Active Loan Trading

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Abstract

Analyzing a novel dataset of leveraged loan trades executed by managers of collateralized loan obligations (CLOs), we document substantial benefits of active trading. The most active CLOs trade leveraged loans at better prices and sell leveraged loans earlier than CLOs that are less active. In addition, leveraged loan sales by active CLOs predict rating downgrades in the sold loans, hinting that active CLOs sell before credit quality deteriorates. Finally, active trading has implications for CLO performance via lower collateral default rates and higher equity returns which indicates that observing the active trading of CLOs can help investors finding good managers.

Keywords: Active management, Collateralized loan obligations (CLOs), Market efficiency, Structured finance, Syndicated loans

JEL: G11, G12, G23, G24

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Introduction

Leveraged loans – loans in which a lead bank arranges a syndicate of lenders – are a primary source of financing for low-rated corporations. These loans are traded over the counter (OTC) and in contrast to other OTC transactions there is no systematic post-trade reporting for leveraged loan transactions. We investigate trading patterns in this market by utilizing a novel dataset of loan transaction prices reported by collateralized loan obligations (CLOs). CLOs are structured finance products with an actively managed collateral pool comprised by leveraged loans and one of the largest leveraged loan investors. Besides purchasing new loans from arranging banks, the CLO collateral manager can enhance the CLO performance by trading parts of the existing loan portfolio on the secondary market. This active loan trading by CLO managers is the focus of our paper.

The four central findings of this paper can be summarized as follows. First, we find that CLOs with a higher active turnover trade leveraged loans at better prices than CLOs with a lower active turnover. This effect is more pronounced for loan sales than for loan purchases. Second, more active CLOs sell leveraged loans earlier than less active CLOs. Third, a sale of a leveraged loan by an active CLO predicts a rating downgrade of the loan. Finally, higher active turnover predicts lower CLO default rates and, at the same time, higher returns to equity holders. Furthermore, we construct a placebo variable that captures only transactions that do not correspond to an active turnover and find that tests with this variable lead to insignificant results.

We start investigating the impact of more active trading by splitting the sample of CLOs into three portfolios, based on their quarterly active turnover and rebalance the portfolios

every quarter. We first compare the transactions of the most active and least active CLOs and find that more active CLOs, on average, sell loans at 5.47% higher prices (t-statistic of 5.15) than less active CLOs. More active CLOs also purchase cheaper loans than less active CLOs, but the average difference of -0.37% (t-statistic of -2.54) is small compared to the difference in sale prices. As a next step, we also compare the performance of the most active and least active CLOs in the following quarter and find that more active CLOs generate higher equity returns and have lower collateral default rates. Most noticeably, the percentage of defaulted loans is over 50% higher for the least active CLOs, compared to the most active CLOs, suggesting that the most active CLOs are better capable of avoiding defaults in their loan portfolios. As a placebo test, we also sort CLOs into portfolios based on their non-active turnover and find no significant difference in equity returns but a significantly higher default rate for CLOs with more passive turnover.

Next, we investigate the drivers of active and non-active turnover and find that younger CLOs tend to exhibit more active trading. This finding is in line with the fact that older CLOs tend to face tighter reinvestment restrictions. Moreover, a higher collateral default rate corresponds to less active trading. In contrast, a higher collateral default rate has the opposite effect for non-active turnover, which is significantly lower for younger CLOs and for CLOs with a higher number of different loans in their portfolio. These findings confirm that our active turnover measure is capturing transactions that occur at a CLO managers discretion.

So far, our results suggest that more active CLOs trade loans at better prices than less active CLOs. We next investigate if this difference in transaction prices remains significant if more active and less active CLOs trade the same loan in the same month. Studying

these matched transactions, we find that high turnover CLOs earn 9 cents (on a 94 dollar transaction) more when they sell the same loan in the same month as a low turnover CLO, and pay 5 cents less (on a 98 dollar transaction) when they purchase the same loan at the same time as a low turnover CLO. Despite the lower economic magnitude, both price differences are statistically significant at a 1% level. Moreover, in line with the previous results we find that the difference in sales prices is larger than the difference in purchase prices. This larger difference in sales prices is in line with our intuition that finding a potential loan buyer is more difficult than simply purchasing a loan on the primary market. Hence, from now on, we focus our analysis on loan sales.

Compared to the difference in average sale prices, the difference in matched sale prices is small. Hence, we next investigate whether more active CLOs are better able in timing the market, but selling non-performing loans earlier. To that end, we compare transaction prices of the same loan without controlling for the timing of the transaction and find a more significant difference: High turnover CLOs earn 95 cents more when they sell the same loan as a low turnover CLO. Investigating our timing hypothesis, we find that high turnover CLOs sell 111 days earlier than low turnover CLOs. Moreover, when high turnover CLOs sell a loan, it is higher rated than when low turnover CLOs sell the same loan. These findings suggest that high turnover CLOs are capable of foreseeing downgrades in their loan portfolio while low turnover CLOs tend to sell later, after the loan has been downgraded.[1]

These differences in transaction prices and transaction timing suggest that more active trading can also impact the overall CLO performance. We investigate the link between ac-

[1]We also run a placebo test using the non-active turnover measure to classify CLOs as high turnover and low turnover. As expected, the results using non-active turnover are either insignificant or significant with the opposite sign as the results for active turnover, suggesting that our measure of active turnover captures a managerial activity that is not reflected in all transactions.

tive turnover and CLO performance by running cross-sectional regressions of two measures of CLO performance on lagged active turnover and lagged non-active turnover. First, in line with our motivating evidence, we find that the percentage of collateral defaults in the CLO portfolio is lower when the CLO was more active in the previous quarter. This effect is robust to controlling for other CLO characteristics, such as, size, age, and leverage. Interestingly, a higher non-active turnover in the previous quarter has a significant opposite effect: Higher non-active turnover predicts higher collateral default rates. One possible explanation for this observation is that CLOs with higher non-active turnover are in financial distress, for instance, due to a collateral test breach, which forces them to liquidate part of their performing loan portfolio, which might increase the percentage of defaulted loans in the collateral portfolio. Second, active turnover also predicts higher equity returns in the following period, even after controlling for various CLO characteristics. For equity returns, non-active turnover is statistically insignificant.

We conclude by investigating whether CLO investors could utilize our active turnover measure to guide their investment choices. To that end, we compute the average active turnover of each CLO in the first observed year and split the CLO sample into three portfolios, based on first-year active turnover. Similarly to the previous portfolio splits, we find that more active managers outperform less active managers. Most notably, using a subset of closed CLOs for which we observe all available cashflows, we compute the internal rate of return (IRR) and find that CLOs with a high initial active turnover have an IRR of 14% compared to an IRR of 2% for the less active CLOs.

We study the effects of active portfolio management by CLOs on the quality of their transactions. In contrast to most other structured finance products, CLO issuance is still at

pre-crisis levels and, according to Bank of America, the share of CLOs in structured finance issuance increased from 26% in 2006 to 98% in 2016. Moreover, the CLO collateral portfolio comprises leveraged loans, which are syndicated loans to credit-risky corporations. Unlike stocks, these loans are traded on an opaque over-the-counter market where active portfolio management can have a stronger impact. In addition, CLO managers receive a variety of performance-based fees and face complex portfolio constraints with their investments. In contrast to hedge funds, the portfolio of a CLO needs to satisfy a variety of collateral tests which can prevent a less-skilled manager from active trading. Therefore, transactions executed by CLOs provide an interesting laboratory to study the impact of active portfolio management on transaction prices and managerial performance.

