

Corporate Syndicated Loans as a Source of Private Information for Interbank Markets

Stijn Ferrari, Issam Hallak, Thomas Matthys, and Rudi Vander Venet

Non-Technical Summary

Banks lend to each other in interbank markets, but at the same time collaborate in lending activities to non-financial firms through syndicated loans.¹ The question we raise is whether a bank would use the private information about other banks gained in *syndicated loan* markets, when it comes to *interbank lending*. To our knowledge this study is the first to investigate private information from interactions outside of the interbank market and its subsequent use *in* the interbank market. Our study aims to empirically test the assumption that observed interbank relationship lending is informationally driven. Understanding whether and how private information is channeled into interbank markets is essential to understanding its functioning, and maintaining financial stability.

The 2008 financial crisis due to Lehman Brothers' collapse proved once again the vital function of the interbank market in the financial system. Among others, it became evident that the lack of information about the value of other banks' assets, and risk concentration was a major determinant of the sudden market disruption. Nevertheless, there is mounting empirical evidence suggesting that lending relationships exist, that private information plays a role in interbank lending, and that it did so even at the peak of the crisis. Yet, no sources of private information have been highlighted that relate to borrowing banks' assets, thus questioning the existence of such informationally driven interbank relationship lending.

In this paper we investigate one source of private information that is obtained through interactions outside of the interbank market. Medium-sized and large corporate loans are subject to substantial private information observable to loan syndicate members only. We argue that if a bank participates in the corporate syndicated loans of another bank, then the former holds relevant private information about the latter's corporate loans. As a result, we expect that by sharing the same syndicated loans an interbank lender would offer different loan terms to an interbank borrower in terms of pricing and loan size. This is consistent with the well-documented "relationship lending" phenomenon in corporate loan markets, where banks hold privileged information about non-financial borrowers.

¹Syndicated loans are loans funded by at least two banks. They are particularly aimed at medium-sized and large companies.

We use a proprietary transaction-level dataset that contains all transfers sent and received by institutions through TARGET2, between July 2008 and December 2013. The database includes daily information on bilateral loans between TARGET2 members. Similar to previous studies we investigate the determinants of interbank loan pricing and volumes, and include measures of concentration in interbank relationships. We complement the interbank dataset with information on corporate syndicated loans that we obtain from Dealscan. From this dataset, we construct a measure of the intensity of syndicated loan sharing between two banks to capture the degree of private information banks hold about each other.

We find that an interbank borrower who participates to a higher degree in the corporate syndicated loans of an interbank lender obtains more favorable loan conditions from the latter, both in terms of pricing and loan size. We enrich our model by interacting the degree of syndicated loan sharing with measures of overall bank opacity as well as the opacity of their corporate loan portfolio. Our results show that sharing syndicated loans mitigates the negative impact of borrower opacity on interbank loan terms. However, we also find that to some extent syndicated loan sharing may be disadvantageous for interbank borrowers. Too high concentration of loan sharing puts downward pressure on access to interbank liquidity, and sharing low-quality syndicated loans is associated with less favorable interbank loan terms. The evidence thus suggests that interconnectedness in interbank markets is also driven by private information generated during interactions outside the interbank market.

The results bear significant implications. We show that bank interconnectedness through shared asset exposures provides banks with valuable private information about other banks' assets. This information can subsequently be transferred to the interbank market, where the lowering of informational asymmetry may add to a more efficient liquidity allocation among banks, thereby contributing to the stability of the financial system. Hence, our work highlights a potential link between asset sharing and systemic risk mitigation. Going forward, we expect that the Basel 3 capital and liquidity regulations may force banks to restrict the maturities in their corporate loan portfolios, thereby providing an additional impetus for the development of the syndicated loan market. We demonstrate that this market may constitute a valuable source of information which is likely to aid in overcoming information asymmetry in the interbank market.

Keywords: Interbank Market, Relationship Lending, Private Information, Financial Stability.

Corporate Syndicated Loans as a Source of Private Information for Interbank Markets[†]

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Abstract

Banks contemporaneously lend to each other on the interbank market and co-lend to large corporations through syndicated loans. Recent evidence documents the existence of lending patterns in interbank loan markets that are consistent with relationship lending theory. Yet, the sources of private information on interbank borrowers' assets remain unclear. We show that lending banks may extract private information about the value of borrowing banks' assets by participating in corporate loan syndicates. We use a large dataset of the euro area interbank market and information on syndicated loans and report that interbank borrowers who share a larger proportion of their syndicated loan portfolio with an interbank lender obtain lower interbank spreads and larger loans. However, sharing low-quality syndicated loans and high concentration of syndicated loan sharing raises risk considerations which reduce the positive effects of private information production.

Keywords: Interbank Lending, Relationship Lending, Private Information, Financial Stability.

JEL Classification: G14, G21.

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1 Introduction

The 2008 financial crisis proved the vital function of the interbank market in the financial system and the need for understanding its mechanisms. Interbank markets play a key role in banks' liquidity management, and effective central bank policymaking. In normal times, they channel liquidity from banks with liquidity surpluses to those in need of liquidity, contributing to banks' ability to fulfill their financial intermediation function. In addition, central banks intervene in interbank markets to set policy rates and support the transmission of monetary policy. Therefore, the state of the interbank market can be regarded as a reflection of the overall health of the financial system (e.g., Allen and Gale, 2000; Ho and Saunders, 1985). As banks routinely negotiate loan conditions and transact overnight interbank loans with multiple counterparties, lending banks are required to regularly update their assessment of borrowing banks' creditworthiness. Yet, recent evidence shows that interbank lenders face increased and substantial informational asymmetries during crises, such as the aftermath of the Lehman Brothers collapse (Heider et al., 2015; Bräuning and Fecht, 2017). The ensuing interbank market disruptions rendered banks unable to refinance their liquidity needs until confidence was restored by central banks. A relevant question for the efficiency of interbank market liquidity allocation is how lending banks decide on interbank loan terms. Do they rely only on publicly available information about the borrowing banks' health or do they use information from other sources to judge the creditworthiness of their counterparties? Understanding the sources of information that drive the dynamics of the interbank market is important for market participants, central banks, and bank regulators.

Our paper is an attempt to understand the nature of information flows by examining the impact of interactions outside of the interbank market on interbank loan terms. We conjecture and find evidence that one such alternative source of information may be the syndicated loan market in which banks co-lend to non-financial firms. By interacting in a lending consortium, banks acquire private information about the loan portfolio and other relevant characteristics of the syndicated loan members. They may then use that information in their assessment of the credit quality of the interbank borrowing bank. Our main conclusion is that increased syndicated loan sharing is associated with more favorable interbank borrowing conditions, both in terms of pricing and volume. We primarily contribute to the growing literature on informational frictions in the interbank market. By focusing on syndicated lending as one potential source of private information, we validate the existence

of information-based lending patterns.

