Credit Conditions when Lenders are Commonly Owned

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Abstract

We investigate how common ownership between lenders affects the terms of syndicated loans. We provide a novel view on common ownership between lenders as a mechanism to mitigate the effects of information asymmetry on the quality of borrowers. As the lead bank does not need to signal the quality of the borrower by means of dissipative signals, high common ownership should have a negative impact on loan rates, the share of the loan retained by the lead bank, and the dispersion in loan returns. We empirically verify all three predictions, leveraging the differences in the level of common ownership across lenders and facilities within a loan. Common ownership affects the terms of the loan more strongly in the presence of opaque or new borrowers, when the lead arranger is more likely to hold an information advantage over the syndicate members. As information flows from the lead arranger to syndicate members, we show that member-to-lead and member-to-member common ownership does not affect the terms of syndicated loans.

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1 Introduction

Over the last two decades, the banking sector has become increasingly interconnected because of the steady growth of shareholders owning equity in multiple banks: the literature refers to those shareholders as common owners. The four largest asset managers (Blackrock, Vanguard, State Street and Fidelity) hold a combined 20% of the shares of the four largest U.S. commercial banks (JP Morgan, Citigroup, Bank of America, and Wells Fargo). At the same time, these four banks issued around two thirds of all commercial loans between 1990 and 2013.

Asymmetric information is another defining feature of banking markets, with consequences in terms of risk pricing and credit rationing. Borrowers employ a variety of strategies to signal attractive attributes to the uninformed lenders by introducing distortions in contracting: Spence (1974) and Leland and Pyle (1977) are two early seminal contributions. In the syndicated lending industry, the lead bank, which conducts the due diligence and acts on behalf of the borrower, may mitigate asymmetric information vis á vis syndicate members by retaining a larger share of the loan (Sufi, 2007; Focarelli et al., 2008; Ivashina, 2009). In banking, direct sharing of information on borrowers is an effective tool to ease information asymmetries (Padilla and Pagano, 2000; Jappelli and Pagano, 2002). In this paper, we show that common ownership allows lenders to achieve the same result.

We investigate how common ownership between lenders affects credit conditions. The topic of our paper fits within the broader debate that looks at the relation between common ownership, firm's objectives and market outcomes. A recent body of empirical work examines the common ownership hypothesis: the hypothesis suggests that, as firms in the same industry are held by one overlapping investor, those firms may internalize the interests of their competitors via the financial stakes held by the common shareholder. Schmalz (2021) and Backus et al. (2019) provide comprehensive reviews of this growing literature. What makes the setting of syndicated loans different is the agency problem between lenders. We conjecture that a lender with superior information on the borrower's risk profile, like the lead bank in a syndicated loan, truthfully transmits such information to another lender when the two are closely interconnected via a common shareholder. Reductions in information asymmetries affect loan prices and the ownership structure. Using data on syndicated loans, we empirically test this novel mechanism through which common ownership affects interconnected firms and the terms of the loan. To perform our tests, we empirically leverage the differences in levels of common ownership across lenders (lead bank and syndicate members) that extend syndicated loans to corporations.

First, we empirically document a positive relation between common ownership and directors shared between lenders. This positive association supports the idea that information transmission is plausible, for example through common directors, when common ownership between the lead bank and members of the syndicate is sufficiently high. Second, we propose a stylized model with asymmetric information to derive empirical predictions regarding how common ownership narrows the information gap between the lead bank and the members of a syndicate. The lead bank represents a penniless borrower. The borrower privately observes the type of its project, which can be either good or bad, and this information is shared with the lead bank.[1] As the assets of the lead bank are not sufficient to fund the project, the lead bank needs to form a syndicate to cover the investment. We distinguish between two scenarios: high and low common ownership. High common ownership means that information on the borrower type is truthfully transmitted by the lead bank to the syndicate members. With low common ownership, asymmetric information implies that, to signal the good type, the lead bank will have to promise higher returns to the syndicate members and commit its funds in the loan. If common ownership is high, instead, lending takes place at the conditions that would prevail with symmetric information. An ancillary consequence of lower returns with high common ownership is that lending conditions should exhibit lower variability.

The syndicated lending market provides an ideal setting to test the predictions of our theoretical framework. First, although multiple banks can participate in a loan, a key aspect of syndication is that only the lead bank conducts the due diligence of the client. This creates an information asymmetry problem between the lead bank and syndicate participants. Moreover, a syndicated loan typically consists of a number of tranches (facilities), with essentially the same default risk and creditor rights. After receiving the mandate, the lead bank announces to the market the non-price characteristics of the loan (like collateral and maturity). The price of each facility, and the composition of the syndicate, is set on the market. Finally, lenders can force the borrower into bankruptcy if credit events occur, such as payment defaults or covenant violations. This last feature implies that the risk of the underlying asset is held constant within a loan; thus, we can credibly identify differences in lending conditions between facilities *within* a loan with varying degrees of common ownership.

We find support for all three predictions in the data. First, high levels of common ownership between the lead bank and the syndicate participants are associated with lower prices. We estimate the impact of common ownership on prices using variation in common ownership across facilities and loans. We obtain these results in specifications that account for other factors affecting the loan spread, including an extensive set of controls

[1]The source of asymmetric information can be the probability of successful project completion, as we currently assume in the model, or the cost of monitoring the firm (as in Sufi (2007)). The qualitative nature of the results remains unchanged.

related to (i) the loan and the facility; (ii) the borrower; (iii) the lender. We employ multiple fixed effects to difference out alternative interpretations such as confounding effects of demand and supply variations. We account for variation in facility type and loan purpose; industry-year-quarter fixed effects control for aggregate variation in demand for syndicated loans in each sector. Borrower fixed effects account for unobserved time-invariant heterogeneity across borrowers, and lead bank fixed effects capture time-invariant supply factors. Coefficient estimates indicate that an increase of one standard deviation in common ownership is associated with a lower spread of 5.34 basis points.

To rule out the possibility that variation in common ownership and spread may reflect omitted characteristics that systematically correlate with prices and common ownership levels, we estimate the effect of common ownership on the pricing of facilities of the same type within the same loan. The within-loan estimates confirm the negative effect on prices: an increase of one standard deviation in common ownership implies a reduction in spread of 9.18 basis points.

Finally, we discretize our common ownership measure into five indicator variables corresponding to the quintiles of its support. All our estimates show that reductions in spread are relevant only for high levels of common ownership (quintiles 4 and 5), and those reductions are monotonically increasing in common ownership. Within a quintile, a change in common ownership in a facility from the minimum to the maximum level reduces the price by roughly 10 to 20 basis points, where the average loan spread is around 197 points for the upper quintiles. These effects are heterogeneous across borrowers: common ownership has a stronger impact on loan prices in the presence of opaque or new borrowers, when the lead arranger carrying out the due diligence is more likely to hold an information advantage over the uninformed syndicate participants.

Second, we find that an increase of one standard deviation in common ownership is associated to a statistically significant 0.64 percentage point decrease in the amount of the loan retained by the lead bank. As before, the effect is non-linear: the lead banks of syndicates in the top quintiles of common ownership (quintiles 3 to 5) retain a significantly smaller share of the facility compared to the bottom quintiles. Within a quintile, an increase in common ownership from the minimum to the maximum level implies a reduction in the amount of facility retained by the lead corresponding to roughly 1.7 percentage points in quintile 3 and 2.7 percentage points in quintiles 4 and 5. As the lead arrangers retain on average 21% of the facility amount, the impact of common ownership is sizeable.

Third, high common ownership should imply lower price dispersion. We verify that an increase of one standard deviation in common ownership is associated with a 2.97 basis points decrease in the dispersion of loan rates across facilities.

We are careful to rule out alternative explanations to our findings. First, we explicitly control for vertical relations, namely common ownership between lenders and borrowers. Second, we run two falsification tests of our hypothesis: as only the lead bank possesses superior information on the riskiness of the borrower, the level of common ownership from the syndicate member to the lead arranger or between members should not affect credit conditions. We find that member-lead and member-member common ownership has no impact on any of the outcome variables, which constitutes an indirect confirmation that information transmission is effectively initiated by the lead bank.

Finally, we worry about the fact that common ownership is the result of the syndicate structure. As the lenders' decision to enter the syndicate is not random and may depend, among other factors, on the level of common ownership with the lead arranger and other unobservables collected in the error term, we extend our model to account for this form of self-selection. Our results do not qualitatively differ when accounting for selection. We also conjecture that the decision of potential lenders to enter the syndicate and fund the loan essentially depends on the credit risk of the borrower. In contrast, the choice of the specific facility should mainly depend on lender-specific preferences. As a consequence, the composition of the syndicate across facilities within a loan should not depend on the degree of common ownership. We empirically confirm that common ownership is not a driver of participation in the single facilities of a loan.

Regulators explicitly acknowledge that common ownership between the lead bank and potential syndicate members can be conducive to the transmission of information regarding the borrower (The European Commission, 2019). This practice is not regarded as anticompetitive per se as long as it does not harm the borrower, for example by artificially raising prices. Our results give practical guidance to policy makers. We provide empirical evidence consistent with the presence of a flow of information between the lead bank and the commonly owned syndicate member banks. As a result, the effects of information asymmetries on contractual terms are mitigated through common ownership.

Related literature Our paper proposes a new mechanism through which common ownership between lenders affects lending conditions. Specifically, we show that common ownership reduces the distortions in credit conditions that arise with asymmetric information. We contribute to several strands of the literature.

The literature on syndicated lending has well documented how asymmetric information affects lending conditions, and in particular the lead bank's loan retention strategy to mitigate the costs of asymmetric information (Sufi, 2007; Focarelli et al., 2008; Ivashina, 2009).[2] Other aspects of syndicated lending examined in the literature include how the

[2]Bruche et al. (2020) provide an alternative explanation for the retention strategy, which hinges on

composition of the syndicate affects loan spreads (Lim et al., 2014), the propensity to syndicate a loan (Dennis et al., 2000), the relationship between final spreads and fees (Berg et al., 2016; Cai et al., 2018), the role of covenants (Drucker and Puri, 2009). We exploit the institutional features of the syndicated lending market (and, in particular, the heterogeneity of syndicate composition across facilities of the same loan) to identify the impact of common ownership between lenders on lending conditions. Our results suggest that common ownership alleviates the costs of asymmetric information.

Lately, common ownership has attracted significant attention by financial and industrial economists. The literature mainly focuses on the common ownership hypothesis, according to which an investor holding a controlling stake in several firms belonging to the same industry might, in turn, influence their pricing with the purpose of softening competition (Azar et al., 2016, 2018; He and Huang, 2017).[3] More relevant to us are Cici et al. (2015), Ojeda (2019) and Wang and Wang (2019): they study the impact of common ownership between lenders and borrowers. Overall, they document lower loan spreads, larger loans and more frequent lending activity in the presence of common ownership. Differently from these papers, we look at common ownership between lenders. We find empirical evidence consistent with the results of a model in which, thanks to common ownership, the lead bank does not need to signal the quality of the borrower by means of "dissipative" signals (Tirole, 2006), such as retention of a share of the loan. In all our specifications, we nevertheless account for relations of common ownership between lenders and borrowers, which excludes the possibility that our results are driven by borrower-lender overlapping ownership.

2 Institutional Setting

2.1 The Syndicated Loan Market

Syndicated lending is an important source of financing for U.S. corporations. Sufi (2007) and Ivashina (2009) report that more than 90% of the largest 500 non-financial Compustat firms in 2002 obtained a syndicated loan between 1994 and 2002. In 2006, syndicated loan issuance surpassed corporate bond issuance with a volume of $1.7 trillion. More recently,

the presence of pipeline risk on the side of the lead bank.

[3] Boller and Morton (2020) use inclusion in a stock market index to identify the impact of an increase in the overlap among investors. Newham et al. (2018), Ruiz-Pérez (2019) and Gerakos and Xie (2019) analyze the effect of common ownership on entry. Antón et al. (2021) investigate how managerial incentives can link common ownership and competition. Aslan (2019) looks at the relation between common ownership and costs. Backus et al. (2021a) use a conduct test to reject that common ownership has large effects on markups. Comprehensive reviews of this growing literature by Schmalz (2021) and Backus et al. (2019) provide a summary of the empirical evidence.

the Federal Reserve's Terms of Business Lending survey documented that 44% of all commercial loans in 2013 were syndicated loans.

The syndicated loan market operates over the counter. Transactions are the result of informal interactions between borrowers and lenders. The borrowers are firms that seek funding from the syndicate to leverage large capital investments. The syndicate is headed by the lead bank, or arranger. The other syndicate members are banks or institutional investors.

The borrower solicits potential lead banks to submit a bid. These banks propose their syndication and pricing strategy to the borrower. The chosen lead bank then receives the mandate to issue a loan and performs the due diligence. Details of the mandate signed between the lead bank and the borrower remain confidential, including any potential rearrangement of the fees to the lead bank depending on the outcome of the syndication.

The loan issued by the lead bank is divided into tranches, or facilities, of different types (credit line, term loan), amount and maturities. All non-price terms of the loan, such as type, amount, maturity, purpose, collateral, and covenants, are set before the marketing phase starts. Only type, amount, and maturity vary across facilities within a loan. Finally, the interest rate paid to syndicate members, calculated as the spread over LIBOR, and the composition of the syndicate are determined during the marketing phase. Specifically, the lead bank proposes the price for each facility in the loan, and potential syndicate members decide whether they wish to buy at the specified spread. The deal is closed when the desired level of demand is met. The lead bank can subscribe part of the loan to close the deal, although it does not have an obligation to do so. Finally, if a credit event occurs, like a missed repayment or a covenant violation, syndicate members can force the borrower into bankruptcy.

2.2 Connections between lenders and common ownership

Asset managers, such as Black Rock, Vanguard, State Street and Fidelity, are often shareholders in both the lead bank and the syndicate members, and their holdings have been growing over time, as documented in Table B.I. The literature (Appel et al., 2016; Brav et al., 2019) presents evidence that institutional investors (e.g., mutual funds), the common owners, use their voting blocs to influence target firms' governance. In practice, asset managers may exert their control through "voice" (Edmans et al., 2019), by direct interventions such as monitoring of the management or by suggesting strategic changes. Matvos and Ostrovsky (2008) show that, in mergers with negative acquirer announcement returns, mutual funds holding shares in both the acquirer and the target are more likely to vote for the merger. He et al. (2019) provide evidence that institutional investors play a more active monitoring role when common ownership is high. Appel et al. (2016) show that the presence of mutual funds has a direct impact on the composition of the board of directors, and in particular an increase in ownership by passive funds is associated with an increase in non-executive directors entrusted by the shareholders.

In our empirical framework, we study situations in which the lead bank and the members in the syndicate are commonly owned by large institutions, with variation in the level of common ownership across loans and across facilities within a loan. Our conjecture is that common ownership may facilitate the transmission of private information regarding the borrowing firms from the informed lead bank to the uninformed members of the syndicate. In line with the literature cited above, we expect that information transmission is more likely when the common owner holds larger voting blocs. Regulators explicitly recognize the possibility of such influence: in a recent report on loan syndication and competition in credit markets, the European Commission acknowledges that information transmission may arise when the lead bank and syndicate members are commonly owned (The European Commission, 2019).

