Nonbank Market Power in Leveraged Lending

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Abstract

Banks finance their lending to risky firms by selling these loans to nonbank financial institutions. Among these nonbanks, collateralized loan obligations (CLOs) provide the bulk of funds. I show that CLO managers have significant market power, which enables them to extract lender-friendly loan terms. Their market power results from switching costs faced by the bank. One source of switching costs is information asymmetries across CLO managers that arise during underwriting. To identify my results, I construct a new instrument using novel data on mergers in the CLO industry. I provide the first analysis of these mergers and their determinants.

Keywords: Leveraged Loans, CLOs, Loan Underwriting, Pipeline Risk, CLO Mergers
JEL Classification: G21, G23, G24, G34

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1 Introduction

Today many corporate loans seem to resemble bonds in all but name. Banks underwrite loans with bond-like features to sell to nonbank financial institutions, many of which also invest in the bond market. This development has not gone unnoticed. In a legal case, which the loan market's advocacy group warns will "jeopardize a trillion-dollar market that is vital to the economy," the US Court of Appeals is left to answer whether these loans should in fact be treated as public securities.[1] Despite the apparent convergence of loan and bond markets, loans continue to carry perplexingly large spreads compared with their bond counterparts (Schwert, 2020). The credit spread on an otherwise identical loan is nearly twice that of a bond.

My paper establishes that imperfect competition in the loan market is an important contributor to high loan spreads. However in doing so, I depart from a long literature that studies inter-bank competition. Instead, I turn to competition in the nonbank sector and provide evidence on the market power of nonbanks, and collateralized loan obligations (CLOs) in particular.

In addition to showing that CLO managers have significant market power, I also investigate the source of this market power. I argue that information asymmetries arise during loan origination, because loans are not public securities. These information asymmetries create an "information oligopoly" for CLO managers, which resembles the information monopoly enjoyed by incumbent banks in traditional lending (Sharpe, 1990; Rajan, 1992). Because of the holdup problem associated with this information oligopoly, it is costly for the bank to replace the funds of one CLO manager with the funds of another CLO manager.[2]

As a third contribution, I provide the first analysis of mergers in the CLO industry. I show that these mergers are liability-driven, not asset-driven. Rather than pursuing targets for their loan portfolios, acquirers choose targets to improve their CLO funding conditions. This form of target selection, combined with targets' high levels of diversification, make the acquired loans random additions to the acquirer's portfolio. This justifies my use of these additions as an instrument in my main analysis.

[1] In May 2022, the Loan Syndications and Trading Association (LSTA) filed an amicus curiae brief outlining its position which can be found at https://www.lsta.org/app/uploads/2022/05/AS-FILED_21-2726-Motion-for-Leave-to-File-Amici-Brief-of-LSTA-et-al-2d-Cir..pdf. At the time of writing the 2nd Circuit's opinion is expected at the end of 2022.

[2] Some work refers to the rent extraction due to an incumbent bank's information monopoly as "market power," while other work refers to it as "bargaining power." I use the former terminology.

I establish these results in the context of the leveraged loan market. The term "leveraged loan" refers to a loan to a sub-investment-grade borrower, which is typically syndicated. While banks continue to provide capital for credit lines, nonbank lenders have largely replaced banks in the provision of capital for term loans. This market for institutional term loans has grown rapidly since the Global Financial Crisis. Today nonbank loans constitute the primary source for high yield corporate debt in the US. To illustrate, in 2021 risky firms raised $910 billion in institutional term loans compared to $430 billion in bonds (White & Case, 2022).

Postcrisis regulatory capital requirements have made it more costly for banks to hold risky loans (Irani et al., 2021). Consequently, the transfer of these loans from a bank's balance sheet to the balance sheets of less regulated institutions can mutually benefit both parties. Typically, the underwriting agreement prevents the arranging bank from freely adjusting a loan's terms to guarantee the sale of the entire issue. Thus, an arranger who is unable to sell a loan in full may be required to retain a loan's unsold portion. This risk to banks from loan underwriting has been coined "pipeline risk" (Bord and Santos, 2015; Bruche et al., 2020).

Nonbanks that account for significant demand for a given loan may internalize the fact that their participation decision represents a risk to the arranging bank. This may grant market power to the nonbank to command lender-friendly loan terms. However, the underwriting agreement aligns the arranging bank's incentives with those of the borrowing firm by remunerating the arranger for borrower-friendly terms through increased underwriting fees. Thus, the arranger may have to choose between the cost of retaining a larger loan share and the reduction in underwriting fees associated with giving in to the nonbank.

For a given new loan issue, I measure a nonbank's market power over the arranging bank as the dollar volume of the nonbank's holdings in the borrowing firm's preexisting loans. These holdings reflect the nonbank's demand for the firm's outstanding loans, which is informative about her demand for the new loan issue. Thus, my measure captures the extent to which the nonbank exposes the arranging bank to pipeline risk.

The complication with this measure is that for any investor a large holding may simultaneously reflect positive private beliefs about the borrower's quality. These beliefs can for example arise as a result of private information. The anticipated effect of private beliefs is in the opposite direction of the effect of market power. While

the market power from large holdings would lead to a higher spread, positive private beliefs may instead induce a nonbank to accept a lower spread. Thus, failure to account for private beliefs may negatively bias my estimates of the effect of market power.

To empirically disentangle these two forces, I employ exogenous portfolio variation arising from mergers in the largest class of nonbank investors, namely CLOs. A CLO is an actively managed loan fund financed with a tranched debt structure. CLO managers, who are often affiliated with large private equity firms, such as KKR, or insurance companies, such as Prudential Financial, typically manage many CLOs. A CLO's management contract aligns the CLO manager with the CLO's equity class. In total, this sector provides 63% of primary market funds for leveraged term loans. For comparison, the next largest primary market investor category are mutual funds with 13.2%, followed by banks with approximately 12% (Hinckley et al., 2022). While the previous discussion applies to nonbank investors broadly, I focus on CLOs because they provide frequent and detailed portfolio disclosures necessary for studying primary market transactions.[3]

My main specification compares the terms at which a given CLO manager lends to different borrowers in the same industry, controlling for time-varying credit risk. Recall that the influence of a CLO manager's private beliefs about the borrower counteracts the market power effect. Thus, my identification strategy instruments a CLO manager's holdings of a borrower with the amount of that borrower's loans obtained through her M&A activity. The main identifying assumption is that merger target portfolios are unrelated to the acquirer's beliefs about borrowers within an industry. I justify this assumption below.

Using this instrument, I show that CLO managers who expose the bank to pipeline risk indeed have market power to affect loan prices. A one-standard-deviation increase in a CLO manager's holdings enables her to command an 8.4 basis point higher credit spread and a 6.3 basis point higher original issue discount. Taken together the borrower experiences an increase in cost of debt of 11.2 basis points. These numbers constitute a significant increase in a borrower's funding costs, comparable to market power effects measured in the relationship banking literature.

Market power shifts other price terms in favor of the lender, as well. Specifically,

[3]Legally, primary market sales to CLOs are structured as secondary market transactions. In practice, these transaction are contracted at primary market terms prior to a loan's closing. Thus, economically, they represent primary market acquisitions.

leveraged loans are callable instruments. To discourage early repayment, these loans often contain so-called "soft call provisions." A soft-call provision stipulates a premium over par which the borrower must pay in order to call the loan prior to the end of the soft call period. I find that both the soft call premium and the soft call period increase with CLO manager market power.

Nonbank market power is also evident in secondary market prices. On average a loan's initial secondary market price lies above its primary market price. In other words, loans are underpriced at issuance, like initial public offerings of equities. I show that the extent of loan underpricing increases with my measure of nonbank market power. This pattern in post-issuance prices represents additional evidence that my estimates reflect market power rather than compensation for risk. If higher spreads were driven by omitted risk factors, the secondary market would price those risks.

In contrast, I do not find meaningful effects for non-price terms such as the loan amount, maturity or covenants. This finding is consistent with pre-syndication loan amount commitments by the arranging bank and concentration of covenant rights with providers of credit lines (Berlin et al., 2020).

The principal threat to my identification is that merger-obtained holdings correlate with acquirers' private beliefs about borrower credit quality. In particular, acquirers may select targets with loan portfolios that reinforce their tilt towards their preferred assets. Note that portfolio-based target selection that is independent of beliefs does not undermine my identification. One such motive is diversification.

To address concerns about belief-based target selection, I demonstrate that during my sample period acquirers select targets based on their CLO liabilities, not their assets. Specifically, acquirers target CLO managers who are constrained in their ability to issue new CLOs due to risk retention requirements or whose CLOs are financed with low leverage or expensive debt tranches. The value proposition for merging stems from both the ability to back the acquired assets with CLO debt refinanced at improved terms and from acquirers' capacity to provide equity for new CLO issues.

I argue that in terms of their assets, targets are indistinguishable from alternative, but non-selected, CLO managers. Instead it is the structure of their liabilities that distinguishes targets. More precisely, targets are more likely than non-targets to manage CLOs with low leverage or high cost of debt. Public statements on merger rationales corroborate these results. In 71% of the mergers, participants point to improved access to outside CLO investors as motivation for the merger and 55% mention

enhanced access to inside equity. Less than 10% of merger statements contain any reference to the loan portfolio, with all such statements being general, not borrower-specific. Regardless, I take a conservative approach and exclude these mergers from my sample. Consistent with CLO managers' stated intentions, I find that target CLOs experience a notable increase in debt refinancing post merger.

Next, I turn to the mechanism that yields market power to CLO managers and ask, what impedes banks from substituting across CLO managers? A necessary condition for market power is the presence of switching costs. In classic models of bank lending, private information allows the incumbent bank to undercut competitor bids on future loans. This induces firms to continue borrowing from their incumbent banks (Sharpe, 1990; Rajan, 1992).

I show that CLO lending to firms is also highly persistent. This persistence suggests that arranging banks indeed find it difficult to replace incumbent CLO managers. A competing hypothesis is that persistence in a firm's nonbank investor base arises as an artifact of banks forming persistent relationships with both firms and nonbanks. Surprisingly, I find strong nonbank persistence even in the absence of any common relationship bank. For example, when a firm switches to a new arranging bank, its CLO investor base remains largely unchanged.

Motivated by the importance of private information in traditional bank-firm relationships, I next turn to the role of information in modern loan underwriting. I argue that information asymmetries *across* nonbanks make it costly for the arranging bank to switch between them. In the presence of information asymmetries, nonbank investment decisions serve as informative signals about borrower quality. Thus, the loss of a previously highly invested CLO manager may depress demand for a new issue through revised nonbank beliefs.

Information asymmetries across nonbank investors arise during syndication. The arranging bank collects private information about the borrowing firm. During book building the bank distributes information to potential investors in the form of memoranda, also called bank books. Different from securities underwriting, the bank assembles both a private bank book containing material private information about the borrower and a public bank book free of such information. Many nonbank investors opt for the public bank book and restrict their information access to avoid jeopardizing their public securities trading with the risk of insider trading allegations.

In line with information asymmetries imposing switching costs on the bank, I find

that CLO lending persistence increases with the level of information asymmetries. For instance, among public borrowers CLO lending is more persistent for smaller firms, as measured by their assets. For the full universe of sample firms, I further show that lending persistence is higher when disagreement in public ratings on the borrower is greater.

Importantly, I observe information asymmetry effects not only in CLO lending persistence but also in loan pricing. Market power effects are more pronounced for high information asymmetry borrowers. For example, loans of borrowers with a high degree of rating dispersion are approximately twice as sensitive to market power. For these borrowers a one-standard-deviation move in market power by my measure increases the cost of borrowing by 21.6 basis points.

This study relies on insights from a number literatures. Many ideas are drawn from the study of the competitive effects of information in the classic bank-firm model tracing back to the seminal theoretical insights of Sharpe (1990) and Rajan (1992). Schenone (2010) provides evidence of bank's information monopolies, while Darmouni (2020) finds that adverse selection increases the cost of lending for non-relationship banks.[4] I find that banks face an information problem with respect to nonbanks. In some ways banks and nonbanks in my setup resemble borrowers and banks in the classic model.

The work on relationship lending instead tends to focus on the advantage of receiving credit at a rate below that offered by competing, but uninformed banks. Early papers study the stock market's reaction to bank relationships (James, 1987; Lummer and McConnell, 1989). Direct evidence on loan terms comes from Berger and Udell (1995) who find that relationships lead to lower loan rates, while Petersen and Rajan (1994) find more pronounced quantity effects. Other work offers the insight that banks do not have to extract rents from their lending business if they can benefit from cross-selling other services (Burch et al., 2005; Drucker and Puri, 2005; Yasuda, 2005). Especially important for my work are Bharath et al. (2007) who study the persistence of bank lending relationships. I use a similar approach to establish the presence of switching costs with respect to nonbanks. I follow the approach continued by Bharath et al. (2011) and relate this persistence to information asymmetries of the borrower.

My work further connects to papers on information asymmetries between the arrang-

[4] A separate literature studies the effect of competition among uninformed banks. Prominent examples of this literature include, Petersen and Rajan (1995), Boot and Thakor (2000), Cetorelli and Strahan (2006) and Zarutskie (2006).

ing bank and other syndicate members (Sufi, 2007; Ivashina, 2009; Gopalan et al., 2011). This concept is related but separate from my case. Rather, I focus on the inability of arranging banks to eliminate nonbanks' informational asymmetries despite a possible information advantage of the arranging banks.

A rich literature studies the effects of bank mergers (Berger et al., 1998; Erel, 2011; Fraisse et al., 2018; Huber, 2021). Most relevant for my work is a stream initiated by Garmaise and Moskowitz (2006) that employs bank mergers as an instrument to identify effects of bank market power. I apply their approach to a new class of lender, CLO managers. The closest work in this literature is Giannetti and Saidi (2019) who use bank mergers to exclude variation from private bank information. Other papers in that literature include Favara and Giannetti (2017), and Saidi and Streitz (2021).

Lastly, my work contributes to a burgeoning literature on the role of nonbanks in corporate lending. Irani et al. (2021) and Irani and Meisenzahl (2017) link nonbank growth to bank capital regulation and liquidity, while Ivashina and Sun (2011) and Fleckenstein et al. (2021) show the connection between nonbank demand and loan availability and terms. A significant subset of this literature focuses on CLOs. A common finding is that firms have benefitted from growth in the CLO sector through lower spreads and improved credit availability (Shivdasani and Wang, 2011; Nadauld and Weisbach, 2012; Bord and Santos, 2015). Fleckenstein (2022) ties the cyclicality in nonbank lending to agency frictions of CLOs. Bhardwaj et al. (2022) turn to the insurance sector to show that demand for CLO issues affects CLO formation and loan market conditions. Their finding that CLO liability demand has important consequences for CLO managers and corporate borrowers is reflected in my results that CLO liabilities are the dominant determinant of mergers in this industry. Other work has centered on the role of CLO loan trading in the secondary market and the potential of fire-sales (Bozanic et al., 2018; Bhardwaj, 2021; Elkamhi and Nozawa, 2022; Kundu, 2022). The focus of my work is on the primary market.

