Yes	Yes
No. of Obs.	3,726	6,012	6,012
Pseudo R^2	38.10%	28.95%	29.59%

Panel B of Table 6 reports the results for the tests that corroborate whether CLO managers' future fundraising exacerbates discretionary trading and reporting at low OC compliance levels. *Forthcoming CLO issuance* is defined as the ratio of the dollar size of new CLOs that a manager raises over the next 6 months to the dollar size of CLOs under his management in the current month. The dependent variable across all specifications is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). All other variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z- statistics are in parentheses. CLO reporting month, manager and trustee fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 6 (Continued)

Panel C: Busy noteholders' trustees and discretionary reporting and loan trading choices

	Low OC Compliance		
Discretionary market value	0.014**		
	(2.12)		
Sell winners & Hold losers		0.010**	
		(2.01)	
Affiliated sales			0.008***
			(5.04)
Busy Trustee	-0.296	0.078*	0.088**
	(-0.76)	(1.67)	(2.21)
*Discretionary market value*Busy Trustee*	**0.004***		
	(2.52)		
*Sell winners & Hold losers*Busy Trustee*		**0.007***	
		(1.93)	
*Affiliated sales*Busy Trustee*			**0.003***
			(2.70)
Controls	Yes	Yes	Yes
No. of Obs.	2,155	5,593	5,593
Pseudo R^2	61.60%	55.64%	56.14%

Panel C of Table 6 reports the results for the tests that corroborate whether CLO managers supervised by busy noteholders' trustees will engage in higher discretionary trading and reporting at low OC compliance levels. *Busy trustees* is defined as the logarithmic transformation of the number of CLOs that a CLO trustee controls and supervises in a month. The dependent variable across all specifications is a binary variable that equals one if the junior or senior overcollateralization (OC) test is passed and the slacks a CLO reports is in the bottom quartile of the OC slacks of other CLOs that also passed the tests, and zero otherwise (*Low OC Compliance*). All other variables are defined in Appendix C. The values of the continuous variables are winsorized at 1% and 99%. We use a probit model across all specifications, marginal effects are reported and z- statistics are in parentheses. CLO reporting month and manager fixed effects are included but not tabulated. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. ***, **, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.

TABLE 7

Bond pricing, discretionary reporting and loan trading decisions

	Note price$_{m+1}$		
Discretionary market value	0.002		
	(1.19)		
Sell winners & Hold losers		0.003	
		(0.71)	
Affiliated sales			0.001
			(0.90)
Low OC Compliance	-0.007	-0.037	-0.030
	(-0.09)	(-1.44)	(-1.27)
Discretionary market value*Low OC Compliance	**-0.004**		
	(-0.99)		
Sell winners & Hold losers*Low OC Compliance		**-0.013***	
		(-1.89)	
Affiliated sales*Low OC Compliance			**-0.005***
			(-1.84)
Note rating	-0.003	-0.006***	-0.006***
	(-0.61)	(-4.01)	(-4.05)
Note amount traded	0.029	0.022**	0.019*
	(1.08)	(2.02)	(1.71)
Controls	Yes	Yes	Yes
No. of Obs.	193	503	503
Pseudo R^2	70.80%	58.98%	47.70%

Table 7 reports the results of the tests that investigate the relation between CLO manager's discretionary trading activity and reporting at low OC compliance slack and note pricing. The dependent variable is the natural logarithm of the average note sale price over the following fiscal month. *Note amount traded* is the natural logarithm of the dollar value of the traded tranches. *Note rating* is a scale variable that equals to 1 if the note's credit rating is 1 if AAA, 2 if AA+, and so forth. All other variables are defined in Appendix C. We use OLS regressions to estimate the models, and coefficient t-statistics are in parentheses. Standard errors are corrected for heteroskedasticity and clustered at the CLO level. The values of the continuous variables are winsorized at 1% and 99%. Fixed effected for CLO month, manager and trustee are included for each model but not tabulated. ∗∗∗, ∗∗, and ∗ denote significance at the 1%, 5%, and 10% (two-sided) levels, respectively. Coefficients of interest are in boldface type.