As connected directors can serve as a simple mechanism of information transmission across lenders, we investigate the association between common ownership and directorship interlocks in our setting. For each pair of lead bank-potential syndicate member, we define a director interlock as an indicator equal to one if (i) at least one director sits on the boards of both banks; or (ii) at least one director from each bank in the pair serves on the board of a common third firm. Information on directors and their joint employments is retrieved from BoardEx, with yearly frequency, for the period 1999-2013.[4] We then describe the probability of director interlocks by regressing the indicator on a measure of common ownership and an extensive set of covariates capturing characteristics of the lender pair.

In Table I we empirically document, within our setting, a positive relation between common ownership and shared directors. The table presents the results of a linear probability model: pairs of lead bank-potential syndicate member with higher levels of common ownership are more likely to exhibit interlocking directorships. This positive association remains significant after controlling for: (i) characteristics of the lenders: their size, equity, book leverage, return on assets, and whether they belong to the S&P 500; (ii) characteristics of the lender pairs: their portfolio similarity and their past relationships; (iii) year dummies. These results support the hypothesis that, in our setting, common ownership can constitute a communication device between firms if it is sufficiently large, as common directors are more likely at higher levels of common ownership. Our findings complement the work of Azar (2012), showing descriptive evidence that firms with common owners are more likely to share directors, and Nili (2020), documenting the rise of so-called horizontal

[4] Our common ownership measure is built at quarter-year level. Because of the information on directors is at yearly frequency, we use the measure of common ownership from the last quarter of each year.

directors, serving on the boards of multiple companies within the same industry.[5]

3 The Model

Consider a penniless borrower that owns a project but lacks financial resources to carry it out. The borrower delegates the lead bank (L) to form a syndicate for a loan of size 1; it then shares with the lead bank the returns of the investment. A continuum of potential members of the syndicate (M) operate in perfectly competitive financial markets and have the financial resources to fund the project. We denote by A, with $0 < A < 1$, the maximum amount of the loan that the lead bank can pledge. A then represents the lead bank's "inside liquidity".

The borrower's project can be one of two types. The good type (G) has a probability of success equal to p. The bad type (B) has a probability of success $q < p$. In either case, the project yields R in the case of success and 0 in the case of failure. Throughout the scenarios we consider, the lead bank always knows the type of the borrower's project. We use α and $(1 - \alpha)$ to denote the potential syndicate members' prior probabilities that the borrower's project is of type G and type B, respectively.[6]

We make the following parametric assumptions.

Assumption 1.

$$pR > 1 > 1 - A > qR, \tag{1}$$

$$qR - A > \frac{q}{p}\left(\frac{1 - \kappa\theta qR}{1 - \kappa\theta}\right). \tag{2}$$

In Assumption 1.(1), $pR > 1$ implies that the good borrower's project has a positive net present value (NPV). $1 - A > qR$ means that the bad borrower's project has a negative NPV despite the use of the lead bank's funds A. At the right-hand side of the condition in Assumption 1.(2), parameter $\kappa \in [0, 1]$ captures the weight that the lead bank attaches to the utility of the fraction $\theta \in (0, 1)$ of commonly owned syndicate members. At the left-hand side, $qR - A$ is the project return of a lead bank representing a bad type (qR), net of the "inside liquidity" A. The condition implies that the value of such net utility is large, which, as we will see, makes signaling the good type particularly costly for the

[5] In a similar vein, Ferreira and Matos (2012) find that, in presence of common directors between bank-borrower pairs, the bank is more likely to be chosen as a lead arranger because of the informational advantage that the connected bank retains over other banks.

[6] In this model, α can also be interpreted as the fraction of good-type borrowers in the economy, or the probability that a given borrower is of type G. This setting extends the model in Tirole (2006), Chapter 6, which in turn uses the mechanism approach in Maskin and Tirole (1992) to solve the contract's design problem.

lead bank. Another consequence of this assumption is that a lead bank representing a good borrower would be strictly better off if it could truthfully disclose its information about the quality of borrowing. Taken together, Assumptions 1.(1) and 1.(2) imply that $0 < A < 1/2$ and an upper bound on θ. Both are satisfied in our data.

All agents are risk neutral, the lead bank is protected by limited liability, and the risk-free interest rate is nil. The contract we consider is $(x_j, R^s_{j,L}, R^f_{j,L}, R^s_{j,M}, R^f_{j,M}, \mathcal{A}_j)$, with $j \in \{G, B\}$. We denote by $x_j \in [0, 1]$ the decision on whether a lead bank representing a borrower of type j receives funding by the potential syndicate members. The share of the returns on a project of type $j = G, B$ received by $i = L, M$ in the case of success (s) is $R^s_{j,i}$, it is $R^f_{j,i}$ in the case of failure (f). We assume for simplicity that $R^f_{j,L} = 0$; $R^f_{j,M} = 0$ follows from limited liability. Finally, $\mathcal{A}_j \leq A$ is the amount of cash invested by L in the loan. Suppressing the notation for success, the contract can be rewritten as $(x_j, R_{j,L}, R_{j,M}, \mathcal{A}_j)$, with $j \in \{G, B\}$.[7]

L holds all the bargaining power. It designs contracts that can be accepted or rejected by M. When indifferent, L will prefer not to commit any cash in the loan (i.e., $\mathcal{A}_j = 0$). This reflects, e.g., the presence of alternative investment opportunities that are more remunerative than the borrower's project. We will analyze the perfect Bayesian equilibrium of the contract design game. As mentioned before, we parameterize by $\kappa \in [0, 1]$ the level of common ownership between the lead bank and the syndicate member, where κ is the weight that the lead bank L places on the utility of the commonly owned syndicate members. A value of κ equal to zero corresponds to a situation of separate ownership, and a value of κ equal one means that the lead bank assigns the same weight to its own utility and the ones of the potential syndicate member.[8]

To begin with, we solve a funding game without common ownership ($\kappa = 0$). We then introduce common ownership. In our model, the lead bank uses common ownership to truthfully channel its private information regarding the borrower's probability of success to the commonly owned syndicate members. In other words, common ownership is equivalent to an information transmission technology. We will say that information transmission is possible only if κ is larger than some threshold $\underline{\kappa} > 0$. We also discuss a situation in which common ownership affects the contracts simply because the lead bank internalizes the impact of its decisions on the profits of the commonly owned investors. We will show that the two situations yield different testable predictions.

We use the model to derive empirical predictions on the two main features of syndicated

[7] $R_{j,L}$ is then split between the lead bank and the borrower according to a bargaining game that is outside the model.

[8] Similarly to Antón et al. (2021), we restrict κ within values in the unit interval. Values of κ larger than one are empirically possible: they correspond to situations in which the lead bank places more weight on the utility of the commonly owned syndicate members than on its own utility. As a consequence, the lead bank would have the incentive to transfer its funds to the syndicate members.

lending contracts in the data, with and without common ownership: the interest rate paid to the syndicate members and the amount of the loan retained by the lead bank. $\mathcal{A}_j$ will be the amount that the lead bank pledges in the loan, and $1+r = R - R_{j,L}$ the interest rate to syndicate members. By the latter formula, we capture the all-in-drawn spread paid by borrowers, which is what we observe.

Before continuing, it is important to note that, with symmetric information, the lead bank rejects the loan to the bad type ($x_B = 0$) and grants the loan to a good type ($x_G = 1$). Moreover, it does not pledge its funds in the loan to the good type ($\mathcal{A}_G = 0$), and sets the reward to investors so to satisfy their break-even condition ($R_{G,M} = 1/p$). If these contracts were available under asymmetric information, a lead bank representing a bad borrower mimics the good borrower and its utility would be positive (because $pR-1 > 0$). However, the syndicate members would not break even in expectation.[9] All proofs are in Appendix A.

3.1 Equilibrium analysis

3.1.1 Funding without common ownership

We now solve the contract design game without common ownership. We will derive the *low-information-intensity* optimum of the contract design game (Rothschild and Stiglitz, 1976; Wilson, 1977). This corresponds to the separating allocation that maximizes the utility of the lead bank representing a good borrower subject to the constraint that the lead bank representing a bad borrower does not receive a rent.[10] In practice, this separating contract is unappealing to a bad borrower and allows the potential members to break even.

Proposition 1. *Without common ownership, the separating contracts offered by the lead bank are* $(x_B, R_{B,L}, R_{B,M}, \mathcal{A}_B) = (0, 0, 0, 0)$ *and*

$$(x_G, R_{G,L}, R_{G,M}, \mathcal{A}_G) = (1, A/q, R - A/q, A).$$

Only the lead bank representing the good borrower chooses $(x_G, R_{G,L}, R_{G,M}, \mathcal{A}_G)$.

The separating allocation is designed so that, if investors subscribe the loan, the lead bank must then choose between the contract targeting the bad borrower and the one targeting the good borrower. By construction, this choice is incentive compatible: type B

[9] Upon accepting, and given their priors, investors' expected utility is $\alpha p(1/p) + (1-\alpha)q(1/p) < 1$ because of Assumption 1.(1).

[10] Assumption 1.(2) guarantees that this allocation exists across the cases we consider (with and without common ownership). See Section 3.3 for a discussion on the existence of other perfect Bayesian equilibria.

prefers the contractual terms featuring $(0,0,0,0)$ and type G will prefer the one featuring $(1, A/q, R - A/q, A)$. To achieve separation, the lead bank representing type G wants to pledge all its funds as a signal that it is confident about the good borrower's future returns ($\mathcal{A}_G = A$). Moreover, the reward to L, $R_{G,L}$, is determined by the mimicking condition of the bad type: the lead bank picks the largest repayment that makes the bad type indifferent between accepting the contract targeting the good type and remain inactive. Finally, the good-type contract can be interpreted as a debt contract featuring M transferring $1 - A$ upfront and getting $R - A/q$ if the project succeeds.

To sum up, without common ownership, the lead bank (L) representing a good borrower will underwrite the loan by committing $\mathcal{A}^* = \mathcal{A}_G = A$. The syndicate members (M) receives an interest rate equal to $1 + r^* = R - A/q$.

3.1.2 Funding with common ownership

Consider now the case in which the lead bank places a weight κ on the utility of the commonly owned potential syndicate members. Specifically, there is a fraction $\theta \in (0,1)$ of commonly owned potential syndicate members (M_{Co}) and a complementary fraction $(1-\theta)$ that are not commonly owned with the lead bank (M_{NCo}). In line with our empirical application, any contract offered by the lead bank features the same reward to M_{Co} and M_{NCo} (so that $R_{j,M} = R_{j,M_{Co}} = R_{j,M_{NCo}}$, with $j = G, B$).

We equate common ownership to an information transmission device. We let the lead bank channel its private information regarding the borrower's probability of success to the commonly owned syndicate members. As a consequence, M_{Co} are perfectly informed about the type of the borrower. We say that information transmission can happen only if $\kappa \geq \underline{\kappa}$, we will empirically identify the threshold $\underline{\kappa}$ in the application. This approach is motivated by the evidence in Section 2.2, documenting that banks with high levels of commonly ownership with the lead bank are more likely to share a network of directors.

The timing of the game unfolds as follows. Having shared with M_{Co} its information about the type of borrower it is representing, L designs the contracts to offer to investors. Subsequently, M_{Co} accept or reject. Finally, after observing M_{Co}'s decision, it is M_{NCo}'s turn to accept or reject the contracts offered by L.[11] We discuss how this timing fits our empirical application in Section 3.3. We find the following:

Proposition 2. *With common ownership, the lead bank representing a good borrower will offer the equilibrium contract with symmetric information, namely:* $x_G = 1$, $R_{G,L} =$

[11] We obtain the same results if we consider a model in which L's decision to share information with M_{NCo} is an equilibrium outcome, M_{NCo} only observe L's decision to share information (not the type of the borrower), and the decision to accept the contract is taken simultaneously by M_{Co} and M_{NCo}. In this alternative model, M_{NCo} update their beliefs on the type of borrower represented by L only based on the latter's decision to share information (and the contract it designs).

$R - 1/p$, $R_{G,M} = 1/p$ and $\mathcal{A}_G = 0$. The lead bank representing a bad borrower, will never get access to funding ($x_B = 0$).

Since they know that L channels its private information to M_{Co}, M_{NCo} are able to make inference on the type of borrower represented by L based on the contracts offered by L and M_{Co}'s decision to accept or reject the offer. In equilibrium, then, the lead bank offers the symmetric information contract, and all investors accept. As a consequence, the lead bank representing the good borrower will be funded at the same conditions as with symmetric information.

To sum up, if common ownership is an information transmission device, we find that, as with symmetric information, only the good projects will be funded ($x_G = 1$,$x_B = 0$), the loan is fully underwritten by the members of the syndicate ($\mathcal{A}^{**} = \mathcal{A}_G = 0$) in exchange of an interest rate equal to $1 + r^{**} = 1/p$. In analogy to the case without common ownership, the contract targeting a good type can be interpreted as a debt contract in which the members of the syndicate transfer 1 upfront and get $1/p$ in the case of project success or else the borrower goes bankrupt.

Common ownership and interest alignment We now discuss the situation in which common ownership serves purely as a mechanism to align incentives across lenders, and does not act as an information transmission device. We still expect common ownership to impact the contract design because the objective function of the lead bank features a weight $\kappa > 0$ attached to the utility of M_{Co}. As before, we focus on the separating allocation corresponding to the low-information-intensity optimum of the contract design game. We derived these contracts to prove Proposition 2. The contract targeting the bad borrower features $x_B = 0$. The contract targeting the good borrower sets $x_G = 1$, commits all the liquidity of the lead bank in the loan ($\mathcal{A}_G = A$) and promises a reward to investors that monotonically decreases with the weight κ attached to the commonly owned syndicate members. That is, since it obtains a share of M_{Co}'s utility, the lead bank bank will set a lower reward to the syndicate members.

The reward in this case is different from what we should observe if common ownership acts as an information transmission device; in that case, our results point to a regime shift featuring a lower reward only if common ownership is large enough ($\kappa \geq \underline{\kappa}$). In addition, if common ownership serves as a mechanism to align incentives, we should still see that the lead bank retains a share of the loan to perform signalling. Both our suggestive evidence on directorship overlap, and our empirical evidence on the impact of common ownership on prices and retained share is consistent with the results of the model in which common ownership allows the lead bank to share its private information with the potential syndicate members. The peculiar features of our setting, in which loans are relatively rare events and their magnitude extremely relevant for lenders, are also favouring a more active role of common ownership in shaping firm strategies.

3.2 Empirical predictions

The following proposition lists the empirical predictions of the model. Our null hypothesis is that common ownership facilitates information transmission; thus, our predictions are based on the results in Proposition 2.