The paper most closely related to my own is Bruche et al. (2020). These authors study the demand discovery problem faced by arranging banks in the underwriting markets. In their model an arranging bank sells a loan to a representative nonbank who is better informed than the bank about the value of the loan. To deter the nonbank from indicating low demand for high quality loans, the truth-revealing mechanism requires the bank to retain a larger share of the loan whenever the nonbank indicates low demand. My analysis complements the important insights from their work in a number of ways. First, I deviate from the representative investor assumption and instead

explore heterogeneity among nonbanks. Second, this allows me to focus on another dimension of information asymmetries. By focusing on the information asymmetries across nonbanks, I sidestep the issue of whether nonbanks are indeed better informed than the bank and show that their notion of pipeline risk is relevant without this assumption. Third, their work tends to focus on bank outcomes and employs loan price adjustments to explain bank retention. In contrast, my work predominantly studies the impact of market power on loan price adjustments and thus concerns borrower outcomes.

The remainder of the article is structured as follows. Section 2 presents the data and gives background information on the institutional setting. Section 3 studies the extent to which CLO managers have market power. Section 4 investigates the determinants of mergers in the CLO industry to provide evidence on the instrument's validity. Section 5 studies the source of CLO manager's market power. Section 6 concludes.

2 Data and Institutional Setting

2.1 Data Description

To conduct the empirical analysis, I primarily rely on data from five source: CLO portfolio holdings from LPC Collateral, hand-collected information on mergers and ownership changes involving CLO managers, loan origination data from Loan Connector, CLO fee and funding data from Creditflux, and firm balance sheet data from Compustat. Those data sets, the link between them, and the resulting sample selection are described in more detail in this section. I occasionally include data obtained from a set of additional sources. References to any such data are made when applicable. The main sample period begins in January 2010 and ends at the end of December 2021. Time is structured in quarters and summarized to the last date of each quarter.[5]

First, I obtain data on CLO security-level portfolio holdings from LPC Collateral. In order to cover the entire sample period this data ends at the end of the first quarter of 2022. I restrict the sample to CLOs predominantly invested in U.S. dollar denominated syndicated loans. Since reissues typically do not directly affect a CLO's loan portfolio, I treat those CLOs as the same entity. Information on CLO holdings are collected from CLO's trustee reports. If a quarter contains more than one report

[5]I deviate from this setup whenever information flows necessitate a refined time structure.

for a given CLO, I include only the last report. I retrieve information on portfolio holdings in U.S. dollar, an indicator for securities that are currently in default, and current security-level rating information from the agencies Moody's, Fitch, and S&P. For comparability, I refer to ratings on the S&P scale. Additionally, I collect CLO-level information on its manager, issue date, final date of the CLO's reinvestment period and its legal maturity date. I ensure that the listed manager corresponds to the CLO's original manager using public Moody's rating announcements.

Second, I hand-collect data on CLO ownership changes. Specifically, I search through CLO industry and major general financial news publications. I complement my news search with results from LexisNexis and mergers listed in SDC's M&A database. Lastly, I search for changes in a CLO's stated CLO manager as reported by Moody's. Individual CLO management changes can arise from sales of individual management contracts or due to other reasons.[6] I reflect changes in CLO managers in the quarter in which the ownership change becomes effective.

Third, I collect loan origination data from Loan Connector. Loan Connector serves as successor to Dealscan and I employ their crosswalk where necessary. I connect a loan's origination information to CLO portfolios using the loan's LIN (loan identification number). In order to accurately reflect CLO loan holdings, I include only loans which are predominantly held by U.S. CLOs as opposed to their European counterparts. Specifically, those currencies are the Australian Dollar, the Canadian Dollar and the U.S. dollar. The exclusion of non-U.S. dollar denominated facilities leaves my results virtually unchanged since I count only 14 Australian dollar and 20 Canadian dollar loans in contrast to 12,899 U.S. dollar denominated loans held by CLOs in my sample. European CLO cross holdings of those loans do not constitute a concern since European CLOs account for less than 0.5% of CLO holdings in those facilities in the median quarter.[7] For the majority of results I consider only institutional term loans

[6]Changes due to other reasons are very rare. One reason for a change in the management agreement can be so-called "key-man" provisions. In 2005, four of six CLOs managed by Katonah Capital, a subsidiary Kohlberg & Co, included such provision for a single key employee. Under the provision investors were permitted to redeem their investments upon the "key-man's" departure unless Kohlberg proposed an acceptable replacement manager within 60 days. Even though Kolberg had agreed with Allied Capital on the sale of Katonah in late 2004, the key-man provision was triggered in early 2005 forcing Kohlberg to find a new manager for the four CLOs. Ultimately Bain (Sankaty at the time), Blackstone and INVESCO acted as replacement managers. Allied walked away from the merger. For more details see https://www.institutionalinvestor.com/article/b150nn7x1zbz75/a-key-womans-leverage.

[7]The U.S. and European CLO sector are largely segmented in their investments. U.S. CLOs account for 0.8%, 1.1% and 0.0% of CLO holdings in euro, pound sterling, and Swedish krona denominated loans, respectively. Loans in other European currencies account for less than 1% of

held by CLOs in my sample. I classify non-amortizing term facility as institutional if it is a Term Loan B,[8] flagged as institutional by Loan Connector or has a substantial CLO investor base. Non-institutional loan holdings constitute well below 1% of a CLO's loan portfolio in the median CLO-quarter in my sample. The restriction to loans held by CLOs further implicitly restricts the sample to non-investment grade borrowers with the most loans being in the BB and B rating categories. In my repeat loan sample no borrower is rated above BBB at loan issuance, with BBB borrower-issues making up less than 1% of the sample. Because CLOs are in effect barred from investing in loans from borrowers without a rating or issuers in default, I exclude the 0.6% of the sample corresponding to such issues.

Fourth, some results employ data on CLOs' capital structure, their fees, and their arranging banks. This data is obtained from Creditflux. The Creditflux sample available to me ends at the end of 2019. Thus, results based on this information exclude the last two years of the sample period. I match CLOs in LPC Collateral to Creditflux using a fuzzy string match. I search the unmatched sample for further matches and verify the validity of all obtained matches. In the overlapping sample period, I find a match for 1,856 out of 1,977 CLOs (94%). Similar to LPC Collateral, Creditflux offers data on CLOs asset holdings. I conduct my analysis with the LPC Collateral data due to the presence of LINs in that sample. Borrowers typically have multiple institutional loans outstanding at any given point in time and precise facility level matching is necessary throughout my analysis.[9] I observe 49 distinct CLO arrangers in Creditflux which I manually connect to the loan origination sample.

Fifth, I augment Loan Connector's borrower information with balance sheet data from S&P's Compustat-Capital IQ database. I connect Compustat to Loan Connector using the Dealscan-Compustat link table provied by Chava and Roberts (2008). I extend the link table to cover the period until the end of my sample. Compustat's balance sheet information is limited to public firms. The majority of CLO holdings are private. 36% of firms in the repeat loan sample are public accounting for 39% of borrower-issues. All main results offer evidence from the entire firm population.

loans held by European CLOs. Additionally, CLO managers active in both CLO markets typically employ separate portfolio managers and analyst teams for their U.S. and European CLOs.

[8]Specifically, amortizing term loans refer to Term Loan As and other loans for which the repayment schedule indicates substantial amortization. Loans different from term loans for example are credit lines and letters of credit. Consistent with convention, the term Term Loan B includes Term Loan C and up.

[9]Among others, I require origination information on outstanding loans to capture relationships among banks, borrowers, and CLO managers.

I study individual firms, banks and CLO managers at their highest level of corporate aggregation. In any given quarter, I assign a CLO to the CLO manager's ultimate parent company in that quarter. Parent companies are identified using S&P NetAdvantage, the CLO manager's or its parent's website, and in CLO industry specific publications. My empirical analysis treats CLO managers belonging to the same parent as a unit. Consequently, in other sections of this paper and subsequently in this section I refer to the parent company as the CLO manager. While a CLO manager may employ multiple CLO portfolio managers,[10] investment decisions and bank interactions occur at the CLO manager level with the manager maintaining discretion over the distribution of investment among her CLOs. Consequently, the CLO manager level constitutes the appropriate level of aggregation for my setting. Banks are summarized at the bank holding company-level using data. I further consolidate borrowers with identical issuer identifiers as encoded in the six LIN entries.

2.2 Institutional Setting[11]

A syndicated loan is a loan that is provided by multiple lenders. If a syndicated loan carries sub-investment-grade credit risk, it is called a leveraged loan. The arranger or arranging bank of a syndicated loan is the investment bank responsible for arranging and marketing the loan to other investors, which is also called the syndication. While going forward I will refer to a single such arranging bank, some loans have several.

Syndicated loans are further separated into two categories: bank loans and institutional loans. Bank loans, also called pro rata facilities, are predominantly sold to banks. These loans typically have either a significant contingent component, such as credit lines or letters of credit, or include amortizing repayment schedules.

In contrast, institutional loans are sold predominantly to investors. The largest institutional investor class in the leveraged loan market are CLOs, which account for two thirds of institutional loan holdings. Other institutional investors are loan mutual funds, distressed debt funds, hedge funds, pension funds, or insurance companies. Institutional term loans almost always are structured with bullet repayments. Institutional loans also typically have longer maturities than their bank loan counterparts. The most common institutional loan are so-called "Term Loan B." Usually Term Loan

[10] For example, at the start of 2020 KKR Credit Advisors (US) LLC, a subsidiary of KKR & Co, employed two portfolio managers for its 27 U.S. CLOs of which 20 were in their reinvestment period.

[11] For an excellent, in many parts similar, description of the underwriting process in the syndicated loan market, I refer the reader to Bruche et al. (2020). Further details are available in Hinckley et al. (2022).

C, Term Loan D, and higher, are also referred to as Term Loan B.

A firm that wants to borrow in the syndicated loan market awards its mandate to the arranger, typically after having solicited bids from several banks. Prior to the arranger marketing the loan, borrower and arranger determine the binding underwriting agreement. This contract states most loan terms such as maturity, covenants, or collateral. Typically excluded are the loan's pricing features and sometimes the loan amount.

Whether the loan amount is a fixed contract feature depends on the syndication method. A loan is syndicated in one of three ways: as underwritten, best-effort, or club deal. Club deals are typically smaller and not part of my sample, and so I will not further describe them here. In a best-effort In an underwritten deal the arranger guarantees the loan amount to the borrower prior to syndication. This means that the arranging bank is contractually obligated to provide herself any difference between the loan amount and the amount raised from other investors. A best effort deal does not provide the same guarantee as an underwritten deal. Thus, such a deal may not close if undersubscribed or the loan may be more flexible with respect to the final loan amount.

A loan's main pricing features are the loan's spread and its original issue discount (OID). The spread of the vast majority of leveraged loans is a floating rate. The most common base rate in the US used to be the London Interbank Offered Rate (LIBOR), but since its recent phase-out this has shifted to the Secured Overnight Funding rate (SOFR). The OID, which is also called "upfront fee", is the fraction of a loan's par value that is withheld as discount at issue. As I mentioned, the underwriting agreement does not typically fix the loan's pricing terms. Rather, they include so-called pricing flex provisions that allow the arranger to adjust price terms depending on the loan's market demand.

It is important to stress that the arranging banks incentives in a deal are very different from sole-lending banks. The arranging bank is hired as agent on behalf of the borrower to market the loan. However, in underwritten deals the arranger may have to step-in as lender. The incentives arising out of her guarantee collide with the interests of the borrower. Specifically, due to risk-based regulatory capital requirements retaining risky loans is very costly for the arranger. Thus, unconstrained arranger would optimally lower the price of the loan until the entire loan is sold. To reduce this agency conflict, the borrower compensates the arranger for borrower-friendly loan

terms through underwriting fees. The arranger bank shares in the cost of a more expensive loan through a reduction in fees. Further, the flex pricing provisions stipulate minimum price levels for the loan.

Flex provisions are confidential and secret documents that are typically well-guarded by arrangers. The concern of arrangers is that purchasers of the loan may exploit this information.

Once the underwriting contract has been finalized, the arranging bank will prepare a memorandum containing information about the borrower and the loan's term sheet. This information memorandum is also called the "bank book." Loans do not constitute public securities, which has several implications for the bank book. First, the bank book is confidential and made available only to potential qualified investors. In particular, retail investors are disqualified from direct investments. Second, and important for my later analysis, the bank book includes private information, legally also called material non-public information, about the borrower generated by the bank.

Note that loan investors can trade on their private information, as loans are not considered public securities. In conrast, private information contained in the bank book may restrict non-loan investment activities of a loan investor or the loan investors' related subsidiaries, because trading public securities in the possession of such information constitutes insider trading. The majority of leveraged loans are made to private firms. Trading restrictions also extend to those firms for at least two reasons. First, the borrower may subsequently decide to pursue an initial public offering (IPO). IPO participants who previously obtained material non-public information may also engage in insider trading. Second, private securities such as private equity also fall under insider trading regulations.[12] To avoid these restrictions and the risk of insider trading allegations, nonbank investors typically voluntarily opt out of receiving private information. For these investors that stay on the public-side, the bank assembles a memorandum that contains only public information.

Loan investors may be able to circumvent aforementioned restrictions and thus serve as private side participant by segregating information flows between subsidiaries. In practice the presence of such "information walls" varies and even compliant nonbanks often choose public side participations to avoid any remaining risks.[13]

[12]SEC Rule 10b5-1 covers fraud and deceit as a result of insider trading for any, including private, securities. For example, in 2011 the SEC fined private Stiefel Laboratories Inc. and its CEO for insider trading; see https://www.sec.gov/divisions/enforce/claims/stiefel-laboratories.htm.

[13]In 2018, Debtwire (2018) surveyed senior executives of 100 major credit firms about their conflict

Based on their individually available information, potential investors will perform their due diligence. In this time, the arranging bank often informally polls selected investors to "read" the market. Ultimately, the arranging bank solicits commitments at for different spread-OID combinations in a range, called "price talk". Depending on demand, the arranging bank can either "print" the loan at one of the solicited spread-OID combinations. Alternatively, the bank can flex the loan price up or down and solicit new bids.

Once the arranging bank prints the loan at given price, the loan issue closes and the credit and security agreements are finalized. Onshore investors are reflected on the original loan documents as lenders or "syndicate members." Offshore accounts, like CLOs or hedge funds, on the other hand face tax disadvantages from primary market purchases. To avoid these costs, offshore accounts participate in the primary market through so-called "primary assignments." Here, the arranging bank will act as syndicate member on behalf of these offshore accounts. At the same time, the arranger contractually agrees to sell the offshore's loan commitments at primary market prices to these accounts a short period after closing. These transactions legally constitute secondary market trades, so that tax disadvantages can be avoided. Since sales are structured as assignments, the offshore account is following trade settlement reflected as syndicate member on the loan documents.

3 The Market Power of CLO Managers

3.1 Variable Creation

Postcrisis risk-based regulatory capital requirements have increased banks' cost of holding risky loans. In response, banks shifted to an originate-to-distribute market structure, especially in the risky leveraged loan market (Irani et al., 2021). In this market, on average only 12% of a loan is financed by banks. Nonbank financial institutions finance the remainder, of which CLOs provide 72% (Hinckley et al., 2022).