Information plays a major role in the functioning of the interbank market. Early studies document that banks use publicly available information to monitor their counterparties in the interbank market, and that the interbank interest rate charged reflects the borrower's credit risk (Rochet and Tirole, 1996; Furfine, 2001). In times of crisis, however, counterparty risk considerations intensify and asymmetric information worsens because the fraction of risky banks increases (Flannery, 1996; Freixas and Jorge, 2008; Heider et al., 2015). At this point, interbank lenders experience difficulties in assessing the credit quality of potential borrowers, urging them to charge higher spreads to all banks, or restrict lending. The main cause of adverse interbank lending conditions in 2008 was the presence of informational asymmetries about the value of borrowers' assets (Afonso et al., 2011). Yet, frequent and repeated interactions between the same banks should positively affect the pricing and transmission of liquidity across banks.

There is growing empirical evidence of the existence of *relationship lending* patterns in interbank markets (e.g., Cocco et al., 2009; Affinito, 2012; and Afonso, et al., 2013; Craig et al., 2015; Bräuning and Fecht, 2017). The distinguishing feature of *relationship lenders* is that they hold information which is non-observable to outsiders, so-called *private information*. In corporate debt markets, relationship lenders are able to produce private information about their borrowers through close contact with borrowing non-financial firms and because they engage in longer and repeated interactions (e.g., Diamond, 1984; Fama, 1985; James, 1987; Boot, 2000). Such interactions lower banks' monitoring costs and reduce information asymmetries. Consequently, relationship lenders offer their customers lower interest spreads and larger funding amounts. In addition, they tend to support their borrowers in bad economic times (Petersen and Rajan, 1995; Sette and Gobbi, 2015). The behavior of relationship lenders is justified not only by the soft information they have acquired over the duration of the relationship but also because of their tendency to maintain lending relationships with customers about which they hold an informational advantage.

While interbank relationship lending patterns are found to exist, it remains unclear how private information enters the interbank market. Producing private information requires time while interbank loans typically are overnight loans that are swiftly agreed on a daily basis. Corporate loan duration on average is in years so that creditors have sufficient time to observe the borrower and decide whether or not to repeat lending. Banks also conduct time-

consuming due diligence about loan applicants whereby they gather and analyze relevant information. Finally, the short life of interbank loans prevents any kind of renegotiation, while debt restructuring constitutes a major source of private information (Boot, 2000). Thus, the characteristics of interbank loans hardly suit the private information production process. As a result, Cocco et al. (2009) argue that it is conceivable that banks collect information about interbank market counterparties outside the interbank market.

In this paper, we investigate one channel through which private information may enter the interbank market. For this purpose, we use a peculiar feature of banks. While banks lend to each other in interbank markets, at the same time they co-lend to non-financial firms through syndicated loans. A *syndicated loan* is a loan funded by at least two banks. The syndicated loan market has evolved over the last decades into a key lending vehicle through which banks lend to large corporations (e.g., Sufi, 2007; Altunbaş et al., 2010; Ivashina and Scharfstein, 2010). In 2003, global syndicated loan volume amounted to \$2 trillion, a number which has risen to \$4 trillion as of 2013.¹ Carey and Hrycray (1999) estimated that syndicated loans as reported by Dealscan, a large corporate loan dataset, covered between 50% and 75% of the value of all commercial loans in the U.S. during the early 1990s, and Chava and Roberts (2008) suggest that this share has been increasing over time. In our sample, we find that the total amount of syndicated loans represents nearly 20% of loans issued by the top 50 most active banks in this market (rising to 43% for the top 10 syndicating lenders), and 10% of total assets (16% for top 10 syndicating lenders). Syndicated loans thus constitute a growing share of bank assets, and are an important source of debt financing for mid-sized and large corporations. Importantly, corporate loans are shown to incorporate the largest degree of private information production among bank assets (Lee and Mullineaux, 2004; Sufi, 2007; Jones et al., 2013). The private information about corporate borrowers can subsequently be shared among syndicate participants. For example, Ivashina and Sun (2011) find that participants in syndicated loans use the private information obtained about a borrower in debt markets to trade in the stock of the same company, allowing participants to generate surplus trading gains. As a result, the more a bank participates in another bank's syndicated loans, the more the former acquires private information about the latter's assets. We argue that banks may profit from this private information by using it in their interbank lending decisions, similar to relationship lenders in corporate debt markets.

¹Thomson Financial

However, syndicated loan participation is also associated with increased interconnect-
edness of the global financial system, and potentially an increase in systemic risk (Cai et
al., 2018). By sharing the same assets (syndicated loans), banks are exposed to common
shocks, which may invoke interbank lenders to remain cautious in their direct lending to in-
terbank borrowers. In other words, we hypothesize that too high risk concentration through
co-lending may deter prospective interbank lenders to lend, or at least may incentivize them
to adjust loan terms. In a similar fashion, we assess the impact of shared syndicated loan
quality on interbank loan terms. When interbank lenders share a low-quality syndicated loan
portfolio with interbank borrowers, we expect the former to issue loans with less favorable
loan terms.

For our analysis, we exploit the information contained in two data sources. First, we
use information on bilateral interbank transfers from TARGET2, which settles 91% of large-
value euro payments in terms of value.² The dataset contains comprehensive information on
the transfers sent and received by institutions. Applying the algorithms described by Furfine
(2001) and Arciero et al. (2016), we obtain the date, interest spread, amount, as well as the
identity of the lender and borrower on interbank loans from July 2008 through December
2013. Second, we obtain data on syndicated loans from LPC’s Dealscan database. Using
details on the syndicate composition and the amount committed, we construct a pairwise
Syndicated Loans Share index, which is a dynamic measure of common syndicated loan
holdings between two banks. Our data also include information on balance sheet variables,
such as assets, profitability, and non-performing loans. We use various control variables and
fixed effects to investigate private information flows between the syndicated loan and the
interbank market. Our hypothesis is that holding private information about an interbank
borrower provides the lending bank informational advantages akin to those of relationship
lenders in corporate loan markets. As a result, we expect interbank borrowers that share
more of their syndicated loans with interbank lenders to obtain more favorable interbank
loan terms.