Proposition 3. *Comparing the lending conditions ($1+r$ and $\mathcal{A}$) with and without common ownership, we find that:*

1. *The interest rate charged by syndicate members is lower with high common ownership than without common ownership.*
2. *The lead bank commits more funds in the loan without common ownership than with high common ownership.*
3. *The standard deviation of the loan returns to the syndicate members is lower with high common ownership than without common ownership.*

In line with intuition developed after Proposition 2, absent common ownership, the separation of types requires that the lead bank representing a good borrower be less greedy than with high common ownership, and promise higher rewards to the syndicate members. Moreover, to achieve separation, the lead bank representing a borrower with a good project signals its type by committing A in the loan. The lead bank thus conveys the quality of the loan it is issuing by means of a "dissipative signal" (Tirole, 2006). With high common ownership, separation is achieved thanks to the channeling of the lead bank's private information to the commonly owned investors. Finally, due to lower interest rates, the returns' standard deviation will be lower with high common ownership.

3.3 Discussion

Without common ownership, the presence of asymmetric information implies that the lead bank must signal the good borrower's type to the potential members by committing its funds in the loan. Since signaling is costly, the interest rate paid will be larger than with common ownership. These results require that there is truthful information sharing with high common ownership. In our analysis, this interpretation is supported by the evidence in Section 2.2 that, when common ownership is large, banks are more likely to share a network of directors that facilitates the channeling of information. In essence, these directors play the role of the information transmission technology in our model.

In the set-up with common ownership, we assume that the lead bank approaches the informed potential investors first. By doing this, the lead bank implements a cheaper form of signaling, through the acceptance decision of the commonly owned syndicate members instead of contract design. This timing is consistent with the institutional setting of loan syndication. Post-mandate, the lead bank informally contacts a group of potential investors to target. The lead bank presents the loan and shares information about the loan terms and the borrower's creditworthiness. Our assumption is that, at this stage, information sharing takes place truthfully only in the presence of large degrees of common ownership. This process is described in Ivashina and Sun (2011) and Bruche et al. (2020).

The predictions of our model are derived under the assumption that the lead bank holds private information on the expected return of the borrower. We would find the same qualitative results if the lead bank had superior information on the cost of monitoring the borrower (Sufi, 2007). If the monitoring cost is unobservable by potential syndicate members, the lead bank needs to retain a share of the loan to signal that it has an incentive to put effort. Moreover, costly signaling would cause a lower reward to the lead bank, and hence a larger reward to the members of the syndicate. Thus, the predictions of this alternative model would be the same as those we find in Proposition 3.

In principle, other dissipative signals could be used to achieve separation of types without common ownership. For example, the borrower could accept shorter maturities or pledge collateral. However, the non-price dimensions of syndicated loans are set before the marketing stage – that is, before syndicates form at the facility level. Moreover, except for maturity, those non-price attributes do not vary across facilities. Any correlation with common ownership would therefore be spurious or non consequential.

Finally, Tirole (2006) shows that, depending on the value of prior beliefs α, there may exist a pooling equilibrium on top of the separating allocation considered in Proposition 1. In such equilibrium, the lead bank chooses between accepting a contract in which the borrower is rewarded only in the case of success, and a contract that has an upfront lump-sum payment A, and no investment. In practice, the lead bank representing a bad borrower, which chooses the second option, is bribed to go away.[12] Our focus on the separating equilibrium in Proposition 1 is motivated by the fact that such pooling contracts are not offered in syndicated lending. Nonetheless, this they still satisfies our prediction on the lead bank's commitment of A in the loan.

[12] See Tirole (2006) Chapter 6 for details.

4 Data

Our sample is constructed in two steps: in the fist step, we assemble a sample of firm-bank-loan-facility observations between 1990 and 2013. In the second step, we combine our data with information from Thomson Reuter S34 to determine the common investors of the lead bank and the syndicate members within a loan.

4.1 Sample construction

Syndicated Loans Our primary data source is the Loan Pricing Corporation's (LPC) DealScan database, which identifies bank-firm relationships. Dealscan contains detailed information on the loan, such as the interest rate paid to the lender group measured in basis points (the all-in drawn spread, which is the sum of the spread of the facility over LIBOR and any annual fees), loan size, loan type (credit line or term loan), purpose (mainly corporate, excluding leveraged buyout), and the presence of collaterals. We restrict the sample to loans issued by commercial banks incorporated in the U.S. to U.S. non-financial firms between 1990 and 2013.

We identify the participants in a syndicate at the loan-facility level. Following Ivashina (2009), we classify a bank as lead bank if its Lender Role field in DealScan is one of the following: administrative agent, agent, arranger, book-runner, coordinating arranger, lead arranger, lead bank, lead manager, and mandated arranger.[13] We then use linking tables from Chava and Roberts (2008) and Schwert (2018) to merge the loan data with borrower and lender characteristics from Compustat, including borrower size, profitability and rating (investment-grade, high-yield and unrated) and lender size and profitability.[14]

Common Ownership To measure common ownership, we use three sources. The first one is the Thomson Reuters S34 database, which consolidates information from the mandatory 13F SEC filings that all institutions with at least $100 million of assets under management have to report at quarterly frequency. We complement the Thomson Reuters S34 data, when possible, with scraped 13F holdings from Backus et al. (2021b). We are careful to aggregate Blackrock holdings filed separately under different entities (Ben-David et al., 2018). Finally, we collect data on shares outstanding from the Center for Research in Securities Prices (CRSP), which we merge to historical CUSIP codes of banks. Our resulting sample allows us to determine which banks within a loan relationship

[13] In the residual case in which no lead bank or multiple ones are identified, we attribute the role of lead bank to the banks for which the field "Lead Arranger Credit" is marked with "Yes".

[14] Schwert (2018) hand-matches DealScan lender names with Compustat GVKEYs for all lenders with at least 50 loans or at least $10 billion in loan volume. The matching table takes into account bank subsidiaries and bank mergers during the sample period.

have common institutional investors and the extent of such overlapping ownership at the loan-facility level.

4.2 Measures of common ownership

The literature proposes several measures of common ownership, such as the Modifed Herfindahl-Hirschman Index (MHHI) developed by O'Brien and Salop (2000), the GGL measure advanced by Gilje et al. (2020), or the measure based on a production function approach in Newham et al. (2018), which implicitly assumes that investors actively engage in decision making. We adopt the profit weights approach based on the theory of partial ownership developed by Rotemberg (1984). This approach has several merits. It avoids the need to define product markets and a specific competitive conduct, such as Cournot (as in the MHHI). It also allows for players' strategic interactions, a feature that is not present in GGL. Finally, different from Newham et al. (2018), our approach assumes that it is the lead bank that takes shareholders' portfolio interests explicitly into consideration. In Appendix B, we replicate our main analysis using alternative proxies for common ownership and obtain similar results.

As in Rotemberg (1984), we assume that the lead bank maximizes a weighted average of shareholder portfolio profits. To construct the profit weights, we rely on O'Brien and Salop (2000). Each lead bank a places a weight κ_{ab_i} on the profit of each syndicate member bank in facility i (b_i) that is overlapping in ownership:

$$\kappa_{ab_i} = \frac{\sum\limits_{s \in S} \gamma_{as} \beta_{b_i s}}{\sum\limits_{s \in S} \gamma_{as} \beta_{as}}, \tag{3}$$

where S is the set of shareholders of lead bank a, and γ and β are, respectively, the voting and cash-flow rights of each investor s. These weights capture the importance to each lead bank of a dollar of profit generated by the syndicate members. We follow the vast majority of the literature and assume that one share corresponds to one vote (proportionality of voting rights): $\gamma_{as} = \beta_{as}$ and $\gamma_{b_i s} = \beta_{b_i s}$.[15]

Given Equation (3), the average weight that the lead bank a places on the profit of other syndicate members in each facility i is:

$$CO_{ia} = \frac{1}{B_i} \sum_{b=1}^{B_i} \kappa_{ab_i}, \tag{4}$$

[15]See Backus et al. (2021b) for a discussion on the importance of the one-share one-vote assumption and other measures of common ownership.

where $B_i \in [1, \overline{B}]$ is the number of syndicate members in each facility i. We consider other choices to aggregate profit weights between the lead bank and members at facility level, such as median and mode: estimation results remain unchanged. Finally, we repeat the same exercise to determine the degree of common ownership between (i) borrowing firms and banks; (ii) member to lead arranger; (iii) participating banks within each loan relationship. The first measure will be an additional control to account for the presence of common and cross-ownership between vertically related firms. The second and third measures will be useful to run falsification tests of our hypotheses.

Following Backus et al. (2021b), we decompose the profit weights in Equation (3) to study the sources of common ownership variation at the facility level. Let $IHHI_a = \|\beta_a\|^2$ be the Herfindahl-Hirschman Index for the investors in company a. Define $\cos(\beta_a, \beta_{b_i})$ as the cosine similarity between vectors a and b_i, representing the cosine of the angle between the positions that investors hold in a and those that investors hold in b_i. Backus et al. (2021b) show that:

$$\kappa_{ab_i}(\beta) = \underbrace{\cos(\beta_a, \beta_{b_i})}_{\text{overlapping ownership}} \cdot \underbrace{\sqrt{\frac{IHHI_{b_i}}{IHHI_a}}}_{\text{relative IHHI}}. \tag{5}$$

The first term is the overlapping ownership. It captures the similarity in investor positions: for investors holding positions in both the lead bank a and a syndicate member bank b_i, a higher position will determine a smaller angle with cosine similarity approaching one. The second term captures the relative concentration of investors. Ceteris paribus, if the lead bank has fewer, larger investors, then the value of $IHHI_a$ is large, control rights are relatively expensive, and profit weights $\kappa_{ab_i}(\beta)$ smaller. Conversely, if the lead bank has many small investors, the value of $IHHI_a$ is small, control rights relatively cheaper, and profit weights $\kappa_{ab_i}(\beta)$ larger.

Finally, we define as common owners all institutions with at least \$100 million of assets filing the mandatory 13F SEC filings. In a number of cases, those institutions are asset management divisions of the lead bank itself: more precisely, direct investment of a lead bank in other lenders configures a situation of cross ownership rather than common ownership. We identify those management divisions and create profit weights that exclude them as common shareholders, while controlling for the presence of cross-ownership. As those divisions tend to hold very low equity in other lenders, the distribution of profit weights is practically unaffected by such exclusion. For simplicity, our main measure of common ownership therefore includes those institutions as shareholders: separately controlling for cross-ownership does not affect our results.

4.3 Summary Statistics

Table II provides the summary statistics: our final sample includes 15,688 loans granted to 4,529 firms. We identify 66 lead banks. The average syndicate size is 8 members. Syndicates extend loans of $934 million on average. Every loan comprises a number of tranches called facilities: our unit of observation is at this level. On average a syndicated loan consists of 1.9 facilities. The average facility spread is 191 basis points and the average amount $544 million. Approximately 52% of the facilities are secured by collateral. Most facilities in our sample are credit lines (67%).[16] On average, lead banks retain 21% of the facility amount: this variable is reported in around one third of the facilities in the sample.

Common Ownership Patterns In the banking sector, the four largest asset managers (Blackrock, Vanguard, State Street and Fidelity) hold together around 20% of the four largest U.S. commercial banks' shares. Figure 1 documents the striking increase in common ownership over time, confirming the findings of previous studies (Azar et al., 2018; Backus et al., 2021b). We calculate profit weights at the facility level: on average, lead arrangers have a weight of 0.68 on the profits of the other syndicate members, with an increase from 0.37 in 1990 to 0.79 in 2013.

To interpret these patterns, we use the profit weights decomposition into overlapping ownership and relative lender concentration: see Equation ((5)). Figure 2 shows the results of such decomposition between 1990 and 2013. We document that control rights in the lead bank become relatively cheaper over time, driving the growth in profit weights. Panel (a) depicts the increase in profit weights, $\kappa_{ab_i}(\beta)$, over time. Panel (b) shows that cosine similarity, $\cos(\beta_a, \beta_{b_i})$, is, as expected, higher at high levels of common ownership and increasing over time. Panel (c) depicts the relative concentration of lenders, $\frac{IHHI_{b_i}}{IHHI_a}$, and Panel (d) represents the average concentration level of the lead banks only, $IHHI_a$. Taken together, Panel (c) and (d) document that, while relative concentration between bottom and upper quintile of common ownership does not differ very much, investor concentration for the lead banks is much lower at the top quintile of common ownership and clearly decreasing over time relative to the bottom quintile. With the lead bank having many small investors, $IHHI_a$ will be small and control rights cheaper. This is driven, in part, by the growth of retail shares at higher levels of common ownership: as retail investors do not have incentives to engage in active governance, they leave more

[16]In the summary statistics, we present two aggregate types: credit lines and term loans. In the data, we observe more granularity, with different types of term loans (A, B, C, and higher designations). We account for these types in the empirical application, using the following categories: credit line, term loan A, term loan B, and others as the residual category. Lim et al. (2014) use a coarser aggregation, considering all facilities with designation B or higher as term loan B.

room for common owners to influence the lead banks' strategies.

A variance decomposition for all lead bank-member pairs of profit weights reveals that around 70% of the variation in profit weights comes from overlapping concentration, and relative investor concentration never falls below 30%. Investors' concentration has a sizeable impact in shaping the variation in profit weights both in the cross section and over time: at the lowest quintile of common ownership, institutional investors tend to be large and undiversified, thus the lead banks put more weight on their own profits.

Finally, in Table III we regress investors' shares on our measure of cosine similarity, controlling for their level of relative concentration. We verify that high levels of overlapping ownership are associated to higher shares of those investors: investors in each lead bank-member pair may therefore be more likely to engage in active and effective corporate governance thanks to their higher positions in both institutions.

Univariate Differences Table IV summarizes the univariate differences between facilities with high and low common ownership residualized on year fixed effects to account for the trends in the raw data. We label a facility as having high common ownership if the average syndicate profit weight between the lead arranger and other syndicate members is in the upper quintile of the distribution.

On average, facilities with high common ownership display lower spreads, with a statistically significant difference of about 33 basis points, and a lower standard deviation of the returns. These facilities are characterized by a smaller amount retained by the lead bank, and are less likely to be secured by collaterals. Moreover, there are no statistically significant differences between borrowers across the low and high common ownership facility groups in terms of riskiness and profitability (as measured by default probability, stock volatility and ROA), except for a better ability of future loan repayment for borrowers in facilities with high common ownership (as measured by the interest coverage ratio). Although these patterns are broadly consistent with the predictions of the model, they may be driven by confounding factors like, for example, differences in borrower characteristics (observable or not). To control for these factors, we turn to the multivariate analysis in the next section.

5 Estimation and Results

We now specify and estimate a model to investigate whether the three predictions of Proposition 3 are verified in the data. In our model, common ownership affects the terms of syndicated loans by facilitating the transmission of information between the lead bank and the syndicate members. We express the outcomes of interest as a function of a common ownership measure (CO) and other exogenous demand and supply covariates (X):

$$Outcome = \beta_0 + \beta_1 CO + \beta_2 X + \varepsilon, \tag{6}$$

where the dependent variable will be specified as: (i) the interest rate; (ii) the amount retained by the lead bank for each facility; (iii) the standard deviation of loan returns to the syndicate members. The coefficient of primary interest is β_1, the parameter measuring the impact of common ownership. Our estimated β's do not estimate neither parameters of the demand curve nor those of the supply curve, but instead the effect of each covariate on the equilibrium outcomes.