As outlined in Subsection 2.2, the arranging bank's main responsibility is marketing, not funding, a loan. The arranging bank typically provides funds only in order to meet the loan amount guarantee that she promised to the borrower. This loan amount

management. 58% of respondents report that they do not have an information wall in place. 34% respond that they previously removed an information wall. Managers without an information wall justify their absence due increased synergies (71%), lower expenses (36%), and lower administrative burden (21%).

guarantee requires the bank to make up a loan's unsold portion. To reduce the risk that arises for the arranging bank from this guarantee, the arranging bank is allowed to adjust a loan's price terms, and sometimes other terms, in response to investor demand. However, to keep the bank's incentives aligned with borrower incentives, the bank participates in a borrower's costs from adjusted loan terms through a reduction in underwriting fees.

Both the committed loan amount and the loan price-fee schedule ("flex") are contractually agreed upon prior to the bank contacting investors. The terms of these contract features are thus negotiated based on the arranging bank's anticipated loan demand. An investor's loan demand depends on a many factors, which makes anticipating demand difficult. Possible factors are for example current market conditions, overall portfolio size of the investor, information about the firm, or investment restrictions faced by the investor. Nonetheless, for borrowers with outstanding loans, the arranging bank has access to additional information about loan demand: a CLO manager's the dollar holdings in these loans.

Since there exists an active secondary loan market, a CLO managers's holdings in any particular loan will reflect her demand for that loan. While frictions, such as tradings costs, mean that holdings reflect demand only approximately, the CLO manager would act on large deviations by trading. Because a firm's outstanding loans and the new loan are debt instruments issued by the same firm, a CLO manager's demand for the former is predictive about demand for the latter. While diversification motives may oppose this relationship for additional holdings, the majority of repeat issues in the leveraged loan market refinance some outstanding loan. Furthermore, I document that a CLO manager's holding in a borrower's loans have strong predictive power for investments in new loans, even absent refinancing.[14]

Because of the loan amount guarantee made by the arranging bank, a CLO manager's investment decisions for a new loan may represent a risk to the arranging bank. If the bank cannot freely compensate for funding shortfalls, for example by replacing one CLO manager with another, she may have to bear a cost, either from capital charges on the retained loan amount or from reduced fees due to adjusting loan terms. In this section, I will infer from the presence of nonbank market power that the arranging bank cannot freely substitute between different CLO managers' funds. I will return to this issue in detail in Section 5, where I investigate the reasons for this inability.

[14]I further discuss this claim in Section 5. Additional refinancing results are in Table A1.

A CLO manager may internalize that her investment decision can impose an externality on the bank. The extent to which this allows the CLO manager to command lender-friendly loan terms from the bank would depend on the size of the risk associated with the CLO manager's investment decision. For a given loan issue, I measure the risk that a CLO manager poses for the bank by the CLO manager's dollar holdings prior to the start of syndication. I refer to a CLO manager's resulting capacity to decrease the loan price as market power, because this reduction represents an economic rent to the CLO manager.[15]

Specifically, I let $\textit{Prior Holding}_{f(l)m}$ measure a CLO manager's total dollar holdings in prior loans of firm $f(l)$ in million US dollars. Loan holdings are taken two quarters prior to a loan becoming effective. This two quarter lag ensure that a CLO manager's holding is taken prior to the start of syndication and therefore not the result of short-term responses to the syndication itself.[16] I exclude holdings in portfolios of CLOs that are past their reinvestment date since these CLOs are in general unable to invest in a new issues.

I further note that my measure deliberately deviates from relative share-based measures of market power frequently used in the literature. The reason for this choice is that the bank's cost of not complying with a CLO manager is a function of the dollar amount that the bank will have to retain as a result. This cost is only indirectly linked to the CLO manager's relative share. Put differently, all else equal it is less costly for a bank to retain 100% of a $1 million loan ($1 million) than 10% of a $100 million loan ($10 million).

3.2 Sample Creation and Empirical Strategy

My sample includes institutional loans issued between January 2010 and December 2021. In order for a loan to appear in my sample, I require $\textit{Prior Holding}_{f(l)m}$ to be positive for at least one CLO manager. I also require that at least one CLO manager acquires the loan in the primary market. I measure a CLO manager's participation in a loan issue, $\textit{Participation}_{lm}$, as the CLO manager's total holding in the new loan measured one quarter after the loan becomes effective. Because CLOs legally acquire

[15] In Section 5, I will argue that the CLO manager has an "information oligopoly" akin to the information monopoly banks acquire over borrowers. While some work refers to the resulting capacity of banks to extract rents as "market power," other work refer to it as "bargaining power."

[16] With the caveat that syndication times are only available for a small subset of my sample, the median syndication time is 56 days from the day the arranger receives the mandate to the loan becoming effective. Those estimates are in line with prior studies and industry figures.

their primary market allocations as secondary market trades, a one quarter delay in measurement ensures that the loan's trade is settled.[17] An observation in my sample is defined by a unique loan - CLO manager pair. In this section, I restrict my sample CLO managers with positive prior holding. In my later analysis, I will expand the sample to include all CLO managers that have an active CLO during loan syndication. I exclude CLO managers that are related to the borrower via a private equity sponsor affiliated with the CLO manager. I consider the relationship to exist starting from the first time that the private equity firm is listed as sponsor on a loan. I exlcude these CLO maangers because their incentives might be different from other CLO managers. Instead of commanding lender-friendly loan terms, these CLO managers might command borrower-friendly loan terms to benefit their affiliated private equity business. While I consider this exclusion necessary to correctly estimate my effect of interest, this choice did not materially alter my results in practice. Summary statistics for my final sample are presented in Table 1.

Loans are priced uniformly, similar to public securities in the US. This means that all loan allocations are sold at the same primary market price. Therefore, I do not have variation in outcomes within any one loan. The lack of within-loan variation precludes me from using a loan fixed effect in the spirit of Khwaja and Mian (2008). Instead, I compare for a given CLO manager how loan outcomes of new loans that are issued in the same quarter to firms in the same industry vary with the CLO manager's prior holdings after controlling for quarterly rating notch-implied credit risk premia.

Formally, I estimate the model

$$y_l = \beta \textit{Prior Holding}_{f(l)m} + \kappa X_l + \phi_{f(l)} + \rho_{r(l)t(l)} + \mu_{mi(l)t(l)} + \varepsilon_{lm}. \tag{1}$$

In addition to my previously defined measure of CLO manager m's market power for the issue of loan l of firm $f(l)$, $\textit{Prior Holding}_{f(l)m}$, I include manager-industry-time fixed effects, $\mu_{mi(l)t(l)}$. This fixed effect ensures that comparisons of loan outcomes, y_l, are made between a given CLO manager's loans made to firms in the same industry $i(l)$ during a given quarter. By only using variation within a CLO manager-industry-quarter, I also control for a CLO manager's industry-level loan demand in a given quarter. Further, rating-quarter fixed effects, $\rho_{r(l)t(l)}$, control for differences arising from firms having different credit risk and time-varying credit risk premia. Ratings are defined the notch-level. In some specifications, I include firm fixed-effects, $\phi_{f(l)}$.

[17] Loan settlement takes on average between two and three weeks. Settlement times of more than three weeks are not uncommon.

Lastly, I control for a set of non-price loan terms, X_l. These non-prince loan terms are not jointly determined with the loan's price, and thus endogenous, because they are not a result of the syndication and determined before syndication begins. I cluster standard errors at the CLO manager level.

3.3 Empirical Challenge and Instrument

Ordinary least squares (OLS) estimates of my model recover the true parameter values if there are no confounding factors that vary between a manager's loan holdings in any industry that would simultaneously affect loan pricing. This would for example be true in a Capital Asset Pricing Model (CAPM)-style world in which a manager's loan holdings are solely a function of the market portfolio and the manager's total portfolio size. However, the leveraged loan market is presumably not well approximated by a CAPM world.

My primary concern is that a manager's private beliefs about the quality of given borrower simultaneously affect her holding decisions in outstanding loans and outcomes of any new loan issue. For example, a CLO manager who has positive private beliefs about the borrower, i.e., she beliefs that the borrower probability of default is lower or any loss given default is higher than priced market beliefs, would hold relatively more of outstanding loans of that borrower. At the same time, such CLO manager would also have a higher willingness to pay for this loan, making her more prone to give in to borrower-friendly loan terms.

In the leveraged loan market, differences in private beliefs are likely to be large. One reason is that information asymmetries across CLO managers are likely to be severe. Loans are not public securities. This means loan trades can occur without risk of violating insider trading regulations, even when one of the trading parties has access to private information. The syndication process can even exacerbates information asymmetries. During loan syndication, the bank disseminates private information that the bank collected about the borrower to investors. However, many CLO managers and other nonbank investors voluntarily limit their information access to public information only.[18]

Thus, in order to separate the effects of a manager's market power that of her private beliefs, I propose a new instrument that is inspired by a literature using bank mergers

[18]I describe the reasons for this in Subsection 2.2 and discuss its consequences in more detail in Section 5.

as instrument (e.g., Garmaise and Moskowitz, 2006; Giannetti and Saidi, 2019). I propose that holdings which a CLO manager obtained through acquisitions of other CLO managers satisfy the requirements to be a valid instrument.

For an instrument to be valid it has to satisfy both relevance and exclusion restriction. Since the instrument's relevance is inherently testable, I will provide evidence on this condition together with my results. In contrast, the exclusion restriction requires a more thorough justification. The identifying assumption for the exclusion restriction to be met is that holdings obtained through mergers affect loan prices only through the additional risk that that a CLO manager poses to the bank. The main concern for this identification is that obtained holdings are also correlated with private beliefs. This would be the case, if acquirers select target's for having a specific loan portfolio. I argue that this concern does not reflect merger decision for CLO managers in my period. The essence of my argument is that CLO managers' loan portfolios are well diversified and that acquirers select their merger targets not for their assets but on the basis of the target's CLO liabilities.

Mergers in the CLO industry have to my knowledge not been studied in the literature. Therefore, I cannot point to earlier work as reference for this claim. Instead, I will provide supporting evidence as contribution in this paper. However, in the interest of proceeding to my results, I will describe the construction of the instrument here, including the most aggregate facts on these merger, but I will delegate the necessary discussion and further details on the instrument's exclusion restriction to Section 4.

I begin with my hand-collected sample of CLO ownership changes and exclude CLO contract transfers for which both acquirer and seller resume operating independently following the transaction. Individual CLO portfolios are less diversified than a CLO manager's total managed portfolio which potentially may make the CLO's loan portfolio a more meaningful point of consideration for mergers. To avoid concerns from acquirers selecting specific CLOs I exclude these non-merger transactions. Specifically, I characterize an ownership change as a merger if the acquirer assumes the entirety of the target's active U.S. CLO contracts. This definition includes partial sales in which the target retains her European CLO business or CLOs past their reinvestment period. The former case is valid due to the segmentation of the U.S. and European CLO business. The latter case makes allowance for acquirers declining to assume CLOs that are in the process of winding down. As will become clear shortly, the reason for this stance is that restructuring a CLOs liabilities is significantly less attractive or even excluded for non-active CLOs.

Furthermore, I consider only transactions for which both parties maintain CLO management activities prior to merger announcement. This restriction excludes cases in which a CLO manager becomes a subsidiary of an acquirer without any such prior activity. While the acquirer may not have chosen a specific CLO manager because of her loan portfolio, such mergers do not generate variation in portfolios necessary for identification. Rather, they leave the entire target's loan portfolio intact.[19] In 17 out of 87 cases, the acquirer did not possess CLO management capabilities prior to merger with excluded mergers spreading relatively homogeneously over the sample period. My total 70 sample mergers account for 399 U.S. CLO management contracts changing hands between 102 out of 203 CLO managers.[20]

For a given manager-loan issue, the instrument equals the manager's total volume of the issuing firm's outstanding loans obtained through her prior merger activity. Merger-implied portfolio additions are taken in the quarter preceding a merger. To account only for direct portfolio effects, I discard the amount corresponding to loans matured or refinanced in the interim between merger and new loan issuance. If a manager obtained multiple loans of an issuer, either through a target's portfolio including multiple loans or through repeated merger activities, I take the total amount. Absent any applicable holdings, I set the instrument to zero.

3.4 Results

I begin by examining the impact of CLO manager market power on the loan's spread since the loan spread is the most salient price term of a loan. The estimation results from are displayed in Table 2. Column 6 presents the first-stage estimates of my IV specification. The first-stage Cragg-Donald F-statistic strongly exceeds convential levels, which indicates that the instrument is relevant. Indeed the coefficient of 0.557 indicates that for every \$100 that a CLO manager obtains of a given firm through a merger, her subsequent prior holdings are expected to increase by \$55.7. The remaining \$44.3 disappear from a CLO manager's loan portfolio. The reasons can be that the CLO manager sold the received loan on the secondary market. Other reasons can be refinancing, maturity, or less likely default.

[19] From the point of view of my instrument such acquisitions are more akin to a manager name change.

[20] Those numbers are comparable with studies employing bank mergers as an instrument. For example, 80 out of 210 banks in the 1992 to 1999 sample of Garmaise and Moskowitz (2006) were involved in mergers and Saidi and Streitz (2021) record 79 merger events between banks for their 1990 to 2015 sample.

My main specification, corresponding to the 2SLS results, appear in Column 5. The coefficient estimate 0.554, implies that a one million dollar increase in a CLO manager's prior holdings grants her the market power to raise the spread by 0.554 basis points. For a one standard deviation increase in prior holdings, this effect corresponds to a 8.587 basis point increase.

Furthermore, as shown in Columns 1 to 3, I find that the OLS results using the endogenous regressor, fall significantly below my IV estimates. This direction is consistent with the effect of private beliefs, through holdings, working in the opposite direction of market power, thereby biasing my estimates downwards.

Finally, I present estimates of the reduced form in Column 4. The resulting intention-to-treat effect is relevant in its own right. The IV estimate retrieve the local average treatment effect, which is the effect of a merger-implied holdings increase for CLO managers who did not subsequently sell their obtained holdings (i.e., the complying CLO managers).

Next, I investigate the effect of CLO manager's market power on non-spread price terms. Estimation results are tabulated in Table 3. I begin with loans' second price term, the original issue discount. Here, too, I find a price increase. Specifically, a one standard deviation increase in a manager's prior holdings gives her market power to command a 6.309 basis points higher original issue discount.

Sometimes the OID and the spread are combined into one measure, called the effective yield, by allocating the OID over the effective maturity, i.e., $\textit{Effective Yield} = \textit{Spread} + \frac{\textit{OID}}{\textit{Effective Maturity}}$. For leveraged loans the typical assumption for the effective maturity is 3 to 4 years. Using a 4 year assumption, I find that the same one standard deviation increase in total raises the cost of borrowing by 11.191 basis points (Column 2). This number is close to the expected outcome from taking the spread and the original issue discount. The economic size of this effect is similar to the magnitude of effects found in the relationship banking literature.[21]

As I alluded to earlier, one drawback of my setting is that I cannot include a loan fixed effects. Consequently, it is theoretically possible that my instrument does not measure the intended market power effect, but rather picks up some unaccounted for risk factor. In that case, the observed decrease in primary market prices (increase in spread and OID) would not reflect market power of the CLO manager but rather

[21] For example, Bharath et al. (2011) show that loans from relationship banks are 10 to 17 basis points cheaper.

compensation for risk. To rule out this concern, I turn to the secondary market's price reaction and study the effect on loan's "break price." A loan's break price refers to the initial secondary market price after close. If my effect was explained by unobserved borrower risk, the change in loan spreads should not affect the break price since break prices are recorded as prices per par dollar of a loan. The increased original issue discount on the hand should decrease the break price.

