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: Banks, Leveraged Loans, Loan Underwriting, CLOs, CLO Manager Mergers
JEL Classification: G14, 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 recent legal case, which the loan market's advocacy group warned will "jeopardize a trillion-dollar market that is vital to the economy," the U.S. Court of Appeals had to answer whether these loans should in fact be treated as public securities.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 (Rajan, 1992; Sharpe, 1990). Because of the hold-up 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.[1]

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]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 United States. To illustrate, in 2024 risky firms raised $1.22 trillion in institutional term loans compared to $233 billion in bonds (White & Case, 2025).

Regulatory capital requirements make it costly for banks to hold risky loans (Irani, Iyer, Meisenzahl, and Peydró, 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, Malherbe, and Meisenzahl, 2020).

Nonbanks that account for significant demand for a given loan may internalize the fact that their lending 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 pre-existing 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%, followed by banks with 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.[2]

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 12.7 basis point higher credit spread and a 7.1 basis point higher original issue discount. Taken together the borrower experiences an increase in cost of debt of 15.0 basis points. These numbers constitute a significant increase in

[2]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.

a borrower's funding costs, comparable to market power effects measured in the relationship banking literature.

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.

Next, I turn to the mechanism that yields market power to CLO managers. A necessary condition for market power is that the bank cannot costly replace a nonbank's funds with other capital. Therefore, I ask, what impedes banks from substituting for a nonbank's funds?

Motivated by the importance of private information in traditional bank lending (Rajan, 1992; Sharpe, 1990), I turn to the role of information in institutional loan underwriting. I argue that information asymmetries *across* nonbanks create a hold-up problem for the bank, which makes 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.

Importantly, I observe information asymmetry effects in loan pricing. Consistent with the arranging bank experiencing a hold-up problem, market power effects are more pronounced for high information asymmetry borrowers. For example, loans of borrowers with a high

degree of rating disagreement are more than 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 43.5 basis points.

Lastly, I return to the question of my instrument's validity. 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.

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.[3] 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, Nanda, and Warther, 2005; Drucker and Puri, 2005; Yasuda, 2005). Especially important for my work are Bharath, Dahiya, Saunders, and Srinivasan (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, Dahiya, Saunders, and Srinivasan (2011) and relate this persistence to information asymmetries of the borrower.

My work further connects to papers on information asymmetries between the arranging bank and other syndicate members (Gopalan, Nanda, and Yerramilli, 2011; Ivashina, 2009; Sufi, 2007). 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, Saunders, Scalise, and Udell, 1998; Erel, 2011; Fraisse, Hombert, and Lé, 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

[3] 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).

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, Gopal, Gutiérrez, and Hillenbrand (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 (Bord and Santos, 2015; Nadauld and Weisbach, 2012; Shivdasani and Wang, 2011). Fleckenstein (2022) ties the cyclicality in nonbank lending to agency frictions of CLOs. Bhardwaj, Ge, and Mukherjee (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 (Bhardwaj, 2021; Bozanic, Loumioti, and Vasvari, 2018; Elkamhi and Nozawa, 2022; Kundu, 2022b). 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 prices and thus concerns borrower outcomes.

The remainder of this article is structured as follows. Section 2 presents the data and Section 3 gives some institutional background. Section 4 studies the extent to which CLO

managers have market power. Section 5 studies the source of CLO managers' market power. Section 6 investigates the determinants of mergers in the CLO industry and provides evidence on the instrument's validity. Section 7 concludes.

2 Data Sources

My analysis primarily draws on data from four sources: CLO security-level portfolio holdings data from LSEG LPC Collateral, CLO issuance and liabilities data from PitchBook | LCD, hand-collected information on mergers and acquisitions (M&A) in the CLO industry, and loan origination data from LSEG Loan Connector. I reference data from other sources in the analysis.

First, I obtain CLO security-level portfolio holdings data from LPC Collateral which LSEG collects from CLO trustee reports. For quarters in which a CLO has multiple reports available, I include only data from the last report. Besides holding amounts, I retrieve current credit ratings issued by the credit rating agencies Moody's, S&P, and Fitch. For comparability, rating references are made at the S&P scale.

Second, I employ CLO issuance data from LCD, formerly S&P Leveraged Commentary & Data. I link CLOs in LPC Collateral to LCD using a fuzzy string match for which I individually verify the match validity. Where possible, I manually supplement matches for the unmatched remainder. I account for renamed CLOs due to reissues, resets, or other name changes.

Third, I hand-collect data on M&A events that result in the transfer of CLO management responsibilities. Formally, a CLO manager is the legal entity to which a CLO assigns portfolio management rights per its collateral management agreement. Transactions that transfer CLO management rights follow either a management replacement deal or as a platform deal structure. In a platform deal, the acquirer obtains control rights over a CLO manager. Thereby, the acquirer implicitly assumes the management rights of its new subsidiary without changes to the acquired manager's collateral management agreements. Alternatively, in a replacement deal collateral management agreements are amended to assign management rights from the current manager to a new replacement manager. In contrast to platform deals that confer all management rights of a manager, replacement deals allow for a subset

to be transferred. However, the amendment of each CLO's collateral management agreement requires the separate approval of CLO noteholders.[4]

To collect a historic record of M&A transactions, I begin with the set of CLO managers at issuance captured by LCD. For each manager, I search through their available historic press releases for public statements referring to such transactions. I complement my results with a news search of CLO industry publications, major general financial news outlets, and LexisNexis. Lastly, I identify transactions from SDC's M&A database. This search yields platform deals and large replacement deals. Small replacement deals frequently lack public statements or news coverage. For these deals, I utilize the fact that amendments of collateral management agreements may trigger a credit rating review and I collect transactions from associated announcement by Moody's and Fitch.

Fourth, I collect leveraged loan origination data from Loan Connector. LSEG loan identification numbers (LINs) provide a common loan identifier between the origination data and CLO holdings data. For missing loan characteristics, I supply the corresponding information recorded in LPC Collateral.

I study CLO managers, arranging banks, and borrowers at their highest level of corporate aggregation. This choice accounts for joint loan investment decisions by CLO manager subsidiaries of the same parent. Specifically, some CLO managers established subsidiaries in response to risk retention requirements which the parent controls through shared services and staff agreements. Corporate ownership information stems from S&P NetAdvantage, the CLO manager's website, and references made in industry publications. I obtain further parent identities as a byproduct of collecting my M&A sample. To aggregate banks, I use the lender link table provided by Schwert (2018). I aggregate public corporate borrowers with the help of the Chava and Roberts (2008) Compustat link table.

[4]Rarely, replacements occur for reasons other than acquisitions. One reason can be the trigger of a key-man provision. For example, in 2005, four of the six CLOs managed by Kohlberg & Co subsidiary Katonah Capital allowed noteholders to redeem upon a key-man's departure unless Kohlberg proposed a suitable replacement manager. Even though Kolberg and Allied Capital had previously agreed on the sale of Katonah, the trigger of this provision forced Kohlberg to find new managers. Ultimately, Blackstone and two other managers replaced Katonah. Allied Capital terminated the merger. For details see institutionalinvestor.com/article/b150nn7x1zbz75/a-key-womans-leverage.

3 Institutional Background

The leveraged loan market first received the attention of regulators at the start of the 1990s due to concerns over commercial banks' involvement in "highly leveraged transactions." Since then, supervisory scrutiny and risk-based capital requirements have imposed significant regulatory costs on banks for high-yield corporate debt held on their balance sheets. In response, banks largely retreated from funding term loans of large, risky firms. Nonbank financial institutions filled this gap and have since become the dominant source of capital for term loans in the leveraged loan market.

Today, institutional loan issuance outstrips that of the bank-funded market segment. Figure 1 shows that institutional loan volumes have exceeded those of bank term loans by more than eight-fold since the Great Financial Crisis. During that period, the institutional loan market has even surpassed its public market counterpart, with nearly double the issuance volumes of high-yield bonds. Thus, as annual issuance volumes approach a trillion dollars, the institutional loan market has become the principal source of debt capital for sub-investment grade corporate borrowers in the United States.

Despite these structural changes, banks remain central to the modern leveraged loan market. As reliance on traditional commercial bank lenders declined, the market transitioned to an underwrite-to-distribute model. Rather than fund loans directly, banks now primarily fulfill an investment bank function. In their capacity as loan arrangers, banks market loans on behalf of corporate issuers to nonbank lenders.