The main result of our empirical analysis is that a higher degree of syndicated loan shar-
ing is associated with lower interbank interest spreads and larger interbank loans. Moreover,
the impact of syndicated loan sharing on interbank interest spread and loan size is robust
in different models including various bank characteristics. Hence, we provide evidence that

²Target Newsletter, Issue number 7, Q4 2013. https://www.ecb.europa.eu/paym/t2/shared/pdf/newsletter/TARGET_Newsletter_issue_number_7.pdf?e4fc29359d60b3248a8d49919c5ebb27

banks extract private information about each other in markets in which they collaborate, and which they subsequently use when dealing in the interbank market. However, when we include indicators for low-quality and opaque shared syndicated loans or the concentration of shared syndicated loans in the participating banks' portfolios, the beneficial impact on interbank conditions largely disappears. Overall, our findings suggest that private information sharing through syndicated lending may partly explain the existence of interbank relationship patterns. Acquiring private information about an interbank borrower through syndicated lending results in more favorable borrowing terms. In contrast, interbank lenders provide less favorable loan terms to interbank borrowers once shared loan concentration surpasses a certain threshold or when the quality of shared loans is low. Banks tend to actively use the information extracted from their co-lending activity in the corporate loan market to determine the terms and conditions in the interbank market.

Our paper primarily contributes to the growing literature on informational frictions and relationship lending in the interbank market. Among others, Cocco et al. (2009) and Afonso et al. (2013) show the existence of relationship lending patterns in the interbank market. By focusing on syndicated lending as one potential source of private information in this market we validate the existence of information-based relationship lending. We show that banks' co-lending on the syndicated loan market reduces information asymmetry between banks and may partly explain the relationship lending patterns observed in previous studies. Our paper also contributes to the literature on financial stability. Recent studies have emphasized the systemic risks associated with the syndicated loan market (e.g., Cai et al., 2018; Nirei, Caballero, and Sushko, 2015; Hale, Kapan, and Minoiu, 2016). By holding common exposures to the same asset two banks are interconnected and a general failure of one sector can cause contagious effects for the financial system. We add to this literature by showing that sharing the same asset through co-lending enables banks to produce valuable information about other banks, which in turn is beneficial to the stability of the interbank market. Last, our paper contributes to the literature on syndicated loans. Previous research has focused on the relationship between borrowers and syndicate members. Emphasis has been put on the role of lead banks and the ability of banks to keep informational advantages over arm's length lending instruments (Lee and Mullineaux, 2004; Sufi, 2007; Bharath et al., 2011). Our analysis indicates that the growing syndicated loan market may produce valuable private information flows which spill over to co-lenders as well as other markets, in

this case the interbank market.

The paper proceeds as follows. Section 2 outlines our data and variable construction. Sections 3 and 4 describe the empirical strategy and results. Section 5 concludes.

2 Data and Variable Description

2.1 Data

To analyze the impact of syndicated loan sharing on interbank loan terms, we combine the information from two different datasets. Interbank market data is obtained from a proprietary transaction-level dataset that contains all transfers sent and received by institutions through TARGET2, covering the period July 2008 to December 2013. TARGET2 (Trans-European Automated Real-Time Gross settlement Express Transfer system) is the main large-value payment system of the Eurosystem.³ The participants in this system are predominantly euro area banks as well as several large non-euro area banks. Our focus is on the unsecured overnight segment of the interbank market, largely because this part is more information-sensitive than the secured interbank market (Cappelletti and Guazzarotti, 2017). Most unsecured overnight loans are based on verbal agreements only (Afonso et al., 2011).

From this dataset we identify unsecured overnight loans using a computer algorithm that builds on Furfine (1999). In its original version, Furfine (1999) identifies an interbank loan as a transaction between two banks with a value larger than \$1 million, with a payment on the following business day in the opposite direction for a value that can reasonably be assumed to be the initial transaction plus interest. As interest rates vary over transactions, a plausibility corridor is set from 50 basis points below the minimum to 50 basis points above the maximum of a day's federal funds rate. Recently, Arciero et al. (2016) considerably refined the Furfine algorithm to be applied to TARGET2 and are able to identify interbank loans with reduced uncertainty. The algorithm identifies loans with a minimum value of €1 million, with variable increments depending on the loan size. The plausible interest rate corridor around EONIA is determined as plus or minus 25 basis points. We use the Arciero algorithm to identify interbank loans for two reasons. First, the algorithm includes a procedure to efficiently select the correct loan in case of multiple plausible matches, which significantly reduces the

³In 2013, TARGET2 settled 91% of the total large-value payments traffic in euro.

probability of error. Second, contrary to previous extensions of the Furfine algorithm, the dataset obtained using the Arciero algorithm has been comprehensively validated against real data. Our interbank loan dataset includes the date, amount, interest rate, as well as the unique identity of each institution for every transaction. The identities of the institutions are aggregated to the parent bank level and we drop transactions between institutions belonging to the same parent, thus excluding liquidity transfers within a group. The final dataset contains transactions between 794 financial institutions from 54 countries.

The second dataset is a sample of syndicated loans obtained from Loan Pricing Corporation's Dealscan, which includes detailed information on syndicated loan contract terms and syndicate members. LPC collects information on loans to companies through attachments on SEC filings, self-reporting by lenders, and the financial press. The Dealscan database contains 224,796 syndicated loan tranches to firms from 1987 to 2014. We exclude tranches without information on lead arranger (4,155) or tranche amount (858). Using this dataset, we reconstruct the syndicated loan portfolio for each bank on a daily basis as from the year 2008, which coincides with the start of our interbank market data. To this end, we exclude tranches maturing before 2008 (79,868). The final sample includes 139,915 syndicated loan tranches to 46,288 firms. A tranche-level analysis as opposed to a deal-level analysis is appropriate in our case as we have noticed that lenders may vary for different tranches within a deal. Moreover, tranches within a deal may have diverging maturities. Focusing on the tranche level hence provides more granular information about the banks' participation. Dealscan contains comprehensive information on the loan terms (e.g., maturity, interest rate, loan size), as well as the identity and role(s) of the lending banks. However, the dataset lacks detailed accounting information about the lending banks.

Therefore, we merge Dealscan with bank financials from Bankscope. The database, compiled by Fitch / Bureau Van Dijk from publicly available data, provides yearly information on bank balance sheets and income statements, including credit risk variables and various financial and profitability ratios. The sample we collect covers the period 2008 - 2013. Consistent with previous literature we control for mergers and acquisitions and allocate the loan portfolio of the acquired bank to the acquiring bank starting from the effective date of the acquisition. We obtain information on 704 banks from 54 countries that are active on the interbank market.