While some data services collect the break price directly, this data is not available to me. Instead, I use CLO's trading activity reported in their trustee reports to back out the break price. Specifically, I measure the break price as the loan's first non-internal CLO sale price within the first half year after the loan's effective date. Internal trades are trades that occur between CLOs of the same CLO manager. CLO reports do not report the trade counterparty. Instead, I exclude trades of loans for which CLOs of the same CLO manager recorded both a purchase and a sale within half a year of each other. The reason for this restriction is that I cannot ascertain that these transactions occur at arms-length prices. I further only take prices from loan sales. Ideally, I would also take purchases into account. However, legally primary market trades of CLOs constitute secondary market transaction and are thus often recorded as trades. These trades happen at primary market prices. By only including sale prices I forgo this problem. Lastly, I only include trades within half a year of the loan's effective date. This restriction that the break price will accurately represent primary market conditions. As I report in Table 1, the distribution of my constructed break price closely resembles that found by Bruche et al. (2020).

The estimates for the break price are recorded in Columns 7 and 8. A one standard deviation increase in a CLO manager's market power results in an expected increase of the break price by 6.774 basis points. This finding is inconsistent with a risk-based explanation. Rather, the loan appears more valuable to lenders.

Similar to public securities, loan's are on average underpriced. This means that a loan's break price on average trades above the loan's primary market price. In Columns 5 and 6, I find that indeed CLO manager market power increases a loan's underpricing. Specifically, I find that a one standard deviation increase in my measure increases a loan's expected underpricing by 8.990 basis points. This effect is smaller than that observed on the effective yield. The market power effect being less pronounced on in the secondary market is a plausible finding. The reason for this is that leveraged loans almost always are structured as callable debt securities. An uncompensated spread increase should reduce the expected time until a borrower

refinances the loan.

4 Mergers in the CLO Industry

In Section 3, I have employed portfolio variation from mergers in the CLO industry as an instrument for CLO manager's private beliefs to study the extent of CLO managers' market power. During that analysis, I strongly statistically reject concerns about the instrument potentially being weak and thus establish my instrument's relevance (see Table 2). This section complements this result by providing evidence in support of the instrument's exclusion restriction.

The main concern for the instrument's exclusion restriction is that merger-obtained holdings correlate with the acquiring CLO manager's private beliefs about borrower credit quality. This correlation can arise as a result of acquirers' target selection. Specifically, it may be possible that CLO managers' private beliefs about borrowers affect their target choice. To alleviate this concern, I investigate target characteristics and the determinants of mergers in the CLO industry during my sample period. Since I provide the first analysis of CLO mergers, I present my results moving from aggregate towards more granular evidence.

4.1 Time Series of Mergers in the CLO Industry

Figure 1 depicts the evolution of U.S. merger activity in the CLO manager market and the distribution of my merger sample within the 2009 to 2021 sample period. Between the Great Financial Crisis and the onset of newly structured CLOs, so-called CLO 2.0, U.S. CLO managers consolidated as market conditions were unfavorable to growth in the CLO primary market in that time. With new issues picking up in 2012 to 2014, the market shifted away from acquisitions. This trend reversed again the end of 2014, when the Federal Reserve, the SEC, and other financial regulators ruled that CLO managers are subject to the Dodd-Frank act's securitization provisions to retain minimum exposure levels. In anticipation of thus increased capital requirements merger activity rose again, with especially independent CLO managers seeking institutional capital access. This trend culminated in 2017, after the requlation came into effect in late 2016 following a two year implementation period. Ultimately, the applicability of Dodd-Frank's risk retention requirements to CLO managers was overruled in early 2018. Still merger levels maintained high levels in 2019 until the 2020 Covid pandemic led to further consolidations. Lastly, with 2021 experiencing record CLO issue levels

merger activity dropped to its lowest level since 2013. In summary, merger levels countercyclically respond to CLO primary market conditions and capital regulation during that period.

4.2 Target Characteristics

Covenants stipulated in CLO contracts limit the differentiability of merger target candidates by individual borrower exposures. In order to alleviate a manager's risk shifting motives indentures restrict loan portfolio concentrations. Typical concentration limits dictate borrower exposures below 1-2%, industry exposures below 10-15%, and very risky, CCC rated, exposures below 5-7.5% of a CLO's loan portfolio. Diversity score tests further constrain concentration. Since a manager's CLO loan portfolios are not perfectly correlated, manager-level portfolio diversification exceeds that of individual CLOs. In practice, the average target portfolio contains 1,131 loans to 242 issuers with the largest borrower exposures being 1.9%. Such high levels of diversification limit the extent to which acquirers can meaningfully differentiate among target candidates by borrower specific portfolio demand.

4.3 Stated Merger Rationales.

CLO managers' public merger communications rarely feature references to loan portfolio considerations. I am able to collect public merger statements for 56 mergers in my sample from which I remove three mergers which issued only general statements.[22] Figure 2 categorizes the mentioned rationales. The most frequently stated rationale is improved access to CLO investors with 71% of mergers including such a reference. Among those statements more than half explicitly refer to larger CLO managers having improved investor access. For example in response to Apollo's merger with Gulf Stream Asset Management an Apollo representative stated, *"[. . .] while smaller market participants can continue to add a high level of service to their existing investors, without the scale and global reach of a platform such as Apollo's, the smaller firms are unable to effectively compete in the market to raise new funds, and their growth prospects are limited."* Almost a third of merger statements make reference to existing investor relationships being a motivation with other considerations in that category including reputation, distribution and CLO underwriting relationships.

Improved equity access is mentioned 55% of times and makes up the second most

[22] In 13 instances no comments were available or both parties declined to comment on the merger. General statements indicate only the hope for high returns on investment.

frequently mentioned category. In fact direct reference to improved equity access is the most commonly cited rationale overall with the occasional explicit risk retention reference.

Notably 23% of merger statements indicate that non-CLO business lines were an important consideration for the merger[23] and the same number stated the European CLO business as an important factor. Under those stated reasons it is unlikely that individual U.S. CLO loan exposures affected the merger decision.

In fact, only three statements refer directly to the loan portfolio. One acquirer states that the target CLOs *"[. . .] have been well managed in a manner consistent with our style and philosophy such that the assets are very complimentary with our existing portfolios,"* another that *"assets are complementary to our existing CLO portfolios."* Lastly, one investor presentation states *"increased portfolio diversity"* as a benefit. No case further expands on loan portfolio *"complimentarity"* and all but one of those cases prominently states other factors, including capital access. While it is thus unclear that the inclusion of these mergers poses any problem to my identification and their inclusion does not alter my qualitative results, I maintain a cautious approach and remove those mergers from my analysis going forward.

4.4 Target Selection and Loan Portfolios

Next, and crucially, I provide direct evidence on the role, or rather lack thereof, of loan portfolios in merger target selection. To that end, for each merger I define a set of counterfactual target candidates from which the target is chosen to include any CLO managers with at most twice the number of target CLOs at time of merger announcement.[24] The acquirer's loan portfolio reveals her previous loan demand. If a target is chosen because the acquirer has high demand for loans in target's portfolio, I would expect that the target can be differentiated from from her peers by a higher loan portfolio overlap. In contrast, if the acquirer did not previously have access to

[23]For example, in 2020, Morgan Stanley announced the acquisition of Eaton Vance. While Eaton Vance's equity and fixed income asset manager, Eaton Vance Asset Management, also manages CLOs, about two-thirds of Eaton Vance's assets under management came from other business lines, most importantly its wealth management division.

[24]In general, I take a "buy-side" view of M&A activity with the acquirer selecting a target out of a set of potential targets rather than the target selecting an acquirer ("sell-side") out of a set of potential acquirers. Sell-side transactions are less problematic for my identification since the acquirer's demand is unobserved by the target. Furthermore, larger CLO managers are usually more diversified which in line with my prior argument makes issuer level demand less relevant. In practice, a good portion of acquisitions in my sample were sell-side initiated with targets approaching investments banks in response to limited capital and risk retention regulations.

loans in target candidate portfolios and seeks loan diversification, I may expect target portfolios to have a lower overlap. To test this hypothesis I estimate the following regression:

$$Target_{am} = \beta Portfolio\ Overlap_{am} + \kappa X_{mt(a)} + \alpha_a + \mu_m + \varepsilon_{am}. \tag{2}$$

Dependent variable $Target_{am}$ indicates target manager m in acquisition a by taking on the value one for the target and zero for all other target candidates. The variable of interest $Portfolio\ Overlap_{am}$ measures the fraction of the target's asset portfolio value from assets also held by the acquirer. I compare portfolios in the quarter prior to merger announcement to employ only information available prior to the merger decision. I investiage the role of portfolio overlaps for both the manager's entire asset portfolio and its institutional term loan subset. While only institutional term loans are relevant for my subsequent analysis, in a merger the acquirer would purchase the entire asset portfolio. Further, my instrument is constructed on the basis of individual loans, my main analysis considers issuer level holdings. Thus, I distinguish between security and issuer level overlap. A security in a target candidate portfolio is considered to overlap at the security level if it appears also in the acquirer portfolio, and at the issuer level if the acquirer holds any, potentially different, security of the respective issuer. Merger fixed effects α_a control for characteristics that are common among all of the merger's target candidates such as the idiosyncrasy of the acquirer portfolio at merger announcement. This fixed effect further absorbs any time-varying macro factors that influence merger activity. Manager fixed effects μ_m control for unobserved time-invariant target candidate heterogeneity such as their inclination to maintain independence. To account for time-varying differences that may also be relevant for target selection and affect a manager's portfolio choice, I include a vector of manager characteristics. Those characteristics are described in Table 5 which also presents the resulting estimates.

The target is statistically indistinguishable based on portfolio overlap with the acquirer from non-chosen target candidates with β being insignificant in all specifications. Economically the loan portfolio overlap also does not meaningfully explain target choices. The coefficients -0.001 for the issuer-level total portfolio overlap implies that a move from the first to the third quarter of portfolio overlap make the target candidate 2.72% less likely to be chosen as target. While the results for the loan portfolio are somewhat larger they are statistically indistinguishable from zero and much smaller than later estimates on liabilities and fees.

4.5 Target Selection and CLO Liabilities

Having provided evidence that loan portfolios contain no discernible explanatory power for acquirers' merger decision, I investigate the role of targets' liabilities. Indeed capital access is not only the most frequently talked about issue surrounding CLO mergers, but its importance is also overwhelmingly stressed in general industry views.[25] Acquirers may be able to create shareholder value from mergers by retiring the target CLOs' existing liabilities if they have access to cheaper debt financing than the target. In that case, target candidates with particularly disadvantageous CLO financing would be more attractive as they offer a greater return on capital invested in the merger.

To provide formal evidence on the role of CLO liabilities for merger selection, I estimate

$$Target_{ac} = \beta Funding\ Characteristic_{ct(a)} + \kappa X_{ac} + \upsilon_{v(c)a} + \varepsilon_{ac}. \tag{3}$$

Parallel to previous specifications, $Target_{ac}$ captures whether CLO c was managed by the target acquired in merger a. *Funding Characteristic* captures different funding characteristics. Specifically, I consider CLO *Leverage Ratio* (the ratio of supplied CLO equity to the sum of CLO equity and outstanding debt tranche amount), *Cost of Debt* (the tranche amount weighted average spread over Libor), *Junior Fee* and *Senior Fee*. κ constitutes a vector of other CLO and Manager characteristics. I ensure that I compare CLOs in the same vintage through the vintage-merger fixed effect $\upsilon_{v(c)a}$. If acquirers select targets based on their capacity to improve CLO profitability via improved capital access, I would expect that worse funding characteristics, i.e., lower leverage, higher cost of debt, and lower fees, predict the chosen target.

The resulting estimates in Table 7 fall in line with those predictions. All estimates are statistically significant and in the expected direction.

[25] For example, in August 2021, Business Insider interviewed a number of CLO industry professionals. The appreciation of capital access appears unanimous. For example two notable quotes include "If you can raise money, which is the name of the game in CLOs, you stand out", and "We're a larger issuer, so we know a lot of repeat investors. It's a niche, collegial market, but one that's growing in awareness." (see https://www.businessinsider.com/top-clo-managers-investors-bankers-lawyers-traders-careers-structure-credit-2021-8?r=clo-teaser). These opinions resonate closely with opinions expressed in private interviews.

4.6 Post-Merger CLO Refinancing

Lastly, I confirm that the acquirer's actions following the merger are consistent a liability-driven target choice. I begin by studying the targets' CLO refinancing activity surrounding mergers. While I offer formal evidence from a difference-in-differences specification in Table A3 in Appendix A, I present graphical evidence in Figure 3. This figure plots the fraction of target and non-chosen target candidate CLOs that were reset, called or reissued over the prior year relative to the merger date. Two years preceding the merger, target and target candidates follow a similar trend. The target refinances her CLOs at a lower rate, consistent with relatively worse capital access. This difference increases shortly prior to the merger consistent with the target forgoing refinancing once the merger has been agreed upon. The reason is that refinancings in that period limit the acquirer's ability to refinance acquired contracts at their terms because newly issued tranches stipulate non-call periods of typically one to two years. Following the merger this pattern reverses. Already one quarter after the merger the fraction of CLOs refinanced is approximately equal between target and target candidate. This trend continues and one year after merger more than 20% of target CLOs have been refinanced compared to 11% of CLOs held by other target candidates. Consistent with capital constraints being important for CLO financing, Figure 4 shows that the increase in refinancings of target CLOs following the merger is accompanied by the acquirer's prior CLOs refinancing at lower rates relative to their trend. Difference-in-differences results confirming this visual evidence are available in Table A4 as part of Appendix A.

5 Sources of Market Power

In Section 3, I established that CLO managers' market power is reflected in lender-friendly loan terms. For a CLO manager to influence loan pricing in the origination process, the arranging bank must not be able to costlessly make up for this CLO manager's funds. Said differently, switching costs constitute a necessary condition for the presence of market power. I examine the presence of such switching costs in this section.

5.1 Lending Persistence

Facing a potential funding shortfall, the arranging bank can respond in one of two ways: either the bank adjusts the loan amount to be raised down or she must raise

these funds from another source. This source can be either herself or another investor.

Adjusting the loan amount downwards, when this option is available, is not costless. The risk-sharing agreement between the borrowing firm and the arranger obligates the arranging bank to participate in deteriorated loan terms through a reduction in fees. In practice, the option to reduce the loan amount is only available for few loans. The loan amount represents a common negotiation feature only when the issuer is flexible with respect to the precise amount raised. One example are loans with the purpose of increasing a borrower's leverage, i.e., dividend recapitalizations. In contrast, many loan purposes necessitate raising a specific loan amount. For instance, loans to roll over existing debt require an amount equal to the refinanced debts' face value plus any expenses to cover incurred call provisions. Similarly, loans that finance acquisitions typically must raise a fixed proportion of the acquisition price. Whenever a specific loan amount is required, the option to alter the loan amount is typically not present.

Raising funds internally is also costly for the arranging bank due to regulatory capital constraints. The retention of a risky loan substantially erodes a bank's regulatory capital because of high associated regulatory risk weights.[26] Indeed, the fact that the arranging bank attempts to sell the loan in the first place is direct evidence that retention represents at least an opportunity cost to the bank.