To compete for a borrower's loan mandate, banks propose preliminary terms and conditions which form the foundation of the subsequent negotiation between the borrower and the selected arranger. At the end of their negotiation, the term sheet contractually formalizes loan pricing and other key contract terms. Importantly, at this time, the arranger of an underwritten deal guarantees that the borrower will receive the full loan amount after syndication. Only then, the arranger begins to market the loan.

This sequence of events exposes the arranger to substantial underwriting risk. Because contract terms are agreed upon before demand discovery, loan terms are negotiated based on anticipated rather than realized demand for a loan. Consequently, market clearing terms may deviate from those initially negotiated due to misjudged demand expectations during

negotiation or due to changes in market conditions during syndication. If such ex-post loan mispricing precludes syndication of the entire loan, the loan amount guarantee made to the borrower requires the arranger to fund any unsold remainder. Providing these funds directly is costly for the arranger because of the high regulatory capital charges associated with these risky loans.

To reduce this pipeline risk, the arranger is permitted to adjust loan pricing, and occasionally other terms, during syndication. However, the arranger must forfeit a portion of their underwriting fees in return when they make lender-friendly loan term adjustments. By ensuring that the arranger participates in the increased cost of borrowing, this risk-sharing agreement prevents the bank from simply changing a loan's terms against the borrower and helps to align the arranger's incentives with those of the borrower.

4 The Market Power of CLO Managers

Unless the arranger can freely compensate for a shortfall of funds from one nonbank with funds from another, a nonbank's investment decision represents a risk to the arranger. If a nonbank lender recognizes that their investment decision imposes an externality on the bank, the nonbank may be able to command more favorable loan terms. These represent an economic rent to the nonbank. Thus, I refer to this capacity of the nonbank to attain more lender-friendly loan terms as market power.

The amount of market power that a nonbank can exert depends on the extent to which a loan's funding is exposed to the nonbank's lending decision. This funding risk is captured by the size of the shortfall that the nonbank would induce if they withheld anticipated funds. Therefore, the expected loan demand from a nonbank, as anticipated by the arranger during negotiations with the borrower, measures the risk from that nonbank.

Many factors can influence an investor's loan demand which generally makes demand difficult to predict. For instance, major factors include current market conditions, the investor's overall portfolio size, information disclosed about the firm, and investment restrictions faced by the investor. However, for a borrower with outstanding loans, the arranger has access to valuable additional information about loan demand: the nonbank's current holdings of the borrower's previously issued loans.

The reason is that nonbank lending is highly persistent for a given firm. Figure 2 illustrates this for CLO managers, which are my nonbanks of interest. This scatter plot maps holdings in a borrower's outstanding loans just before a new loan syndication against the CLO manager's subsequent primary market investment in the new issue, i.e., their primary allocation. The distinct positive relationship between these variables indicates strong explanatory power of prior holdings for the intensive margin of that nonbank lending. To distinguish the extensive margin, I further include a binned scatter plot. Its first bin contains observations without prior holdings, while the other 19 bins split the remaining sample into equal-sized groups. Importantly, each bin contains observations both with and without primary market participation.[5] Overall, the inclusion of CLO managers that do not invest attenuates the relationship only modestly, which implies a high probability of continued investment by CLO managers that have prior holdings. In contrast, CLO managers without existing exposure to the borrower provide almost no funds on average.

Because of the presence of an active secondary loan market, a nonbank's holdings of a loan reflect their current demand for that loan. While frictions, such as trading costs or institutional constraints like CLO covenants, mean that holdings may reflect demand only approximately, a nonbank will act on sufficiently large deviations by trading the loan. A borrower's outstanding loans and their new loan are similar debt instruments since they represent promises by the same firm so that the same assets secure both loans. Hence, nonbanks' revealed demand for outstanding loans provides valuable information about nonbank funding for a new issue.

In **??**, I examine the pattern displayed in Figure 2 formally. I find strong evidence of lending persistence even when I restrict tests to within-loan variation. Thus, differences in loan characteristics do not drive this result. Importantly, lending persistence is also not explained by the presence of common relationship banks that form relationships with both corporate borrowers and nonbanks. Moreover, nonbank diversification motives that might counteract this relationship do not constitute a concern because most repeat issues in the leveraged loan market refinance outstanding loans.[6]

In summary, a nonbank's investment decision imposes a cost if an arranger cannot freely

[5] Individual observations without primary allocation are not discernible as they cluster on the x-axis.
[6] In **??**, I show that holdings strongly predict investment decisions even absent refinancing.

substitute between funds of different nonbank lenders. This potential externality may enable the nonbank to command more lender-friendly loan terms. Although the extent to which a loan relies on funding from any specific nonbank is unobservable, a nonbank's prior holdings of the borrower's outstanding loans strongly predict a nonbank's subsequent investment. Therefore, I measure a loan's exposure to funding from a given nonbank as the nonbank's dollar holdings prior to the start of syndication.

Notably, my measure intentionally deviates from share-based measures of market power commonly used in the literature. Ultimately, the incremental dollar amount that the arranger may need to retain or raise from other investors if a nonbank withholds funds determines the cost imposed on the arranger. This cost depends on the absolute size of the funding shortfall but 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).

4.1 Empirical Design

Like U.S. public securities offerings, primary market offerings in the leveraged loan market follow uniform pricing. This means that primary allocations are sold to all investors at identical primary market terms. Thus, market power effects cannot be identified from within-loan variation. Instead, I compare outcomes across loans relative to their differential exposure to a given CLO manager for loans issued by firms in the same industry in a given quarter, after controlling for quarterly rating-implied credit risk premia. Formally, I estimate the model

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

This specification explains loan contract outcomes, y, for institutional term loans, l, in my sample. The variable of interest is *Prior Holding* which is my measure of CLO manager m's market power with respect to borrower $f(l)$'s loan. Specifically, this variable captures a CLO manager's total dollar holdings in the borrower's outstanding loans, expressed in million U.S. dollars, prior to the syndication of the new loan. I record these holdings two quarters before the new loan becomes effective. This two-quarter lag ensures that holdings are measured before the syndication begins and, therefore, that they are not a short-term response to the

syndication itself.[7]

In addition to my variable of interest, I include manager-industry-time fixed effects, μ. These fixed effects ensure that I compare loans outcomes for loans issued by firms in the same industry i during quarter t relative to their exposure to the same CLO manager. This restriction to within-CLO manager-industry-quarter variation controls for time-varying industry-level loan demand. The inclusion of rating-quarter fixed effects, ρ, further removes differences in loan outcomes due to time-varying credit risk premia at the rating level, r. Firm fixed effects, ϕ, control for time-invariant borrower characteristics. Finally, I include a set of non-price loan controls, X, which I list in Table 2.[8] Inference is based on two-way clustered standard errors that are clustered at the CLO manager level, i.e., the unit of randomization (Abadie, Athey, Imbens, and Wooldridge, 2023), and at the loan level to account for correlation in the error term induced by uniform loan pricing.

Ordinary least squares (OLS) estimates of my model would recover the true parameter value of interest if there are no confounding factors that vary with a CLO manager's loan holdings within an industry that simultaneously affect loan pricing. For instance, this condition might hold in a Capital Asset Pricing Model world where an investor's holdings reflect portfolio weights of the market portfolio scaled by the investor's portfolio size. However, the assumptions needed to generate such portfolios arguably poorly approximate the leveraged loan market.

My principal concern is that a CLO manager may have private beliefs about the quality of a given borrower. These private beliefs could simultaneously affect her current holdings as well as new loan terms. For example, a CLO manager with positive beliefs about a borrower, i.e., the CLO manager believes that the expected loss of the loan under the risk-neutral measure is lower than market prices imply, would hold relatively more of that borrower's outstanding loans. At the same time, the CLO manager would have a higher willingness to pay for the borrower's new issue which would make the CLO manager more prone to give in

[7] With the caveat that syndication times are available for only a small subset of my sample, the median syndication takes 56 days from the date the arranger receives the mandate to the date that the loan becomes effective. These estimates resemble those of prior studies and industry figures.

[8] I argue that these loan terms are not jointly determined with a loan's pricing because they are set before and not a result of the syndication. In **??**, I examine the effect of CLO manager market power on these terms. I find neither statistically nor economically significant effects. Typically, these loan terms are final before the start of underwritten syndications, which may explain the lack of detectable effects.

to borrower-friendly loan terms.