For each outcome variable, we first present the empirical specification. We then discuss the identification strategy, highlighting the key sources of identifying variation in the data. Finally, we present the results.

5.1 Interest rates

According to Prediction 1 of Proposition 3, the interest rate paid to the syndicate members will be lower at higher levels of common ownership. We test the prediction by estimating the following equation:

$$Spread_{iat} = \beta_0 + \beta_1 CO_{iat} + \beta_2 X_{iat} + \varepsilon_{iat}, \tag{7}$$

where the dependent variable $Spread_{iat}$ is the all-in-drawn spread paid to syndicate members, the credit spread over LIBOR plus annual fees of facility i arranged by bank a in quarter t. The variable of primary interest, CO_{iat}, is the average weight that the lead bank a puts on the profit of other syndicate members, as defined in Equation (4). Prediction 1 translates into the prediction that the coefficient β_1 is negative when common ownership is high enough, where the threshold $\kappa \geq \underline{\kappa}$ is empirically identified.

The vector of variables X_{iat} includes an extensive set of controls related to (i) the loan and the facility; (ii) the borrower; (iii) the lender. We account for relations of common ownership between lenders and borrowers: under the lens of a vertical integration model, common ownership between lenders and borrowers may result in lower prices for the borrower. Other loan and facility-related controls include facility amount, number of participants, arranger's past relations with syndicate participants and with the borrower, the presence of collateral in the facility, and its maturity. The rationale of using the facility amount and other non-pricing features of the loans as controls is that those characteristics are fixed before the syndication process. If we remove those controls, our estimates are essentially unchanged. We also control for the three-month LIBOR rate at origination, as the literature documents a relation between LIBOR and loan spreads (Roberts and Schwert, 2020). Borrower-related controls include the borrower's size measured in assets, profitability, and a measure of leverage, defined as book debt over total assets. Finally, lenders' related variables include their size, capital and profitability. The full set of controls X_{iat} is listed in Table B.II.

In addition to our time-varying set of controls, we employ multiple fixed effects to difference out alternative interpretations such as confounding effects of demand and supply variations. First, we account for variation in facility type and loan purpose. Second, we include in our baseline specification, Equation (7), industry-year-quarter fixed effects to control for aggregate variation in demand for syndicated loans in each sector, as well as aggregate time-varying propensity towards risk in each sector. Third, borrower fixed effects account for unobserved time-invariant heterogeneity across borrowers. Finally, to capture time-invariant supply factors, for example the fact that the lead arranger may specialize in loans with specific features or hold a certain reputation, we add lead bank fixed effects.

Our coefficient of primary interest, the one on common ownership, is mainly identified by the cross sectional variation that arises from differences in the composition of the syndicate both across facilities and across loans. As we use quarter-year fixed effects, interacted with the industry in which the borrower operates, the coefficient is identified by the within variation in common ownership among facilities and loans that differs from the average common ownership level faced by borrowers in a certain industry and period. Persistent differences in common ownership across borrowers and lead arrangers are absorbed by our fixed effects at borrower and lead arranger level.

While our set of controls and fixed effects is very extensive, we cannot rule out the possibility that variation in spread associated with common ownership may reflect omitted characteristics, for example related to borrower risk, that systematically correlate with both prices and common ownership. To address this concern, we focus on pricing differentials between different facilities of the same type *within* a loan with low and high levels of common ownership: this method of measuring the effect of common ownership on prices is unlikely to be affected by omitted characteristics. This identification strategy was developed by Ivashina and Sun (2011) and later adopted by Lim et al. (2014). As a credit event on one or more facilities within a loan triggers the default on the entire loan, facilities in the same loan essentially reflect the same underlying risk characteristics. We control for any other remaining difference across facilities of the same type that may influence their pricing: their size, maturity, and the presence of collaterals.

To assess the importance of each source of variation, we regress our common ownership measure on all the covariates included in the main specification, and then partition the variance of the residual into three components: (i) variance in industry-year-quarter, borrower, lead arranger, facility type and loan purpose dummies; (ii) variance across loans; (iii) variance across facilities within a loan. We find that the first component explains around 66.5% of the total variance in common ownership: this is the portion of variance absorbed by our fixed effects and time-varying controls. Variation in common ownership across loans and facilities, after accounting for the fixed effects and the controls, explain 27.6% of the variance in common ownership. The remaining 5.9% comes from differences in common ownership attributable to variation across facilities within a loan.

Results Panel (a) of Table V presents the estimation results for the coefficients of primary interest. The full results from estimating this specification are presented in Columns (4) and (5) of Table B.IV in Appendix B. Column (1) of Table V reports the effect of our common ownership measure on prices without regard for non-linearities in the impact of common ownership. Coefficient estimates indicate that an increase of one standard deviation in common ownership is associated with a lower spread of $0.2 \times 26.78 = 5.34$ basis points.

To understand how price reductions vary across the range of common ownership, we discretize our common ownership measure into five indicator variables corresponding to the quintiles of its support: CO^1_{iat} $(0.06 < CO_{iat} < 0.46)$; CO^2_{iat} $(0.46 < CO_{iat} < 0.62)$; CO^3_{iat} $(0.62 < CO_{iat} < 0.75)$; CO^4_{iat} $(0.75 < CO_{iat} < 0.84)$; CO^5_{iat} $(0.84 < CO_{iat} < 1.20)$. Column (2) of Table V shows that reductions in spread are relevant only for high levels of common ownership (quintile 4 to 5, corresponding to 41% of the loans in our sample), and those reductions are monotonically increasing in common ownership. Assuming no changes in spread for the omitted category (CO^1_{iat}), the point estimates represent the average change in spread for loans in each quintile. Our results are not only statistically, but also economically significant: within a quintile, a change in common ownership in a facility from the minimum to the maximum level reduces the price by roughly 10 basis points. The average loan spread in quintiles 4 and 5 of common ownership is around 197 points.

Appendix B contains the results of several robustness tests. Table B.III reports the same empirical specification using an alternative definition of common ownership as the average of the minimum commonly held shares between the lead arranger and the syndicate members (see Equation (2) in Newham et al. (2018)): the parameter estimates are remarkably similar in magnitude. Our results are also robust to the inclusion of different sets of fixed effects, as reported in Table B.IV. In particular, in Column (5) we include lead-year-quarter fixed effects rather than additive lead bank and year-quarter fixed effects. The interaction rules out sorting based on some unobservable variation in the risk preferences in each lead arranger: the resulting coefficient has roughly the same magnitude. In Column (6) we consider borrower-year fixed effects to control for unobserved time-varying borrower heterogeneity: estimates indicate an even larger reduction in spread associated to high common ownership. Finally, the syndicated loan market is concentrated: JP Morgan and Bank of America are the most active lead arrangers, with around 45% of the loans in the sample (50% in terms of value). We repeat our analysis excluding the loans arranged by these two banks: Column (7) reports the results. Our findings are substantially unchanged, confirming the effectiveness of our controls at lead arranger level, and that the negative effect of common ownership on prices is not driven only by the two main actors in this market, but impacts the market as a whole.

Within-loan estimates We estimate the effect of common ownership on the pricing of facilities of the same type *within* a loan. We have 302 loans with facilities of the same type in the same loan. We estimate Equation (7) on this subsample; results are reported in Columns (1) and (2) of Table V, Panel (b). Differences in spread between facilities of the same type with low/high common ownership cannot be attributed to correlations between common ownership levels and firm-level unobservables driving the spread. The estimates confirm again our hypothesis of price reduction as common ownership increases. Our estimates imply a spread reduction of even bigger magnitude with respect to the above estimation: within a quintile, a change in common ownership in a facility from the minimum to the maximum level of common ownership reduces the spread by roughly 20 basis points.

As robustness check, we look at within-borrower variation as well: we focus on borrowers issuing one or more loans, in the same year, with more than one facility type, non necessarily from the same loan. Our sample contains 2,022 loans with those characteristics. Table V reports the coefficients estimates of Equation (7) on this subsample. The estimated decrease in price determined by common ownership is similar to the within-loan specification.

In sum, both the estimates based on cross-sectional variation and within-loan variation are consistent with Prediction 1 of Proposition 3.

5.2 Funds committed by the lead bank

Prediction 2 of Proposition 3 says that, at higher levels of common ownership, information sharing between the lead bank and the members of the syndicate implies that the lead bank detain a lower share of funds for each facility in the loan. We test Prediction 2 by estimating the following equation:

$$Percent\ Lead\ Amount_{iat} = \beta_0 + \beta_1 CO_{iat} + \beta_2 X_{iat} + \varepsilon_{iat}, \tag{8}$$

where the dependent variable is the percent of facility i's amount retained by lead bank a in quarter t. As before, X_{iat} includes an extensive set of controls related to (i) the loan and the facility, (ii) the borrower and (iii) the lender. As before, we account for variation in facility type and loan purpose; we include industry-year-quarter fixed effects to control for aggregate variation in demand for syndicated loans in each sector, and use lead bank fixed effects to capture time-invariant supply factors.[17]

Prediction 2 implies that β_1 is negative. Table VI presents the coefficient estimates of Equation (8). Column 1 reports the effect of our common ownership measure on the share of loan retained by the lead bank without regard for the possible non-linearities of such impact. Coefficient estimates indicate that an increase of one standard deviation in common ownership as measured by CO_{iat} implies a 0.64 percentage point decrease in the amount retained by the lead bank, holding all other variables constant at their mean values. Lead arrangers retain on average 21% of the facility amount. As above, we discretize our common ownership measure into five indicator variables corresponding to the quintiles of its support to account for non-linearities. Column 2 of Table VI reports that reductions in the funds committed by the lead bank are relevant only for high levels of common ownership. Assuming no effect on the amount retained by the lead for the omitted category (CO^1_{iat}), the point estimates in Table VI represent the average percent point change in the share of the facility retained in each quintile. We find statistically significant decreases in quintiles 3 to 5; within a quintile, an increase in common ownership from the minimum to the maximum level implies a reduction in the amount of the facility retained by the lead corresponding to roughly 1.7 percentage points in quintile 3 and 2.7 percentage points in quintiles 4 and 5. The impact of common ownership on loan retained is therefore sizeable when common ownership is sufficiently high.

Within-loan estimates Similar to above, we test our the hypothesis by restricting our attention to the relatives differences between facilities within the same loan: thanks to such identification strategy, measuring the effect of common ownership on the portion of funds committed by the lead arranger is unlikely to be affected by unobserved firm-level heterogeneity, like the risk of default. Before presenting the estimation results, we need to address the fact that information on the share retained by the arranger is often missing, as

[17] As well known in the literature, information on the share retained by the lead arranger is available for only 30% of the facilities in our sample; we therefore do not include borrower-level fixed effects because of overfitting concerns given the limited sample size.

well-documented in the literature (Ivashina, 2009); when restricting our sample to loans with multiple facilities of the same type, we face a problem of small sample size and, as a consequence, low statistical power. We recover the missing shares using multiple imputation methods. Because of the high fraction of missing information, we only apply the technique to loans for which (i) we have a sufficient number of observations for the auxiliary variables; (ii) only some facilities in the loan have missing information on the amount retained by the lead arranger.[18] Our final sample contains only 100 loans with multiple facilities of the same type in a loan for which we are able to recover the percent of loan retained by the lead. We estimate Equation (8) using this subsample. Results are reported in column (1) and (2) of Table VI, Panel (b). Again, the negative sign of the coefficient estimates points to a decrease in the share of the loan retained by the lead arranger; however, the size of our sample is insufficient to detect a statistically significant effect.

To overcome the issue of statistical power, we turn to multiple loans issued by a borrower, in a given year, with more than one facility type. Our sample presents 685 loans with these characteristics. Our coefficients are identified by variation in the degree of common ownership across facilities of the same type in one or more loans issued by a borrower in a given year. Table V reports the coefficients estimates of Equation (8) on this subsample. The results confirm a decrease in the retained amount determined by common ownership: the magnitude of the coefficient estimates is similar to the one obtained in the within-loan specification; the coefficients are now statistically significant as we have more observations.

In sum, we find empirical support for our hypothesis of reduction in the amount retained by the lead for each facility as common ownership increases.

5.3 Standard deviation of loan returns

According to Prediction 3 of Proposition 3, the standard deviation of the loan returns to the syndicate members is lower at higher levels of common ownership. We test the hypothesis by estimating the following equation:

$$Stand.Dev.\ Spread_{jat} = \beta_0 + \beta_1 CO_{jat} + \beta_2 X_{jat} + \varepsilon_{jat}, \tag{9}$$

where $Stand.Dev.\ Spread_{jat}$ denotes the standard deviation of the all-in-drawn spread across facilities within loan j arranged by bank a in quarter t. The unit of observation is therefore loan-bank-firm rather than facility-loan-bank-firm as before. Common own-

[18]Chodorow-Reich (2014) and Darmouni (2020) use imputation techniques on datasets of the same type to recover the missing information on the share retained by the arranger.

ership is measured as the average profit weights across facilities within the loan j. The coefficient β_1 measures the effect of an increase in common ownership between members of the loan on the dispersion of the all-in-drawn spread.

Prediction 3 implies that β_1 is negative when common ownership is sufficiently high. Table VII presents the estimates of Equation (9) in column (1) and (2). An increase of one standard deviation in common ownership is associated with a 2.97 basis points decrease in the standard deviation of the spread. Given that the standard deviation of the spread equals to 21 basis point, such decrease corresponds to 14% of the total spread. In column (3) and (4), we redefine the dependent variable as the standard deviation in the price of loans issued by the same borrower in a year; coefficients estimates present the same sign and similar magnitude.

6 Other Results

6.1 Falsification Tests

We now present the results of two falsification tests: they both leverage on the testable implications of our hypothesis of common ownership as a mechanism of information transmission from the lead to the member banks.

Common ownership member-lead The first falsification test exploits the asymmetry in our measure of common ownership between pairs of banks: lead-member, κ_{ab_i}, and member-lead, κ_{b_ia}. Such asymmetry is a feature of our common ownership measure and results in the following testable implication: as only the lead arranger holds superior information on the borrower, the level of common ownership from the syndicate member to the lead arranger (κ_{b_ia}) should not impact the lending conditions once we control for the weight that the lead arranger puts on the profit of the syndicate member (κ_{ab_i}). As discussed in Backus et al. (2021b), such asymmetry is entirely driven by differences in relative investor concentration. In Appendix B, we provide a decomposition of the profit weights member-lead into cosine similarity and relative lender concentration: see Equation (5). Figure B.1 shows the results: Panel (a) shows that the cosine similarity member-lead is identical to lead-member, as reported in Figure 2. Panel (b) depicts the relative concentration of lenders in the measure of common ownership member-lead.