Since both the provision of internal funds and loan amount adjustments are costly, I am left to study, whether the arranging bank can costlessly substitute between funds of different investors. To study this aspect, I follow an approach used by the relationship literature and study switching costs intertemporally. This literature argues that the persistence of bank-borrower relationships is evidence of opportunity costs that borrowers face when switching away from their incumbent bank (e.g., Bharath et al., 2011). Following this line of reasoning, persistence of CLO lending for a given borrower would constitute evidence of switching costs that an arranging bank faces with respect to invested CLO managers.

To formally test the extent to which a borrower's CLO lenders remain stable over different loan issues in time, I expand my earlier used loan-CLO manager sample to include all CLO managers with at least one active CLO during the loan's syndication. This means that I add active CLO managers without investments in a borrower's loans to that sample.

[26] Under Basel II and III's standardized approach, BBB rated corporate borrowers carry a 75% and 100% risk weight respectively. In contrast B rated borrowers carry a 150% risk weight, while prime borrower risk weights can be as low as 20%.

I begin by providing graphical evidence in Figure 5. Each grey point in this figure plots a CLO manager's holdings prior to a new loan issue against this CLO manager's investment participation in that issue. The graph displays a positive relationship between prior holdings and subsequent investments and therefore is evidence of CLO lending being persistent on the intensive margin. One striking feature of this figure is that many observations are clustered around the identity line. These clustered observations predominantly correspond to CLO managers that roll over their refinanced investment into the new loan issue.

In order to also capture the effect of extensive margin decision, I display points of a binned scanned plot in blue. I define one bin for all observations corresponding to CLO managers without prior investments. The other bins split the sample with positive prior holdings into 19 equally sized buckets by observation count. The binned scatter plot displays a close to similar relationship.

Next, I complement my graphical evidence by estimating the CLO model:

$$Participation^{M}_{lm} = \beta Prior\ Holding^{M}_{f(l)m} + \lambda_l + \mu_{mt(l)} + \varepsilon_{lm}. \tag{4}$$

I provide separate specifications depending on the margin of study, M. For intensive margin results, I define $Participation^{Int.}_{lm} = \ln(1 + Participation_{lm})$ and $Prior\ Holding^{Int.}_{lm} = \ln(1 + Prior\ Holding_{lm})$, $Participation_{lm}$ and $Prior\ Holding_{lm}$ following earlier definitions in Subsection 3.1. Extensive margin results use the definitions, $Participation^{Ext.}_{lm} = \mathbb{1}\{Participation_{lm} > 0\}$ and $Prior\ Holding^{Ext.}_{lm} = \mathbb{1}\{Prior\ Holding_{lm} > 0\}$. By including loan fixed effects, λ_l, in my specification, my results are identified by comparing the investment decision of different CLO managers for the same loan issue. Within a loan all CLO managers face the same borrower, arranging bank, and loan terms. Further, in the spirit of Khwaja and Mian (2008) loan fixed effects eliminate any effect resulting from aggregate supply conditions or due to borrower credit demand. I further account for time-varying manager-level differences that may affect my results by including manager-time fixed effects, $\mu_{mt(l)}$. I cluster standard errors at the CLO manager level.

My coefficient of of interest in this model is β with $\beta > 0$ indicating persistence in CLO investments. OLS estimates in Table 8 establish that CLO lending is indeed persistent. All relevant coefficients are statistically significant beyond the 1% level. On the extensive margin, I find that in the same loan issue CLO managers who hold existing loans of the borrower are 53.7 percentage points more likely to invest in the

new loan issue than uninvested CLO managers (Column 1). This estimate is close to the difference in unconditional investment likelihoods. CLO managers without prior investments invest in a new loan issue with a 8.8% unconditional likelihood compared to 62.5% for the invested subset. On the intensive margin, I find that a 100% increase in loan holding increase the expected size of investment by 54.4% (Column 4). These numbers are even more pronounced when I only study deals with a single institutional term loan in Columns 2 and 5. In Column 3, I combine extensive and intensive margin effects of my variable of interest to explain CLO manager's investment propensity. I find that a CLO manager is more likely to participate in a new issue the higher they are invested in the borrower.

5.2 Relationships and Lending Persistence

The underlying argument that links persistence to switching costs is that an increase in the cost of switching should decrease the likelihood of switching because a larger benefit from switching is required to offset associated costs. To scrutinize the factors that influence the degree to which CLO lending is persistent, I modify my previous model and estimate

$$\begin{aligned} Participation^{M}_{lm} = \beta_1 Prior\ Holding^{M}_{f(l)m} \times Characteristic_{lm} \\ + \beta_2 Prior\ Holding^{M}_{f(l)m} + \beta_3 Characteristic_{lm} + \lambda_l + \mu_{mt(l)} + \varepsilon_{lm}. \end{aligned} \tag{5}$$

One competing theory that can potentially explain my result is that banks form persistent relationships with both their borrowing firms and their CLO managers. In this case, the observed persistence between CLO managers and borrowing firms would arise as a result of a common relationship bank. These CLO manager-bank relationships could invalidate the interpretation of banks facing switching costs. Rather it may be costly for the CLO manager to not provide funds if non-investment jeopardizes a beneficial relationship with the bank.

While there is a long literature on bank-firm relationships, bank-CLO manager are a more nascent topic of research. On reason that CLO managers may benefit from relationships with banks could be preferential primary market access since new loans are on average underpriced. In recent work, Bhardwaj (2021) shows that banks also benefit from relationships with CLO managers because these CLO managers provide secondary market liquidity insurance to the bank's distressed borrowers.

The extent to which CLO manager-bank relationships grants market power to either

party would depend on the relative value of the relationship to the bank and the CLO manager. Absent reliable estimates on these quantities, it is conceivable that lending persistence does not predominantly arise due to switching costs faced by banks but by CLO managers.

Recall that I defined a relationship between bank b and firm f to exist if the bank acted as lead arranger for the firm on a previous loans outstanding and held by active CLOs. I follow Bhardwaj (2021) and define a manager-bank relationship to exists if bank b acted as underwriter for any active CLO managed by manager m. Since this relationship exists only due to interactions at the beginning of a CLOs life, I further stipulate that at least one of these CLOs was managed by m prior to the CLO being priced. This slight deviation accounts for subsequent CLO acquisitions which may not transfer relationships. This deviation does not meaningfully impact my results.

To test whether relationships are responsible for my results, I let $Characteristic_{lm} = Relationship_{lm}$ indicate the presence of a relationship with the value 1 and 0 otherwise for a host of relationship measures. The main concern is that CLO lending persists only in the presence of relationships that could be the result of CLO managers, not banks, facing switching costs. To test this hypothesis, the coefficient of relevance is β_3. If CLO lending persistence is in fact explained by these relationships, then CLO lending outside of these relationships should not be persistent, i.e., $\beta \leqslant 0$. In contrast, if CLO lending persists outside of relationships there exists another reason that gives rise to the observed persistence.

I define manager m to be connected to firm $f(l)$ through a common relationship bank if there exists an arranging bank $b(l)$ such that b is both a relationship bank of firm f and a relationship bank of CLO manager m. I define a relationship between bank b and firm f to exist if the bank acted as lead arranger for the firm on a previous loans outstanding and held by active CLOs. With respect to CLO manager-bank relationships, I follow Bhardwaj (2021) and consider bank b to be a relationship with CLO manager m if the bank acted as underwriter for any active CLO managed by the CLO manager. Since this relationship exists only due to interactions at the beginning of a CLOs life, I further stipulate that at least one of these CLOs was managed by m prior to the CLO being priced. This slight deviation accounts for subsequent CLO acquisitions which may not transfer relationships.

I present regression estimates using this relationship definition, *Manager-Bank-Firm (Liab.)*, in Columns 1 and 2 of Table 9. Along both the extensive and the inten-

sive margin, this test statistically rejects that CLO participations persist only in the presence of common relationship definition.

One reason why CLO lending may persist outside of this relationship measure is the existence of other unncaptured relationships. For example, one alternative is that CLO managers and banks form relationships on the basis of their loan-based interactions. CLO managers and banks interact very frequently in the primary market and so it seems natural that relationships can form based on their interactions here. For example, banks often assign their corporate borrowers to a fixed banker. Similar to personal relationships that a banker forms with borrowers (Karolyi, 2018; Herpfer, 2021), the banker may also form relationships with the CLO managers she interacts with. To capture these relationships at a given issue, I define a CLO manager and firm to be related via a common relationship bank if the CLO manager holds a loan of that borrower previously originated by one of the the borrower's relationship banks on the new loan issue. Under this definition, the CLO manager and the responsible banker are likely to have previously interacted.footnoteIn the case of a bankers' departure, predecessors are typically introduced to key accounts in order to carry over relationships. Note that I do not require the CLO manager to gain its participation on the primary market and allow for relationships from subsequent secondary market acquisitions. I consider this definition to be more conservative, since bank - CLO manager interactions are likely to occur during secondary market trades.[27]

To capture these asset-side relationships, I define a CLO manager and a firms to be related for a given issue if the CLO manager holds a loan of that borrower previously originated by one of the borrower's relationship banks, *Manager-Bank-Firm (Assets)*. The results from using this definition are displayed in Table 9's Columns 3 and 4.

[27]Loans on the secondary market can be acquired by way of assignment or participation. Assignments make the acquiring party a direct signatory of the loan and thereby confer all rights and benefits to the acquirer. In contrast, participation agreements constitute arrangements only between the transacting parties. Arranger and acquirer interact on assignments. Assignments usually trade through arranger's secondary market desks. Changing loan signatories requires high assignment fees which are usually waived for trades over the arranger's trading desk. Assignments further require the consent of borrower and agent bank, though any objections have to be prudent. The bank also confirms that the assignments abide to the minimum assignment amounts stipulated in the loan documents. By contractually engaging only between transacting parties, participations avoid having to comply with aforementioned restrictions and fee. However, participations do not generally confer rights to the acquirer and the acquirer is typically precluded from voting on non-material amendments. More importantly, though, the acquirer is treated as general creditor vis-à-vis the seller and has no direct claim to any collateral supporting the loan. Typically more than 90% of a CLO's portfolio are required to be invested in senior secured loans. Thus, the acquirer assumes credit risk of both borrower and seller. As a consequence CLOs typically contain covenants that restrict loans bought via participations to account for less than 10% of a CLO's portfolio.

Finally, to rule out further concerns about the definition of CLO manager-bank relationships, I change the definition of $Relationship_{lm}$ to only reflect the relationship between arranging bank and borrower. Specifically, I define a relationship to exist at the issue level when at least one bank constitutes a relationship bank with respect to the firm. This measure strictly expands my previous relationship definitions and restricts non-relationship loans to include only loans for which the firm hired a non-relationship bank as arranger. If a bank and a firm are not in a relationship, then the borrower cannot be connected to the CLO manager through a relationship bank. The results for this definition are tabulated in Table 9's Columns 5 and 6.

5.3 Information Asymmetries and Lending Persistence

Information asymmetries are central for the formation of long-term relationships between firms and banks. In contrast to bond investors, banks collect private information on their borrower. Subsequent lending decisions incorporate this information. As recognized in seminal contributions by Sharpe (1990) and Rajan (1992), the incumbent bank's information monopoly results in increased cost of providing credit for uninformed competitors due to adverse selection. The original bank's ability to offer a cheaper loan results in the borrower continuing its bank relationship. While the relationship bank offers a rate lower than that of its competitors, its ex post monopoly allows for the extraction of rents from the borrower.

In the leveraged loan market, arranging banks may face a related mechanism with respect to its nonbank investors, and especially CLO managers. If CLO managers are asymmetrically informed about the borrower, an observed decision by a previously invested CLO manager to not provide funds can be interpreted as a signal about negative borrower prospects. This negative signal may grant an "information oligopoly" to the invested CLO managers if that signal is costly to the bank.[28]

For this argument to be valid three conditions must be met. First, there have to be information asymmetries about the borrower across CLO managers. Absent information asymmetries, observed investment decisions do not incrementally inform other CLO managers about the borrower.[29] Second, CLO managers decisions must be observable. Otherwise they cannot serve as signal. Third, these signals must be

[28] Alternatively, the term "information oligopsony," would further highlight the fact that CLO managers act as purchasers of loan.

[29] I do not strictly require the presence of information asymmetries but rather the perception of CLO managers that other CLO managers may possess additional information about the borrower with some positive probability.

costly to the bank. If the updating of other CLO manager's beliefs about the borrower does not represent a cost to the bank, then the non-investment decision would not be costly,

Information asymmetries arise naturally during syndication. Prior to receiving the information memorandum about a loan, CLO managers must declare themselves to be private or public side investors. Private side investors receive an information memorandum that incorporates the private information collected by the bank on the borrower. In contrast, public side investors receive an information memorandum that includes only public information. Access to private information, also called "material non-public information," may restrict non-loan investment activities of a CLO manager's affiliated subsidiaries. Under US securities law, trading public securities in the possession of private information constitutes insider trading.

In my sample 42.1% of leveraged loans are made to private firms. Trading restrictions may also extend to these private firms for at least two reasons. First, private borrowers may decide to subsequently pursue an initial public offering (IPO). IPO participants who previously obtained material non-public information can also be considered insider traders. Second, in some conditions private securities such as private equity can also fall under insider trading regulations.[30]

A CLO manager may be able to circumvent having to self-restrict information access by segregating information flows between subsidiaries. Such segragation is often called an "information wall." In practice the presence of information walls varies and even compliant CLO managers often choose public side participations to avoid remaining risks.[31]

Information asymmetries can also arise for reasons unrelated to the syndication. For example, many CLO managers are affiliated with large private equity firms. Information obtained by the affiliated private equity business may flow to the CLO manager. For example a sponsoring private equity firm can be represented on the firm's board. Since I exclude observations for which the CLO manager has a sponsor relationship

[30]SEC Rule 10b5-1 covers fraud and deceit as a result of insider trading for any, including private, securities. For example, in 2011 the SEC fined private Stiefel Laboratories Inc. and its CEO for insider trading; see https://www.sec.gov/divisions/enforce/claims/stiefel-laboratories.htm.

[31]In 2018 Debtwire (2018) surveyed senior executives of 100 major credit firms about their conflict management. 58% of respondents report that they do not have an information wall in place. 34% respond that they previously removed an information wall. Managers without an information wall justify their absence due increased synergies (71%), lower expenses (36%), and lower administrative burden (21%).

with the firm, this particular information asymmetry is unlikely to be important in my case. However, private information received by the private equity firm about borrowers for which they ultimately decided against an investment may well be present.

Information asymmetries can also arise between non-private equity firms if screening and monitoring of a firm requires the CLO manager to exert costly effort. Such costly effort can lead to CLO managers specializing with portfolios tilted towards borrowers for which the CLO manager acquired more information (Van Nieuwerburgh and Veldkamp, 2010). If some of the acquired information is soft and cannot be transmitted, the bank may be unable to remove the resulting information asymmetry even if the bank is in possession of that information.

Having discussed the role of information asymmetries in the primary loan market, I now turn to discuss the extent to which CLO manager's investment decisions are observable by other market participants and the costs arising for the bank. On the one hand, information about CLO manager participations may be conveyed to loan market participants during the syndication process. In this case, the cost to the arranger from a non-investing CLO manager is immediate. Other CLO managers revise their beliefs about the quality of the borrower down, which leads them to demand less of that loan at any given price.