To disentangle the effects of market power from those of private beliefs, I construct a new instrument. Inspired by a literature that uses bank mergers as an instrument to identify market power effects in bank lending (e.g., Garmaise and Moskowitz, 2006; Giannetti and Saidi, 2019), I utilize variation from mergers in the CLO industry. Specifically, I propose that shifts in funding exposure due to mergers between CLO managers satisfy the requirements necessary to serve as a valid instrument.

For an instrument to be valid, it must satisfy both exclusion restriction and relevance. Since an instrument's relevance is inherently testable, I demonstrate that my instrument satisfies this condition alongside my main results. In contrast, the exclusion restriction requires a more detailed justification. The identifying assumption for the instrument to be excluded is that holdings obtained through mergers affect loan pricing only through additional nonbank market power. The main concern for this assumption is that merger-obtained holdings could also be correlated with private beliefs. This would be the case, for example, if acquirers select merger targets based on their loan portfolios. However, this concern does not reflect CLO managers' merger decisions during the period of this study.

My argument is that acquirers pick targets based on their CLO liabilities, rather than their assets. Targets appear constrained in their CLO issuance, and their CLOs face high cost of debt. Mergers create value by refinancing these debt tranches at a lower cost. To my knowledge, mergers in the CLO industry have not yet been studied in the literature. As a result, I am unable to point to earlier work as a reference for this claim. Instead, I provide supporting evidence as an additional contribution in this paper. However, in the interest of proceeding to the main market power results, I delegate this necessary discussion on the instrument's exclusion restriction and related details on mergers in the CLO industry to Section 6.

To construct the instrument, I begin with my hand-collected sample of CLO management changes. From this sample, I exclude transfers where both the acquirer and the seller continue to independently manage U.S. CLOs after the transaction. Individual CLO portfolios are less diversified than a CLO manager's total managed portfolio. Therefore, loan portfolios are more likely to be a meaningful factor in the selection of specific CLOs. To avoid these

concerns, I exclude such non-merger acquisitions. Specifically, I define an ownership change as a merger if the acquirer assumes all of the target's active U.S. CLOs. This definition includes partial sales where 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 and leveraged loan markets. The latter case allows acquirers to decline the assumption of CLOs that currently wind down.

4.2 Main Results

The most salient contract term of leveraged loans is their credit spread. Thus, I begin my analysis by examining the extent to which CLO managers exert market power over this price term. Table 2 presents the estimation results of the specification in Equation 1 with the credit spread as the outcome variable. Column 1 shows the first-stage estimates corresponding to my preferred two-stage least squares (2SLS) specification and demonstrates that loans obtained through a CLO manager's merger activity significantly shift the variable of interest. The coefficient estimate is statistically significant at 0.556. This means that if a CLO manager through a merger obtained \$100 in loans of Borrower A and no loans of control Borrower B in the same industry, in expectation holds \$55.6 more of Borrower A's loans than Borrower B's loans prior to their concurrent new loan issues. Importantly, the Cragg-Donald F-statistic rejects that the instrument is weak at conventional levels. Hence, the instrument satisfies the relevance condition.

Column 2 presents 2SLS estimates of my baseline specification. The coefficient estimate on *Prior Holding* is positive and statistically different from zero. Economically, the point estimate of 0.761 implies that a one-standard-deviation increase in my market power measures raises spreads by 12.67 basis points (bps) on average. This result supports the hypothesis that CLO managers that expose banks to funding risk have market power to command lender-friendly loan terms.

While I treat the most tightly controlled specification as my baseline, I present results with less stringent controls in Columns 3 to 5. The specification in Column 3 replaces CLO manager-industry-quarter fixed effects with CLO manager-quarter fixed effects. This removes the requirement for the control group to consist of borrowers from the same industry. The Column 4 specification excludes loan controls and rating-quarter fixed effects. In both

cases, the resulting estimates are statistically significant and of a similar magnitude to the baseline. Lastly, the specification in Column 5 excludes borrower fixed effects. Absent borrower fixed effects, the estimate remains statistically significant and increases. Under this specification, a one-standard-deviation increase in market power results in a credit spread increase of 20.56 bps.[9]

Next, I investigate whether CLO managers exert market power over loan pricing through terms other than the spread in Table 3. Column 1 presents estimates for the original issue discount (OID). The OID represents a loan's primary market price as the discount to par. I find that a one-standard-deviation increase in market power leads to an average increase in the OID of 7.09 bps. Because an increase in the OID means that primary allocations are sold at a lower price, this implies, all else equal, a higher expected return on the loan for primary market participants.

To measure a borrower's total cost of a loan, the effective yield combines the credit spread and OID. The extent to which the OID increases a loan's yield depends on the loan's expected time to repayment. Leveraged loans almost universally grant the borrower the option to prepay at any date, which most firms exercise well before a loan's maturity. Despite a median time-to-maturity at origination of slightly more than six years in my sample, a common assumption is that these loans will be called three years after origination. Under this three-year effective maturity assumption, a simple measure of a loan's effective yield evenly distributes the loan's OID over the three years and adds this component to the loan's spread. The estimate in Column 2 implies that a one-standard-deviation increase in market power raises the effective yield by 15.0 bps. This magnitude closely mirrors that obtained from the separate credit spread and OID estimates.[10]

Market power effects are also present in loans' call provisions. Leveraged loans near-universally come with an early repayment option. To reduce the value of this option, lenders may equip a loan with a soft call provision. Unlike hard call provisions of bonds, which preclude borrowers from calling a bond before some cutoff date, soft call provisions still permit the borrower to call the loan at any date. However, the borrower must pay a premium over par, referred

[9]For reference, I provide OLS estimates in **??**. Consistent with private beliefs introducing a negative bias, the estimates are smaller in magnitude.

[10]In **??**, I reestimate Table 3 without borrower fixed effects which, as for spreads, raises market power estimates.

to as the soft call premium, when they call the loan before the end of its soft call period. My results in Columns 3 and 4 imply that CLO manager's market power increases both soft call premia and soft call periods. A one-standard-deviation increase in market power leads to an expected increase in the soft call premium of 2.32% and lengthening of the soft call period by 5.0% relative to the average. This effect decreases the value of the borrower's prepayment option and thereby increases primary market investors' expected return.

Lastly, I investigate whether secondary market prices react to market power-induced loan terms. In particular, I study the effect on loan underpricing. Loan underpricing refers to the return from selling a primary allocation at the "break price," which is the price on a loan's first secondary market trade. I calculate the break price from CLO transactions within six months of origination as the price of the first sale to an unaffiliated party.[11] In Column 5, I find that market power effects indeed appear in secondary market valuations through higher underpricing. A one-standard-deviation increase in market power leads to 13.37 bps higher loan underpricing, which represents a large 28.1% increase over the average. Thus, CLO managers have market power in the primary market to purchase the loan from the borrower at a lower price than that subsequently asked for in the secondary market.

Importantly, this finding adds additional credibility to my identification strategy. Due to uniform pricing, identification must come from outcome comparisons across loans. Thus, it is conceivable that I observe higher borrowing costs not because of market power, but rather as compensation for some unaccounted risk factor that correlates with my instrumented market power measure. However, if my primary market results were indeed the result of priced risk, this risk would also be reflected in the pricing of arm's-length secondary market transactions. The fact that, instead, I find an effect on underpricing commensurate to that on primary market pricing rules out alternative risk-based explanations of my findings.

[11] In general, CLOs must obtain primary allocations through secondary market purchases to maintain their pass-through vehicle status. These purchases convey no open market information, as they occur at pre-agreed primary terms. Nonetheless, they may appear in transaction reports. To exclude these de facto primary market transactions, I remove all purchases from the trade sample. Further, I require that the loan is sold to an unaffiliated party because trades between CLOs managed by the same manager may not resemble arm's length transactions. Since CLOs do not disclose trade counterparties, I exclude trades where another CLO of the same manager purchases the loan within six months of the sale. Finally, to limit the influence of other post-primary market events on my results, I remove trades that occur more than six months after the loan becomes effective. The median break price in my sample is recorded after 45 days, and the distribution of break prices closely matches that of Bruche et al. (2020).