Our findings suggest an inefficiency in the leveraged loan market that enables more active CLOs to outperform less active CLOs by selling deteriorating loans early. Thereby, we contribute to the current debate on whether active portfolio management can improve the investor returns. For example, Pastor, Stambaugh, and Taylor (2017) find that more active mutual fund managers outperform less active managers. We find a similar result for CLOs, where more active CLOs have higher equity returns and lower collateral default rates. In addition, Busse, Tong, Tong, and Zhang (2016) find a positive relationship between trading frequency and portfolio returns for institutional equity investors. Our findings add to this literature by showing that the effects of more active management are even more pronounced in the leveraged loan market. To the best of our knowledge, our paper is the first one to investigate leveraged loan transactions, executed by CLOs. Our paper also relates to a small but growing literature on CLOs and leveraged loans. Benmelech and Dlugosz (2009) give a detailed overview of rating practices in the CLO market and find that most CLOs have

a similar "boiler-plate" structure. Benmelech, Dlugosz, and Ivashina (2012) and Bord and Santos (2015) debate whether CLOs differ from other securitizations in the sense that the adverse selection effect in CLOs is much lower. The effects of securitization on leveraged loan prices are studied by, among others, Ivashina and Sun (2011), Nadauld and Weisbach (2012), and Shivdasani and Wang (2011). Ivashina and Sun (2011) show that institutional demand for buying leveraged loans by CLOs can decrease loan prices. Nadauld and Weisbach (2012) and Shivdasani and Wang (2011) study the influence of of securitization on corporate debt and leveraged buyouts respectively. More recently, Liebscher and Mählmann (2016) document significant inefficiencies in the CLO market that contradict the cashflow patterns documented for mutual funds by Chevalier and Ellison (1997) and challenge the theory by Berk and Green (2004) on active management.

1 CLOs and Leveraged Loans

We now summarize the relevant CLO features for our analysis, focusing on the CLO manager and the underlying collateral portfolio. Like other structured finance products, the securities issued by the CLO have a strict seniority ranking. The equity tranche takes the first losses of the underlying portfolio and the senior tranche only suffers losses if all other tranches have already defaulted. The securities issued by the CLO are backed by an asset portfolio, which mainly consists of leveraged loans. These loans are tradable on a secondary market and allow for a manager who, besides the initial selection and purchase of the loan portfolio, purchases and sells leveraged loans throughout the CLO's lifetime.

A leveraged loan is defined as "a syndicated loan given to a non-investment-grade com-

pany or a loan that exceeds a certain interest threshold, for instance, LIBOR + 125 basis points" (LSTA, 2013). As we can see from the definition, leveraged loans are loans to risky corporations.[2] In addition, leveraged loans are syndicated, meaning that a lead bank, called the arranger, organizes the loan issuance with several counterparties to raise the required volume. At issuance, the arranger searches for investors to co-finance the loan, which makes it relatively easy for CLOs to purchase leveraged loans. On the other hand, selling a leveraged loan is more difficult. While the notional amount of leveraged loans outstanding is huge, there is a small secondary market for leveraged loans, which makes finding a counterparty difficult. Hence, as we explain in more detail in the next section, a high CLO turnover can point to better managerial skill.

To understand the typical CLO and leveraged loan size, note that CLOs only invest in a small fraction of a leveraged loan. The average leveraged loan notional is approximately 523 million USD (e.g. Benmelech et al. (2012)) while, in our sample that we describe in the following section, the average number of leveraged loans in a CLO portfolio is 352 and the average CLO balance of USD-denominated CLOs is approximately 510 million USD. Hence, a CLO manager only invests in a small fraction of a leveraged loan. The large number of leveraged loans is because the CLO manager is required to hold a diversified loan portfolio that mitigates the default risk of the senior tranches. We next discuss the CLO manager's incentives and constraints in more detail.

[2]Lower-rated corporations who need to raise large amounts of debt that exceed normal loan volumes have two financing options, issuing bonds or syndicated loans. See Denis and Mihov (2003) and Altunbas, Kara, and Marques-Ibanez (2010) for more details on this trade-off.

1.1 The Manager's Incentives and Constraints

The CLO manager receives a compensation in the form of three different fees. First, a senior fee, which is around 15 basis points of the CLO balance. Usually, this fee has the highest priority in the cash flow waterfall and is paid to the manager before the interest on the senior tranches. Second, a junior fee of approximately 30 basis points if all cashflows to senior and mezzanine tranches are made and the collateral tests (described below) are met. Finally, an incentive fee, which is paid to the manager if all the criteria for the junior fees are fulfilled and the CLO equity returns exceed a pre-specified threshold. The incentive fee is approximately 20% of the payment to the equity investors but can vary significantly across CLOs. This complex compensation structure, combined with the fact that junior and senior tranche holders might have different incentives, distinguishes CLOs from other actively managed portfolios such as mutual funds.

Besides the complex compensation structure, the CLO manager has to comply with a variety of constraints.[3] As described by Aufsatz (2015) in an industry-research note, there are three major constraints. First, the loan portfolio must fulfill a pre-specified diversity score, avoiding concentration in specific issuers or industries. Second, managers can only invest in "eligible" assets, which are assets that are consistent with the structure of the CLO. For example, a manager of a U.S. CLO must allocate most of the collateral portfolio to U.S. dollar denominated assets. Third, the amount invested in risky loans that are rated as triple-C or below may not exceed a pre-specified threshold. Hence, high portfolio turnover could also be due to rating deteriorations in the loan portfolio, which force the CLO manager

[3]In general, the CLO managers portfolio constraints are tighter in CLOs issued after the financial crisis. Further, with the Volker rules becoming effective, CLO managers are also required to retain 5% of the CLO risk on their own books.

to sell triple-C rated loans. We label forced trades as "non-active trading" and next describe the different reasons for non-active trading.

1.2 Active Trading and Non-Active Trading

The simplest reason for a non-active trade occurs when a loan in the collateral portfolio matures. In that case, the manager uses the proceeds from the matured loan to invest in new loan(s). Other non-active trades occur in the first 3-6 months after closing of the CLO (referred to as the ramp-up period). In this period, the manager still needs to purchase part of the initial collateral portfolio. Together with the the potential difficulties in selling leveraged loans, these simple reasons for non-active trading highlight that loan sales are more informative for constructing a measure of active trading than loan purchases.

As described above, one reason for non-active loan sales are binding portfolio restrictions. In addition to these portfolio restrictions, the CLO's performance is monitored through a variety of collateral tests, which ensure the safety of the senior debt tranches. The most common collateral test is the over-collateralization (OC) test which measures the cushion of the par value of the CLO assets relative to the par value of the senior CLO tranche(s):

$$\frac{Asset\ Par}{CLO\ Tranche\ Par} \geq Limit. \tag{1}$$

The asset par value is the sum of the notional value of all performing loans and the notional value of all non-performing loans, which enter at a haircut. The CLO tranche par value is the current par amount of outstanding principal for the respective CLO tranche. If the tranche is not the most senior one, the CLO tranche par is the sum of the tranche par and all tranches above it in seniority. If the test result is below the limit the OC test is breached,

which forces the CLO manager to sell part of the loan portfolio and repay a fraction of the debt tranches to comply with the test limit again. This is another reason for a non-active loan sale.

Overall, a large amount of non-active transactions is an indicator of poor collateral management rather than managerial skill. Therefore, to rule out that a sale was enforced to repay debt tranches, we construct our measure of active trading as one where loan sales and loan purchases occur within a small time window. Matching a loan sale with a loan purchase ensures that the manager is selling the loan to purchase new loans instead of selling the loan to repay tranche holders. In contrast to non-active trades, these trades are more likely based on the manager's view about the underlying credits regarding rating changes or changes in credit spreads from what we might label as non-active trades.

While a simultaneous sale and purchase of different leveraged loans is more likely to positively influence the CLO performance, the CLO manager might simply sell loans with a high market value and buy loans with a lower market value but a higher principal value instead. This transaction is called "par building". A CLO manager engaging in par building avoids an OC test breach because the transaction increases the par value of the asset portfolio, thereby increasing the test cushion. In contrast to active trading based on managerial insights, it is not obvious that par building affects collateral default rates or CLO equity returns.

Finally, the CLO trading activity can vary over its lifetime, which comprises the following three periods. First, the first 3–6 months after issuance, called ramp up period. As mentioned above, the CLO manager still purchases parts of the loan portfolio in this period. However, given that we measure active turnover by matching loan sales to loan purchases, we do not

expect this period to affect our active turnover measure. Second, the reinvestment period starts, which starts after the ramp up period and lasts for 3–6 years. In this period, the CLO manager can reinvest the proceeds from maturing loans and loan sales in new loans. Finally, in the amortization period, which starts after the reinvestment period, the CLO manager must dedicate most cashflows from maturing loans and loan sales to debt repayments. In this period, we expect active loan trading to be significantly lower than in the first two periods. Overall, this discussion shows that CLO age is an important control variable.