On the other hand, a CLO manager's non-investment decision may not become public during syndication. In this case, they bank may be able to avoid any effects during the syndication itself. Because CLOs file monthly trustee reports that outline their portfolio holdings, CLO managers' investment decisions will become public within a few weeks of a loan's issue. Thus, other CLO managers would update their beliefs with a delay. Nevertheless, the new information will ultimately be reflected in lower secondary market prices of that loan. These lower prices can be damaging to a arranging bank's reputation with nonbank investors for future loan issues, because nonbank investors acquire loans in the primary market with the expectation that the issues will be underpriced.[32]

Having discussed how information asymmetries can make the replacement of invested CLO managers costly for the arranging bank, I will now turn to provide evidence on the effect of information asymmetry on the extent to which CLO manager's investments are persistent. Under the outlined theory, higher information asymmetries increase switching costs for the bank. Thus, I test the prediction that higher infor-

[32]In my sample, 14.2% of loans were overpriced. In comparison, Ritter and Welch (2002) record 30.5% of IPOs with negative first day returns over that period.

mation asymmetries are accompanied with more persistent CLO lending.

Since neither a CLO manager's information about a borrower prior to loan issue nor their choice to act as private or public side participant is observed, I instead proxy for aggregate issue-level information asymmetries. To this end, I follow previous work on the role of information asymmetries in traditional firm-bank relationships[33] and let $Characteristic_{lm} = Opacity_l$ capture the degree to which a borrower is opaque. The argument is that publicly available signals are less informative for opaque borrowers, which makes information asymmetries between insiders and outsiders more pronounced.

I employ three measures of borrower opacity: a borrower is opaque if the borrower is (1) small, (2) has disagreeing public ratings, or (3) if the borrower is private. Small firms are treated as more opaque in the literature for reasons such as less frequent coverage by journalists, or the positive correlation of size with the number of employees who may leak private information. I consider a borrower small if their assets are in the bottom quartile of firms in my sample. Information on a firm's assets is available only for the subset of public firms in my sample, which restricts my analysis to that subset. Another frequently used measure is the presence of a public rating from one of the large rating agencies. I excluded loans without rating from my sample because CLOs are restricted from investing in these loans. Thus, I cannot use this measure of information asymmetry. Instead, I use the fact that most loans have two or more ratings and capture rating disagreement. To this end, I assign numerical values to ratings following the classification of Becker and Todd (2011) and calculate the average absolute distance from the mean rating for each borrower. I classify borrowers in the top quartile of this measure as opaque. The rationale for this measure is that public ratings serve to communicate private information about the borrower to public side investors. The more a firm's ratings disagree, the less informative is the rating signal, which increases information asymmetries. Lastly, I capture whether the issuer is private, which I retrieve from Compustat/CRSP. The literature treats private issuers as more opaque as issuers do not file public information.

My estimation results are reported in Table 10. Consistent with the bank facing information asymmetries that make it costly for her to replace invested CLO managers, I find that CLO lending is more persistent for more opaque borrowers using both opacity measured by size and opacity measured by rating disagreement. Specifically,

[33]The importance of information asymmetries for that relationship has spurred a vast theoretical and empirical literature. For detailed references, see Kysucky and Norden (2016).

a CLO manager's investments in small firms are 4.0% more like to persist. They are also 7.6% larger, despite smaller borrowers on average issuing smaller loans. Both these numbers are significant at the 1%-level. The extensive margin effect of ratings dispersion are smaller, but positive and significant at the 10%-level with these CLO managers being 1.2% higher when ratings are dispersed. The intensive margin effects are statistically significant at the 1% level. The economic magnitude here corresponds to a 2.2% increase.

Interestingly, I find that CLO lending is less persistent with private firms. This is result is not inconsistent with my result. On the one hand, public firms have higher public reporting requirements. This reporting increases the information available to CLO managers that are active as private side participants. This means that a borrower being public decreases the amount of information asymmetries between public and private side investors. On the other hand, a firm's status as public firm also affects CLO managers' choices whether to act as public or private side lenders. While obtaining private information for public firms can directly impact trading in public securities, this is less likely for private firms. Here the main impact is only indirect in the case of a future IPO. Thus, CLO managers are more likely to act as private side market participants, which in turn can reduce the overall information asymmetries across CLO managers.

6 Conclusion

Nonbanks have market power in leveraged loan underwriting. While typically borrowing through banks is more expensive than through bond markets, banks provide services to borrowing firms that bond markets cannot. In particular, the capacity of banks to extract future rents from their relationships allows them to provide loans to borrowers for whom capital markets are closed or support borrowers in distress with subsidized credit. In establishing the existence and source of nonbank market power, this paper sets the stage for future work to answer whether this market power allows nonbanks to fulfill a similar insurance function to banks. The answer to this question will be important in evaluating the welfare implications of nonbank market power.

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Figures

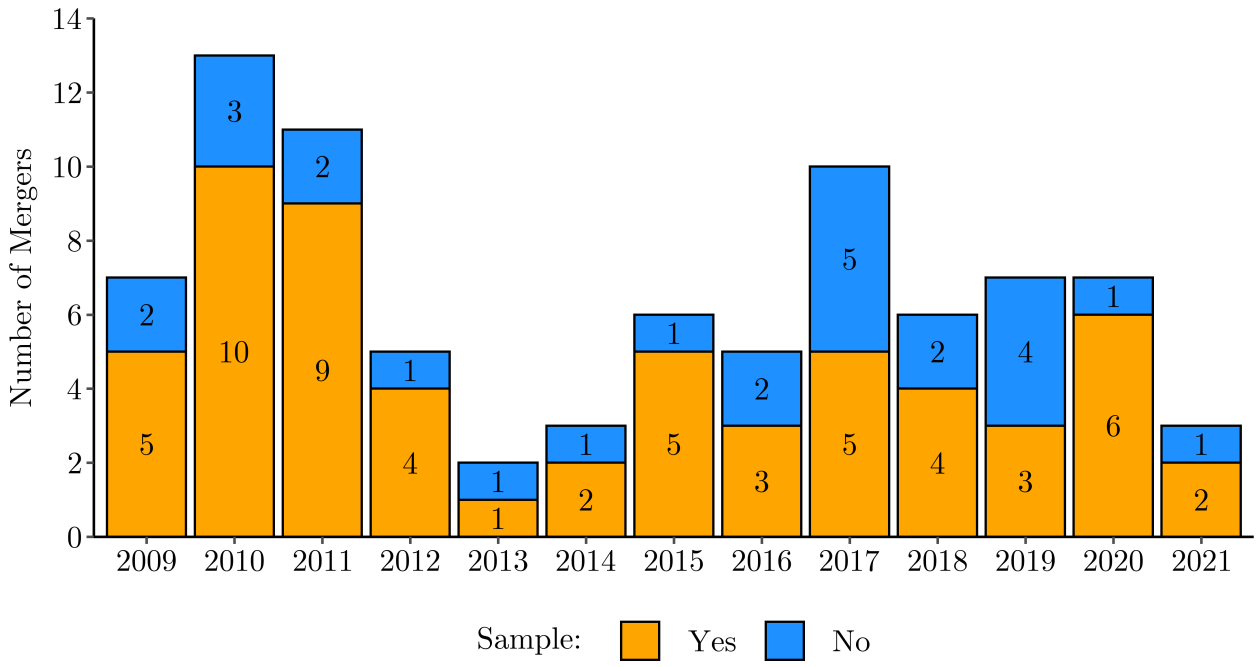

Figure 1. U.S. CLO Manager Mergers: 2009 - 2021

This figure plots the number of mergers in the U.S. CLO manager sector in a given year for the period 2009 to 2021. Mergers are recorded in the year in which they become effective.

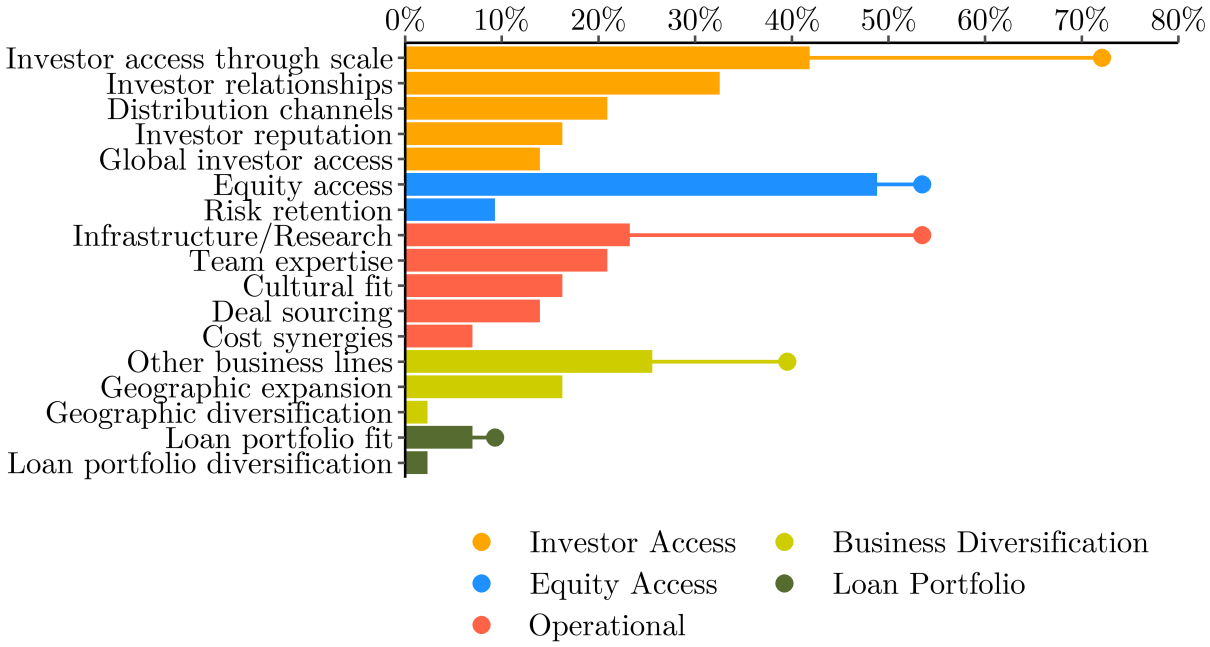

Figure 2. Stated Merger Rationales

This plot displays the frequency of stated merger motivations. Each motivation is grouped into one of five categories by color. Bars displays the frequency of each motivation. Points displays the frequency of a category.

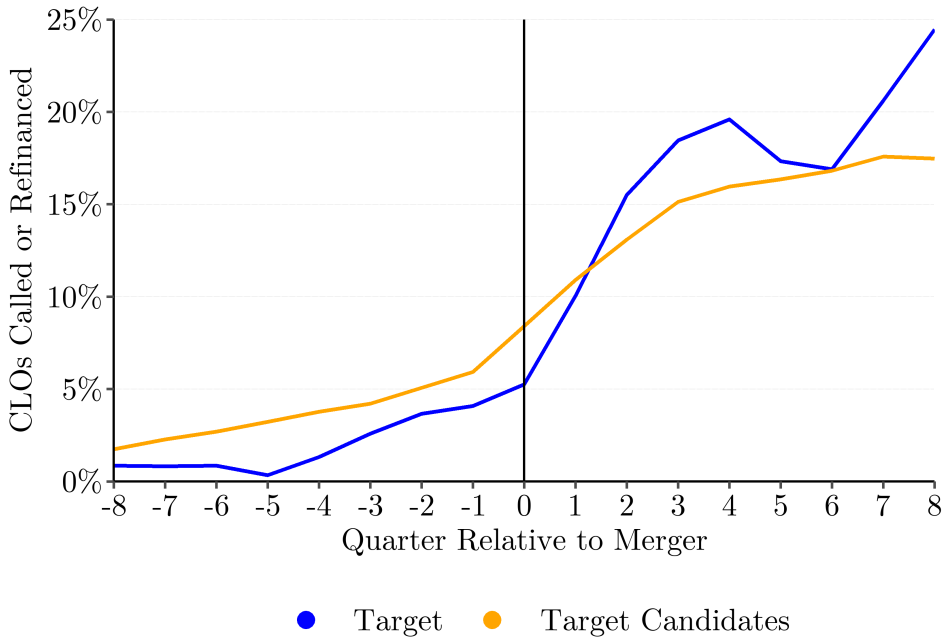

Figure 3. Target and Target Candidate CLO Refinancing

This plot displays the rate at which target and other target candidates refinance or calle their CLOs around merger events. Rates are calculated over the last four quarters.

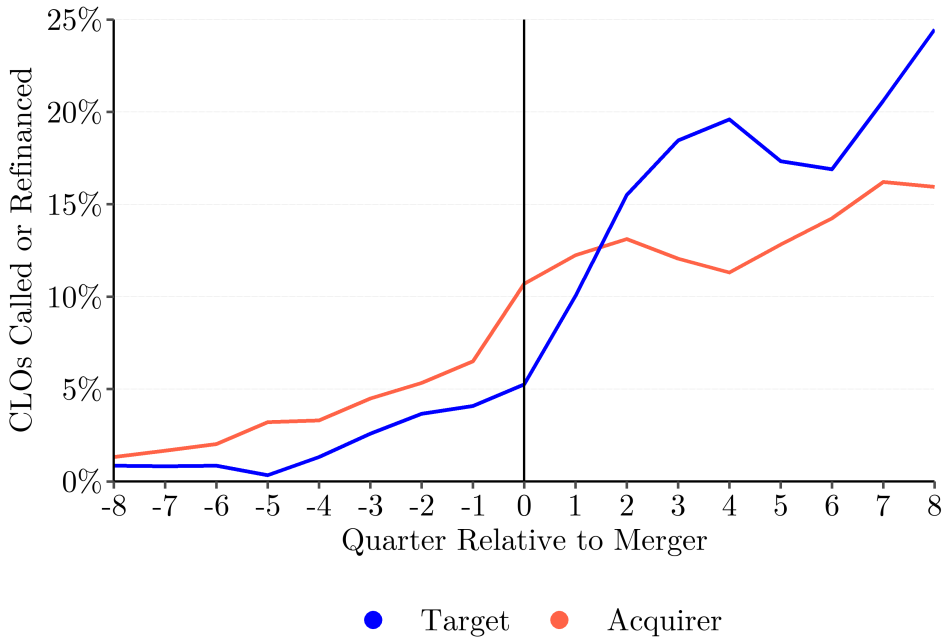

Figure 4. Target and Acquirer CLO Refinancing

This plot displays the rate at which target and acquirer refinance or call their CLOs around merger events. Rates are calculated over the last four quarters.