5 Sources of Market Power

TO BE FINALIZED

6 Mergers in the CLO Industry

In the preceding analysis, I have have posited that variation from mergers between CLO managers provides a valid instrument to identify nonbank market power in the origination of leveraged loans. In Section 4, I established the instrument's relevance. To justify the instrument's exclusion restriction, I study the determinants of mergers in the CLO industry in this section.

Recall, for the instrument to satisfy the exclusion restriction, I require that merger-induced changes in a loan's funding exposure to a CLO manager are uncorrelated with the manager's private beliefs about borrower quality. The main concern is that such correlation could arise if acquirers' private beliefs also affect merger target selection. However, I find that portfolios do not drive target selection. Instead, acquirers select targets that face constraints in their ability to issue CLOs.

I provide five pieces of evidence that, taken together, support my identifying assumption. First, I show that in the time-series high M&A activity often coincides with difficult CLO issuance conditions. Second, three-quarters of public merger statements cite improved access to capital as a motivation for the merger, while only three statements contain any reference to the target's loan portfolio.[12] Third, I provide direct evidence that targets are indistinguishable from other similarly-sized managers based on their portfolio composition. Fourth, expensive CLO liabilities distinguish targets instead. Fifth, post-merger, acquirers refinance these expensive debt tranches.

6.1 The History of Mergers in the CLO Industry

Figure 3 compares the annual number of U.S. CLO management changes from 2007 to 2023 against new CLO issuance volumes. Following the Global Financial Crisis issuance conditions

[12] Although these references are very general in nature, I have excluded these mergers from my sample when constructing the instrument.

were unfavorable to new CLOs. Issuance halted for nearly two years during which the CLO industry quickly consolidated. Only after the emergence of a new CLO structure[13] had restarted the market for new CLOs by the end of 2010, M&A activity began to subside again leading to only a single merger in 2013 and 2014.

M&A activity saw a sudden resurgence in 2015 after U.S. regulators had ruled that CLOs were subject to risk retention requirements under the Dodd-Frank Act. These "skin-in-the-game" provisions stipulated that CLO managers must retain at least five percent of a CLO's value. In response, many CLO managers sought access to institutional capital or to exit the market. Simultaneously, issuance steeply fell as CLO managers had to build up capital prior to the rule's implementation.

Risk retention requirements came into effect at the end of 2016. However, ultimately, these rules were only short-lived. A lawsuit won by the LSTA in 2018 reversed their application to CLOs and which was followed by high CLO issuance. Issuance only declined again in mid-2019 and into 2020 due to the COVID-19 pandemic. During this time M&A activity nearly reached levels seen during the Financial Crisis.

During a brief recovery in 2021, merger activity fell again until the start of the recent monetary tightening cycle. Since then, CLO issuance has been low while M&A activity has stayed elevated at all-time-high levels.

In summary, merger activity in the CLO industry responds countercyclically to CLO issuance which is the first evidence that CLO funding conditions are a key determinant of mergers.

6.2 Merger Rationales from Public Statements

Next, I take a narrative approach to study what motivates CLO manager mergers. For the mergers in my sample, I collect public statements that accompany these transactions. I find statements for 50 mergers. For each public statement, I identify comments on the motivation for the merger. I classify these comments into five broader categories: outside investor access, equity constraints, other non-U.S. CLO business lines, cost synergies and operations, and loan portfolio consideration. I remove five mergers for which statements

[13]This post-crisis generation of CLOs is referred to as CLO 2.0.

contain only universal comments.[14]

Figure 4 shows the share of mergers that reference each comment and category. In 71% of mergers, CLO managers cite improved investor access as a reason for the merger, which makes this the most frequent category. Almost half of all mergers claim that this is the result of increased scale. For example, in reference to their acquisition of Gulf Stream Asset Management, a representative of Apollo Global Management 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."* Other reasons include enhanced investor relationships, cited in 33% of mergers, and better distribution channels, mentioned in 20%. The second most common category is improved equity access, cited in 55% of mergers. This category includes 9% of mergers that directly reference capital needs due to risk retention requirements.

In contrast, the least frequent of the five categories concerns loan portfolios. In fact, only five statements make any reference to these assets. Of the five statements, two argue that the acquisition will diversify the portfolio. Diversification, in itself, is consistent with the exclusion restriction, as long as the diversification motive is orthogonal to private beliefs within an industry. Three mergers contain general statements about the fit of the target's assets. To illustrate, one acquirer noted that the target's 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."* In another case, the acquirer claimed that the *"assets are complementary to our existing CLO portfolios."* None of these statements explain the source of complementary, and all but one also prominently cite other considerations. Therefore, it is unclear whether these mergers would pose a problem to the instrument's validity. Nonetheless, I have excluded these mergers in the construction of my instrument.[15]

[14]The ten mergers without public statements involve smaller targets, and their contribution to my instrument is limited. In four of those cases, the involved parties declined to comment, while references to the other mergers appear only in in public reports. Universal comments include, for example, the expectations of high returns for investors.

[15]In practice, I obtain slightly smaller estimates when I include these mergers. Nonetheless, the statistical or economic significance of my results remains unchanged.

6.3 Testing Portfolio-based Target Selection

Now, I proceed to directly examine the role of loan portfolios in merger target selection. I test if their loan portfolio distinguishes the target from other CLO managers in this set, conditional on the loan portfolio of the acquirer. For this exercise, I define a set of counterfactual similar-sized target candidate CLO managers. For each merger, I include a manager in this set if they manage between half and double the number of CLOs as the target at merger announcement. Note that the unobserved actual candidates that an acquirer had considered would not be the correct counterfactual group because these CLO managers may already have been selected for their loan portfolios.

In Table 6, I present statistics for the acquirer, the target, and the target candidates. By construction, target and target candidates have a similar size when measured by the number of CLOs under management or the number of loans in their portfolio. Furthermore, targets and target candidates are comparable by portfolio metrics that I did not select on. Importantly for my instrument, target and target candidates portfolios appear on average similar in their portfolio alignment with the acquirer in terms of overlap and portfolio similarity as measured by the cosine similarity.

To formally test whether the target's portfolio alignment with the acquirer statistically separates the target, and to control for other factors that potentially could mask an effect, I estimate the linear probability model

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

The dependent variable, *Target*, is a dummy variable that equals one for the realized target manager, m, in acquisition, a, and zero for non-selected target candidates. I consider two measures of portfolio alignment with the acquirer. First, *Portfolio Overlap* measures the value-weighted share of loans that a target candidate portfolio has in common with the acquirer. Second, *Portfolio Similarity* measures the cosine similarity between portfolio weight vectors of the target candidate and of the acquirer. This metrics captures differences in portfolio tilts towards the acquirer at the intensive margin. As controls, I include merger fixed effects, α, to absorb factors common to all target candidates such as the acquirer's portfolio specificity relative to all target candidates. Lastly, I include a set of control variables, X,

which I list in Table 7.

Panel A in Table 7 displays the estimates of Equation 2. Column 1 and Column 2 show that neither portfolio overlap nor portfolio similarity can statistically distinguish the target when I compare portfolios at the loan level. The coefficients are positive but statistically indistinguishable from zero. The implied size of the economic effect is small. For portfolio overlap, a target candidate with an overlap equal to the 75th percentile of the distribution is only 0.25 percentage points more likely to be the realized than an otherwise equal CLO manager with an overlap equal to the 25th percentile. This effect is even smaller for the portfolio similarity. Column 3 and Column 4 find similarly small magnitudes for portfolio alignments measured at the loan issuer level.

However, manager-level portfolio measures are potentially too coarse to distinguish the targets. To address this concern, I use the granularity of my data and I expand my sample to the the merger-CLO manager-loan/issuer level. I estimate the linear probability model

$$Target_{am} = \beta Portfolio\ Alignment_{al} + \alpha_{al} + \kappa X_{mt(a)} + \varepsilon_{aml}, \tag{3}$$

on the sample of loans/issuers held by the acquirer. I again consider two measures of portfolio alignment. *Shared Loan/Issuer* is an indicator that equals zero except for loans held by both target candidate and acquirer. The second measure is the negative absolute difference between the target candidate's portfolio weight, w, and the acquirer's portfolio weight, w^A. For comparability to the earlier tests, I take the negative so that an increase signifies a closer portfolio alignment with the acquirer. I now include merger-loan fixed effect, α_{al} to average out acquirer-specific portfolio idiosyncrasies at the loan level. This set of fixed effects also controls for any loan characteristic at time of merger announcement. Finally, I include the same vector of CLO manager characteristics as in previous manager-level tests.