2 Data and Variable Construction

We describe the data underlying our analysis in this section. Our dataset contains information on the CLO structure and performance, the underlying collateral portfolios, and collateral transactions conducted by the CLO managers. The datasource is the Creditflux CLO-i database and we focus our analysis on U.S. CLOs and the period from January 2009 to December 2016. In this section we first describe the sample of CLOs we use in our analysis and summarize our sample of loans transactions, executed by CLOs. Afterwards, we construct our active and non-active turnover measures.

2.1 CLO Data

We apply the following four filters to the CLO-i database. First, we require the CLOs to report both tranche information and equity returns. These are the minimum information necessary to understand the CLO structure. Second, we drop CLOs where we are unable to identify the equity tranche, which is important to compute the CLO's leverage ratio and annualized equity payment. Third, we remove observations where the CLO's original tranche

balance deviates from the median original balance of the CLO. If over 20% of the original balance observations deviate from the median, we deem that we are unable to determine the true original balance of the CLO and remove the CLO from the sample.[4] Finally, to avoid strong outliers driving our results, we remove observations where the CLO repaid over 50% of the original balance. CLOs that have repaid half of their original balance, tend to report extremely high default rates and/or high equity payments.[5] Our final sample comprises 892 CLOs.

The two main performance measures in our analysis are the payments to the most junior tranche holders, called equity payments, and collateral default rates, which measure the percentage of loans in default for each CLO. Panel A of Table 1 reports summary statistics of the different CLO characteristics and performance measures in our filtered database. As we can see from the table, the average annualized equity payment is 19.72% with a standard deviation of 8.30%. While annual equity payment is the annual percentage return CLO equity investors receive on their initial investment, these numbers are not the return on equity because the equity payment also includes return of principal. We address this potential issue in Section 5.1, where we compute the internal rate of return (IRR) for a subsample of closed CLOs and test the impact of active turnover on these figures. Finally, the average collateral default rate in our CLO sample is 1.65%, with a high standard deviation of 4.59%.

[Table 1 about here]

Panel A of Table 1 also shows that the percentage of CCC or below rated loans is, on

[4]Changes in the original balance are a clear mistake and happen, for example, when the reports for some tranches are missing in some months. This filter is relatively harsh and leads us to drop 77 CLOs. In addition, we remove outliers in another 186 CLOs, where the original balance deviates in some months.

[5]Our results are robust to using other cut-off values, such as 20% or 90%.

average, 5.95%, and almost four times as high as the percentage of defaulted loans. The average CLO size is USD 510 million and CLOs hold, on average, 352 different leveraged loans in their potfolio, which is in line with Benmelech et al. (2012). Family size shown in Table 1 gives the number of CLOs under the same CLO manager. On average, a CLO manager handles 12.62 CLOs, although there is a large cross-sectional variation in family size, ranging from a 10% quantile of 2.54 to a 90% quantile of 24.88. On average, CLOs have an equity share of 10.53% and are 41.94 months old. Finally, for a small subsample of CLOs, we have information on the fee structure. As we can see from the table, the median senior and junior fees are 20 basis points and 30 basis points, respectively.

2.2 Transaction Data

We next describe the sample of CLO collateral transactions, which enable us to get insights into leveraged loan transactions. The observations include information on the loan in question, the transaction price, and the transaction date. The dataset comprises purchases and sales made by CLOs in our filtered sample and we focus on term leveraged loans which comprise over 90% of the transaction data sample sample. We delete observations with obvious reporting mistakes in the price or the size of the transaction, namely zero or negative values or prices above 120 USD or below 15 USD.[6] Finally, 14% of the transactions have a price equal to $100, which is most likely a default value used when the actual transaction price is not observed. We delete these observations from our sample but note that the results are robust to including transactions with a price equal to $100.

We report summary statistics of transaction prices, trade size, loan rating, and loan

[6]Most of these misreportings occur in the early part of the sample.

maturity in Panel B of Table 1. The sample comprises almost half a million transactions with 196,312 sales and 280,619 purchases, indicating that approximately one third of the purchased loans are held until the loan either matures or defaults. The average transaction size is USD 1.06 million, ranging from a 10% quantile of USD 0.13 million to a 90% quantile of 2.45 million. Splitting these numbers into loan purchases and sales, the average transaction size is USD 1.2 million and USD 0.8 million, respectively (we do not report these separate numbers in the table to conserve space). The credit rating and loan maturity is available for a subsample of 245,179 and 343,870 of the traded loans and the average traded loan has a rating of B+ and a time to maturity of 4.98 years. Again, splitting these numbers into purchases and sales, the loans in our sample have an average 5.2 years to maturity and an average B+ rating when purchased, and an average of 4.5 years to maturity and an average B rating when they are sold.

2.3 The Active Trading Measure

As noted in section 1.2, a CLO manager can be forced to sell loans (e.g. after a collateral test breach) or to purchase new loans if part of the collateral portfolio matures. Hence, we need to distinguish between these non-active trades and active trades which occur at the CLO managers discretion. To distinguish active from non-active trades, we first identify active sales by matching the cash-flows from loan sales at day i to the cash-flows of loan purchases exectuted within a 3-window:

$$\text{ActiveSale}_{i,3} := \min\left(CF_i^{Sales}, CF_{k\in[i-3,i+3]}^{Purch}\right). \tag{2}$$

Equation 2 identifies transactions where the manager has sold part of the loan portfolio to purchase new loans.

We then construct our measure of active turnover as follows. On each day we compute $\text{ActiveSale}_{i,3}$, where we remove any previously matched purchases to avoid double-counting of loan purchases. Afterwards, we aggregate all active sales within quarter t and divide this figure by the total CLO liabilities in quarter t. In summary, our measure of active turnover is defined as:

$$\text{ActiveTurnover}_t := \sum_{i \in t} \frac{\text{ActiveSale}_i^3}{CLO\ Tranche\ Par_t}. \tag{3}$$

Next, we construct a measure of non-active turnover that comprises all sales without matching expenses from loan purchases. As before, we take the sum of all non-active transactions in quarter t and divide by the total CLO liabilities in quarter t. In contrast to the 3-day window for active trades, we use a 7-day window to identify non-active trades to ensure a significant difference in the reason behind these transactions.[7] Our measure for non-active trading is defined as:

$$\text{PassiveTurnover}_t := \sum_{i \in t} \frac{CF_i^{Sale} - \text{ActiveSale}_{i,7}}{CLO\ Tranche\ Par_t}. \tag{4}$$

Panel C of Table 1 provides summary statistics for the active and non-active turnover measures. Active turnover is on average 1.38%. It varies from a 10% quantile of 0.22% to a 90% quantile of 2.66%, illustrating that there is a large variation in trading activity across CLOs. Non-active turnover is on average 0.78%, ranging from a 10% quantile of 0.05% to

[7] Our results are robust to using different time windows, like using the same 3-day window for both active and non-active turnover or using the same 7-day window for both active and non-active turnover.

a 90% quantile of 1.53%. The median active turnover is 0.99% and the median non-active turnover is 0.45%, indicating that approximately two thirds of the loan sales are classified as "active."

3 Motivating Evidence

In this section, we present the results of two simple tests which serves as motivation for our further analysis. First, we split the sample of CLOs into three groups based on their quarterly active turnover and find that CLOs with higher turnover sell loans at higher prices. In addition, more active CLOs have higher equity returns and lower default rates in the following quarter. Second, we investigate the drivers of active turnover and non-active turnover.

3.1 Higher Trading Activity and Better Performance

We first compare loan transactions by high and low turnover CLOs. To get CLO portfolios with significantly different active turnover, we use the quarterly active turnover measure described in Section 2.3 and form three portfolios: High turnover, medium turnover, and low turnover. The portfolio formation is based on the active trading measure within the same quarter and we rebalance the portfolios every quarter. Figure 1 shows that high turnover CLOs buy and sell leveraged loans at better prices than low turnover CLOs. As shown in the figure, more active CLOs sell more leveraged loans above par value and while less active CLOs sell more loans with a market value below 55%. Panel (b) of Figure 1 shows that the picture is reversed for purchases, where less active CLOs tend to purchase loans at par value.