We estimate Equation (7) and Equation (8) by regressing both the all-in-drawn spread and the amount of loan retained by the lead on a measure of the average common ownership between lead arranger and syndicate member in a facility (CO_{ia}), as before, and a measure of the average common ownership between syndicate member and lead arranger in a facility (CO_{ib}). The expectation is that adding CO_{ib} should not impact the lending conditions. Column (3) and (4), Panel (a) of Table VIII show the results: in all specifications, the magnitude of the coefficient of common ownership lead-member (CO_{ia}) is unchanged. The coefficient of common ownership member-lead (CO_{ib}) is small in magnitude and not statistically different from zero.

Common ownership member-member The second falsification test turns to the level of common ownership between members. Our identification strategy relies on the presence of variation in common ownership between the lead bank and the syndicate members across facilities and loans: only the lead bank possesses superior information on the riskiness of the borrower (good or bad type). In presence of high common ownership, information sharing between the lead and the commonly owned members mitigates those information asymmetries, resulting in lower prices. We test our identification strategy by conducting a falsification test. We select a sample in which common ownership between the lead and the members is low; we then compute a measure of common ownership between member pairs, rather than between lead-members. We estimate Equation (7) by regressing the all-in-drawn spread against the member-member common ownership measure. Panel (b) of Table VIII reports the estimated coefficients: common ownership between members does not appear to impact the pricing of facilities. We also re-estimate Equation (8) regressing the share retained by the members against our measure of common ownership between member pairs. Column (3) and (4), Panel (b) of Table VIII reports the estimated coefficients. Again, common ownership between members does not impact the share of facility retained by the lead bank.

Overall, both tests constitutes an indirect confirmation that information sharing is effectively initiated by the lead bank when common ownership between the lead arranger and the members in high enough.

6.2 Heterogeneous Effects

In our analysis we have so far considered the overall effect of common ownership on the financing terms of syndicated loans. We expect that the role of common ownership will be stronger when information asymmetries are particularly pronounced. Following Sufi (2007), we consider two dimensions of heterogeneity in information asymmetry between the informed lead arranger and the uninformed syndicate members: the transparency of borrowers, proxied by their rating, and the reputation of borrowers, measured by their past access to the loan market.

Table IX reports the results of regressing the all-in-drawn spread against the common ownership measure for each subsample: rated versus unrated and new versus repeated borrowers. Panel (a) of Table IX shows that common ownership strongly impacts loan pricing when borrowers are opaque (unrated), and the effect is stronger with respect to more transparent borrowers (rated). Assuming no effect on the amount retained by the lead for the omitted category (CO^1_{iat}), the coefficient estimates represent the average percent point change in the share of facility retained in each quintile. For unrated borrowers, public firms without a credit rating, we find statistically significant decreases in quintiles 4 and 5; within a quintile, an increase in common ownership from the minimum to the maximum level implies a reduction in spread corresponding to 10.5 basis points in quintile 4 and 19.0 percentage points in quintile 5. The corresponding values for rated firms are much smaller: 6.5 basis points in quintile 4 and 10.2 in quintile 5. Panel (b) of Table IX shows that common ownership matters for borrowers whose reputation is less established. Those borrowers have almost no history in the loan market; the lead arranger carrying out the due diligence will be more likely to hold an information advantage over the uninformed syndicate participants. For borrowers forming new relations with the lead in the market, we find statistically significant decreases in quintiles 3 to 5; within a quintile, an increase in common ownership from the minimum to the maximum level implies a reduction in spread corresponding to 9.0 basis points in quintile 3, 17.9 basis points in quintile 4, and 23.0 basis points in quintile 5. In contrast, common ownership does not impact the spread of repeated borrowers.

6.3 Common Ownership and Syndicate Participation

Our variable of interest, common ownership, is a function of the syndicate structure, namely the set of lenders participating in the syndicate. As the lenders decision to enter the syndicate is not random and may depend, among other factors, on the level of common ownership with the lead arranger and other unobservables collected in the error term, we extend our model to account for this form of self-selection. We assume that the utility maximization problem of potential members can be characterized by a reservation interest rate (spread) or reservation return. The reservation interest rate will depend on the characteristics of the member, among which his assessment on the riskiness of the borrower, as follows:

$$Spread^r_{iabt} = \gamma_0 + \gamma_1 \kappa_{iabt} + \gamma_2 X_{iabt} + \upsilon_{iabt}, \tag{10}$$

where κ_{iabt} is weight that the lead arranger a puts on the profit of each potential syndicate member b in facility i arranged in quarter t, as defined in Equation (3). Finally, X_{iabt} is a vector of controls including characteristics of (i) the potential member; (ii) the lead arranger; (iii) the loan and the facility; (iv) the borrower.

If the actual interest rate offered to the potential members is below the reservation interest rate, $Spread^r_{iabt}$, the potential member does not participate in the syndicate. The participation decision of potential member bank (p_{iabt}) is therefore:

$$\begin{aligned} p_{iabt} &= 1 \text{ if } Spread_{iat} - Spread^r_{iabt} > 0 \\ &= 0 \text{ if } Spread_{iat} - Spread^r_{iabt} \leq 0. \end{aligned}$$

The inequality can be expressed as follows:

$$\begin{aligned} p^*_{iabt} &= (\beta_0 - \gamma_0) + (\beta_1 \kappa_{iabt} - \gamma_1 \kappa_{iabt}) + \\ &\quad (\beta_2 X_{iabt} - \gamma_2 X_{iabt}) + (\varepsilon_{iabt} - \upsilon_{iabt}) \\ &= \delta_0 + \delta_1 \kappa_{iabt} + \delta_2 X_{iabt} + \eta_{iabt}. \end{aligned}$$

The participation equation is therefore:

$$p_{iabt} = 1[\delta_0 + \delta_1 \kappa_{iabt} + \delta_2 X_{iabt} + \eta_{iabt} > 0]. \tag{11}$$

The resultant outcome equation is:

$$\begin{aligned} Spread_{iat} &= \beta_0 + \beta_1 \kappa_{iabt} + \beta_2 X_{iabt} + \varepsilon_{iabt} \text{ if } p^*_{iabt} > 0 \\ &= \text{not observed if } p^*_{iabt} \leq 0, \end{aligned} \tag{12}$$

where we modify Equation (7) to use a more granular unit of observation at member-facility level rather than facility level as in the main specification.[19] Clearly, the error term η_{iabt} involves the unobserved determinants influencing the interest rate offered to the members ε_{iabt}. To account for correlation between unobservable drivers of participation and the resulting interest rate offered to the syndicate members, we assume a joint normal distribution for the two error terms:

$$\begin{pmatrix} \eta_{iabt} \\ \varepsilon_{iabt} \end{pmatrix} \sim N\left(0, \begin{pmatrix} 1 & \sigma_{12} \\ \sigma_{12} & \sigma_2^2 \end{pmatrix}\right).$$

We estimate the model using the standard Heckman two-step procedure. The joint normality of the errors implies that the error in the pricing equation, ε_{iabt}, is a multiple of the error in the participation decision equation (σ_{12}) plus some noise that is independent of the participation decision equation.

[19] The dependent variable, $Spread_{iat}$, is set at facility level and does not vary across members of the same facility.

While the sample selection model is theoretically identified without any restriction on the regressors, we use exclusion restrictions to allow for identification of the parameters attributable to variation in the data rather than parametric assumptions. We argue that the following variables should impact participation, but should not affect the resulting prices: the characteristics of potential members, a variable capturing the portfolio similarity between the potential member and the lead (Euclidian distance), a dummy equal to one if the potential member had previous relations with the borrower. Interest rates are a function of a variety of determinants linked to the lead bank, the borrower and the loan, but the characteristics of potential members should not directly influence the final price. While the validity of the exclusion restrictions cannot be directly tested, we perform some sensitivity analyses and results do not change. Finally, all the variables included in the participation equation are also present in the outcome equation.

Table X presents the results without the correction for selection (Column 1) and with the correction (Column 2 and 3). Results from the selection model indicate that participation is not random. Panel (a) of Table X presents the results using the full sample of observations. In Column (2) we present the results of the participation equation. Potential members with higher common ownership with the lead bank are more likely to enter the syndicate, confirming that high levels of common ownership can mitigate information asymmetries: as those potential members may hold superior information than other uninformed participants, their reservation price is lower and they may be more likely to participate in the syndicate. Other statistically important drivers of participation include the level of common ownership between the potential member and the borrower (positive), and the portfolio distance between the lead and the member (negative).

We find evidence of selection, with a significant sample selection term, λ, and an implied correlation coefficient of 0.43: we have unobserved attributes that positively affect both the probability of participating to the syndicate and the prices offered to the syndicate members. Qualitatively, these results do not appear to be very different from those without correction, especially with regard to the impact of common ownership on prices.

In Panel (b) of Table X we repeat the same analysis selecting the subsample of 302 loans with facilities of the same type in the same loan. In this setting, it is reasonable to assume that the decision of potential lenders to enter the syndicate and fund the loan essentially depends on the credit risk of the borrower. In contrast, the choice of the specific facility should mainly depend on lender-specific preferences. As a consequence, the composition of the syndicate across facilities within a loan should not depend on the degree of common ownership. Our intuition is verified in the data: common ownership is not a driver of participation in specific facilities of loans. The differences between the estimates with and without selection are practically small. The t-statistic on the coefficient of the selection term, λ, is statistically insignificant, and the implied correlation coefficient is practically zero. As a result, the two models lead to similar coefficient estimates.

7 Conclusion

We study the impact of common ownership in the syndicated loan market, focusing on the connection between the lead bank and the syndicate members. Our hypothesis is that common ownership may facilitate the transmission of private information on the borrowing firms between the lead bank and other members of the syndicate; common ownership is therefore a tool to ease information asymmetries.

We empirically document that in the syndicated loan market shared directors are more likely when common ownership increases: this positive association supports the idea of common ownership as an information transmission device. After, we develop a signaling model in which a lead bank detains private information on the riskiness of a project while seeking funding to finance it. Signaling is costly in that it requires a larger commitment of funds by the lead bank. We solve the model under two scenarios: no common ownership, corresponding to asymmetric information, and high common ownership, corresponding to symmetric information. The model provides three empirical predictions: at higher levels of common ownership (i) the interest rate paid to the syndicate members is lower; (ii) the lead bank retains lower funds; (iii) the standard deviation of the loan returns to the syndicate members is lower.

We use data on the syndicated loan market to empirically verify these predictions and find clear empirical support for all of them. Our identification leverages the differences in the level of common ownership between tranches of a loan, holding the risk of the underlying asset constant. An increase of one standard deviation in common ownership between the lead arranger and members of the syndicate is associated with a decrease equal to: (i) 9 basis points in interest rates; (ii) 0.64 percentage points in the amount retained by the lead; (iii) 2.97 basis points in the standard deviation of the spread. These results are robust to a variety of robustness and falsification tests.

Regulators recognize that common ownership can be conducive to the transmission of information about the borrower. We provide empirical evidence consistent with the presence of this flow of information and quantify the impact of common ownership on the contractual terms of the loan. More broadly, we provide a novel view on common ownership as a mechanism to mitigate the effects of information asymmetry. Given the pervasiveness of overlapping ownership across industries, future research analysing its impact in other contexts characterized by information asymmetry would be of relevant interest.

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Tables and Figures

Table I: **Board Connections and Common Ownership**

	(1)	(2)	(3)
CO	0.308***	0.058**	0.061**
	(9.660)	(2.077)	(2.168)
Distance Lead-Member		-0.093**	-0.077**
		(-2.460)	(-2.041)
Relationship Lead-Member		0.197***	0.196***
		(4.365)	(4.344)
Lead Size		0.074***	0.078***
		(9.743)	(10.077)
Lead Market Equity		0.125	-0.054
		(1.178)	(-0.464)
Lead Book Leverage		-0.046	-0.112**
		(-1.015)	(-2.310)
Lead ROA		0.337	0.219
		(0.365)	(0.191)
Member Size		0.079***	0.084***
		(11.347)	(11.887)
Member Market Equity		0.149*	0.004
		(1.675)	(0.037)
Member Book Leverage		-0.049	-0.111**
		(-1.062)	(-2.320)
Member ROA		-0.099	-0.342
		(-0.115)	(-0.357)
Year FE	No	No	Yes
Observations	8,213	7,942	7,942
Adjusted R-squared	0.040	0.159	0.165

The table reports the OLS regression parameter estimates and t-statistics. The dependent variable is as an indicator equal to one if a pair of banks have a board connection. Distance Lead-Member is the portfolio distance between the lead bank and the syndicate participant in the previous four quarters, Relationship Lead-Member is the number of loans arranged by the lead bank where the member bank participated in the previous four quarters divided by the number of loans arranged by the lead bank in the previous four quarters. Standard errors are clustered by member bank. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table II: **Summary Statistics**

	Mean	Std.Dev	p25	p50	p75	Obs.
			Loan Variables			
All-in-Drawn Spread	191	129	100	175	275	31,446
CO	0.680	0.200	0.560	0.730	0.827	31,580
CO Bank-Borrower	0.410	0.320	0.090	0.410	0.680	31,541
Facility Amount $M	543.6	1,089.2	100.0	250.0	600.0	31,580
Loan Amount $M	934.3	1,735.3	190.0	450.0	1,000.0	31,580
# Facilities within Loan	1.860	1.050	1.000	2.000	2.000	31,580
Log Maturity	3.800	0.630	3.580	4.090	4.094	30,915
Secured Loan	0.520	0.500	0.000	1.000	1.000	31,580
Refinancing	0.690	0.460	0.000	1.000	1.000	31,580
Log Number of Members	2.050	0.730	1.610	2.080	2.565	31,580
Guarantor	0.090	0.290	0.000	0.000	0.000	31,580
Relationship Score	0.040	0.020	0.030	0.040	0.045	31,580
New Lending Relation	0.530	0.500	0.000	1.000	1.000	31,580
LIBOR 3M	0.030	0.020	0.000	0.030	0.054	31,580
Non-Bank Synd. Member	0.230	0.420	0.000	0.000	0.000	31,580
Prob. Default	0.040	0.150	0.000	0.000	0.000	23,888
Stock Volatility	0.420	0.530	0.280	0.370	0.490	24,870
Lead Amount	20.59%	15.92%	9.56%	15.00%	26.66%	10,295
Credit Line	0.670	0.470	0.000	1.000	1.000	31,580
Term Loan	0.330	0.470	0.000	0.000	1.000	31,580
			Borrower Variables			
Size	7.560	1.640	6.460	7.490	8.689	30,867
ROA	0.090	0.240	0.050	0.090	0.127	30,802
Book Leverage	0.360	0.260	0.190	0.320	0.486	30,778
Tangibilities	0.310	0.230	0.130	0.250	0.457	30,755
Tobin's Q	1.740	1.640	1.180	1.470	1.928	26,625
Log Int. Cov.	2.120	1.080	1.390	1.930	2.611	28,072
Liquidity Ratio	0.060	0.080	0.010	0.040	0.083	30,437
Unrated Borrower	0.360	0.480	0.000	0.000	1.000	31,580
High Yield	0.360	0.480	0.000	0.000	1.000	31,580
Investment Grade	0.280	0.450	0.000	0.000	1.000	31,580
			Bank Variables			
Bank Size	13.290	1.170	12.470	13.530	14.262	31,172
Bank Market Equity	0.120	0.060	0.070	0.110	0.158	31,172
Bank Book Leverage	0.270	0.110	0.220	0.260	0.308	31,164
Bank ROA	0.010	0.010	0.010	0.010	0.013	31,172

The table reports summary statistics of the main variables in our sample related to (i) facilities and loans; (ii) borrowers; (iii) banks. All variables are defined in Table B.II.