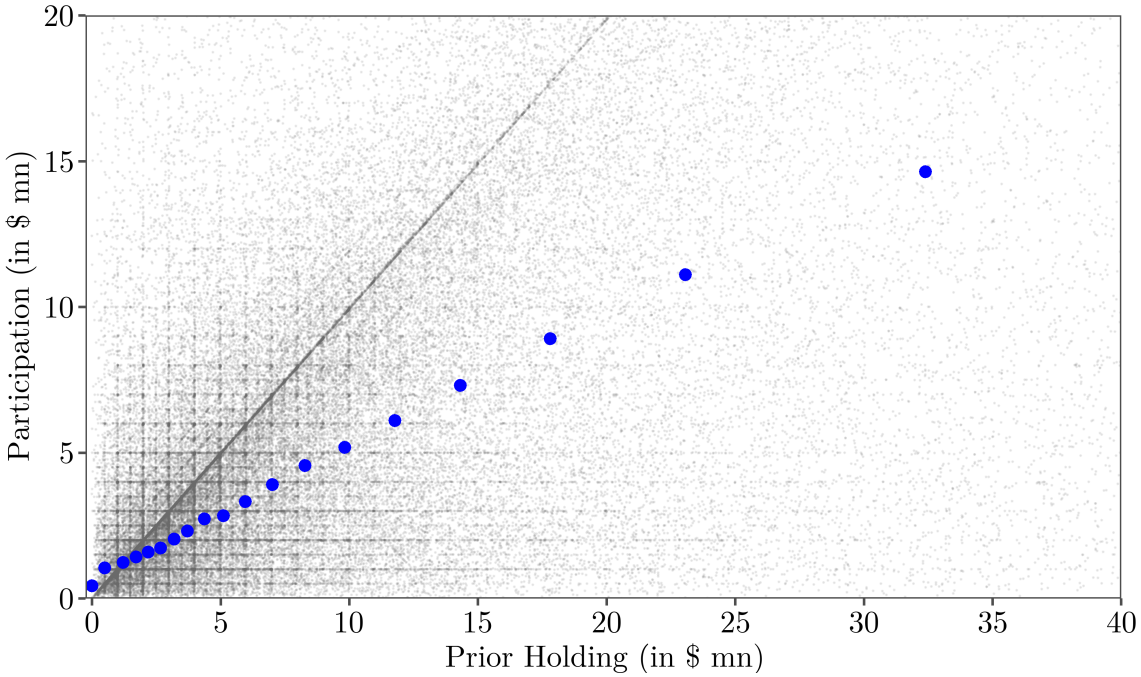

Figure 5. CLO Manager Lending Persistence

This figure displays the relationship between CLO managers' holdings prior to a new loan issue and their subsequent participation in the new issue. Each grey dot is one CLO manager-loan observation in the sample. A binned scatter plot is displayed in blue points. One bin captures observations corresponding to no prior holding. The remaining 19 points split the sample into bins with equal observation count by prior holding.

Tables

Table 1. Summary Statistics

Variable	Unit	Mean	Std. Dev.	p25	p50	p75	Obs.
Panel A: Loan Level							
Spread	bps	405.58	175.13	300.00	350.00	450.00	4,676
Original Issue Discount	bps	68.21	101.68	0.00	50.00	100.00	3,836
Effective Yield	bps	417.15	183.30	300.00	375.00	475.00	3,836
Soft Call Premium	bps	91.34	63.16	100.00	100.00	100.00	4,583
Call Provision Period	months	10.24	8.18	6.00	6.00	12.00	3,608
Break Price − Par	bps	15.45	134.72	-12.50	25.00	75.00	2,739
Underpricing	bps	57.63	101.46	13.00	54.00	100.00	2,292
Loan Amount	$ mn	767.19	790.80	285.00	510.00	983.77	4,676
Maturity	months	71.72	15.69	62.00	74.00	84.00	4,676
Secured	0/1	0.98	0.13	1.00	1.00	1.00	4,676
Second Lien	0/1	0.09	0.28	0.00	0.00	0.00	4,676
Covenant-lite	0/1	0.63	0.48	0.00	1.00	1.00	4,676
Sponsored	0/1	0.62	0.49	0.00	1.00	1.00	4,676
Panel B: Deal Level							
No. Loans		1.19	0.46	1.00	1.00	1.00	3,922
Loan Amount	$ mn	914.68	928.81	350.00	625.00	1,132.42	3,922
No. Loans Outst.		1.73	1.10	1.00	1.00	2.00	3,922
Loan Amount Outst.	$ mn	1,384.13	2,013.89	390.00	750.70	1,580.05	3,922
CLO Share	%	23.13	29.01	6.59	14.42	29.17	3,922
Bank Relationship	0/1	0.66	0.47	0.00	1.00	1.00	3,789
Sponsored	0/1	0.61	0.49	0.00	1.00	1.00	3,922
Assets	$ bn	25.56	183.54	1.66	3.41	8.18	1,708
Small	0/1	0.25	0.43	0.00	0.00	0.25	1,708
PPE/Assets	%	25.96	23.32	6.54	17.30	43.16	1,708
Intangible (Borrower)	0/1	0.25	0.43	0.00	0.00	0.25	1,708
Intangible (Industry)	0/1	0.25	0.43	0.00	0.00	0.00	3,890
No. Ratings		2.06	0.30	2.00	2.00	2.00	3,922
Has S&P Rating	0/1	0.99	0.10	1.00	1.00	1.00	3,922
Has Moody's Rating	0/1	0.99	0.09	1.00	1.00	1.00	3,922
Has Fitch Rating	0/1	0.08	0.27	0.00	0.00	0.00	3,922
Median Rating		13.64	1.68	B (13)	B (13)	B+ (14)	3,922

Table 1. Summary Statistics *(continued)*

Variable	Unit	Mean	Std. Dev.	p25	p50	p75	Obs.
Rating Dispersion		0.46	0.52	0.00	0.50	0.50	3,858
High Rating Dispersion	0/1	0.20	0.40	0.00	0.00	0.00	3,858
Panel C: CLO Manager-Loan Level							
$\mathbb{1}\{\text{Participation} > 0\}$	0/1	0.24	0.43	0.00	0.00	0.00	482,432
Participation^{+}	\$ mn	7.84	10.48	1.99	4.16	9.48	116,409
$\mathbb{1}\{\text{Prior Holding} > 0\}$	0/1	0.29	0.45	0.00	0.00	1.00	482,432
Prior Holding^{+}	\$ mn	11.20	15.24	2.81	5.94	13.40	138,192
Manager-Bank-Firm (Liab.)	0/1	0.07	0.25	0.00	0.00	0.00	414,920
Manager-Bank-Firm (Asset)	0/1	0.19	0.39	0.00	0.00	0.00	465,956

This table presents summary statistics for my variables interest. The most extensive sample period covers the years 2010 to 2021. Participation^{+} and Prior Holding^{+} summarize the positive part of those variabes only.

Table 2. CLO Manager Holdings and Loan Spreads

IV Stage	Spread				Second	First Prior Holding
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Holding	-0.261***	0.018*	0.046***		0.554***	
	(0.039)	(0.011)	(0.016)		(0.132)	
Prior Holding (Merger)				0.308***		0.557***
				(0.072)		(0.078)
Estimation	OLS	OLS	OLS	OLS	IV	IV
Rating-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	–	Yes	Yes	Yes	Yes	Yes
Manager-Industry-Quarter FE	–	–	Yes	Yes	Yes	Yes
Loan Controls	–	Yes	Yes	Yes	Yes	Yes
Observations	138,189	138,175	132,957	132,957	132,957	132,957
R^2	0.356	0.845	0.879	0.879	0.878	0.586
Cragg-Donald F-statistic						1,563

This table examines CLO manager's influence on loan spreads determined in the primary market and displays results from the estimation of

$$Spread_l = \beta Prior\ Holding_{f(l)m} + \kappa_1 X_l + \phi_{f(l)} + \rho_{r(l)t(l)} + \mu_{mi(l)t(l)} + \varepsilon_{lm}.$$

The unit of observation is at the loan - CLO manager (lm) level. The sample restricts that of Table 10 to managers with positive prior holdings that do not maintain a private equity relationship with the firm. The dependent variable, $Spread_l$, measures the loan's spread over LIBOR. $Prior\ Holding\ (Merger)_{f(l)m}$ records a manager's holdings in the firm's outstanding loans obtained through her M&A activity. Column five presents instrumental variable (IV) estimates with $Prior\ Holding\ (Merger)_{f(l)m}$ serving as excluded instrument for $Prior\ Holding_{f(l)m}$. Column six shows the corresponding first stage results. Controls include borrowing firm, $\phi_{f(l)}$, rating-quarter, $\rho_{r(l)t(l)}$, and manager-industry-quarter $\mu_{mi(l)t(l)}$ fixed effects (FE). Further loan controls, X_l, are the logarithm of the loan amount, $\ln Loan\ Amount_l$, the logarithm of the loan's time to maturity, $\ln Maturity_l$, indicators for loans that are covenant-lite, $Covenant\text{-}lite_l$, secured, $Secured_l$, second lien, $Second\ Lien_l$, or sponsored, $Sponsored_l$, and a set of loan purpose fixed effects, $Loan\ Purpose_{p(l)}$. Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 3. CLO Manager Holdings and Non-Spread Loan Prices

	Effective Yield		OID		Underpricing		Break Price	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Prior Holding (Merger)	0.384***		0.216***		0.302***		0.239***	
	(0.078)		(0.070)		(0.113)		(0.058)	
Prior Holding		0.722***		0.407***		0.580***		0.437***
		(0.171)		(0.138)		(0.189)		(0.126)
Estimation	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rating-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Manager-Industry-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	108,883	108,883	108,883	108,883	73,328	73,328	88,387	88,387
R^2	0.910	0.908	0.814	0.812	0.753	0.749	0.812	0.811
First Stage Estimates								
Prior Holding (Merger)		0.531***		0.531***		0.521***		0.547***
		(0.082)		(0.082)		(0.091)		(0.097)
Cragg-Donald F-statistic		1,119		1,119		662		873

This table examines CLO manager's influence on non-spread loan price outcomes determined in the primary market and displays results from the estimation of

$$y_l = \beta Prior\ Holding_{f(l)m} + \kappa_1 X_l + \phi_{f(l)} + \rho_{r(l)t(l)} + \mu_{mi(l)t(l)} + \varepsilon_{lm}.$$

The unit of observation is at the loan - CLO manager (lm) level. With the exception of dependent variables, y_l, sample and definitions follow Table 2. OID_l is the loan's original issue discount. The effective yield is defined as $Effective\ Yield_l = Spread_l + OID_l/4$. The loan's break price, $Break\ Price_l$ is the price relative to par for the first observed secondary market sale of the loan. A loan's underpricing is defined as $Underpricing_l = Break\ Price_l - (1 - OID_l)$. The soft call premium, $Soft\ Call\ Premium_l$, is the the premium over par the borrower has to pay in order to repay the loan prior to the end of the soft call period. In case of soft call premia being staggered over time, $Soft\ Call\ Premium_l$, denotes the initial premium. Absent a soft call provision, the premium is zero. Controls are defined as previously. Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 4. CLO Manager Market Power and Loan Terms - Within Deal

	Spread	OID	Effective Yield	Maturity
	(1)	(2)	(3)	(4)
Prior Holding (Merger)	0.165**	0.350**	0.350**	0.033
	(0.065)	(0.139)	(0.139)	(0.032)
Deal FE	Yes	Yes	Yes	Yes
Manager-Industry-Quarter FE	Yes	Yes	Yes	Yes
Observations	4,919	3,048	3,048	4,919
R^2	0.981	0.980	0.980	0.919

$$\overline{y}_{dm} = \beta \textit{Prior Holding}_{dm} + \delta_d + \mu_{mi(l)t(l)} + \varepsilon_{dm}.$$

The unit of observation is at the deal - CLO manager (dm) level. The sample aggregates the loan-level subsample of Table 2 with more than one first lien secured loan to the deal-level and further restricts it participating managers. Dependent variables, $\overline{y}_{dm}$, capture manager-level deal outcomes. $\overline{\textit{Spread}}_{dm}$ records the participation weighted average spread of a given manager. $\overline{\textit{OID}}_{dm}$, $\overline{\textit{Effective Yield}}_{dm}$, $\overline{\textit{Maturity}}_{dm}$, and $\overline{\textit{Coivenant-Lite}}_{dm}$ constitute corresponding participation weighted averages. $\textit{Prior Holding}_{dm}$ is defined as prior. Controls include deal, δ_d, and manager-industry-quarter, $\mu_{mi(d)t(d)}$ fixed effects (FE). Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 5. CLO Manager Mergers: Manager-Level Portfolio Similarity

	Target			
	Total Portfolio		Loan Portfolio	
Match Level	Issuer	Loan	Issuer	Loan
	(1)	(2)	(3)	(4)
Portfolio Overlap	0.018	0.021	0.021	0.024
	(0.024)	(0.023)	(0.023)	(0.022)
Merger FE	Yes	Yes	Yes	Yes
Target Candidate FE	Yes	Yes	Yes	Yes
Target Candidate Controls	Yes	Yes	Yes	Yes
Observations	2,484	2,484	2,484	2,484
R^2	0.177	0.177	0.177	0.177

This table examines the loan portfolio similarity of CLO managers involved in mergers and displays results from the estimation of

$$Target_{am} = \beta Portfolio\ Overlap_{am} + \kappa X_{mt(a)} + \alpha_a + \varepsilon_{am}.$$

The unit of observation is at the merger-manager (am) level. The sample includes mergers between January 2010 and December 2021 for which both target and acquiror manage at least one CLO at merger announcement. For each merger the set of target candidates is defined as the set of managers with at most double the target's number of CLOs. The dependent variable, $Target_{am}$, indicates the realized target manager with a value of one and takes on the value zero otherwise. All independent variables are measured prior to merger announcement. Columns one and two consider the entire security portfolios while columns three and four restrict portfolios to sample loans. $Portfolio\ Overlap_{am}$ measures the share of a target candidate's portfolio value from either securities that appear in the acquirer portfolio (*Match Level: Security*) or securities issued by firms to which the acquirer is also exposed (*Match Level: Issuer*). Controls include merger, α_a, fixed effects (FE) and Target Candidate Controls, $X_{mt(a)}$. Target Candidate Controls are the log of the manager's total managed assets, $\ln Managed\ Assets_{mt(a)}$, the log of the manager's number of CLOs, $\ln \#CLOs_{mt(a)}$, the asset's weighted average rating, *Avg. Rating*, the fraction of assets rated CCC or below, $Fraction\ CCC\ Bucket_{mt(a)}$, the fraction of asset in default $Fraction\ Defaulted_{mt(a)}$, and the fraction of assets invested in structured finance securities $Fraction\ Structured\ Finance\ Securities_{mt(a)}$. Two-way clustered standard errors at the merger and the target candidate level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 6. CLO Manager Mergers: Security-Level Portfolio Similarity

	Target			
	Total Portfolio		Loan Portfolio	
Match Level	Issuer	Loan	Issuer	Loan
	(1)	(2)	(3)	(4)
$\left\|w^{\text{Target Cand.}} - w^{\text{Acq.}}\right\|$	-0.014	-0.009	-0.029	-0.015
	(0.020)	(0.019)	(0.039)	(0.041)
Merger-Issuer FE	Yes	–	Yes	–
Merger-Security FE	–	Yes	–	Yes
Target Candidate FE	Yes	Yes	Yes	Yes
Target Candidate Controls	Yes	Yes	Yes	Yes
Observations	540,332	697,782	523,562	648,065
R^2	0.251	0.269	0.250	0.262

This table examines the loan portfolio similarity of CLO managers involved in mergers and displays results from the estimation of

$$Target_{ami} = \beta \left| w_{ami}^{Target\ Cand.} - w_{ai}^{Acq.} \right| + \kappa X_{mt(a)} + \alpha_{ai} + \varepsilon_{ami}.$$