2.2 Measuring Syndicate Loan Sharing

The main explanatory variable in our analysis is a measure of private information acquired through the banks' involvement in the syndicated corporate loan market. To capture the amount of information an interbank lender holds about the syndicated loans granted by an interbank borrower, we construct a pairwise *Syndicated Loans Share* $_{Lend,Borr}$ index using syndicated loan data. The index measures the intensity of loan sharing between two banks. Its construction proceeds as follows. First, we allocate the individual commitment amount for each bank within the syndicate using the *bank allocation* variable in Dealscan. When this variable is missing, we follow Gatev and Strahan (2009), and allocate the total commitment amount equally across lenders within a syndicate.^{4,5}

Second, we reconstruct the syndicated loan portfolio of all interbank borrowers on a daily basis by calculating the euro volume of *outstanding* loans ($Volume\ Outstanding_{Borr,d}$). A tranche is considered to be outstanding at day d when the issuance date is before d , and the maturity date is after d . Third, we calculate a bank-pair level amount of outstanding syndicated loans held by interbank borrower $Borr$ for which interbank lender $Lend$ is a co-lender in the syndicate ($Volume\ Outstanding_{Lend,Borr,d}$). Fourth, the *Syndicated Loans Share* $_{Lend,Borr,d}$ captures the depth of the banks' syndicated loan relationship by measuring the relative amount of private information Bank $Lend$ (*interbank lender*) holds about Bank $Borr$ (*interbank borrower*) through the syndicated loan market at day d . In our analysis, we use the monthly average for *Syndicated Loans Share*:

$$Syndicated\ Loans\ Share_{Lend,Borr,t} = \frac{1}{T_t} \sum_{d \in t} \frac{Volume\ Outstanding_{Lend,Borr,d}}{Volume\ Outstanding_{Borr,d}}$$

A higher *Syndicated Loans Share* ratio signifies that an interbank lender has acquired relatively more private information about the quality of an interbank borrower's syndicated

⁴The correlation between estimated and actual allocations is 0.89 and highly significant.

⁵For robustness, we calculate the commitment amount in three other ways: (i) allocating the median lead bank's share of each loan-size quartile (Ivashina, 2009); (ii) estimating a model of bank allocations that depends on the status of the bank as lead lender or participant, the number of lead banks, and the number of participant banks. Once we have estimated the model, we apply the estimates to all observations, including the ones for which we had data (Acharya et al., 2017); (iii) estimating a censored regression model that depends on the status of the bank as lead lender or participant, the number of lenders in a tranche, the logarithm of the loan size, loan maturity, and year dummies (Le, 2013). Our results remain unchanged when using any of these alternative bank allocation proxies.

loans. The underlying assumption is that the higher the total volume of shared syndicated loans between an interbank lender and an interbank borrower relative to the interbank borrower’s total portfolio of syndicated loans, the more information the interbank lender holds about the interbank borrower. A higher syndicated loans share should reduce information asymmetry about the asset quality of the interbank borrower, which in turn is expected to have a favorable impact on interbank loan terms, and vice versa.

2.3 Interbank Loan Terms

2.3.1 Interest Spread

The first dependent variable quantifies the cost of interbank loans. We construct the normalized *Interest Spread* (i) as follows. First, we calculate the difference between the interest rate on a given transaction between banks ($i_{Lend,Borr,d}$) and the market-wide interest rate on overnight transactions on that day (\bar{i}_d).⁶ Second, we divide the difference by the standard deviation of overnight interest rates for that day (σ_d^i). Third, we average the interest spread measure to a monthly level for all loans from bank *Lend* to bank *Borr*:

$$Interest\ Spread_{Lend,Borr}^t = \frac{1}{T_t} \sum_{d \in t} \frac{i_{Lend,Borr,d} - \bar{i}_d}{\sigma_d^i}$$

where T_t denotes the number of trading days in period t . The construction of the normalized interest spread follows Cocco et al. (2009) and is justified by the GARCH effect documented in interbank market interest rates (Hamilton, 1996). This measure allows us to investigate the impact of syndicated loan sharing on interbank loan pricing. It is important to note that in the empirical analysis, we are only able to address the question of whether or not interbank borrowers with connections in the syndicated loan market obtain loans at rates that are either lower or higher than the average market-wide interest rate. We are unable to infer the numerical importance of this effect, because the average market-wide interest rate is the endogenous result of the market-wide bank relationships that exist.

⁶The market-wide interest rate is a daily volume-based weighted average of interest rates.

2.3.2 Loan Size

The second dependent variable measures the size of interbank loans. Afonso et al. (2011) show that the interbank market relies more heavily on rationing of loan sizes than interest spreads, and thus it is important to explore this aspect of interbank loan contracting. We define *Loan Size* as the natural logarithm of the monthly sum of all interbank loan amounts lent by interbank lender *Lend* to interbank borrower *Borr*. The aggregated interbank loan amount, *Loan Size*, thus represents the total funding committed by the interbank lender to the interbank borrower over the course of one month:

$$Loan\ Size_{Lend,Borr}^t = \ln \left(\sum_{d \in t} Amount_{Lend,Borr,d} \right)$$

where t denotes the number of trading days in the month, and $Amount_{Lend,Borr,d}$ is the euro amount of daily interbank loans from interbank lender to borrower. The construction closely follows Afonso et al. (2013), who use the logarithm of monthly amount borrowed in the interbank market by lender-borrower pair. We aim to measure the commitment (in euro) from an interbank lender to an interbank borrower.

2.4 Control Variables

In this section we describe other variables that are likely to have an impact on interbank loan terms. The first set of variables relates to public information available to interbank lending banks. Furfine (2001) shows that banks actively use the publicly available information to decide on interbank loan terms. We control for observed bank heterogeneity by including a number of accounting variables. The first bank-specific control variable is bank *Size*, measured by the natural logarithm of total assets. To the extent that larger banks are more diversified, able to obtain cheaper funding or simply be considered to be too big to fail (see, e.g., Köhler (2014), Mergaerts and Vander Vennet (2016)), they may be able to obtain more favorable loan conditions in the interbank market. In a similar fashion, we include *Return on Assets (ROA)* as a measure of bank profitability. We also control for the quality of the banks' *overall* loan portfolio. *Loan Loss Provisions (LLP)* is calculated as loan loss provisions divided by net loans. Other studies such as Cocco et al. (2009) include the proportion of non-performing loans (NPLs), but since we use data for banks in

52 different countries, the definitions of NPLs vary considerably. Following studies such as De Jonghe and Öztekin (2015) and Mergaerts and Vander Venet (2016), we include the more comparable LLP ratio. In separate specifications, we also control for unobserved bank heterogeneity by including the average borrower interest spread and loan size over the prior period. Afonso et al. (2013) argue that prior loan terms are a good predictor of current interbank loan terms, and capture unobserved bank characteristics by including proxies for fixed effects. Similar to their empirical strategy, we include the average spread or amount for the borrower and lender as fixed effects proxies.