Table III: **Average Share Owned by Top10 Common Shareholders and Investors' Holdings Similarity**

	(1) Mean Share Top 10	(2) Mean Share Top 10	(3) Mean Share Top 10
Cosine Simil. Quintile 2	3.543***	2.485***	1.638***
	(6.889)	(3.885)	(3.099)
Cosine Simil. Quintile 3	5.280***	3.112***	2.711***
	(10.209)	(3.734)	(4.215)
Cosine Simil. Quintile 4	6.660***	3.929***	3.485***
	(12.236)	(4.243)	(5.062)
Cosine Simil. Quintile 5	7.853***	4.563***	4.608***
	(11.296)	(4.177)	(5.861)
Lead IHHI	77.864***	10.345	5.334
	(2.739)	(0.387)	(0.357)
Aveage Synd. Member IHHI	390.929***	-114.937	-71.838
	(8.577)	(-1.300)	(-0.839)
Year-Quarter FE	No	Yes	Yes
Bank FE	No	No	Yes
Observations	970	970	961
Adjusted R-squared	0.686	0.772	0.845

The table reports the OLS regression parameter estimates and t-statistics. The dependent variable is the average share retained by the top 10 common shareholders in each lead bank, *Mean Share Top 10*. The covariate of interest is the average cosine similarity between the lead bank and other syndicate members, *Cosine Simil Quintile 1-5*. *Lead IHHI* is the Herfindal-Hirschman Index (HHI) for the investors in the lead bank. *Average Synd. Member IHHI* is the aveage Herfindal-Hirschman Index (HHI) for the investors in the member banks. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table IV: **Differences in attributes of high common ownership facilities and low common ownership facilities**

	CO Low (1)		CO High (2)		Difference (1)-(2)	
	Mean	Obs.	Mean	Obs.	Diff.	t-stat
			Loan and Facility Characteristics			
All-in-Drawn Spread	21.34	4837	-11.81	6753	33.15***	(15.60)
Lead Amount	2.74%	2374	0.84%	1754	1.91%***	(3.79)
Log Maturity	0.03	4713	-0.04	6691	0.07***	(6.17)
Secured Loan	0.05	4854	-0.05	6786	0.11***	(11.41)
All-in-Drawn Spread SD	2.76	2708	-1.21	3448	3.97***	(3.61)
			Borrower Characteristics			
Prob. Default	0.01	3424	0.00	5329	0.01*	(2.00)
ROA	0.00	4694	-0.01	6679	0.01	(1.10)
Log Int. Cov.	-0.02	4316	0.04	6039	-0.06**	(-3.03)
Observations	4854		6786			

The table reports the differences between facilities with high common ownership and facilities with low common ownership for the main variables of our sample. All variables are time demeaned. A facility is defined as high common ownership if the average level of profit weight between the lead bank(s) and the syndicate members falls in the upper quintile of the common ownership distribution. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table V: **Facility Loan Spread**

Panel A: Full Sample

	(1)	(2)
CO	-26.780***	
	(-3.742)	
CO Quintile 2		2.800
		(0.916)
CO Quintile 3		-4.007
		(-1.157)
CO Quintile 4		-10.531**
		(-2.393)
CO Quintile 5		-11.601***
		(-2.823)
Loan Purpose FE	Yes	Yes
Facility Type FE	Yes	Yes
SIC2 FE	No	Yes
Year-Quarter FE	No	No
Lead FE	Yes	Yes
Borrower FE	Yes	Yes
SIC2 X Year-Quarter FE	Yes	Yes
Observations	19,923	19,923
Adjusted R-squared	0.808	0.808

Panel B: Within-loan estimates

	Same Facility Type - Same Loan		*Same Facility Type - Same Borrower-Year*	
	(1)	(2)	(3)	(4)
CO	-45.878***		-52.761***	
	(-3.414)		(-4.533)	
CO Quintile 2		-4.093		-0.113
		(-0.772)		(-0.021)
CO Quintile 3		-17.204***		-5.582
		(-2.818)		(-0.793)
CO Quintile 4		-25.307***		-21.230***
		(-3.937)		(-3.177)
CO Quintile 5		-24.269***		-28.126***
		(-3.181)		(-4.099)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	794	794	2,747	2,747
Adjusted R-squared	0.848	0.848	0.702	0.704

The table reports the OLS regression parameter estimates and t-statistics of Equation (7). The dependent variable is the all-in-drawn loan spread, expressed in basis points. The covariate of interest is a measure of common ownership between the lead and member banks in the same syndicate. The model also control for facility-loan, lender, and borrower characteristics. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table VI: **Facility Amount Retained by Lead Bank**

Panel A: Full Sample

	(1)	(2)
CO	-2.258**	
	(-2.328)	
CO Quintile 2		-0.319
		(-0.481)
CO Quintile 3		-1.874**
		(-2.371)
CO Quintile 4		-2.839***
		(-3.826)
CO Quintile 5		-1.769*
		(-1.891)
Loan Purpose FE	Yes	Yes
Facility Type FE	Yes	Yes
Lead FE	Yes	Yes
Borrower FE	No	No
SIC2 X Year-Quarter FE	Yes	Yes
Observations	6,753	6,753
Adjusted R-squared	0.726	0.727

Panel B: Within-loan estimates

	Same Facility Type - Same Loan		*Same Facility Type - Same Borrower-Year*	
	(1)	(2)	(3)	(4)
CO	-4.066		-4.072*	
	(-0.533)		(-1.900)	
CO Quintile 2		-1.008		0.157
		(-0.305)		(0.164)
CO Quintile 3		-3.555		-1.541
		(-1.028)		(-1.587)
CO Quintile 4		-3.824		-2.043*
		(-0.902)		(-1.914)
CO Quintile 5		-3.953		-2.741**
		(-0.975)		(-2.368)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	327	327	903	903
Adjusted R-squared	0.604	0.610	0.638	0.639

The table reports the OLS regression parameter estimates and t-statistics of Equation (8). The dependent variable is the percentage facility amount retained by each lead bank in the syndicate. The covariate of interest is a measure of common ownership between the lead and member banks in the same syndicate. The model also control for facility-loan, lender, and borrower characteristics. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table VII: **Standard Deviation of Loan Returns**

	(1) Price SD Loan	(2) Price SD Loan	(3) Price SD Borrower-Year	(4) Price SD Borrower-Year
CO	-14.914***		-22.150***	
	(-3.026)		(-3.283)	
CO Quintile 2		-5.054**		3.189
		(-2.374)		(0.982)
CO Quintile 3		-5.641**		-12.454***
		(-2.474)		(-3.836)
CO Quintile 4		-4.169		-5.604**
		(-1.582)		(-2.124)
CO Quintile 5		-11.005***		-11.483***
		(-4.426)		(-4.435)
Loan Purpose FE	Yes	Yes	No	No
SIC2 X Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	3,925	3,925	4,817	4,817
Adjusted R-squared	0.441	0.443	0.363	0.369

The table reports the OLS regression parameter estimates and t-statistics of Equation (9). The dependent variable is the standard deviation of prices among facilities within the same loan (1)-(2) and same borrower-year (3)-(4). Common ownership is defined as the average profit weight between the lead arranger(s) and other syndicate members within the same loan (1)-(2) and same borrower-year (3)-(4). The model also controls for facility-loan, lender, and borrower characteristics. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table VIII: **Facility Loan Spread - Falsification Test**

Panel A: CO directionality

	(1) Spread	(2) Spread	(3) Lead Amount	(4) Lead Amount
CO Member-Lead	-2.790	-2.812	-1.317	-0.538
	(-0.304)	(-0.311)	(-0.671)	(-0.275)
CO Lead-Member	-26.529***		-1.951*	
	(-3.762)		(-1.823)	
CO Quintile 2		2.593		-0.353
		(0.924)		(-0.515)
CO Quintile 3		-3.561		-1.863**
		(-1.054)		(-2.387)
CO Quintile 4		-10.616**		-2.818***
		(-2.496)		(-3.921)
CO Quintile 5		-11.753***		-1.724*
		(-2.875)		(-1.805)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
SIC2 FE	No	No	No	No
Year-Quarter FE	No	No	No	No
Lead FE	Yes	Yes	Yes	Yes
Borrower FE	Yes	Yes	No	No
SIC2 X Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	20,151	20,151	6,732	6,732
Adjusted R-squared	0.807	0.807	0.725	0.726

Panel B: CO among syndicate members only

	(1) Spread	(2) Spread	(3) Lead Amount	(4) Lead Amount
CO among Members Only	-2.043		-0.263	
	(-0.111)		(-0.072)	
CO Among Members Quintile 2		-6.925		-0.429
		(-1.439)		(-0.342)
CO Among Members Quintile 3		-3.136		-0.241
		(-0.633)		(-0.237)
CO Among Members Quintile 4		5.629		-0.865
		(0.930)		(-0.671)
CO Among Members Quintile 5		-2.235		1.857
		(-0.275)		(0.791)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
SIC2 FE	No	No	Yes	Yes
Year-Quarter FE	No	No	Yes	Yes
Lead FE	Yes	Yes	Yes	Yes
Borrower FE	No	No	No	No
SIC2 X Year-Quarter FE	Yes	Yes	No	No
Observations	4,013	4,013	1,677	1,677
Adjusted R-squared	0.811	0.812	0.614	0.614

The table reports the OLS regression parameter estimates and t-statistics of Equation (7) in Column (1) and (2) and Equation (8) in Column (3) and (4). The dependent variable is facility loan spread (Column 1 and 2) and the percentage of loan retained by the lead bank (Column 3 and 4). In Panel (a), the covariate of interest is a measure of common ownership member-lead. In Panel(b), the covariate of interest is a measure of common ownership member-member. The model also control for facility-loan, lender, and borrower characteristics. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table IX: **Facility Loan Spread and Common Ownership - Group Splits**

Panel A: Rated vs Unrated borrowers

	(1) Rated	(2) Rated	(3) Unrated	(4) Unrated
CO	-24.569***		-33.600***	
	(-2.786)		(-3.539)	
CO Quintile 2		-1.712		1.905
		(-0.472)		(0.358)
CO Quintile 3		-4.921		-2.898
		(-1.479)		(-0.483)
CO Quintile 4		-10.733***		-10.516*
		(-2.913)		(-1.891)
CO Quintile 5		-11.870***		-16.749***
		(-3.075)		(-2.779)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
Lead FE	Yes	Yes	Yes	Yes
SIC2 X Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	14,115	14,115	5,649	5,649
Adjusted R-squared	0.761	0.761	0.713	0.713

Panel B: New lending relationships vs Repeated borrowing

	(1) New Relation	(2) New Relation	(3) Repeated Lending	(4) Repeated Lending
CO	-51.688***		-7.121	
	(-5.994)		(-0.796)	
CO Quintile 2		0.392		-4.149
		(0.083)		(-0.862)
CO Quintile 3		-13.868**		-6.978
		(-2.505)		(-1.332)
CO Quintile 4		-23.572***		-8.178
		(-4.375)		(-1.291)
CO Quintile 5		-26.553***		-6.682
		(-4.619)		(-1.191)
Loan Purpose FE	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes
Lead FE	Yes	Yes	Yes	Yes
SIC2 X Year-Quarter FE	Yes	Yes	Yes	Yes
Observations	9,932	9,932	9,835	9,835
Adjusted R-squared	0.752	0.752	0.757	0.757

The table reports the OLS regression parameter estimates and t-statistics of Equation (7). The dependent variable is the all-in-drawn loan spread, expressed in basis points. Common ownership is defined as the average profit weight between the lead arranger(s) and other syndicate members. Column (1) contains loans issued to unrated borrowers, namely public companies that did not have a credit rating from Standard & Poors at the time of loan issuance. Column (2) contains loans issued to rated borrowers. Column (3) report the effect of syndicate common ownership on facility spreads for new lending relations. Column (4) report the effect of syndicate common ownership on facility spreads for repeated lending relations. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table X: **Facility Loan Spread: Heckman Selection**

Panel A: Full sample

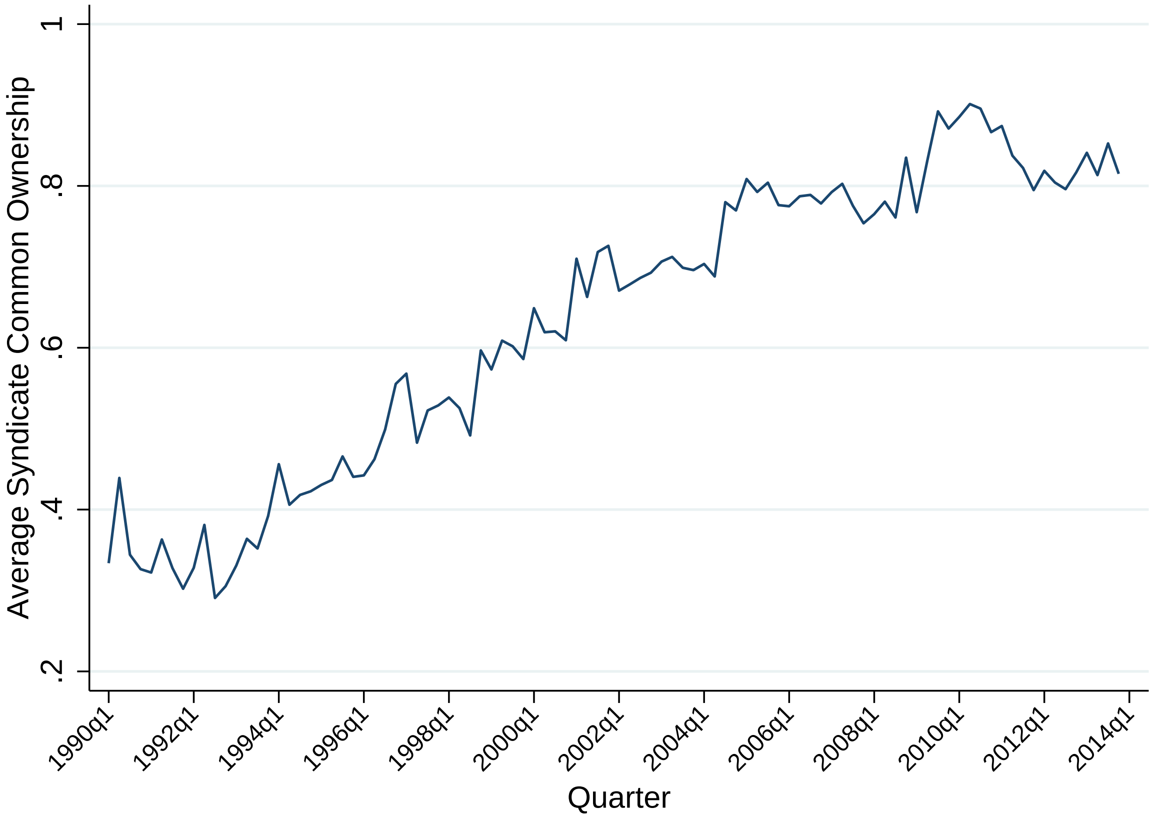
	No Selection	Heckman Selection	
	(1) Spread	(2) Member	(3) Spread
CO	-10.194***	0.162***	-8.596***
	(-3.251)	(2.989)	(-7.305)
λ			25.138***
			(6.573)
Loan Purpose FE	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes
SIC2 FE	Yes	Yes	Yes
Observations	66,259	66,232	66,232