[**Figure 1 about here**]

Overall, Figure 1 suggests that high turnover and low turnover CLOs exhibit different trading patterns, both when purchasing loans, where more active CLOs pay less, and, even more so, when selling loans, where more active CLOs are able to sell loans at much higher prices. Panel A of Table 2. In panel A of Table 2, we test if there is a significant difference between the transaction prices that more active and less active managers obtain. We first compare the transactions of the most active and least active CLOs and find that more active CLOs, on average, sell loans at 5.47% higher prices (t-statistic of 5.15) than less active CLOs. More active CLOs also purchase cheaper loans than less active CLOs, but the average difference of -0.37% (t-statistic of -2.54) is small compared to the difference in sale prices. Note that these results do not control for type of loans and the timing of the loan trade. That is, we cannot yet claim that more active investors get better prices when they trade assets with a similar risk. We further investigate this hypothesis in Section **??**.

[**Table 2 about here**]

Next, we investigate whether the payments to equity tranche holders and the collateral default rates differ between high and low turnover CLOs. As before, we form portfolios based on active turnover now using the turnover in quarter $t-1$ to classify CLOs as high turnover, medium turnover, or low turnover and to predict CLO performance in quarter t. First, we use the active turnover measure constructed in Section 2.3 and test if there is a significant difference between the equity returns and default rates of high active turnover and low active turnover CLOs. Afterwards, we run a placebo test with the non-active turnover measure, described in Section 2.3. In this placebo test, we form three CLO portfolios based on their

non-active trading activity in quarter $t-1$ and analyze the difference between equity returns and default rates in the three portfolios.

As we can see from Panel A of Table 2, there is a significant difference between active turnover in quarter t for CLOs with a high turnover in quarter $t-1$ and CLOs with a low turnover in quarter $t-1$. Moreover, annualized equity payments decrease monotonically from CLOs with high turnover to CLOs with low turnover and there is a difference of 2.20% (t-statistic of 2.27) between the high- and low-turnover groups. Similarly, default rates increase monotonically from high turnover to low turnover CLOs and the difference between the high and low turnover groups is -0.76% (t-statistic of -5.93). Overall, these findings suggests that more active turnover predicts better CLO performance.

Turning to our placebo test with non-active turnover, we first note that more non-active turnover should not improve the CLO performance. If anything, a higher non-active turnover can indicate that the CLO is in financial distress which forces it to sell part of its loan portfolio to redeem senior note holders. In line with this intuition, Panel B of Table 2 shows that more non-active turnover does not predict a significant difference in equity returns. However, CLOs with more non-active turnover have significantly higher default rates with a difference of 1.79% (t-statistic 2.40), compared to less-active CLOs. Hence, more non-active turnover is indeed an indicator for deteriorations in the credit quality of the loan portfolio.

3.2 The Drivers of Active and Non-Active Turnover?

We next run a panel regression of active CLO turnover and non-active CLO turnover of the following form:

$$Turnover_{i,t} = \alpha + \beta^{Reinv} 1_{\{t \leq Reinv\}}(t) + \beta^{Test} 1_{\{\text{Test breach}\}} + \beta^{Def} Def_{i,t} + \beta^{CCC} CCC_{i,t} + \beta^{\#Loan} \#Loans_{i,t} + \beta^{Fam} Family\ Size_{i,t} + \beta^{Size} \log(Size_{i,t})_{i,t} + \beta^{Age} Age_{i,t} + + \varepsilon_{it}. \quad (5)$$

The first set of explanatory variables are related to the CLO lifetime and collateral portfolio and include a dummy variable that is equal to one if the CLO is still in its reinvestment period and zero otherwise, a dummy variable that is one if a collateral test has been breached and zero otherwise, the percentage of defaulted loans in the collateral portfolio, the percentage of loans with a rating of CCC or below, and the number of loans in the collateral portfolio. In a second step, we add the number of CLOs under the same manager, the logarithm of the CLO size, and the CLO age as explanatory variables. The results are exhibited in Table 3.

[Table 3 about here]

We examine active CLO turnover in the first two panels and non-active turnover in the last two panels. As we can see from the table, CLOs that are still in their reinvestment period have a significantly higher active turnover and a significantly lower non-active turnover. Moreover, a test breach leads and a larger percentage of defaulted loans in the collateral portfolio lead to a significant drop in trading activity. These two variables tend to have the opposite effect for non-active turnover. Finally, the number of loans in the portfolio is insignificant for active turnover and significant with a negative sign for non-active turnover. Turning to the three additional control variables, we find that larger CLOs and younger CLOs tend to exhibit a higher active turnover. Importantly, the CLO family size is insignificant in explaining any of the turnover measures, indicating that managers do not execute trades among CLOs within the same family.

4 Active CLOs Trade at Better Prices

We present our main results in this section: CLOs with higher active turnover trade at better prices than CLOs with low active turnover. As in Section 3, we split the overall sample of CLOs into three buckets (high active turnover, medium active turnover, and low active turnover) and run two sets of tests. First, we test if high turnover CLOs and low turnover CLOs trade at the same price when they trade the same loan in the same month. Second, we compare transaction prices of the same loan traded by high and low turnover CLOs at any point in time, i.e., without controlling for the time the transaction took place. As a placebo test we sort CLOs based on their *passive* turnover and test if CLOs with high non-active turnover trades at better prices than CLOs with low non-active turnover.

[Table 4 about here]

The first two rows of Panel A in Table 4 show the average transaction prices for the CLO portfolios as well as the difference in price when high and low active turnover CLOs trade the same loan in the same month. For each loan and each month we compute the median sale and purchase price for high, medium, and low turnover CLOs. We then use the subset of loan-months where both high and low turnover CLOs sold the same loan in the same month and report the average sale price of high turnover, medium turnover, and low turnover CLOs. We find that high turnover CLOs, on average, get 9 cents more when selling the same loan in the same month as low turnover CLOs. This difference of 9 cents is relative to a price of \$94, which is not economically large but it is statistically significant at a 1% level. We next investigate whether there is a significant difference between purchase for the high and low turnover CLOs for the subset of transactions where the same loan is purchased

by both high and low turnover CLOs. We find that high turnover CLOs, on average, pay 5 cents less buying the same loan in the same month as low turnover CLOs. The difference in price is statistically significant but, as before, the economic magnitude is small. So far, these results document that high turnover CLOs get better prices than low turnover CLOs when they trade the same loan at the same time.

Given the large difference in sale prices between high turnover and low turnover CLOs, observed in Section 3, the small difference of 9 cents documented above seems surprising. Therefore, we next consider the subset of loans sold by both high and low turnover CLOs without requiring a transaction within the same month. For each of these loans and for each CLO turnover group, we compute the median sale price, median sale date, and rating at the median sale date of all sales. Averages of these values across loans are reported in the last panel of Panel A in Table 4. We find that a high turnover CLO gets 95 cents more when he sells the same loan as a low turnover CLO. Moreover, a high turnover CLO sells 111 days earlier than a low turnover CLO. The average numerical rating of the loans at the time they are sold is 7.4 for high turnover CLOs and 7.31 for low turnover CLOs. Though both numerical ratings correspond to a credit rating of B, the ratings in the two groups are significantly different. Hence, high turnover CLOs tend to sell loans with better ratings than low turnover CLOs.

Altogether panel A tells us that more active CLOs get better prices when high and low turnover CLOs sell the same loan simultaneously. Furthermore, when we compare transactions across time we find that active CLOs sell earlier and when they sell they sell at a higher price and the loan is typically higher rated. This suggests that active CLOs sell loans of firms that are likely to get downgraded in the near future, and that less active CLOs are

left selling the loans when the firm is already on the path toward default.