The second set of control variables is designed to capture pre-existing interbank relationships. Since we investigate the added value of private information originating from the syndicated loan market, we control for already existing ties between banks on the interbank market. The control variables relate to previous interbank relationships and interbank bargaining power, both of which have been found to be important determinants of interbank spreads and loan sizes. Similar to Cocco et al. (2009), Affinito (2012), and Bräuning and Fecht (2017) we consider the intensity of interbank relationship lending, that is, how important a particular counterparty is for a bank relative to all other banks in the interbank market. We compute a *Lender Preference Index (LPI)* equal to the amount $Amount_i^{Lend \rightarrow Borr}$ lending bank $Lend$ granted to borrowing bank $Borr$ at time t , relative to the total amount $Amount_i^{Lend \rightarrow All}$ lending bank $Lend$ granted to all interbank market participants over period t :

$$LPI_{Lend, Borr, t} = \frac{\sum_{i \in t} Amount_i^{Lend \rightarrow Borr}}{\sum_{i \in t} Amount_i^{Lend \rightarrow All}}$$

Similarly, we compute a *Borrower Preference Index (BPI)* which equals the ratio of the amount $Amount_i^{Lend \rightarrow Borr}$ borrower $Borr$ borrowed from lender $Lend$, relative to the total amount $Amount_i^{All \rightarrow Borr}$ borrowed by borrower $Borr$ over the same period t . The ratios are constructed on a monthly basis.

2.5 Summary Statistics

Table 1 reports summary statistics for our main variables. Variables are winsorized at the 1 and 99% level to mitigate the impact of outliers. The normalized interest spread

is expressed as the basis point difference with the market interest rate, corrected for the standard deviation of the market rate to account for periods of increased volatility. The mean spread is -0.24 with a standard deviation of 0.98. On a monthly basis, banks lend on average 787 million euro to their interbank borrowers (*Loan Size*). Note that *Loan Size* is a pairwise measure and thus captures the average monthly loan size for each unique lender-borrower pair. Our main explanatory variable, *Syndicated Loans Share* indicates that interbank lenders on average co-lend 21.26% of all interbank borrowers' syndicated loans on average. Since the share variable varies from 0% to a maximum of 100%, this cross-sectional variation should enable us to gauge the impact of syndicated corporate co-lending on interbank loan terms. The *Borrower Preference Index (BPI)* and *Lender Preference Index (LPI)* have a mean (median) of 8.40 (2.20) and 8.42 (2.75) percent, respectively. As the mean is substantially larger than the median for the two ratios, we observe that banks lend (borrow) little to (from) most banks, but large amounts to (from) a few of them, which is a typical feature of the two-tiered nature of the interbank market (Craig and Von Peter, 2014; in 't Veld and van Lelyveld, 2014). These characteristics are based on a sample which includes banks that interact with each other both on the syndicated loan market and on the interbank market. When we compare these statistics to previous literature on Euro Area interbank markets, we find similar concentration of lending and borrowing activity, on average.⁷

Finally, we report borrower and lender characteristics. Banks frequently act both as lender and borrower in the interbank market, in which case they are included in the summary statistics for both. On average, lending banks have *Assets* of 355 billion euro, compared to 339 billion euro for borrowers. Lenders are also slightly less profitable (*Return on Assets*), and have lower loan quality (higher *Loan Loss Provisions*) than borrowing banks. Return on assets for the average lender (borrower) is 0.10% (0.12%), while the standard deviation is 1.49% (1.30%). Finally, we provide statistics on our primary sample of syndicated loans. The average loan is 160 million euro, while the average syndicate is composed of 5.8 lenders, and 2.2 lead arrangers. The average percentage retained by a lead arranger is 28.49%, with a standard deviation of 27.08%.

⁷Cocco et al. (2009) report a mean (median) of 8.39 (4.09) percent for the LPI and 7.94 (3.07) percent for the BPI on the Portuguese interbank market from 1997 to 2001. Affinito (2012) reports a mean (median) of 13 (27) percent for the LPI and 19 (33) for the BPI on the Italian interbank market from 1998 to 2009. Bräuning and Fecht (2017) report a mean of 6.4 (4.3) percent for the LPI (BPI) on the German interbank market from 2006 to 2007.

3 Empirical Strategy and Baseline Results

3.1 Univariate Tests

To examine whether co-lending through the syndicated loan market affects interbank loan contracting, we first investigate two important interbank loan characteristics to see if these are different for varying levels of syndicated loan sharing.

Figures 1 and 2 illustrate the evolution of interbank *Interest Spread* and *Loan Size*, respectively. We segregate our sample of interbank loans into *Top 50% SLS* and *Bottom 50% SLS* based on the distribution of the *Syndicated Loan Sharing* variable. *Top 50% SLS* are interbank loans for which the ratio of shared syndicated loans to total interbank borrower syndicated loans is above the 50th percentile of the distribution. Conversely, *Bottom 50% SLS* are interbank loans where this ratio is below the 50th percentile. In Figure 1, loans to interbank borrowers that share a high degree (*Top 50% SLS*) of their syndicated loans with their interbank lender, are associated with consistently lower interbank interest spreads. The magnitude of the difference is substantial in economic terms: *Top SLS* interbank borrowers obtain loans that are on average around 60% less expensive than loans to *Bottom SLS* borrowers. Figure 2 displays a similar pattern for interbank loan size. Here, *Top SLS* borrowers obtain larger loans compared to interbank borrowers with a low degree of syndicated loan sharing. Again, the economic effect is sizable. Interbank borrowers that share a high degree of their syndicated loan portfolio obtain on average 500 million euro in additional liquidity on a monthly basis. These figures provide a preliminary indication that higher degrees of co-lending are associated with more beneficial interbank borrowing conditions.

Next, we turn to a more formal analysis of the association between syndicated loan sharing and interbank loan terms using t-tests. Table 2 displays results for a standard t-test of differences in interbank loan terms for different quartile values of *Syndicated Loans Share* (SLS). In Panel A, we compare interbank interest spread and loan size for top 50% and bottom 50% values of SLS, which is a more precise representation of Figures 1 and 2. We show that higher degrees of syndicated loan sharing are indeed associated with more favorable interbank lending conditions, both in terms of cost and volume. Our results are statistically significant at the 1% level of significance.