Panel B: Within loan

	No Selection	Heckman Selection	
	(1) Spread	(2) Member	(3) Spread
CO	-8.206**	-0.090	-8.524**
	(-2.012)	(-0.489)	(-1.995)
λ			-6.901
			(-1.121)
Loan Purpose FE	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes
Year-Quarter FE	Yes	Yes	Yes
SIC2 FE	No	No	No
Observations	2,790	2,584	2,584

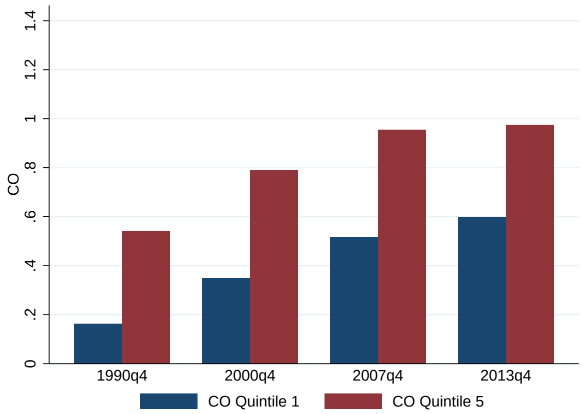
The table reports the the regression parameter estimates and t-statistics of a one-step OLS estimation of Equation (12) (Column 1) and a two-step estimation of Equation (11) and Equation (12) accounting for sample selection (Column 2 and 3). The dependent variable is the all-in-drawn loan spread, expressed in basis points. The covariate of interest is a measure of common ownership between the lead and member banks in the same syndicate. The model also control for facility-loan, syndicate member bank, and borrower characteristics. Standard errors are clustered by member bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Figure 1: **Average Syndicate Common Ownership Over Time**

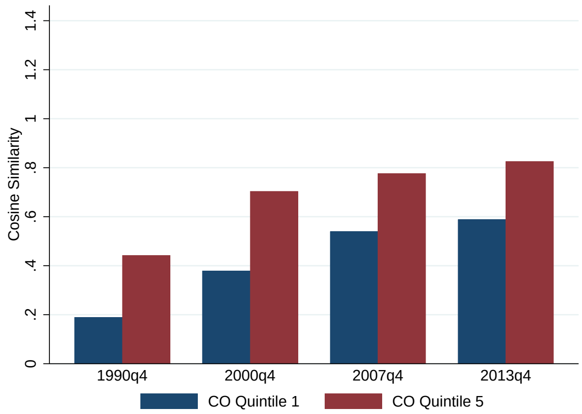


This figure reports the average common ownership among banks in the same syndicate between 1990 and 2013 at a quarterly frequency. Common Ownership is defined as the average the profit weights between the syndicate lead-arranger(s) and the syndicate members.

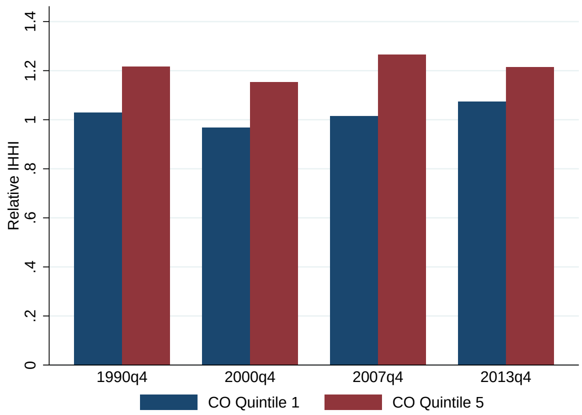
Figure 2: **CO Decomposition**



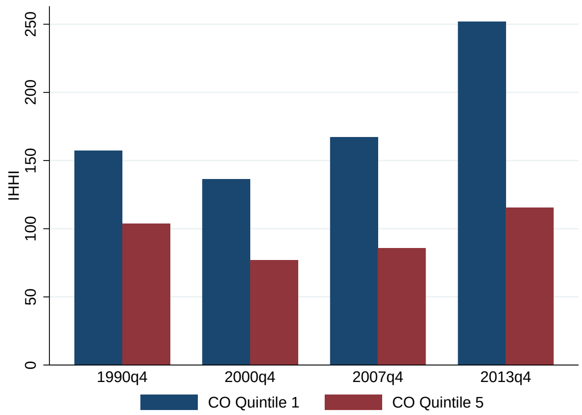
(a) CO



(b) Cosine Similarity



(c) Relative IHHI



(d) Lead IHHI

The figure reports the average values of syndicate common ownership (a) and its decomposition (b) and (c) for the highest and lowest quintile of the common ownership distribution over time. Syndicate common ownership (CO) is defined in Equation 4 and the decomposition in Equation 5. Panel (d) reports the average shareholders' concentration of lead banks (Lead IHHI) for the highest and lowest quintile of the common ownership distribution over time.

Appendix A

A.1 Proof of Proposition 1

Proof. We solve for the separating allocation featuring a contract $c = (x_G, R_{G,L}, R_{G,M}, \mathcal{A}_G)$ for the good borrower and the symmetric information contract $\tilde{c} = (x_B, R_{B,L}, R_{B,M}, \mathcal{A}_B) = (0, 0, 0, 0)$ for the bad borrower. Contract c will maximize the good borrower's utility subject to M breaking even for the good borrower and to the bad borrower not preferring c to $\tilde{c}$. Under Assumption 1.(1), Tirole (2006) Lemma 6.2 proves that this separating allocation is the low-information-intensity optimum.

Contract c then solves the following maximization problem:

$$\max_{\{x_G, R_{G,L}, R_{G,M}, \mathcal{A}_G\}} x_G p R_{G,L} - \mathcal{A}_G \tag{A.1}$$

subject to

$$x_G(pR_{G,M} - 1) + \mathcal{A}_G \geq 0, \tag{A.2}$$

$$x_G q R_{G,L} - \mathcal{A}_G \leq 0, \tag{A.3}$$

$$R = R_{G,L} + R_{G,M}, \tag{A.4}$$

$$x_G \in [0, 1],\ \mathcal{A}_G \leq A. \tag{A.5}$$

Condition (A.2) is the participation constraint of the potential syndicate members; Condition (A.3) is the mimicking constraint of the lead bank representing a bad borrower.

To begin with, $x_G > 0$ as otherwise the contract would yield a zero payoff for L, despite a type-G borrower holds a positive-NPV project. Moreover, were $x_G < 1$, then increasing x_G slightly, keeping $x_G R_{G,L}$ constant, does not affect neither the maximand nor the left-hand side of Condition (A.3), but increases the left-hand side of Condition (A.2) (because $pR > 1$ and $R_{G,M} = R - R_{G,L}$). Then, $x_G = 1$.

Since with symmetric information the utility of the bad borrower is equal to zero, Constraint (A.3) must be binding. That is, $qR_{G,L} = \mathcal{A}_G$. Plugging $R_{G,L} = \mathcal{A}_G/q$ into Expression (A.1), we obtain:

$$\mathcal{A}_G \left(\frac{p}{q} - 1 \right),$$

which increases in $\mathcal{A}_G$; thus, $\mathcal{A}_G = A$ (L commits its entire funds in the loan) and $R_{G,L} = A/q$.

Finally, the participation constraint of M can be rewritten as

$$pR - 1 > A\left(\frac{p}{q} - 1\right), \tag{A.6}$$

which hods true under Assumption 1.(2). □

A.2 Proof of Proposition 2

Proof. We solve the contract design game with common ownership by assuming that L offers $c_j = (\mu_j, x_j, R_{j,L}, R_{j,M}, \mathcal{A}_j)$, with $j = G, B$, where μ_j denotes the probability that the commonly owned investors M_{Co} accept c_j, $x_j \in [0,1]$, $R = R_{j,L} + R_{j,M}$ and $0 \leq \mathcal{A}_j \leq A$. The timing of the game is:

1. The lead bank L formulates its offer to M_{Co} and M_{NCo}.
2. M_{Co}, being informed about the type of borrower represented by L, accept or reject the offer.
3. Conditional on observing the decision taken by M_{Co}, M_{NCo} update their priors α. We denote M_{NCo}'s posteriors by $\hat{\alpha}$; they depend on the contract offer (including the decision by M_{Co}, μ).
4. Given $\hat{\alpha}$, M_{NCo} decide whether to accept or reject L's offer.

We first show that the utility of a lead bank L representing type j increases in μ_j. Take the objective function of L:

$$\mathcal{M}_{j,L}(c_j) \equiv x_j \omega_j R_{j,L} - \mathcal{A}_j + \mu_j \theta \kappa [x_j(\omega_j R_{j,M} - 1) + \mathcal{A}_j]$$

where $\omega_G = p$ and $\omega_B = q$. Consider two rewards $R_{j,M}$ and $\tilde{R}_{j,M}$ such that

$$\mu_j R_{j,M} = \tilde{\mu}_j \tilde{R}_{j,M}, \tag{A.7}$$

where μ_j and $\tilde{\mu}_j$ are the probabilities that M_{Co} accept when their reward is $R_{j,M}$ and $\tilde{R}_{j,M}$, respectively, with $\mu_j > \tilde{\mu}_j$ and $R_{j,M} < \tilde{R}_{j,M}$. Since $R = R_{j,L} + R_{j,M}$, setting $R_{j,M} < \tilde{R}_{j,M}$ implies that $R_{j,L} > \tilde{R}_{j,L}$. Hence,

$$\mathcal{M}_{j,L}(c_j) \geq \mathcal{M}_{j,L}(\tilde{c}_j),$$

where $\tilde{c}_j = (\tilde{\mu}_j, x_j, \tilde{R}_{j,L}, \tilde{R}_{j,M}, \mathcal{A}_j)$.

Moreover, Condition (A.7) implies that considering $R_{j,M}$ or $\tilde{R}_{j,M}$ does not affect the participation constraint of M_{Co}:

$$\mu_j\theta[x_j(\omega_j R_{j,M} - 1) + \mathcal{A}_j] \geq 0,$$

because $\mu_j\theta[x_j(\omega_j R_{j,M} - 1) + \mathcal{A}_j] = \tilde{\mu}_j\theta[x_j(\omega_j \tilde{R}_{j,M} - 1) + \mathcal{A}_j]$. All this means that a higher value of μ_j increases the utility of L and leaves the participation constraint of M_{Co} unaffected. Consider then two candidate equilibrium contract offers such that $\mu_G = \mu_B = 1$.

Symmetric information equilibrium contracts. Let the lead bank representing type $j \in \{B, G\}$ offer:

$$\begin{aligned} c_G^{SI} &= (\mu_G, x_G, R_{G,L}, R_{G,M}, \mathcal{A}_j) = (1, 1, R - 1/p, 1/p, 0), \\ c_B^{SI} &= (\mu_B, x_B, R_{B,L}, R_{B,M}, \mathcal{A}_j) = (1, 0, 0, 0, 0). \end{aligned}$$

Since they observe the type of the borrower, M_{Co} accept these contracts. After observing the contract offer and M_{Co}'s decision, M_{NCo} will also accept because, since $\hat{\alpha}|c_G^{SI} = 1$ and $\hat{\alpha}|c_B^{SI} = 0$, their participation constraint (PC) is always satisfied with equality:

$$\begin{aligned} PC(c_G^{SI}):\ & (1-\theta)[x_G(pR_{G,M} - 1) + \mathcal{A}_G] = 0, \\ PC(c_B^{SI}):\ & (1-\theta)[x_B(qR_{B,M} - 1) + \mathcal{A}_B] = 0. \end{aligned}$$

It follows that, at the symmetric information contracts, the utility of a lead bank representing a good type is $U_L^{SI} = pR - 1$; the utility of a lead bank representing a bad type is equal to zero.

Low-information-intensity optimum contracts. We now construct the separating allocation corresponding to the low-information-intensity optimum of the game with high common ownership. For the same reason as in the proof of Proposition 1, the lead bank L sets $(\mu_B, x_B, R_{B,L}, R_{B,M}, \mathcal{A}_B) = (1, 0, 0, 0, 0)$, and maximizes $\mathcal{M}_{G,L}(c_G)$ with respect to $c_G = (1, x_G, R_{G,L}, R_{G,M}, \mathcal{A}_G)$, subject to:

$$x_G(pR_{G,M} - 1) + \mathcal{A}_G \geq 0, \tag{A.8}$$

$$x_G qR_{G,L} - \mathcal{A}_G + \theta\kappa\tilde{U}_{B,M_{Co}} \leq 0. \tag{A.9}$$

Condition (A.8) is M_{NCo}'s participation constraint, Condition (A.9) is the mimicking constraint, and $\tilde{U}_{B,M_{Co}} \equiv x_G(qR_{G,M} - 1) + \mathcal{A}_G$. Proceeding as in the analysis without common ownership, we find that $x_G = 1$, $\mathcal{A}_G = A$, and

$$R_{G,L} = \frac{A}{q} - \frac{\theta\kappa}{(1-\theta\kappa)q}(qR-1). \tag{A.10}$$

Plugging these values into $\mathcal{M}_{G,L}(c_G)$ we find that, with common ownership, the utility of the lead bank representing a good borrower at the low-information-intensity optimum separating allocation is

$$U_L^{SE} = (1-\theta\kappa)A\left(\frac{p}{q}-1\right) - \frac{\theta\kappa p}{q}(qR-1) + \theta\kappa(pR-1).$$

Finally, the participation constraint of M_{NCo} in (A.8) can be rewritten as

$$U_L^{SI} \geq U_L^{SE}, \tag{A.11}$$

which holds true by Assumption 1.(2).

Equilibrium contracts. Given the results above, and, in particular, Condition (A.11), it follows that: (i) a lead bank L representing a good borrower strictly prefers offering c_G^{SI} to the low-information-intensity optimum contracts; (ii) a lead bank L representing a bad borrower will never get access to funding. □

A.3 Proof of Proposition 3

Proof. For the first bullet point, note that

$$r^* - r^{**} = R - \frac{A}{q} - \frac{1}{p} > 0 \tag{A.12}$$

$$\iff A < \frac{q(pR-1)}{p} \tag{A.13}$$

follows from Assumption 1.

The second bullet point directly follows from $\mathcal{A}^{**} = 0 < A = \mathcal{A}^*$.