The unit of observation is at the merger-manager-issuer (ami) and merger-manager-security level for columns one to three and four to six respectively. The sample is the disaggregated counterpart to Table 5 and includes all issuers (securities) in a target candidate's portfolio. The dependent variable, $Target_{am}$, indicates the realized target manager with a value of one and takes on the value zero otherwise. Columns one and two consider the entire security portfolios while columns three and four restrict portfolios to sample loans. The independent variable $\left|w_{ami}^{\text{Target Cand.}} - w_{ai}^{\text{Acq.}}\right|$ captures the absolute difference between an issuer's (*Match Level: Issuer*) or security's (*Match Level: Security*) portfolio weight in a the target candidate's and the acquirer's portfolio. Controls include merger-issuer or merger-security, α_{ai}, and target candidate fixed effects (FE), μ_m. Target candidate controls, $X_{m(c)t(a)}$, equal those of Table 5. Two-way clustered standard errors at the merger and the target candidate-issuer level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 7. CLO Manager Mergers: Funding and Fee Characteristics

	Target		
	(1)	(2)	(3)
Leverage Ratio	-0.036***		
	(0.007)		
Cost of Debt (in %)		0.004**	
		(0.001)	
ln (Junior Fee)			-0.005**
			(0.002)
ln (Senior Fee)			-0.001
			(0.002)
Vintage-Merger FE	Yes	Yes	Yes
Target Candidate FE	Yes	Yes	Yes
CLO & Target Cand. Controls	Yes	Yes	Yes
Observations	10,193	3,838	6,698

This table examines the fee and funding characteristics of CLOs involved in mergers and displays results from the estimation of

$$Target_{ac} = \beta Funding/Fee\ Characteristics_{ac} + \kappa_1 X_{ct(a)} + \kappa_2 X_{m(c)t(a)} + \upsilon_{v(c)a} + \mu_{m(a,c} + \varepsilon_{ac}.$$

The unit of observation is at the merger-CLO (ac) level. Merger and target candidate sample for the period 2009 to 2019 are constructed analogously to Table 5. For each merger-target candidate the sample contains all outstanding CLOs managed by the target candidate at the time of merger announcement. The dependent variable, $Target_{ac}$, indicates CLOs of the realized target manager with a value of one and takes on the value zero otherwise. All independent variables are measured prior to merger announcement. $\ln(Junior\ Fee)_c$ and $\ln(Senior\ Fee)_c$ are the logarithm of a given CLO's junior and senior fees in basis points. $Leverage\ Ratio_{ct(a)}$ is the ratio of a CLO's equity to the sum of its outstanding debt and equity. $Cost\ of\ Debt\ (in\ \%)_{ct(a)}$ is the average spread on a CLO's debt tranches weighted by the their outstanding par amount in %. Controls include vintage-merger, $\upsilon_{v(c)a}$, and target candidate fixed effects (FE), $\mu_{m(a,c)}$. A CLO's vintage refers to its year of issue. Included CLO controls, $X_{ct(a)}$ are as follows: $\ln CLO\ Assets_{ct(a)}$, the logarithm of the CLO's total assets, $\ln(1 + Remaining\ Active\ Quarters)_{ct(a)}$, the logarithm of one plus the the number of quarters until a CLO's reinvestment end date, $Reinvestment\ Period_{ct(a)}$, an indicator that equals one if the CLO is active, $\ln(1 + Quarters\ to\ Maturity)_{ct(a)}$, the logarithm of one plus the number of quarters until a CLO's legal maturity date, $Callable_{ct(a)}$, an indicator that equals one if the CLO is callable at merger announcement, $Fraction\ CCC\ Bucket_{ct(a)}$, the fraction of a CLO's assets rated CCC or below, $Fraction\ Defaulted_{ct(a)}$, the CLO's fraction of assets in default, and $Fraction\ Structured\ Finance\ Security_{ct(a)}$, the fraction of assets invested in structured finance security. Target candidate controls, $X_{m(c)t(a)}$, equal those of Table 5. Two-way clustered standard errors at the merger and the CLO level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 8. Lending Persistence of CLO Managers

	$\mathbb{1}\{\text{Participation} > 0\}$			$\ln(1 + \text{Participation})$	
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{\text{Prior Holding} > 0\}$	0.493***	0.549***	0.303***		
	(0.006)	(0.006)	(0.009)		
$\ln(1 + \text{Prior Holding})$			0.100***	0.501***	0.569***
			(0.003)	(0.005)	(0.006)
Loan FE	Yes	Yes	Yes	Yes	Yes
Manager-Quarter FE	Yes	Yes	Yes	Yes	Yes
Deal Sample	All	Single Loan	All	All	Single Loan
Observations	482,432	337,393	482,432	482,432	337,393
R^2	0.436	0.469	0.447	0.525	0.561

This table examines the persistence of CLO manager lending and displays results from the estimation of

$$Participation_{lm} = \beta Prior\ Holding_{f(l)m} + \lambda_l + \mu_{mt(l)} + \varepsilon_{lm}.$$

The unit of observation is at the loan - manger (lm) level. The sample includes institutional loans issued between January 2010 and December 2021. The loan sample is restricted to issues for which two quarters prior to issuance at least one active CLO holds a loan of borrowing firm $f(l)$ previously originated by an arranging bank of the new issue. The sample further excludes loans for which no purchases were recorded. The set of CLO managers consists of all managers with at least one active CLO two quarters before loan issuance. Columns two and five restrict the sample to deals with a single sample loan. Dependent variables are measured in the quarter after issuance. In columns one through three, the dependent variable is an indicator equal to one if the manager participates in the loan issue and zero otherwise ($\mathbb{1}\{Participation_{lm} > 0\}$). In columns four and five, the dependent variable is the logarithm of one plus the amount of the issued loan held by the manager in million U.S. dollars ($\ln(1 + Participation_{lm})$). Independent variables are measured two quarters prior to issuance. $\ln(1 + Prior\ Holding_{f(l)m})$ captures the logarithm of one plus the volume of the borrower's previous loans held by the manager prior to issuance in million U.S. dollars. $\mathbb{1}\{Prior\ Holding_{f(l)m} > 0\}$ constitutes an indicator which equals one if the manager has non-zero $Prior\ Holding_{f(l)m}$ and zero otherwise. Controls include loan, λ_l, and manager-quarter, $\mu_{mt(l)}$, fixed effects (FE). Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 9. Relationships and Lending Persistence

Relationship Indicator =	Participation					
	Manager-Bank-Firm (Liab.)		Manager-Bank-Firm (Assets)		Bank-Firm	
Extensive/Intensive Margin	Ext.	Int.	Ext.	Int.	Ext.	Int.
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Holding × Relationship	0.054***	0.048***	0.155***	0.121***	0.118***	0.096***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Prior Holding	0.497***	0.510***	0.408***	0.445***	0.427***	0.458***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Loan FE	Yes	Yes	Yes	Yes	Yes	Yes
Manager-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	395,182	395,182	395,182	395,182	395,182	395,182
R^2	0.446	0.538	0.450	0.541	0.448	0.539

This table examines the influence of relationships on the persistence of CLO manager lending and displays results from the estimation of

$$Participation_{lm} = \beta_1 Prior\ Holding_{f(l)m} \times Relationship_{f(l)m} + \beta_2 Prior\ Holding_{f(l)m} + \beta_3 Relationship_{f(l)m} + \lambda_l + \mu_{mt(l)} + \varepsilon_{lm}.$$

Odd columns (*Ext.*) display extensive margin results with $Participation_{lm} = \mathbb{1}\{Participation_{lm} > 0\}$ and $Prior\ Holding_{lm} = \mathbb{1}\{Prior\ Holding_{lm} > 0\}$. Even columns (*Int.*) display intensive margin results with $Participation_{lm} = \ln(Participation_{lm} + 1)$ and $Prior\ Holding_{lm} = \ln(Prior\ Holding_{lm} + 1)$. The unit of observation is at the loan - manger (lm) level. The sample construction follows that of Table 8 with the modifications that loans are issued between January 2010 and December 2019 and the no prior origination by an arranging bank is required. Common variables are defined as previously. $Relationship_{lm}$ indicates the presence of a relationship. For a given loan, a lead arranger bank constitutes a relationship bank of the firm if the bank acted as lead arranger on at least one of the borrower's previous loans currently outstanding and held by CLOs. A bank and a manager have a liability-side relationship if the bank arranged at least one of the manager's CLOs which is in its reinvestment period and was warehoused by that manager. A bank and a manager have an asset-side relationship if the manager holds a previous loan of the firm that was arranged by the bank. There is a $Manager\text{-}Bank\text{-}Firm\ (Liab.)_{f(l)m}$ relationship if there exists an arranging bank that is a relationship bank with firm $f(l)$ which also has a liability-side relationship with manager m. If a relationship bank of the firm has an asset-side relationship with a manager the firm and the manager are connected by an $Manager\text{-}Bank\text{-}Firm\ (Asset)_{f(l)m}$ relationship. A $Bank\text{-}Firm_{f(l)}$ exists if at least one arranging bank is a relationship bank of the firm. Controls include loan and manager quarter fixed effects (FE) and $Relationship_{lm}$ where not absorbed by the fixed effects. Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Table 10. Information Asymmetries and Lending Persistence

	Participation					
Opacity Indicator =	Small		Rating Dispersion		Private	
Extensive/Intensive Margin	Ext.	Int.	Ext.	Int.	Ext.	Int.
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Holding × Opacity	0.020***	0.038***	0.006*	0.011***	-0.012***	-0.010***
	(0.007)	(0.007)	(0.004)	(0.004)	(0.004)	(0.003)
Prior Holding	0.490***	0.497***	0.492***	0.499***	0.500***	0.506***
	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Loan FE	Yes	Yes	Yes	Yes	Yes	Yes
Manager-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	199,491	199,491	474,560	474,560	482,432	482,432
R^2	0.456	0.547	0.437	0.526	0.436	0.525

This table examines the influence of information asymmetries on the persistence of CLO manager lending and displays results from the estimation of

$$Participation_{lm} = \beta_1 Prior\ Holding_{f(l)m} \times Opacity_{f(l)} + \beta_2 Prior\ Holding_{f(l)m} + \lambda_l + \mu_{mt(l)} + \varepsilon_{lm}.$$

Odd columns (*Ext.*) display extensive margin results with $Participation_{lm} = \mathbb{1}\{Participation_{lm} > 0\}$ and $Prior\ Holding_{lm} = \mathbb{1}\{Prior\ Holding_{lm} > 0\}$. Even columns (*Int.*) display intensive margin results with $Participation_{lm} = \ln(Participation_{lm} + 1)$ and $Prior\ Holding_{lm} = \ln(Prior\ Holding_{lm} + 1)$. The unit of observation is at the loan - manger (lm) level. The sample construction follows that of Table 8 with the modification that no prior origination by an arranging bank is required. Common variables are defined as previously. $Opacity_{f(l)}$ indicates whether the firm is categorized as informationally opaque. Columns one through four are estimated on the subset of public firms and categorize a firm as opaque if the firm falls in the bottom quartile by total assets ($Small_{f(l)}$) or the fraction of net property, plants, and equipment over total assets ($Intangible\ (Borrower)_{f(l)}$). $Intangible\ (Industry)_{f(l)}$ assigns the median fraction of net property, plants, and equipment over total assets in the borrower's industry to the borrower and equals one if the borrower falls into the bottom quartile by that measure. Columns seven and eight are estimated on the subset of borrowers with at least two ratings. $Rating\ Dispersion_{f(l)}$ takes the average distance of the borrower's Moody's, S&P, and Fitch rating from the mean of those ratings and equals one if the firm falls into the fourth quartile by that measure. Controls include loan and manager quarter fixed effects (FE). Clustered standard errors at the manager level are reported in parenthesis below their corresponding point estimates. *, **, and *** denote significance at the 10%-, 5%-, and 1%-level respectively.

Appendices

Appendix A Tables

Table A1. Lending Persistence of CLO Managers - Refinancing

	$\mathbb{1}\{\text{Participation} > 0\}$			$\ln(1 + \text{Participation})$	
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{\text{Prior Holding} > 0\}$	0.338***	0.365***	0.177***		
	(0.006)	(0.007)	(0.008)		
$\mathbb{1}\{\text{Refinanced Prior Holding} > 0\}$	0.218***	0.266***	0.186***		
	(0.005)	(0.006)	(0.008)		
$\ln(1 + \text{Prior Holding})$			0.088***	0.316***	0.338***
			(0.003)	(0.007)	(0.007)
$\ln(1 + \text{Refinanced Prior Holding})$			0.013***	0.267***	0.343***
			(0.004)	(0.005)	(0.006)
Loan FE	Yes	Yes	Yes	Yes	Yes
Manager-Quarter FE	Yes	Yes	Yes	Yes	Yes
Deal Sample	All	Single Loan	All	All	Single Loan
Observations	482,432	337,393	482,432	482,432	337,393
R^2	0.446	0.484	0.456	0.542	0.588

Table A2. Lending Persistence of CLO Managers - Level Specification

	$\mathbb{1}\{\text{Participation} > 0\}$			Participation	
	(1)	(2)	(3)	(4)	(5)
$\mathbb{1}\{\text{Prior Holding} > 0\}$	0.493***	0.549***	0.451***		
	(0.006)	(0.006)	(0.006)		
Prior Holding			0.005***	0.368***	0.429***
			(0.000)	(0.006)	(0.009)
Loan FE	Yes	Yes	Yes	Yes	Yes
Manager-Quarter FE	Yes	Yes	Yes	Yes	Yes
Deal Sample	All	Single Loan	All	All	Single Loan
Observations	482,432	337,393	482,432	482,432	337,393
R^2	0.436	0.469	0.442	0.472	0.508

Table A3. CLO Manager Mergers: Target vs. Target Candidate CLO Refinancing

	CLO Refinanced/Called			
	(1)	(2)	(3)	(4)
Target × Post	0.019***	0.018***	0.018**	0.020**
	(0.007)	(0.007)	(0.007)	(0.008)
Target	-0.004*	-0.006**		
	(0.002)	(0.002)		
Quarter-Merger FE	Yes	–	–	–
Vintage-Quarter-Merger FE	–	Yes	Yes	Yes
Manager-Merger FE	–	–	Yes	–
CLO-Merger FE	–	–	–	Yes
CLO Controls	Yes	Yes	Yes	Yes
Observations	213,877	212,286	212,286	212,286
R^2	0.057	0.127	0.146	0.216

Table A4. CLO Manager Mergers: Acquirer vs. Target Candidate CLO Refinancing

	CLO Refinanced/Called			
	(1)	(2)	(3)	(4)
Acquirer × Post × # Target Refi / # Acq. CLOs	-0.029***	-0.046***	-0.049***	-0.061***
	(0.009)	(0.011)	(0.014)	(0.016)
Acquirer × Post	-0.004	-0.004	-0.004	0.003
	(0.004)	(0.004)	(0.004)	(0.004)
Acquirer × # Target Refi / # Acq. CLOs	-0.016*	0.000		
	(0.008)	(0.009)		
Acquirer	0.006***	0.007***		
	(0.002)	(0.002)		
Quarter-Merger FE	Yes	–	–	–
Vintage-Quarter-Merger FE	–	Yes	Yes	Yes
Manager-Merger FE	–	–	Yes	–
CLO-Merger FE	–	–	–	Yes
CLO Controls	Yes	Yes	Yes	Yes
Observations	176,081	174,689	174,689	174,689
R^2	0.061	0.137	0.155	0.219