Panel B of Table 4 shows the same results as the last part of Panel A, but where CLOs are classified as high turnover, medium turnover, and low turnover based on their *non-active* turnover. Recall that non-active turnover reflects sales where the proceeds have not been used to purchase new loans. Compared to the sorts based on active sales, the difference in sale price and sales date now has the opposite sign and is less significant. That is, high non-active turnover is not associated with better prices. The negative significant sign on the price difference is likely because non-active turnover can be a result of a test breach where the CLO is forced to sell loans immediately, possibly at unfavorable prices. Because non-active turnover is not a choice of the CLO manager but rather a consequence of poor CLO performance, this test acts as a placebo test, ensuring that it is only voluntary or active turnover that affects CLO trading prices.

Next we run two robustness tests. First, to test whether the results are driven by CLO managers with multiple CLOs under management, we run the same tests as before but this time at the CLO manager level. Second, we test whether the results are simply driven by transaction size by looking into subsamples of transactions that have, approximately, the same size.

4.1 Result on CLO manager level

In this section we repeat our analysis on the CLO manager level, instead of testing for individual CLOs. As we have seen in Table 1, the average CLO manager is in charge of 12 different CLOs. This raises two potential concerns. First, from conversations with industry practitioners, we learned that it is possible that several of the individual CLO trades could

occur within the same family. One typical example is that a CLO manager that wants to sell the same loan in various CLOs transfers the loans to one CLO and sells them as a bundle.[8] Second, Eisele, Nefedova, and Parise (2016) find that, for mutual funds, trades within the same fund family are more likely executed at prices that differ from the market price.

To repeat our analysis on the manager level, we first aggregate CLO turnover at the manager level. We define manager turnover as the weighted average of the turnover of all CLOs that the manager has under management. As before, we then sort CLO managers into high turnover, medium turnover, and low turnover buckets. Table 5 exhibits the results for the manager level tests, following the same logic as Table 4 for individual CLOs. CLO managers are sorted by their *active* turnover in Panel A and by their *passive* turnover in Panel B. For each loan in the sample we compute the monthly median sale price and monthly median purchase price paid by high turnover, medium turnover, and low turnover managers. First, we consider the subsample of month-loan observations where both high turnover and low turnover managers sold the loan and find that high turnover managers receive 13 cents more than low turnover managers when they sell the same loan in the same month. Next we look at the subsample of loan-months where high and low turnover managers both purchased the loan and find that high turnover managers pay 8 cents less when they purchase the same loan as a low turnover manager in the same month. Both differences are statistically significant at a 1% level and marginally higher than the differences for individual CLOs.

[Table 5 about here]

We next focus on sales and refrain from matching transactions at the time they are

[8]The transactions that occur within a CLO family are typically executed at 100%, which is why we exclude sales at 100% from our sample.

executed. As before, we split transactions in high turnover, medium turnover, and low turnover managers. For each loan in the sample we then determine the median sale price, median sale date, and rating at the median sale date. We find that, on average, the high turnover anagers earn 59 cents more on a transaction of $95 when they sell the same loan as a low turnover manager. Moreover, active managers sell, on average, 73 days earlier than the passive managers and tend to sell loans with a better rating. Panel B of Table 5 shows the results of a placebo tests, where we form three groups of CLOs based on *passive* turnover. As we can see from that panel, there is no significant difference between sale price or loan rating for high non-active turnover and low non-active turnover managers.

Overall, the manager level are consistent with the individual CLO level tests. That is, more active managers do, overall, trade earlier and at better prices than less active managers. Hence, we can rule out that the better transaction prices are simply picking up a spurious manager effect, arising, for example from managers' shifting loans across CLOs.

4.2 Sample Split by Transaction Size

In the above analysis we do not control for transaction size, but transaction size can influence prices. In stock markets larger transactions mean higher price impact, that is, executing a large sale would drive down the price. The corporate bond market on the other hand is an over-the-counter market where large participants, who typically are behind the large transactions, are better negotiators and therefore negotiates tighter bid-ask spreads, see, for example Feldhütter (2012). A large sale would therefore be executed at a higher price than a small sale. The secondary market for leveraged loans is very illiquid and there have, to our knowledge, not been done any research on the effect of transaction size on transaction

prices in this market. However, the leveraged loan market share many similarities with the corporate bond market, for instance, both trade in the over-the-counter market. Our results could therefore be driven by high turnover CLOs executing larger transactions and therefore getting more favorable prices. In this section we run robustness tests showing that the main results are robust to controlling for transaction size.

CLOs execute sales at a wide range of transaction sizes but two large clusters are found around $500,000 and $1,000,000. Therefore, we focus on two subsamples: Transactions in the range of $400,000 to $600,000 and transactions in the range of $900,000 to $1,100,000. The results for the first and second range are reported in Panel A and Panel B of Table 6, respectively. We report the same results as for the full sample, not controlling for transaction time, and only include transactions with size between $400,000 and $600,000 in Panel A and sizes between $900,000 and $1,100,000 in Panel B, respectively.

[Table 6 about here]

We investigate the impact of active turnover on transactions of the same loan, not matching the transactions on the month they were executed.[9] We consider all loans that are sold by both high and low turnover CLOs at the appropriate transactions size at least once during the sample period. For each loan we compute the median price, the median date and the loan rating at the median date, again only considering transactions of the appropriate size, and report averages across loans. For transactions close to $500,000 we find that high turnover CLOs earn 43 cents more when they sell the same loan as a low turnover CLO. The difference increases to $1.19 for transactions close to $1 million. High turnover CLOs sell

[9]Matching transactions in the same month gives qualitatively similar, but less significant results than in Section 4. This could be due to the fact that the sample becomes too small.

earlier in both transaction size groups. High turnover CLOs sell loans when they are 0.08 notches higher rated in the $500,000 transactions size sample, and 0.19 notches higher rated in the $1,000,000 sample.

We learn two things from Table 6. First, our main result that more active CLOs trade earlier and at better prices is robust to comparing transactions of two smaller subsamples where transactions are of similar size. That is, transaction size is not driving our main results. Second, the positive relation between high activity and favorable prices is stronger for large transactions. Large transactions is also associated with a greater difference in selling date and loan rating at selling date. This is reasonable if finding a counterparty to large transactions is more difficult than finding a counterparty to small transactions. The benefit of being more active is then stronger when the CLO needs to sell off large loans in the portfolio.

5 Active Trading Leads to Better CLO performance

In this section we further investigate the relationship between active turnover and CLO performance. As in Section 3, we use the payoffs to CLO equity holders as a proxy for CLO returns and the percentage of defaulted loans in the CLO collateral portfolio as a measure of the CLOs riskiness. We then test whether our measures of active and non-active turnover have any predictive power for equity returns and defaults rates. In contrast to Section 3, we now estimate the impact of active turnover on returns and portfolio defaults using a panel regressions with the following controls:

$$\begin{aligned} Performance_{i,t} = \alpha + \beta^{Active} Turnover^{Active}_{i,t-1} + \beta^{Passive} Turnover^{Passive}_{i,t-1} + \\ \beta^{Perf} Performance_{i,t-1} + \beta^{Lev} Leverage\ Ratio_{i,t} + \beta^{CCC} CCC\ Bucket_{i,t} + \\ \beta^{Age} Age_{i,t} + \beta^{Fam} Family\ Size_{i,t} + \beta^{\#Loan} \#Loans_{i,t} + \gamma Controls_t + \varepsilon_{it}. \end{aligned} \tag{6}$$

The dependent variable in this regression is either $Equity\_payment_{i,t}$ (the annualized cash return to equity holders received in quarter t), or $Default\_rate_{i,t}$ (the average quarterly collateral default rate). In our baseline specification, we use five independent variables. First, $Turnover_{i,t-1}^{Active}$ is the lagged quarterly active turnover measure we constructed in Section 2.3. Second, $Turnover_{i,t-1}^{Passive}$ is the lagged non-active turnover measure described in Section2.3. We use lagged turnover because past trading determines the composition of the collateral pool in the next period and therefore influences the current performance. Third, lagged performance $Performance_{i,t-1}$ to control for the potential non-stationarity of the performance measures. Third, $Leverage\ Ratio_{i,t}$ to capture the cross-sectional variation in the CLO equity share. Finally, $CCC\ Bucket_{i,t}$ to control for the fraction of low-rated loans in the portfolio. In a second regression specification we add CLO age, family size, and the number of loans in the CLO portfolio as control variables. Moreover, we control for LTSA leveraged loan index (LLI) returns when the dependent variable is equity return and for LLI default rates when the dependent variable is the CLO default rate. In a third specification we also add time fixed effects.