Panel B in Table 7 tabulates the resulting OLS estimates. Despite the additional statistical power of these tests, target loan holdings continue to be indistinguishable from those of other CLO managers. Again, this holds true for both portfolios considered at the loan level in Columns 1 and 2, and the issuer level in Columns 3 and 4. The absence of an effect is independent of the sample definition in this specification. **??** shows that loan holdings fail to predict merger selection under alternative sample definitions that include all outstanding

loans, loans in the acquirer's or the target candidates' portfolios, or only loans in the pricing sample.

Overall, the fact that loan portfolio considerations do not appear to be prominent determinants of mergers is perhaps not surprising. To prevent risk shifting, CLO noteholders require that a CLO must maintain very high levels of diversification through covenants that tightly restrict portfolio concentration (Kundu, 2022a). Typical concentration limits dictate individual borrower exposures below 2%, industry exposures below 15%, and CCC-rated high credit risk exposures below 7.5%. Additional requirements like industry diversity score tests further constrain possible concentration. At the manager-level portfolio diversification is even higher because individual CLO portfolios are not perfectly correlated.

6.4 Target Selection and CLO Liabilities

TO BE FINALIZED

Having established that loan portfolios contain no discernible explanatory power in merger target selection, I next turn to the role of CLO managers' capital access to fund CLOs. Indeed, capital access for CLOs is the issue that is most frequently stressed in public merger statements as a reason for merging.[16] 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, CLO managers with particularly disadvantageous CLO financing would be more attractive merger targets as they offer a greater return on capital invested in the merger.

To formally investigate the role of CLO funding for merger target selection, I estimate

$$Target_{ac} = \beta Funding\ Characteristic_{ct(a)} + \kappa X_{ac} + \upsilon_{v(c)a} + \varepsilon_{ac}. \tag{4}$$

[16] Independent of mergers, the importance of capital access is also overwhelmingly stressed in general industry views. To illustrate, in August 2021, Business Insider interviewed a number of CLO industry professionals. Across interviews, the importance of capital access is highlighted unanimously. For example, one interviewee states that "If you can raise money, which is the name of the game in CLOs, you stand out", while another remarks "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 quotes closely resonate with opinions expressed in private conversations with CLO industry professionals.

Parallel to specifications 2 and 3, $Target_{ac}$ is a dummy variable that equals one, expressed in percent, for CLO c managed by the realized target manager, m, in acquisition, a, and zero for CLOs of other non-selected target candidates. *Funding Characteristic* captures different CLO funding characteristics. I consider CLOs' *Leverage Ratio* measured as the ratio of supplied CLO equity to the sum of CLO equity and outstanding debt tranche amount, and their *Cost of Debt*, measured as the tranche amount weighted average spread over the base rate. κ constitutes a vector of other CLO and Manager characteristics. Further, I include vintage-merger fixed effects, $\upsilon_{v(c)a}$, to only compare CLOs of the same vintage and to remove factors common to all target candidates.

If acquirers select targets based on their capacity to improve CLO profitability via improved capital access, CLOs with worse funding characteristics, i.e., lower leverage or higher cost of debt, would be predictive of the chosen target. The estimates in **??** support these predictions. Relevant estimates have the expected direction are statistically significant.

6.5 Post-merger CLO Refinancing

TO BE FINALIZED

Lastly, I establish that post-merger CLO refinancing patterns support the argument of CLO funding-driven target selection. While I delegate formal difference-in-differences estimates in **??** to **??**, I present graphical evidence here.

First, I study refinancing of the targets' CLOs surrounding the mergers. **??** shows the fraction of targets' and other target candidates' CLOs that are reset, called or reissued relative to the merger date. Two years before a merger, the target refinances her CLOs at a consistently lower rate than other target candidates. Yet, target and target candidates follow a similar trend. This pattern is in line with targets refinancing at a lower rate because they have inferior capital access. This difference increases only shortly before a merger, potentially because targets forgo refinancing once the merger has been agreed upon.[17] A reason to delay refinancing would be that newly issued tranches stipulate non-call periods of typically one to two years which would limit the acquirer's ability to refinance acquired contracts at their better terms. Following the merger this pattern reverses. Already one quarter after the

[17]This short-term pattern disappears when I consider refinancing relative to merger announcements which rules out the concern that my target selection findings may be explained by delayed refinancing.

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.

Second, consistent with capital constraints being important for CLO financing, **??** shows that the increase in refinancings of target CLOs following the merger is accompanied by the acquirer's other CLOs refinancing at lower rates relative to their trend.

7 Conclusion

Nonbanks have market power in leveraged loan underwriting. While loans are typically more expensive than bonds, banks traditionally provide additional services to borrowing firms that bond markets cannot provide. The capacity of a bank to extract future rents from relationships allows the bank to provide loans to borrowers for whom capital markets are closed or to support borrowers in distress with subsidized credit. In my study, I establish the existence of market power for CLO managers, which account for the majority of nonbank lending to risky corporate borrowers. I provide evidence that informational asymmetries may be an important source of their market power. However, I remain silent on whether nonbanks fulfill additional functions, similar to banks, as a result of their economic rents. 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. Sub-investment Grade Corporate Debt Issuance.

This figure shows annual issuance volumes of non-contingent debt contract types by sub-investment grade corporate borrowers in the United States between 2006 and 2023. Issuance is shown in billion U.S. dollars. Each year, the first bar shows bank term loans issuance; the next bar shows institutional loans; the last bar shows high-yield bonds. Bank term loan and institutional loan issuance come from LCD. High-yield bond issuance comes from the Securities Industry and Financial Markets Association.

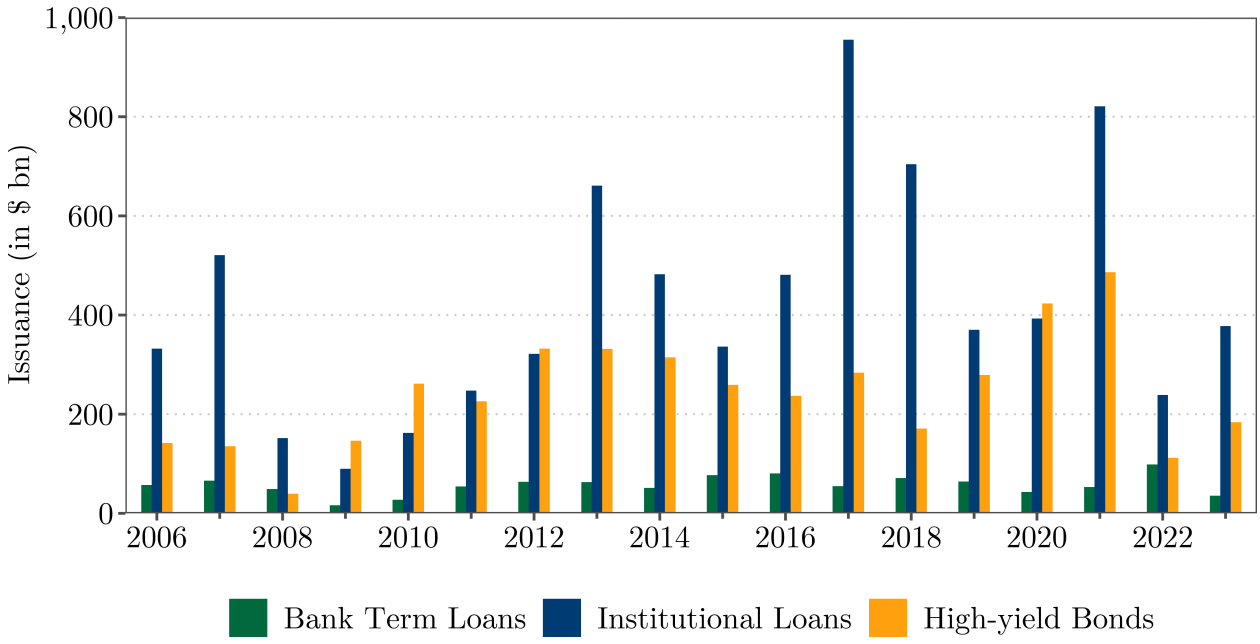


Figure 2: CLO Manager Lending Persistence.