We subject our analysis to two different sample segregations along SLS, namely top and bottom quartile values (Panel B), and bottom 75th percentile and top 25th percentile.

The results in both panels confirm our earlier findings that higher syndicated loan sharing is associated with more favorable interbank loan terms, although the difference in interest spread is insignificant in Panel C.

3.2 Syndicated Loan Sharing and Interbank Loan Terms: Baseline Multivariate Tests

Our paper is most closely related to contributions of Cocco, Gomes, and Martins (2009), and Afonso, Kovner, and Schoar (2013), who study relationship lending in the interbank market. We contribute to a better understanding of how banks acquire information about one another through the syndicated loans market. To assess the validity of our results, we alternate control variables in accordance with their methodology. In particular, for each multivariate test we report separate results including the control variables used in Cocco et al. (2009), henceforth CGM, and Afonso et al. (2013), henceforth AKS.

The control variables in CGM (e.g. bank size and profitability) allow us to estimate the impact of individual bank characteristics on the loan interest rate and loan size for all transfers recorded in TARGET2. In the first set of estimations we control for bank heterogeneity by explicitly including bank characteristics which may influence the interbank loan conditions. AKS on the other hand exclude the impact of individual bank characteristics and account for a wider set of unobserved bank heterogeneity by including proxies for interbank lender and borrower fixed effects. Their analysis is thus likely to explain more of the variation in the dependent variable. In the second set of estimations we use the panel dimension of the data and control for bank heterogeneity using fixed effects proxies, since it can be argued that fundamental bank features will remain largely constant over a relatively short time span. This allows us to discard the constant term to account for unobserved heterogeneity and obtain more efficient estimations of the coefficients. We posit that alternating the control variables is necessary for our analysis in the context of interbank payments through TARGET2 since most previous studies have investigated interbank market dynamics in individual countries (e.g. Affinito (2012) and Bräuning and Fecht (2017)). All regressions include month-year dummies, which turn out to be negative and (mostly) significant as a reflection of the declining interest rates over the entire sample period.

3.2.1 CGM: Bank-Specific Characteristics

In our first set of results, we investigate the determinants of interbank loan terms using a regression framework that allows us to control for bank-specific characteristics. We focus on the impact of the degree of syndicated loan sharing on the interbank interest spread and loan size, conditioning on counterparty and loan characteristics.

$$\begin{aligned}
 Loan\ Term_{Borr,Lend,t} &= \alpha_0 + \beta_0 Syndicated\ Loans\ Share_{Borr,Lend,t} \\
 &+ \sum_{p=1}^P \lambda_p Borrower_{p,Borr,t} + \sum_{q=1}^Q \psi_q Lender_{q,Lend,t} \\
 &+ \sum_{r=1}^R \omega_r Loan_{r,Borr,Lend,t} + \varepsilon_{Borr,Lend,t} \tag{1}
 \end{aligned}$$

where the dependent variable $Loan\ Term_{Borr,Lend}^t$ is either *Interest Spread* or *Loan Size*, t indexes time, and the subscripts *Borr* and *Lend* refer to borrowers and lenders, respectively. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). $Borrower_{p,Borr,t}$, $Lender_{q,Lend,t}$, and $Loan_{r,Borr,Lend,t}$ are vectors with time-varying interbank borrower, interbank lender, and loan-level characteristics, respectively. We include borrower and lender *Size*, *Return on Assets*, and *Loan Loss Provisions*. *Loan* characteristics include pre-existing relationships *in* the interbank market: the Lender Preference Index and the Borrower Preference Index. We also include *Loan Size* as an independent variable in the interest spread models, as we suspect larger loans to be associated with lower loan spreads.

We expect borrowers who share more of their syndicated loan portfolio with interbank lenders to receive more favorable loan terms because of reduced information asymmetry. Hence, we expect a negative sign on the *Syndicated Loans Share* variable when *Interest Spread* is the dependent variable. Accordingly, we expect the *Syndicated Loan Share* variable to be positively associated with *Loan Size*. Further, we expect the *LPI* to have a positive sign and the *BPI* to carry a negative (positive) sign for the *Interest Spread* (*Loan Size*) regressions. A higher lender preference should enable the lender to extract more favorable lending terms, while a higher borrower preference is expected to allow the

borrowing bank to obtain more favorable conditions. Table 3 shows estimation results for Model (1).

Columns 1 and 2 in Table 3 show results for the interest spread specifications, with bank control variables incrementally added in column 2. The coefficient on the syndicated loans share is negative yet insignificant in column 2, suggesting that interbank borrowers sharing more of their syndicated loan portfolio with their interbank lender fail to obtain lower loan spreads. Larger loans (Loan Size) are associated with lower spreads. The *Lender Preference Index* variable has a positive and statistically significant impact on the interbank interest spread, indicating that lending banks may profit from repeated lending to banks with frequent liquidity needs. On the other hand, the *Borrower Preference Index* is insignificant in the basic model. This would imply that borrowers fail to profit from building a long-term interbank relationship with cash-rich counterparty banks.

In contrast to the interest spread results, the *Syndicated Loans Share* variable carries a positive and highly significant coefficient in columns 3 and 4 (Loan Size). The interpretation is that interaction in the corporate syndicated loan market lowers the information asymmetry between banks that subsequently transact on the interbank market, and that the information spillover is associated with larger loans. The *LPI* retains a positive sign, while building relationships with lenders (*BPI*) seems to yield a beneficial impact for interbank borrowers in terms of larger access to liquidity. Our control variables behave as expected. Bank *Size* turns out to be a very powerful determinant of interbank loan pricing. Loans to and from larger banks are associated with lower interest spreads and this effect is highly significant. Consistent with the interpretation of bank size as a proxy for the too-big-to-fail nature of big banks, this finding may reflect the general association of bank size with lower funding costs (see Babihuga and Spaltro, 2014). Evidently, larger banks grant and obtain larger loans. We also show that borrowers with lower overall asset quality (higher *Loan Loss Provisions*) pay a higher interbank spread and obtain smaller loans, and this effect is statistically significant at the 1% level. As expected, banks with a perceived lower credit quality in their overall loan portfolio exhibit a lower creditworthiness also on the interbank market.

3.2.2 AKS: Fixed Effects Proxies

In a second set of regressions, we account for bank heterogeneity by including a proxy for bank fixed effects rather than individual bank characteristics. We re-estimate model (1)

and replace the variables in the borrower- and lender-specific vectors to reflect lender and borrower fixed effects proxies.