[Table 7 about here]

The results are exhibited in Table 7. As shown in the table, active turnover is statistically significant for all six model specifications. From specifications (1), (2), and (3), we can see that a higher active turnover predicts a lower percentage of defaulted loans in a CLO portfolio. In the baseline specification, an increase in active turnover of 1% predicts a seven basis point decrease in the default rate. While the economic significance of active turnover decreases in specifications (2) and (3) where we add more controls, the variable

remains statistically significant at a 1% level. Interestingly, an increase in non-active turnover predicts an increase in portfolio defaults and the variable is statistically significant at a 5% level. This impact of non-active turnover is in line with our intuition that a forced loan sale, which increases the non-active turnover, is an indicator of poor CLO performance.

From specifications (4) to (6) in Table 7 we can see that a higher active turnover predicts higher equity payments. In the baseline specification, a 1% increase in active turnover predicts an 18 basis points increase in equity payments. The effect becomes even more significant in specifications (5) and (6), after adding more controls. In contrast to default rates, non-active turnover does not have a significant influence on equity payments. Overall, Table 7 shows that more trading activity improves CLO performance. This improved performance is reflected in both higher equity returns, which benefit junior tranche holders and lower default rates, which tend to benefit junior tranche holders.

5.1 Making Money with Investments in Active CLOs

In this subsection, we investigate whether CLO investors could use our active turnover measure to guide their investment choices. To that end, we compute the average active turnover of each CLO in the first observed year and split the CLO sample into three portfolios, based on first-year active turnover. We then form three portfolios, using the remaining performance data. This split ensures that, in theory, an investor capable of observing the active turnover of CLO managers and the follow a buy and hold strategy in the most active CLOs.

[Table 8 about here]

In line with the results from Section 3, we find that more active CLOs outperform less

active CLOs. CLOs with the most active turnover have an average equity payment of 24.99% while CLOs with the least active turnover only pay an average of 20.58% to their investors. Similarly, the percentage of defaulted loans is almost twice as high for the least active CLOs when compared to the most active CLOs. In addition, we use a subset of closed CLOs for which we observe all cashflows to compute the internal rate of return (IRR). Using the IRR instead of equity payments enables us to obtain a cleaner measure of CLO performance which is not affected by notional repayments. Comparing the IRR for high active turnover and low active turnover CLOs, we find a striking difference: CLOs with a high initial active turnover have an IRR of 14% compared to an IRR of 2% for the CLOs with a low initial turnover.

6 Conclusion

In this paper, we analyze a novel set of leveraged loan transactions that are executed by CLOs. After constructing a measure for active portfolio turnover of CLOs, we find that CLOs with a higher trading activity trade at better prices than CLOs with a lower trading activity. This finding is robust to controlling for transaction size and tests on the manager level instead of the individual CLO level. Moreover, we document that more active CLOs trade earlier than less active CLOs and tend to sell loans with a better credit rating. In addition to these trade-level tests, we find that higher active turnover predicts higher equity returns and lower CLO portfolio default rates. This finding is in line with previous research on active versus passive management in the case of equities, showing that more active managers are capable of outperforming the market. Placebo tests with an alternative turnover measure which

captures non-active trading lead to insignificant or qualitatively different results, suggesting that our measure of active turnover is capable of capturing a unique skill of CLO managers.

References

Altunbas, Y., A. Kara, and D. Marques-Ibanez (2010). Large debt financing: syndicated loans versus corporate bonds. *European Journal of Finance 16*(5), 437–458.

Benmelech, E. and J. Dlugosz (2009). The alchemy of CDO credit ratings. *Journal of Monetary Economics 56*(5), 617–634.

Benmelech, E., J. Dlugosz, and V. Ivashina (2012). Securitization without adverse selection: The case of CLOs. *Journal of Financial Economics 106*(1), 91–113.

Berk, J. B. and R. C. Green (2004). Mutual fund flows and performance in rational markets. *Journal of political economy 112*(6), 1269–1295.

Bord, V. and J. A. Santos (2015). Does securitization of corporate loans lead to riskier lending? *Journal of Money, Credit and Banking 47*(2-3), 415–444.

Busse, J. A., L. Tong, Q. Tong, and Z. Zhang (2016). Trading frequency and fund performance.

Chevalier, J. and G. Ellison (1997). Risk taking by mutual funds as a response to incentives. *Journal of Political Economy 105*(6), 1167–1200.

Denis, D. J. and V. T. Mihov (2003). The choice among bank debt, non-bank private

debt, and public debt: evidence from new corporate borrowings. *Journal of financial Economics 70*(1), 3–28.

Eisele, A., T. Nefedova, and G. Parise (2016). Are star funds really shining? cross-trading and performance shifting in mutual fund families.

Feldhütter, P. (2012). The same bond at different prices: Identifying search frictions and selling pressures. *Review of Financial Studies 25*(4), 1155–1206.

Ivashina, V. and Z. Sun (2011). Institutional demand pressure and the cost of corporate loans. *Journal of Financial Economics 99*(3), 500–522.

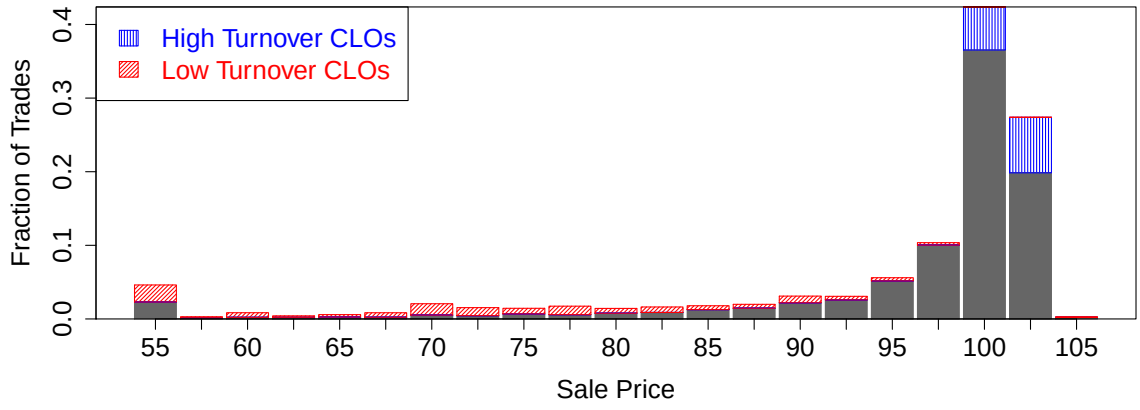
Liebscher, R. and T. Mählmann (2016). Are professional investment managers skilled? evidence from syndicated loan portfolios. *Management Science 63*(6), 1892–1918.

LSTA (2013). Leveraged loans: A primer.

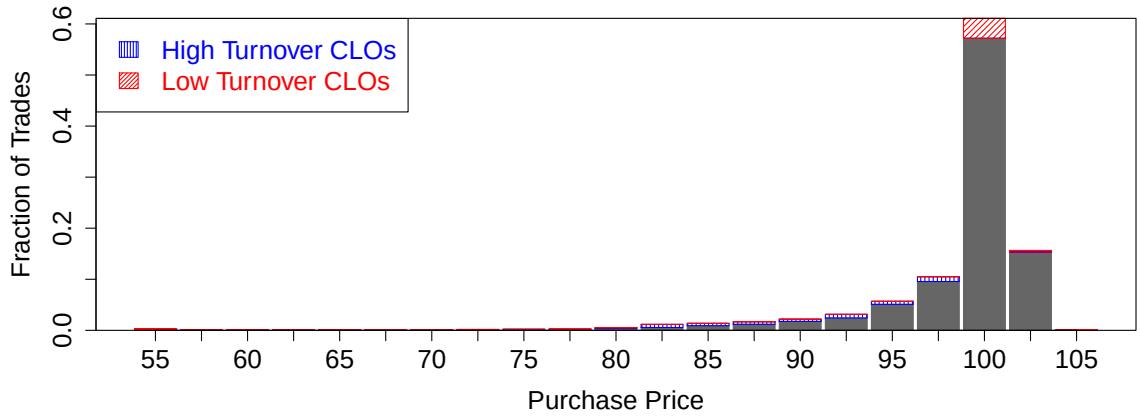
Nadauld, T. D. and M. S. Weisbach (2012). Did securitization affect the cost of corporate debt? *Journal of Financial Economics 105*(2), 332–352.