This figure shows the relationship between CLO managers' holdings in a borrower's outstanding loans before syndication of a new loan and their primary allocation in the new issue. Each gray dot corresponds to a CLO manager-loan observation in the sample outlined in **??**. A binned scatter plot is displayed in blue. Its first bin contains observations without prior holdings, i.e., $Prior\ Holding_{f(l)m} = 0$. The remaining 19 bins equally split the positive sample by size.

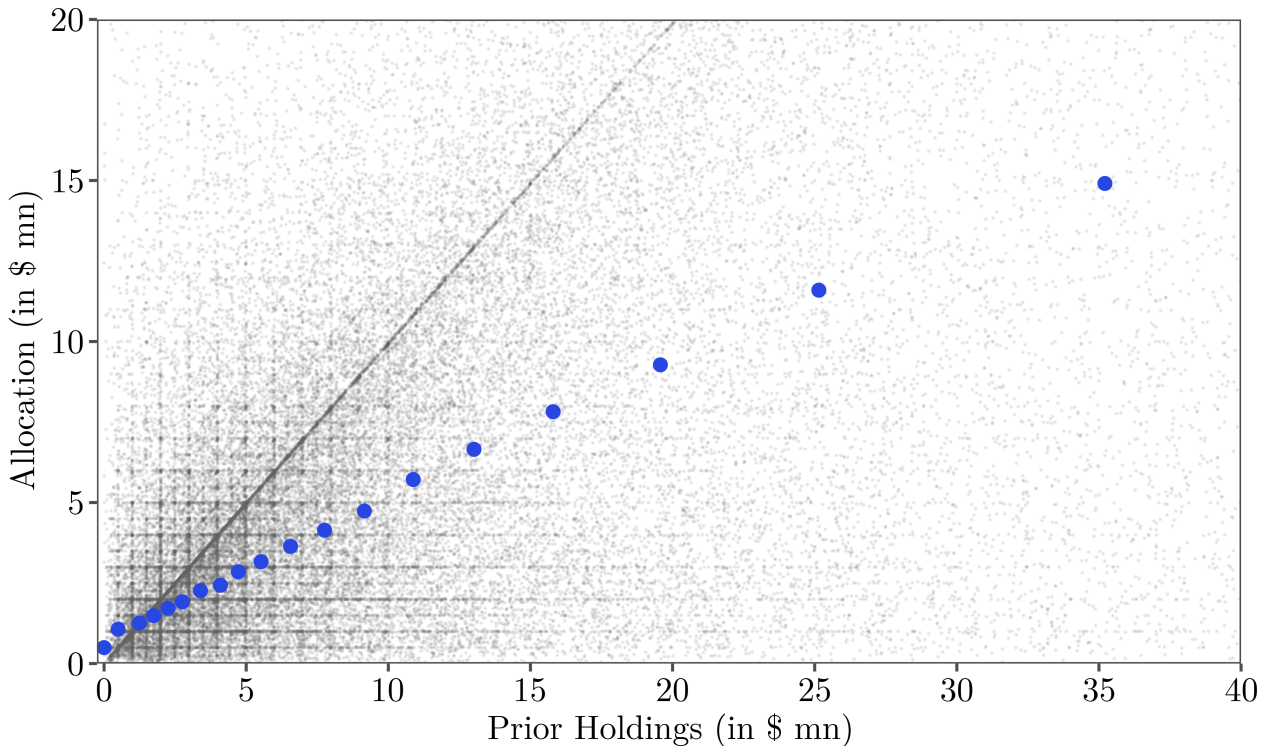


Figure 3: M&A Activity in the U.S. CLO Industry.

This figure depicts the U.S. CLO merger and issuance activity between 2009 and 2023. Bars describe the annual number of U.S. CLOs that are transferred to another U.S. CLO manager, with values on the left y-axis. The line shows the annualized volume of CLOs issued over a six-month centered rolling window in billion U.S. dollars, with values on the right y-axis.

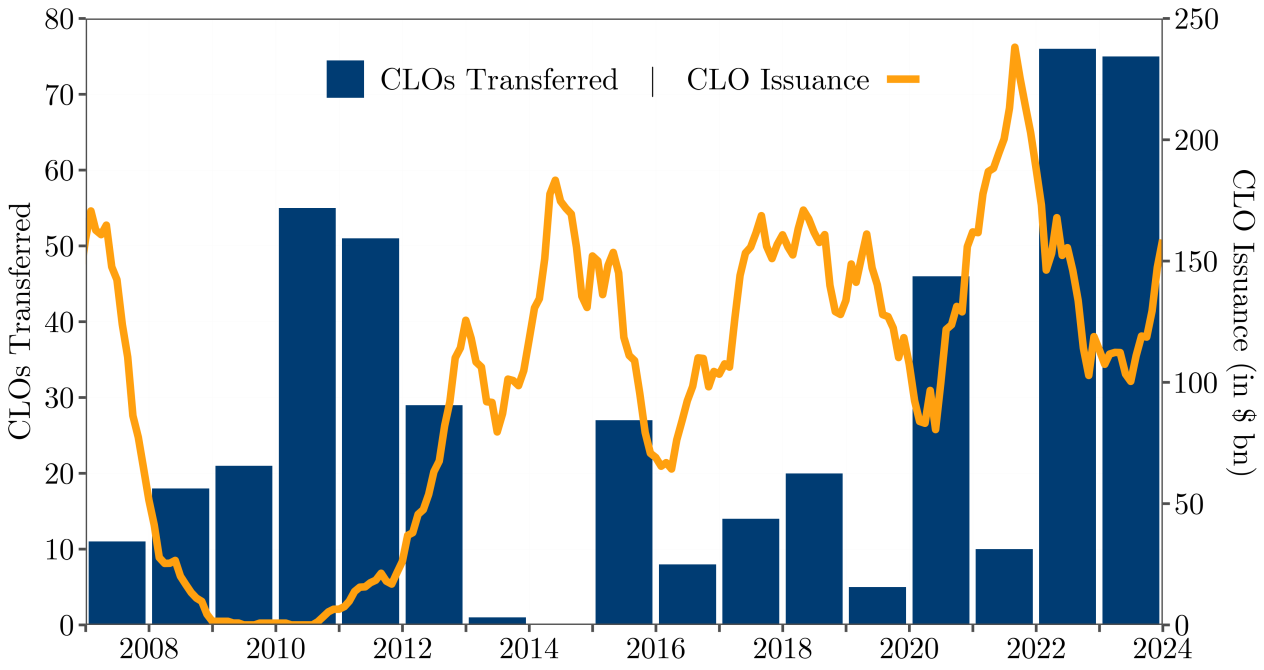
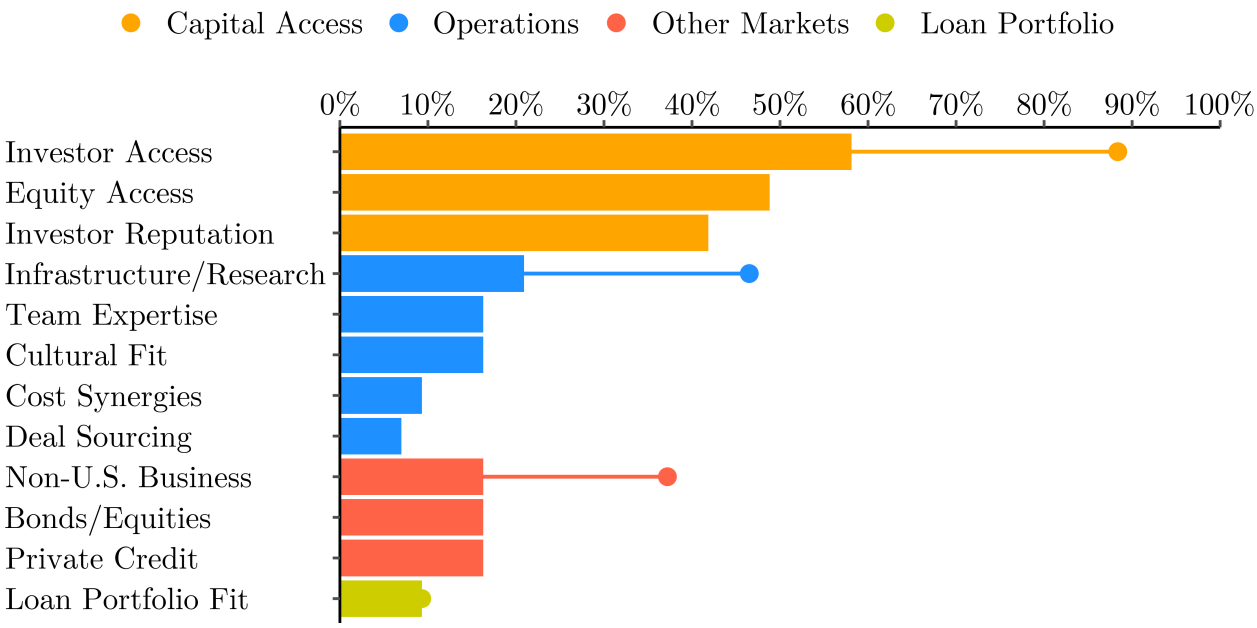


Figure 4: Stated Merger Rationales.