In line with Afonso et al. (2013), we use *Average Spread* or *Average Loan Size* as proxies for borrower and lender fixed effects, depending on the independent interbank loan term. We define *Average Spread Borrower* as the average monthly spread the interbank borrower pays. *Average Spread Lender* is the monthly average spread the interbank lender charges on interbank loans. *Average Loan Size Borrower* is the monthly average loan size borrowed by the interbank borrower, while *Average Loan Size Lender* is the monthly average loan size lent by the interbank lender. The proxies for fixed effects aim to capture unobserved characteristics of the borrowing and lending bank in a given month.⁸ This means that we look at the within borrower-lender relationship and investigate how syndicated loan sharing affects the terms of interbank loans over time. In the *Loan* vector, we make one adjustment and include only the one-month lagged borrower preference index *BPI (lagged)* to account for the intensity of interbank relationship lending.

Estimation results are reported in Table 4. Panel A presents results for *Interest Spread* models. When we omit controls for lender or borrower unobserved characteristics, the impact of syndicated loan sharing is negative though insignificant. The lagged borrower preference index also carries a negative and statistically insignificant coefficient, suggesting that pre-existing interbank relationships with lenders are unassociated with lower interbank interest spreads. In columns 2 through 4 we augment the model, controlling for borrower and lender heterogeneity. Not surprisingly, previous interbank interest spreads turn out to be important determinants of current interbank interest spreads. Interestingly, after controlling for unobserved borrowing bank characteristics we observe a negative and significant impact of sharing syndicated loans on the interbank interest spread. These findings are consistent with the interpretation that syndicated loan sharing yields more beneficial interbank loan spreads for the borrowing banks. We also notice that the R^2 for these specifications is higher compared to the results in Table 3, underlining the importance of controlling for bank fixed effects.

Loan spreads are only one characteristic of interbank loan conditions. We hypothesize that reduced information asymmetries between interbank counterparties should translate in a higher willingness to lend. As a result, we expect interbank lenders to provide larger loans

⁸The number being constant within a month for a borrower and lender, another interpretation of this variable is that it is a bank-month fixed effect (Afonso et al., 2013).

to borrowers who participate in more of the former’s corporate loan syndicates. Panel B of Table 4 present coefficients for the impact of syndicated loan sharing on interbank loan sizes. We introduce additional fixed effects for borrowers and lenders. When these effects are included the explanatory power of the specifications increases markedly. The main result is that co-lending with an interbank lender is associated with access to significantly larger interbank loans. This result is robust to the inclusion of unobserved bank characteristics. Partnering in the syndicated loan market can thus be an approach for interbank borrowers to ensure their access to interbank funding to cover any liquidity needs. Interbank lenders are thus less likely to ration loan amounts to interbank borrowers if they share more syndicated loans. Additionally, borrowers with pre-existing interbank lending relationships receive larger loans; the coefficient on the borrower preference index is positive and highly significant.

Overall, we find convincing evidence that syndicated loan sharing may constitute a mechanism to reduce information asymmetry between interbank counterparties. Based on our initial findings, sharing syndicated loans seems to have an impact on obtaining larger, rather than less costly interbank loans. Liquidity rationing is lessened when lending banks participate in more of the borrowing bank’s loan syndicates. Put differently, lending banks provide larger loans to co-lending interbank borrowers. Our findings are consistent with the notion that banks use publicly available information to monitor their counterparties in the interbank market (Furfine, 2001) and that lending relationships are a determining element in providing liquidity (Bräuning and Fecht, 2017). In the remainder of our results section, we report CGM and AKS estimations in one table.

3.3 Non-linear Effects in Syndicated Loan Sharing and Interbank Loan Terms

One potential issue raised by Cai et al. (2018) is that increased syndicated interconnectedness makes banks vulnerable to contagious effects through overlap in bank loan portfolios. We hypothesize that interbank loan terms are negatively affected when the interbank lender’s exposure to the same asset (syndicated loan) as the interbank borrower increases. We expect interbank lenders to readjust loan terms to borrowers when concentration increases. To investigate this, we estimate a non-linear model by including the squared syndicated loans share variable, *Syndicated Loans Share*². As before, we expect that a higher degree of syndicated loan sharing is associated with more beneficial borrowing terms, but that there exists

a level of syndicated loan sharing where the beneficial effects of loan sharing is mitigated due to more pronounced concerns about loan concentration. In other words, we expect a convex (concave) relationship between syndicated loan sharing and interest spread (loan size). Table 5 reports results.

Results in columns 1 and 2 show that syndicated loan sharing is associated with significantly lower interbank interest spreads. The coefficient on the quadratic *Syndicated Loans Share* variable is positive and significant for AKS, suggesting a U-shaped relationship. When we plot the relation, we find that a value of 50% on the syndicated loan sharing variable represents the threshold at which interest spreads increase again. In explaining interbank loan size (columns 3 and 4) in the quadratic specification, we find a similar pattern for the interest spread. The association now takes the form of an inverted U-shape, suggesting that interbank borrowers obtain larger loans as the interbank lender obtains more information about the interbank borrower's assets. However, after a certain threshold is surpassed, loan size decreases.

4 Channels of Information Sharing

Our results until now suggest that increased syndicated loan sharing is associated with more favorable interbank borrowing conditions. We argue that the relation is due to the mitigation of information asymmetry arising from cooperation between two banks. In this section, we investigate the channels of information sharing through co-lending, and examine alternative explanations for our baseline results.

4.1 Mitigation of Interbank Borrower Opacity

So far, we have shown that syndicated loan sharing is associated with more beneficial loan terms for all interbank borrowers. To assess whether syndicated loan sharing mitigates information asymmetry, however, it is important to consider that the beneficial impact of syndicated co-lending may depend on individual bank characteristics. We argue that co-lending banks that are ex ante more informationally opaque stand to benefit more compared to co-lending banks with less pronounced problems of information asymmetry. To empirically identify this hypothesis, we classify borrowing banks based on the degree of opacity and interact with syndicated loans sharing. We construct two measures of overall bank opacity.