Pastor, L., R. F. Stambaugh, and L. A. Taylor (2017). Do funds make more when they trade more? *Journal of Finance*.

Shivdasani, A. and Y. Wang (2011). Did structured credit fuel the LBO boom? *Journal of Finance 66*(4), 1291–1328.



(a) Distribution of median prices



(b) Distribution of purchase prices

Figure 1: **Do CLOs with high active turnover trade at better prices?** We categorize transactions as high turnover, medium turnover, and low turnover based on the active turnover of the CLO which executed the transaction. The measure for active turnover is defined in Section 2.3. The figure shows the empirical distribution of the median sale price (panel (a)) or median purchase price (panel (b)), respectively. For each loan we find the median high turnover and low turnover price over the full sample period of transactions and include the median prices in the computation of the empirical density. The sample period is January 2009 to December 2016. The sample of transactions consists of loans that are sold by both high and low turnover CLOs in this period.

Table 1: **Summary Statistics.** This table reports summary statistics of the our filtered CLO and loan trade sample. Panel A reports CLO performance measures and other characteristics. Panel B reports summary statistics for loan transactions executed by CLOs in our sample. Panel C reports the summary statistics for the active and non-active turnover measures constructed in Equations (3) and (4). We report mean, standard deviation (std), 10% quantile (10%), median, 90% quantile (90%), and the number of observations (N) for transaction price and transaction size. In Panels A and C, we first compute CLO lifetime averages of all variables and then use these averages to compute mean, standard deviation (std), 10% quantile (10%), median, and 90% quantile (90%). The number of observations in Panels A and C refer to the number of CLOs with available data. The sample period for all data is January 2009 to December 2016.

	Mean	std	10%	Median	90%	N
Panel A: CLO characteristics and performance measures						
Equity pmt (%)	19.72	8.30	10.39	19.67	27.58	892
Default (%)	1.65	4.59	0.00	0.65	4.00	892
CCC bucket (%)	5.95	3.29	2.68	5.40	9.62	892
Original Size	509.48	201.78	333.79	499.45	712.19	892
Family size	12.62	10.04	2.54	10.19	24.88	892
# Loans	352.24	187.11	158.65	318.93	602.47	892
Equity Share (%)	10.53	5.11	7.90	9.45	13.17	892
Age (months)	41.94	29.74	8.26	32.05	80.89	892
Panel B: Transaction Data						
Sale price	94.57	12.16	83.12	99.01	100.50	196,312
Purchase price	97.36	5.48	92.50	99.00	100.25	280,612
Transaction size (mill $)	1.06	1.41	0.13	0.69	2.45	476,924
Rating	B+	1.67	B-	B	BB	245,179
Maturity (years)	4.98	1.60	2.70	5.12	7.00	343,870
Panel C: Turnover measures						
Active turnover (%)	1.38	1.65	0.22	0.99	2.66	855
Non-active turnover (%)	0.78	1.44	0.05	0.45	1.53	855

Table 2: **Analysis of different CLO and transaction subsamples split by Turnover.** This table shows average CLO performance and transaction prices for different subsamples of the entire CLO sample. At the beginning of quarter t, the entire CLO sample is split into three portfolios based on their turnover in quarter $t-1$. In Panel A, the sample is split based on the active turnover measure, constructed in Section 2.3. Panel A reports the average sale and purchase prices of CLOs in the three different portfolios, executed in quarter $t-1$, quarter t turnover, Equity payments and collateral default rate. Panel B reports results for portfolios sorted on the non-active turnover measure, constructed in Section 2.3. High - Low tests if there is a significant difference between high and low turnover portfolios, ***, **, and * indicate significance at a 1%, 5%, and 10% level respectively. The sample period is January 2009 to December 2016.

	High Turnover	Medium Turnover	Low Turnover	High - Low	[t-stat]
Panel A: Results for active turnover					
Sale price$_{t-1}$	94.07	91.57	88.60	5.47***	[5.15]
Purchase price$_{t-1}$	96.56	96.73	96.93	−0.37**	[−2.54]
Turnover$_t$	0.06	0.02	0.01	0.05***	[24.52]
Equity$_t$	23.20	22.26	21.00	2.20**	[2.27]
Default$_t$	1.34	1.61	2.10	−0.76***	[−5.93]
Panel B: Results for non-active turnover					
Turnover$_t$	0.10	0.02	0.00	0.09***	[3.36]
Equity$_t$	25.57	19.00	20.90	4.91	[0.83]
Default$_t$	3.67	1.95	1.88	1.79**	[2.40]

Table 3: **What Drives Active Trading and Non-Active?** This table exhibits the results of regressing active turnover and non-active turnover on the indicated variables. $1_{\{t \leq \text{Reinv Date}\}}(t)$ is an indicator variable that equals one if the CLO is still in its reinvestment period and zero otherwise. $1_{\{\text{Test breach}\}}$ is a dummy variable that equals one if the CLO had a test breach and zero otherwise. Family Size$_t$ is the number of CLOs under the same manager scaled by 100. $\log(Size)_t$ is the logarithm of the total value of the CLO debt tranche. Age$_t$ is the age of the CLO in years. Perc Default$_t$ is the percentage of defaulted loans in the collateral portfolio. CCC bucket$_t$ is the percentage of the collateral portfolio that is rated CCC or below. # Loans$_t$ is the number of loans held by the CLO scaled by the maximum number of loans per manager. The sample period is January 2009 to December 2016, including all CLOs from our filtered sample. ***, **, and * indicate significance at a 1%, 5%, and 10% level respectively.

	Active Turnover		Non-Active Turnover	
Intercept	0.56^{***}	-10.35^{***}	1.77^{***}	9.95^{**}
	(0.09)	(2.15)	(0.21)	(4.92)
$1_{\{t \leq \text{Reinv Date}\}}(t)$	2.42^{***}	1.40^{***}	-0.83^{***}	-1.21^{***}
	(0.07)	(0.10)	(0.16)	(0.21)
$1_{\{\text{Test breach}\}}$	-0.94^{***}	-1.20^{***}	0.85	0.78
	(0.23)	(0.22)	(1.24)	(1.25)
Perc Default$_t$	-8.87^{***}	-6.22^{***}	23.34^{*}	25.10^{*}
	(2.02)	(1.72)	(13.32)	(13.98)
CCC Bucket$_t$	2.42^{*}	2.38^{*}	-6.14^{*}	-6.15^{*}
	(1.34)	(1.32)	(3.59)	(3.59)
# Loans$_t$	-2.11	-2.44^{*}	-9.64^{***}	-8.60^{***}
	(1.48)	(1.42)	(2.38)	(2.48)
Family Size$_t$		-0.39		0.62
		(0.33)		(0.48)
$\log(Size_t)$		0.63^{***}		-0.38
		(0.11)		(0.23)
Age$_t$		-0.22^{***}		-0.13^{**}
		(0.02)		(0.06)
Observations	9,092	9,092	9,092	9,092
Adjusted R^2	0.12	0.15	0.05	0.06

Table 4: **CLOs with higher active turnover sell loans at higher prices and purchase loans at lower prices.** We categorize transactions as high turnover, medium turnover, and low turnover based on the active turnover of the CLO which executed the transaction in Panel A, or based on the non-active turnover of the CLO in Panel B. Active and non-active turnover are defined in Section 2.3. For each turnover group we report averages of prices, sale date, and loan rating at sale date and test if high and low turnover values are significantly different. *Transactions in same month* is a sample of loan-months where both high turnover and low turnover CLOs traded the same loan in the same month. For each loan and each month we report the median price of sales and median price of purchases made by high turnover, medium turnover, and low turnover CLOs. *Transactions any time* is a sample of loans that are sold by both high and low turnover CLOs. For each loan we find the median sale price over the full sample length, the median sale date, and numerical rating (defined in Sections 3) at the median sale date. ***, **, and * indicate significance at a 1%, 5%, and 10% level respectively. The sample period is January 2009 to December 2016.