This plot describes publicly stated motivations for mergers in the U.S. CLO industry. Motivations are classified into twelve categories in one of four groups. The percentage share of mergers that mention a given category is displayed by colored bars. The color of a given bar indicates the category's group. Points display the share of mergers that mention any category within of a group.



Tables

Table 1: Summary Statistics.

This table provides descriptive statistics for variables used in the main analysis. The sample includes institutional loans by borrowers with outstanding loans which were originated from January 2010 to December 2022 and record primary allocations to CLOs. Panel A contains loan-level variables and Panel B contains deal-level variables. Panel C contains variables at the loan-CLO manager level. Loan terms are from Loan Connector when available and LPC Collateral otherwise. CLO holdings are from LPC Collateral. *Primary Allocation*$^+$ and *Prior Holding*$^+$ refer to the positive part of *Primary Allocation* and *Prior Holding*, respectively. Constructed variables are defined in **??**.

Variable	Unit	Mean	Std. Dev.	p25	p50	p75	Obs.
Panel A: Loan-level							
Spread	bps	405.89	170.76	300.00	375.00	450.00	3,052
Original Issue Discount	bps	71.10	105.44	0.00	50.00	100.00	3,052
Effective Yield	bps	429.59	190.82	300.00	375.83	491.67	3,052
Soft Call Premium	bps	116.75	49.58	100.00	100.00	100.00	3,052
Soft Call Period	mos	10.23	8.48	6.00	6.00	12.00	3,052
Break Price − Par	bps	2.32	103.36	-25.00	13.00	56.00	1,981
Underpricing	bps	47.62	105.58	12.50	50.00	100.00	1,981
Loan Amount	$ mn	808.39	815.70	300.00	535.00	1,000.00	3,052
Maturity	mos	74.16	14.13	65.00	78.00	84.00	3,052
First Lien	0/1	0.91	0.28	1.00	1.00	1.00	3,052
Cov-lite	0/1	0.73	0.44	0.00	1.00	1.00	3,052
Sponsored	0/1	0.66	0.47	0.00	1.00	1.00	3,052
Panel B: Deal-level							
No. Loans		1.16	0.42	1.00	1.00	1.00	2,628
Total Amount	$ mn	938.81	913.04	360.00	635.00	1,169.32	2,628
No. Loans Outst.		1.72	1.13	1.00	1.00	2.00	2,628
No. Borrower Ratings		2.14	0.52	2.00	2.00	2.00	2,628
Has S&P Rating	0/1	0.93	0.25	1.00	1.00	1.00	2,628
Has Moody's Rating	0/1	0.98	0.13	1.00	1.00	1.00	2,628
Has Fitch Rating	0/1	0.23	0.42	0.00	0.00	0.00	2,628
Median Rating		13.51	1.44	B (13)	B (13)	B (13)	2,628
Rating Dispersion		0.68	0.89	0.00	1.00	1.00	2,439
Uncertain Rating	0/1	0.14	0.35	0.00	0.00	0.00	2,439
Assets	$ bn	34.58	231.35	1.64	3.43	7.68	924
Small	0/1	0.25	0.43	0.00	0.00	0.25	924
Private	0/1	0.65	0.48	0.00	1.00	1.00	2,628
Bank-Firm Relationship	0/1	0.76	0.42	1.00	1.00	1.00	2,618
Panel C: Loan-CLO Manager-level							
$\mathbb{1}\{\text{Primary Allocation} > 0\}$	0/1	0.26	0.44	0.00	0.00	1.00	312,548
Primary Allocation$^+$	$ mn	8.25	11.02	2.00	4.43	9.96	81,384
$\mathbb{1}\{\text{Prior Holding} > 0\}$	0/1	0.31	0.46	0.00	0.00	1.00	312,548
Prior Holding$^+$	$ mn	12.33	16.65	2.98	6.60	14.92	96,509
CLO-Bank-Firm (Liab.)	0/1	0.23	0.42	0.00	0.00	0.00	311,282
CLO-Bank-Firm (Asset)	0/1	0.21	0.41	0.00	0.00	0.00	311,282

Table 2: CLO Manager Market Power and Loan Spreads.

This table examines the effect of CLO manager market power on loan spreads and displays results from the estimation of

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

The unit of observation is at the loan-CLO manager (lm) level. For any loan, the sample includes CLO managers with positive *Prior Holding*. Columns two to five present two-stage least squares (2SLS) estimates with *Prior Holding (Merger)* as excluded instrument for *Prior Holding*. Column one presents the first stage of the model in Column two and the corresponding Cragg-Donald F-statistic. Controls include manager-industry-quarter, μ, rating-quarter, ρ, and borrower fixed effects (FE), ϕ , and a vector of loan controls X. Loan controls are ln *Loan Amount*, ln *Maturity*, *Cov-lite*, *First Lien*, *Sponsored*, and a set of loan purpose fixed effects, *Loan Purpose*. Standard errors are double-clustered at the CLO manager- and loan-levels, and reported in parenthesis below their corresponding point estimates. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	Prior Holding	Spread			
	(1)	(2)	(3)	(4)	(5)
Prior Holding		0.761***	0.892***	0.823***	1.235***
		(0.162)	(0.090)	(0.214)	(0.406)
Prior Holding (Merger)	0.537***				
	(0.031)				
Estimation	OLS	2SLS	2SLS	2SLS	2SLS
Manager-Industry-Quarter FE	Yes	Yes	–	Yes	Yes
Rating-Quarter FE	Yes	Yes	Yes	–	Yes
Borrower FE	Yes	Yes	Yes	Yes	–
Manager-Quarter FE	–	–	Yes	–	–
Loan Controls	Yes	Yes	Yes	–	Yes
Observations	90,066	90,066	96,404	90,066	90,073
R^2	0.584	0.909	0.873	0.676	0.787
Cragg-Donald F-statistic	898				

Table 3: CLO Manager Market Power and Non-spread Loan Pricing.

This table examines the effect of CLO manager market power on non-spread loan pricing and displays results from the estimation of

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

The unit of observation is at the loan-CLO manager (lm) level. Sample construction and independent variables and fixed effects (FE) match those in Table 2. The outcome variables, y, are the original issue discount (*OID*), *Effective Yield*, *Soft Call Premium*, *Soft Call Period*, and *Underpricing*. All columns present two-stage least squares (2SLS) estimates with *Prior Holding (Merger)* as excluded instrument for *Prior Holding*. Cragg-Donald F-statistics, first-stage coefficient estimate and standard error are reported below their corresponding 2SLS specification. Standard errors are double-clustered at the CLO manager- and loan-levels, and reported in parenthesis below their corresponding point estimates. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	OID	Effective Yield	Soft Call Premium	Soft Call Period	Underpricing
	(1)	(2)	(3)	(4)	(5)
Prior Holding	0.426***	0.903***	0.163***	0.031***	0.803***
	(0.103)	(0.186)	(0.025)	(0.005)	(0.150)
Estimation	2SLS	2SLS	2SLS	2SLS	2SLS
Manager-Industry-Quarter FE	Yes	Yes	Yes	Yes	Yes
Rating-Quarter FE	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes	Yes
Observations	90,066	90,066	90,066	90,066	65,393
R^2	0.847	0.910	0.803	0.835	0.757
First-stage Estimates					
Prior Holding (Merger)	0.537***	0.537***	0.537***	0.537***	0.556***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.036)
Cragg-Donald F-statistic	898	898	898	898	651

Table 4: CLO Manager Market Power and Information Asymmetries.