For the third bullet point: given $r \in \{r^*, r^{**}\}$, the formula for the variance of the project's returns is

$$Var(R) = E[r^2] - E[r]^2 = pr^2 - (pr)^2, \tag{A.14}$$

which is increasing in r for all $(1-p)r > 0$. So the standard deviation of returns is larger without common ownership. □

Appendix B

Table B.I: **Largest Shareholders of Three Largest Banks**

JP Morgan

2002		2007		2014	
CAPITAL RESEARCH & MANAGEMENT	8%	HANSON INVESTMENT MANAGEMENT	6%	BLACKROCK INC	6%
BARCLAYS GLOBAL INVESTORS	4%	AXA	5%	VANGUARD GROUP INC	5%
STATE STREET CORP	3%	STATE STREET CORP	4%	STATE STREET CORP	5%
DEUTSCHE BANK	3%	FMR LLC	3%	FMR LLC	3%
AXA	3%	DAVIS SELECTED ADVISERS	2%	CAPITAL WORLD INVESTORS	3%

Citigroup

2002		2007		2014	
STATE STREET CORP	5%	STATE STREET CORP	3%	BLACKROCK INC	6%
BARCLAYS GLOBAL INVESTORS	4%	CAPITAL RESEARCH GLOBAL INVESTORS	3%	VANGUARD GROUP INC	5%
MANUFACTURERES LIFE INSURANCE	4%	CAPITAL WORLD INVESTORS	3%	STATE STREET CORP	5%
FMR CORP	4%	FMR LLC	2%	FMR LLC	3%
AXA	3%	AXA	2%	WELLINGTON MANAGEMENT GROUP	2%

Bank of America

2002		2007		2014	
MANUFACTURERES LIFE INSURANCE	8%	STATE STREET CORP	3%	BLACKROCK INC	6%
BARCLAYS GLOBAL INVESTORS	4%	FMR LLC	3%	VANGUARD GROUP INC	5%
FMR CORP	4%	AXA	2%	STATE STREET CORP	5%
DEUTSCHE BANK	3%	CAPITAL RESEARCH GLOBAL INVESTORS	2%	FMR LLC	4%
AXA	3%	WELLINGTON MANAGEMENT GROUP	2%	JPMORGAN	2%

This table reports the five largest shareholders of the three largest lead arrangers in the U.S. syndicated loan market. Ownership data comes from the Thomson Reuters s34 database.

Table B.II: **Variable Definition**

Variable	Description
	Loan Variables
All-in-Drawn Spread	Facility all-in-drawn spread over the LIBOR rate
Mean Syndicate Profit Weight	Average profit weight between syndicate lead arranger and syndicate members
CO Bank-Firm	Average profit weight between borrower and syndicate banks
Facility Amount $M	Facility amount in 100 billion dollars
Log Maturity	Natural logarithm of the maturity of the facility in months
Secured Loan	Dummy variable equal to 1 if the facility is secured
Refinancing	Dummy variable equal to 1 if the purpose of the facility is refinancing
Log Number of Members	Natural logarithm of the number of syndicate members
Guarantor	Dummy variable equal to 1 if the facility has a guarantor
Relationship Score	$\frac{\frac{1}{N}\times\sum_j^N \text{Number of facilities between lead}_i \text{ and participant}_j \text{ in the past 3 years}}{\text{Number of facilities arranged by lead}_i \text{ in the past 3 years}}$
New Lending Relation	Dummy equal to 1 if the borrower has not received a loan from the lead arranger(s) in the syndicate before
LIBOR 3M	LIBOR 3-months rate at the time of the loan origination
Non-Bank Syndicate Member	Dummy variable equal to 1 if the facility has a non-bank lender in the syndicate
Volatility	SD of the borrower's stock return over the 12 months period before loan issuance
Credit Line	Dummy variable equal to 1 if the facility is a credit line
Term Loan A	Dummy variable equal to 1 if the facility is a term loan A
Term Loan B	Dummy variable equal to 1 if the facility is a term loan B or higher (C,D,...,H)
	Borrower Variables
Size	natural logarithm of the borrower's total assets
ROA	EBIT over total assets
Book Leverage	Debt over total assets
Tangibilities	PP&T over total assets PP&T over total assets
High Yield	Dummy variable equal to 1 if the borrower has a high-yield rating
Unrated Borrower	Dummy variable equal to 1 if the borrower is unrated
Tobin's Q	Market to book value
Log Int. Cov.	Log of 1 plus interest coverage truncated at 0
Liquidity Ratio	Cash over total asset
	Bank Variables
Bank Size	Natural logarithm of the bank's total assets
Bank Market Equity	Market value of equity capital over total assets
Bank Book Equity	Book value of equity capital over total assets
Bank Leverage	Bank debt over total assets
Bank ROA	EBIT over total assets

Table B.III: **Facility Loan Spread and Common Ownership - Alternative CO definition**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CO	-56.338**	-57.437**	-56.792**	-56.411**		-48.680**	-103.474**
	(-2.101)	(-2.218)	(-2.255)	(-2.150)		(-2.280)	(-2.552)
CO Quintile 2					2.986		
					(1.001)		
CO Quintile 3					-8.335*		
					(-1.724)		
CO Quintile 4					-8.707*		
					(-1.877)		
CO Quintile 5					-9.672*		
					(-1.849)		
Loan Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC2 FE	No	Yes	No	No	Yes	No	No
Year-Quarter FE	Yes	Yes	No	No	No	No	No
Lead FE	No	Yes	No	Yes	Yes	No	Yes
Borrower FE	No	Yes	Yes	Yes	Yes	No	No
SIC2 X Year-Quarter FE	No	No	Yes	Yes	Yes	No	No
Lead X Year-Quarter FE	No	No	No	No	No	Yes	No
Borrower-Year FE	No	No	No	No	No	No	Yes
Observations	21,051	20,597	19,879	19,877	19,877	20,528	18,164
Adjusted R-squared	0.654	0.764	0.807	0.808	0.808	0.776	0.883

The table reports the OLS regression parameter estimates and t-statistics of Equation (7). The dependent variable is the all-in-drawn loan spread, expressed in basis points. Common ownership is defined as the sum of the minimum commonly held shares by investors between the lead arranger(s) and other syndicate members. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Table B.IV: **Facility Loan Spread and Common Ownership**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CO	-29.107***	-23.180***	-26.984***		-24.792***	-61.691***	-19.906*
	(-4.116)	(-3.413)	(-3.756)		(-3.422)	(-4.130)	(-1.736)
CO Quintile 2				2.786			
				(0.906)			
CO Quintile 3				-3.960			
				(-1.136)			
CO Quintile 4				-10.494**			
				(-2.374)			
CO Quintile 5				-11.640***			
				(-2.820)			
Facility Amount	-0.004***	-0.004***	-0.003***	-0.003***	-0.004***	-0.003***	-0.005
	(-9.476)	(-6.054)	(-5.488)	(-5.453)	(-6.214)	(-4.428)	(-1.594)
CO Member-Borrower	-26.116***	-20.713***	-17.034***	-17.094***	-21.292***	-4.573	-33.705**
	(-13.731)	(-5.701)	(-4.111)	(-4.062)	(-7.123)	(-0.215)	(-2.405)
Log Maturity	4.756***	5.525***	4.753***	4.849***	4.765***	3.211**	2.858
	(3.512)	(4.299)	(3.840)	(3.938)	(4.072)	(2.424)	(1.558)
Secured Loan	40.080***	29.989***	25.266***	25.148***	28.321***	3.933	47.283***
	(14.246)	(10.550)	(7.204)	(7.136)	(9.651)	(0.595)	(11.814)
Refinancing	-8.497***	-5.482***	-7.978***	-8.161***	-5.920***	-23.747***	-13.136*
	(-4.266)	(-4.430)	(-5.705)	(-5.994)	(-4.579)	(-5.941)	(-1.959)
Log Number of Members	-20.000***	-18.968***	-22.842***	-22.972***	-19.238***	-24.950***	-21.980***
	(-14.074)	(-9.901)	(-9.395)	(-9.401)	(-9.494)	(-8.525)	(-6.176)
Guarantor	0.286	-6.823***	-7.916***	-7.809***	-5.635***	-11.302*	-3.134
	(0.193)	(-3.436)	(-3.373)	(-3.361)	(-2.874)	(-1.930)	(-0.440)
Relationship Score	-187.186***	-138.202***	-235.358***	-227.856***	-196.690***	-218.912*	-179.387***
	(-3.386)	(-2.816)	(-5.107)	(-5.065)	(-4.023)	(-1.767)	(-3.478)
New Lending Relation	0.348	0.702	-1.421	-1.171	0.415	-8.123**	-1.406
	(0.402)	(0.747)	(-0.868)	(-0.709)	(0.418)	(-2.449)	(-0.447)
LIBOR 3M	-524.737	-823.375	-559.973	-575.048	-791.282*	-1,646.310***	378.953
	(-0.848)	(-1.646)	(-1.173)	(-1.169)	(-1.962)	(-6.353)	(0.253)
Non-Bank Synd. Member	23.867***	18.241***	17.778***	17.981***	16.561***	18.889***	33.320***
	(9.359)	(8.748)	(6.538)	(6.587)	(8.593)	(3.352)	(5.736)
Prob. Default	55.250***	59.482***	55.341***	54.570***	60.850***	31.457	30.428***
	(7.206)	(6.971)	(5.933)	(5.791)	(6.414)	(1.337)	(2.811)
Stock Volatility	98.736***	85.732***	95.972***	95.816***	92.380***	163.133***	72.804***
	(13.292)	(10.161)	(9.260)	(9.337)	(10.966)	(4.500)	(6.749)
Size	-0.083	-8.026***	-6.149***	-5.981***	-7.604***		-3.876
	(-0.079)	(-3.741)	(-3.451)	(-3.306)	(-4.122)		(-1.640)
ROA	-68.898***	-118.837***	-139.456***	-140.574***	-142.188***		-94.880***
	(-4.162)	(-6.076)	(-6.399)	(-6.435)	(-8.522)		(-2.898)
Book Leverage	32.015***	35.125***	37.700***	37.310***	36.952***		31.630**
	(5.363)	(5.981)	(5.309)	(5.054)	(6.336)		(2.354)
Tangibilities	2.041	5.713	32.054**	33.070**	3.066		-10.465
	(0.614)	(0.502)	(2.521)	(2.566)	(0.267)		(-1.005)
Tobin's Q	-3.380***	-3.672***	-2.999*	-3.018*	-2.724**		-3.918**
	(-3.749)	(-2.925)	(-1.807)	(-1.818)	(-2.437)		(-2.035)
Log Int. Cov.	-10.966***	-6.323***	-4.516***	-4.543***	-5.436***		-8.060***
	(-13.509)	(-3.440)	(-3.370)	(-3.419)	(-2.865)		(-2.772)
Liquidity Ratio	33.680***	18.945	31.734	33.384	14.205		40.226*
	(3.928)	(0.961)	(1.586)	(1.646)	(0.718)		(1.721)
Unrated Borrower	23.718***	21.771***	17.867***	17.969***	25.232***		11.856*
	(9.935)	(4.711)	(5.872)	(5.724)	(5.146)		(1.908)

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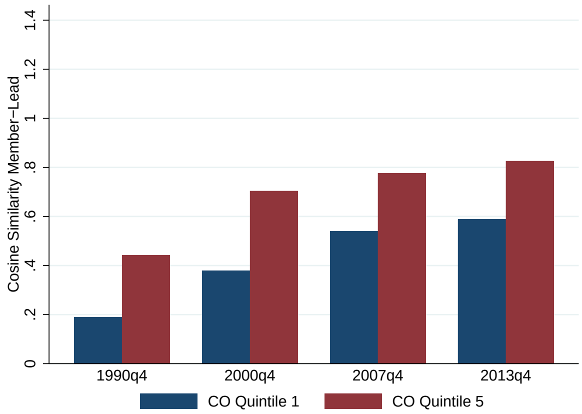
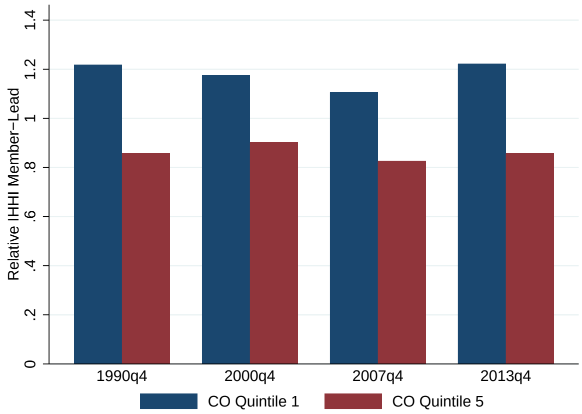
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High Yield	31.985***	15.356***	13.908***	14.010***	17.259***		19.515***
	(14.570)	(4.011)	(5.592)	(5.605)	(4.354)		(3.006)
Lead Size	-3.575**	-7.487**	-5.030*	-4.135		-7.392***	-2.810
	(-2.596)	(-2.430)	(-1.797)	(-1.503)		(-3.442)	(-0.404)
Lead Market Equity	-5.259	-12.864	-15.532	-13.300		3.478	40.012
	(-0.223)	(-0.453)	(-0.517)	(-0.435)		(0.197)	(1.395)
Lead Book Leverage	28.377**	-13.724	-19.527	-19.584		-4.395	-18.472
	(2.361)	(-0.777)	(-1.371)	(-1.343)		(-0.590)	(-0.617)
Lead ROA	-91.144	42.603	80.399	87.549		112.496	349.338
	(-0.328)	(0.201)	(0.415)	(0.446)		(0.859)	(0.958)
Loan Purpose FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Facility Type FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SIC2 FE	No	Yes	No	No	No	No	No
Year-Quarter FE	Yes	Yes	No	No	No	No	No
Lead FE	No	Yes	Yes	Yes	No	Yes	Yes
Borrower FE	No	Yes	Yes	Yes	No	No	No
SIC2 X Year-Quarter FE	No	No	Yes	Yes	No	No	Yes
Lead X Year-Quarter FE	No	No	No	No	Yes	No	No
Borrower X Year FE	No	No	No	No	No	Yes	No
Observations	21,094	20,638	19,922	19,922	20,569	18,208	6,110
Adjusted R-squared	0.653	0.763	0.808	0.808	0.774	0.882	0.723

The table reports the OLS regression parameter estimates and t-statistics of Equation (7). The dependent variable is the all-in-drawn loan spread, expressed in basis points. Common ownership is defined as the average profit weight between the lead arranger(s) and other syndicate members. Standard errors are clustered by lead bank. All variables are defined in Table B.II. ***, **, and * correspond to statistical significance at the 1%, 5%, and 10% level, respectively.

Figure B.1: **CO Member-Lead Decomposition**



(a) Cosine Similarity



(b) Relative IHHI

The figure reports the decomposition of the average values of syndicate common ownership (Member-Lead) for the highest and lowest quintile of the common ownership (Lead-Member) distribution over time. Syndicate common ownership (CO) is defined in Equation 4 and the decoposition in Equation 5.