	High Turnover	Medium Turnover	Low Turnover	High - Low	[t-stat]
Panel A: Results for *active* turnover					
Transactions in same month:					
Sale price	94.26	94.14	94.17	0.09***	[3.71]
Purchase price	97.80	97.78	97.85	−0.05***	[-6.47]
Transactions any time:					
Sale price	95.55	95.09	94.59	0.95***	[7.68]
Sale date	Jan 4, 2014	Apr 15, 2014	Apr 25, 2014	-111***	[-13.29]
Loan rating at Sale date	7.40	7.34	7.31	0.09***	[4.60]
Panel B: Results for *passive* turnover					
Transactions any time:					
Sale price	95.21	95.13	95.40	−0.19*	[-1.90]
Sale date	May 9, 2014	Apr 23, 2014	Mar 16, 2014	54***	[8.03]
Loan rating at Sale date	7.40	7.45	7.42	−0.01	[-0.91]

Table 5: **Results at the manager level.** This table reports the same figures as Table 4 but with transactions characterized as high, medium, or low turnover based on the aggregate turnover of the CLO manager. In Panel A we sort CLO managers based on the aggregated active turnover of the CLOs they have under management. In Panel B we sort CLO managers based on the aggregated non-active turnover of the CLOs they have under management. *Transactions in same month* is the subsample of loan-months where the same loan was traded in the same month by both low and high turnover CLO managers. *Transactions any time* is the subsample of loans which have been traded by both high and low turnover CLO managers at least once.

	High Turnover	Medium Turnover	Low Turnover	High - Low	[*t*-stat]
Panel A: Results for *active* turnover					
Transactions in same month:					
Sale Price	95.44	95.25	95.32	0.13***	[3.41]
Purchase Price	98.05	98.14	98.13	−0.08***	[-7.91]
Transactions any time:					
Sale Price	95.64	95.28	95.05	0.59***	[4.39]
Sale date	Feb 6, 2014	May 9, 2014	Apr 20, 2014	-73***	[-8.18]
Loan rating at sale date	7.44	7.42	7.33	0.11***	[5.23]
Panel B: Results for *passive* turnover					
Transactions any time:					
Sale Price	95.42	95.51	95.79	−0.37***	[-3.33]
Sale date	May 11, 2014	Feb 8, 2014	Jan 26, 2014	105***	[13.18]
Loan rating at sale date	7.48	7.52	7.49	−0.01	[-0.82]

Table 6: **Results when transactions are of similar size.** This table reports the same results as Panel A of Table 4 but for a subsample of the transactions. Panel A only include transactions with transaction size between $400,000 and $600,000 and Panel B only includes transactions with transaction size between $900,000 and $1,100,000. All transactions are "anytime", that is, we focus on the subsample of loans which have been traded with transaction size in one of the respective transaction size groups by both high and low turnover CLOs, without matching the transaction month.

	High Turnover	Medium Turnover	Low Turnover	High - Low	[t-stat]
	Panel A: Transaction size between $400,000 and $600,000 (anytime)				
Sale Price	95.62	95.75	95.19	0.43**	[2.28]
Sale date	Apr 28, 2014	Sep 11, 2014	Aug 6, 2014	-100***	[-6.88]
Loan rating at sale date	7.50	7.51	7.42	0.08**	[2.51]
	Panel B: Transaction size between $900,000 and $1,100,000 (anytime)				
Sale price	95.87	95.32	94.67	1.19***	[4.74]
Sale date	Dec 25, 2013	Jun 1, 2014	May 13, 2014	-139***	[-6.69]
Loan rating at sale date	7.59	7.56	7.40	0.19***	[3.78]

Table 7: **Does trading activity predicts CLO performance?** This table exhibits the results of a predictive regression of CLO collateral default rates and CLO equity payments on lagged active CLO turnover and lagged passive CLO turnover.

$$Performance_{i,t} = \alpha + \beta^{Active} Turnover^{Active}_{i,t-1} + \beta^{Passive} Turnover^{Passive}_{i,t-1} + \gamma Controls_t + \varepsilon_{it}.$$

$Turnover^{Active}_{i,t-1}$ is the quarterly active turnover defined as the sum of sales where the proceeds have been spend purchasing new loans relative to the total CLO liabilities. $Turnover^{Passive}_{i,t-1}$ is the quarterly non-active turnover defined as the sum of sales where the proceeds have been payed out to the CLO investors relative to the total CLO liabilities. Leverage ratio is the size of debt tranches relative to the size of equity tranches. CCC bucket is the percentage of collateral loans that are rated CCC or below. Age is the age of the CLO in months. Family size is the number of CLOs managed by the same manager. # loans is the number of loans held by the CLO. Finally we add lagged values of the dependent variable. The sample period is January 2009 to December 2016, including all CLOs from our filtered sample. ***, **, and * indicate significance at a 1%, 5%, and 10% level respectively.

	Percentage Default			Equity Payments		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.64	2.01	2.12	−12.25***	−9.58	−0.91
	(1.31)	(1.47)	(1.04)	(−2.79)	(−1.41)	(−0.14)
$\text{Turnover}^{Active}_{t-1}$	−0.07***	−0.04***	−0.03***	0.18***	0.22***	0.11**
	(−3.83)	(−5.26)	(−2.90)	(3.11)	(4.13)	(2.25)
$\text{Turnover}^{Passive}_{t-1}$	0.30**	0.28**	0.28**	0.63	0.65	0.87
	(2.18)	(2.01)	(2.10)	(0.92)	(0.93)	(1.20)
Leverage Ratio_t	−0.02	−0.03*	−0.03	0.20***	0.25***	0.31***
	(−1.35)	(−1.69)	(−1.35)	(3.98)	(4.24)	(4.91)
CCC Bucket_t	0.06*	0.04	0.01	−0.21***	−0.13***	−0.03
	(1.65)	(1.63)	(0.37)	(−3.54)	(−2.77)	(−0.46)
Age_t		0.01**	0.01***		0.02***	−0.00
		(2.34)	(2.89)		(2.89)	(−0.56)
Family Size_t		−0.01*	−0.01**		−0.02	−0.01
		(−1.77)	(−2.09)		(−1.53)	(−1.01)
$\#\ \text{Loans}_t$		−0.01	−0.01		0.09**	0.09**
		(−1.11)	(−1.12)		(2.46)	(2.27)
$\text{Perc Default}_{t-1}$	0.76***	0.71***	0.74***			
	(5.08)	(4.42)	(3.85)			
Equity Pmts_{t-1}				0.74***	0.72***	0.66***
				(13.64)	(12.10)	(9.95)
Add. Controls?	*No*	*Yes*	*Yes*	*No*	*Yes*	*Yes*
Time FE?	*No*	*No*	*Yes*	*No*	*No*	*Yes*
Observations	8,214	8,214	8,214	7,723	7,697	7,697
Adjusted R^2	0.52	0.53	0.55	0.41	0.43	0.45

Table 8: **Making money with investments in active CLOs.** This table shows the average CLO performance for different subsamples of the entire CLO sample. In a first step, the average active turnover for the first 4 observed quarters are computed for each CLO. Afterwards, we split the entire CLO sample into three portfolios based on their average active turnover in the first year. The table shows the average turnover, Equity payments, and collateral default rate for the different portfolios. IRR is the internal rate of return which is computed for the subset of closed CLOs for which we have complete payment information. High - Low tests if there is a significant difference between high and low turnover portfolios, ***, **, and * indicate significance at a 1%, 5%, and 10% level respectively. The sample period is January 2009 to December 2016.

	High	Mid	Low	H-L	[t-stat]
Active Turnover	3.02	1.65	1.18	1.84***	[9.74]
Equity Pmt	24.99	23.65	20.58	4.41***	[4.08]
Perc Default	1.12	1.44	2.37	-1.25***	[-11.73]
IRR	0.14	0.11	0.02	–	–