This table examines how information asymmetries affect CLO manager market power and displays results from the estimation of

$$y_l = \beta_1 \textit{Prior Holding}_{f(l)m} \times \textit{Rating Uncertainty}_{f(l)} + \beta_2 \textit{Prior Holding}_{f(l)m} + \mu_{mi(l)t(l)} + \rho_{r(l)t(l)} + \phi_{f(l)} + \kappa X_l + \varepsilon_{lm}.$$

The unit of observation is at the loan-CLO manager (lm) level. Loan controls, fixed effects and sample construction match those in Table 2 with the additional restrictions that borrowers must have credit ratings from multiple rating agencies. The outcome variables measure loan pricing as in Table 2 and Table 3. All columns present two-stage least squares (2SLS) estimates with *Prior Holding (Merger)* as excluded instrument for *Prior Holding*. Cragg-Donald F-statistics are reported below their corresponding 2SLS specification. Standard errors are double-clustered at the CLO manager- and loan-levels, and reported in parenthesis below their corresponding point estimates. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	Spread	OID	Effective Yield	Soft Call Premium	Soft Call Period	Underpricing
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Holding × Rating Uncertainty	1.613***	1.487	2.109***	0.313***	0.135***	2.839**
	(0.266)	(0.955)	(0.506)	(0.105)	(0.017)	(1.209)
Prior Holding	0.459***	0.136**	0.504***	0.100***	0.013***	0.445***
	(0.088)	(0.059)	(0.095)	(0.025)	(0.003)	(0.139)
Estimation	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Manager-Industry-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Rating-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	84,954	84,954	84,954	84,954	84,954	61,489
R^2	0.909	0.856	0.910	0.804	0.830	0.749
First-stage Estimates						
Cragg-Donald F-statistic	340	340	340	340	340	238

Table 5: CLO Manager Market Power Loan Pricing and Deal Type.

This table examines how information asymmetries affect CLO manager market power and displays results from the estimation of

$$y_l = \beta_1 Prior\ Holding_{f(l)m} \times Acquisition_{f(l)} + \beta_2 Prior\ Holding_{f(l)m} + \mu_{mi(l)t(l)} + \rho_{r(l)t(l)} + \phi_{f(l)} + \kappa X_l + \varepsilon_{lm}.$$

The unit of observation is at the loan-CLO manager (lm) level. Loan controls, fixed effects and sample construction match those in Table 2 with the additional restrictions that borrowers must have credit ratings from multiple rating agencies. The outcome variables measure loan pricing as in Table 2 and Table 3. All columns present two-stage least squares (2SLS) estimates with *Prior Holding (Merger)* as excluded instrument for *Prior Holding*. Cragg-Donald F-statistics are reported below their corresponding 2SLS specification. Standard errors are double-clustered at the CLO manager- and loan-levels, and reported in parenthesis below their corresponding point estimates. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	Spread	OID	Effective Yield	Soft Call Premium	Soft Call Period	Underpricing
	(1)	(2)	(3)	(4)	(5)	(6)
Prior Holding × Acquisition	1.154	1.683***	1.715**	0.482*	0.160***	3.866***
	(0.774)	(0.576)	(0.844)	(0.289)	(0.053)	(1.186)
Prior Holding	0.632***	0.239	0.712***	0.110**	0.014***	0.523***
	(0.189)	(0.149)	(0.218)	(0.047)	(0.001)	(0.058)
Estimation	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
Manager-Industry-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Rating-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	Yes	Yes	Yes	Yes
Loan Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	90,066	90,066	90,066	90,066	90,066	65,393
R^2	0.908	0.842	0.908	0.800	0.827	0.727
First-stage Estimates						
Cragg-Donald F-statistic	189	189	189	189	189	110

Table 6: Characteristics of Merging CLO Managers.

This table compares target CLO managers to alternative target candidates. For each acquisition, the target candidates set contains CLO managers, other than the acquirer, that manage between half and double the number of CLOs as the target. The columns *Acquirer*, *Target*, *Target Candidate* display averages over the sample mergers, with the target candidate value corresponding to the median value for each merger. Variables are measured before merger announcement. *No. Loans* and *No. Borrowers* capture the total number of distinct loans and borrowers in a CLO manager's portfolio. *Max. Loan Exposure* and *Max. Borrower Exposure* measure to the largest portfolio weight by a single loan or borrower. *Time Since Issue* is the number of months since a CLO's closing date. **??** and **??** define the other variables.

Variable	Unit	Acquirer	Target	Candidates
Panel A: CLOs				
No. CLOs		11.13	5.20	4.85
No. Active CLOs		9.32	4.18	3.98
No. CLOs in Warehouse		0.78	0.13	0.16
Panel B: Loan Portfolios				
No. Loans		412.88	297.54	297.25
No. Borrowers		311.05	232.61	235.21
Max. Loan Exposure	%	1.33	1.49	1.39
Max. Borrower Exposure	%	1.67	1.73	1.72
Avg. Rating		13.58	13.53	13.63
Portfolio Overlap (Loan-level)	%	100.00	32.16	36.29
Portfolio Overlap (Issuer-level)	%	100.00	37.38	42.05
Portfolio Similarity (Loan-level)	%	100.00	14.23	16.02
Portfolio Similarity (Issuer-level)	%	100.00	18.73	21.16
Panel C: CLO Characteristics				
Junior Fee	bps	29.62	25.37	28.56
Senior Fee	bps	17.52	18.10	17.48
Time Since Issue	mos	35.39	39.42	35.86
Time to Reinvest	mos	33.52	26.82	30.48
Time to Maturity	mos	117.70	108.81	115.00
Portfolio Size	$ mn	474.10	429.18	416.33

Table 7: CLO Manager Mergers and Portfolio-based Target Selection.

This table examines the role of loan portfolios in merger target selection and displays estimates of

$$Target_{am/aml} = \beta Portfolio\ Alignment_{am/aml} + \alpha_{a/al} + \kappa X_{mt(a)} + \varepsilon_{am/aml}.$$

The sample includes the target candidates defined in Table 6. The dependent variable, *Target*, equals 1, expressed in %, for the target and zero otherwise. All independent variables are measured before merger announcement. Columns 1 and 2 define portfolios based on all assets of the target candidate and the acquirer. Columns one and two consider only the subset of loans by borrowers in the sample of Table 2. In Panel A, the unit of observation is at the merger-manager (am) level. Columns one and three measure the portfolio share of loans also held by the acquirer, *Portfolio Overlap*. Columns two and four measure the cosine similarity between acquirer and target candidate portfolio weight vectors, *Portfolio Similarity*. In Panel B, the unit of observation is at the merger-manager-loan (aml) level. For each manager-merger pair, Columns one and three define the loan sample as the loans that are held by either the acquirer or the target. Columns two and four define the loan sample as the loans that are held by the target. All estimates are ordinary least squares estimates. Controls include merger and merger-loan fixed effects (FE), α, and a vector of CLO manager controls, X. Controls in X are *No. CLOs*, *Avg. Rating*, *CCC Bucket Share*, *Defaulted Share*, and *Middle Market Share*. Double-clustered standard errors at the merger- and manager, and at the merger-manager-level for Panels A and B, respectively, are reported in parenthesis below their corresponding point estimates. ***, **, and * denote statistical significance at the 1%-, 5%-, and 10%-level, respectively.

	Target			
Match Level	Loan		Issuer	
	(1)	(2)	(3)	(4)
Panel A: Manager-level Portfolio Alignment				
Portfolio Overlap	0.009		0.012	
	(0.029)		(0.026)	
Portfolio Similarity		0.003		0.002
		(0.039)		(0.031)
Manager Controls	Yes	Yes	Yes	Yes
Merger FE	Yes	Yes	Yes	Yes
Observations	1,810	1,810	1,810	1,810
R^2	0.006	0.006	0.006	0.006
Panel B: Loan-level Portfolio Alignment				
Shared Loan/Issuer	0.001		0.001	
	(0.002)		(0.002)	
$-1 \times \left\lvert w - w^{\mathrm{A}} \right\rvert$		0.003		0.003
		(0.015)		(0.015)
Manager Controls	Yes	Yes	Yes	Yes
Merger-Loan/Issuer FE	Yes	Yes	Yes	Yes
Observations	734,700	734,700	554,653	554,653
R^2	0.006	0.006	0.006	0.006