First, we construct a dummy variable *Small Bank Borrower* equal to one if the interbank borrower is in the bottom tercile of the distribution with respect to total assets, and zero otherwise. The use of borrower size as a proxy for information asymmetry is well established in the literature (e.g. Llorente et al. (2002) and Chae (2005)). Larger size is associated with greater information production. Therefore, we expect smaller borrowers to obtain less beneficial loan terms, all else equal. We also expect that by sharing syndicated loans, informational asymmetries are alleviated to the extent that smaller borrowers benefit to a larger extent than larger borrowers. Second, we include *Corporate Loan Bank*, a dummy variable equal to one if the borrower’s *Corporate Loans to Assets* ratio is in the top tercile of the distribution, and zero otherwise. Corporate loans have been shown to be one of the most informationally opaque items on banks’ balance sheets (Sufi, 2007; Jones et al., 2013). As a result, we suspect that corporate loan banks initially obtain less favorable loan terms, but that sharing syndicated loans mitigates the informational asymmetries associated with large degrees of corporate loans. We estimate the following model:

$$\begin{aligned}
Loan\ Term_{Borr,Lend,t} &= \alpha_0 + \beta_0 Syndicated\ Loans\ Share_{Borr,Lend,t} \\
&+ \beta_1 Borrower\ Opacity_{Borr,t} \\
&+ \beta_2 Syndicated\ Loans\ Share_{Borr,Lend,t} \times Borrower\ Opacity_{Borr,t} \\
&+ \sum_{p=1}^P \lambda_P Borrower_{p,Borr,t} + \sum_{q=1}^Q \psi_q Lender_{q,Lend,t} \\
&+ \sum_{r=1}^R \omega_r Loan_{r,Borr,Lend,t} + \varepsilon_{Borr,Lend,t}
\end{aligned} \tag{2}$$

where all variables are defined as before, and *Borrower Opacity*_{Borr,t} is either *Small Bank Borrower* or *Corporate Loan Bank*. Estimation results for model (2) are in Table 6. Panel A reports results for the specification with CGM control variables, and Panel B reports results for the specification with AKS control variables.

Considered individually, the borrower size dummy carries a positive sign in the interest spread specifications (columns 1-4), suggesting that smaller bank borrowers are penalized for their higher degree of informational opacity. The interaction term between *Small Bank Borrower* and syndicated loan sharing is negative and highly significant, supporting our hypothesis that syndicated loan sharing mitigates information asymmetry and leads to more

beneficial loan terms. We report a negative association between borrower size and loan size, but ascribe the negative coefficient to the fact that smaller banks merely require lower levels of funding in absolute terms.

The corporate loan dummy carries a predominantly positive sign in the loan spread regressions (columns 3 and 4), though only significantly so when we also control for unobserved bank heterogeneity (AKS). However, the interaction with the syndicated loans share yields a negative and significant coefficient. Our interpretation of this finding is that sharing information through the syndicated loan market reduces information asymmetry more when the borrowing bank engages primarily in corporate lending. Columns 7 and 8 depict results for the loan size specification. Here, we observe a negative sign on the interaction term between *Corporate Loan Bank* and our syndicated loan sharing variable. Liquidity rationing by the interbank lender seems to occur when the borrowing bank engages primarily in corporate lending, which is associated with a higher risk profile than, e.g. mortgage lending. The risk considerations overcompensate the information sharing effect. Hence, we conclude that although syndicated loan sharing may yield more beneficial interbank loan terms, when the risk profile of the borrower is judged by the lending bank as risky, the latter consideration dominates in terms of loan size.

4.2 Mitigation of Shared Syndicated Loan Opacity

In this subsection, we aim to capture the information contained in the shared syndicated loan portfolio. More specifically, we focus on the type of common syndicated borrowers. To the extent that interbank lenders monitor the opacity of shared syndicated loans, we expect heterogeneity in interbank loan terms dependent on the type of syndicated borrowers. Therefore, we add indicators capturing the intensity of the information sharing and the opacity of the shared assets in the syndicated loan market. In each case, we consider the standalone effect as well as the interaction effect with the *Syndicated Loans Share* $_{Borr,Lend,t}$ variable. We identify three measures of syndicated loan opacity. First, small syndicate borrowers tend to be unlisted, have lower reporting requirements, and are the type of borrowers where public information production is lowest (Chae, 2005; Sufi, 2007). We construct *Small Syndicate Borrowers*, a dummy equal to one if, on average, borrowers in the shared syndicate portfolio are in the lowest tercile of the distribution with regard to size (sales), and zero otherwise. We expect shared syndicated loan portfolios with a large share of small

borrowers to be associated with less favorable loan terms. Second, non-financial borrowers without a recent track record of accessing the syndicated loan market are deemed to be more informationally opaque than firms accessing the loan market repeatedly. The reason for this is that repeated borrowing is associated with information production, which alleviates informational asymmetries. *New Syndicate Borrowers* is a dummy equal to one if the share of new borrowers in the shared syndicated loan portfolio is in the top tercile of the distribution. We define new borrowers as those that have not accessed the syndicated loan market in the past 5 years (Sufi, 2007). We conjecture that sharing syndicated loans predominantly consisting of more opaque borrowers is negatively associated with interbank loan terms. Third, we define *Unrated Syndicated Loans (High)* as a dummy equal to one if the proportion of unrated syndicated loans within the total shared syndicated loan portfolio is in the top tercile of the distribution. Sufi (2007) argues that unrated corporate borrowers are more opaque than rated borrowers, as they lack a publicly available third-party debt evaluation. Accordingly, we expect sharing of unrated loans to be associated with additional information asymmetry and less favorable interbank loan terms. For all information asymmetry variables we require at least five shared syndicated loans between interbank lender and interbank borrower. Table 7 reports results.

The coefficient estimates in columns 1-3 of Table 7 reveal that higher degrees of syndicated loan opacity (higher levels of small, new, and unrated non-financial borrowers) are associated with higher interbank interest spreads, indicating that interbank lenders monitor the level of information contained in the shared syndicated loan portfolio when making lending decisions. The interaction term captures the additional impact of higher levels of sharing an informationally opaque loan portfolio. Here, the slightly negative coefficients on the interaction with new syndicate borrowers (Panel A), and unrated borrowers (Panels A and B) suggest that as interbank lenders share more of the portfolio, they reduce interest spreads, which may be the result of increased cooperation and transfer of private information about these informationally opaque syndicated loans.

In columns 3-6, we explore the impact of our informational asymmetry measures on interbank loan size. Increasingly sharing loans to small borrowers with interbank lenders tends to lower interbank loan size, as measured by the standalone variable *Small Syndicate Borrowers*. Lenders ration liquidity further if the small syndicate borrower portfolio is increasingly shared with the interbank lender, as evidenced by the interaction term with

our syndicated loan sharing variable. Further, we observe smaller interbank loans to co-lending interbank borrowers when the shared syndicated loan portfolio increasingly consists of loans to new syndicate borrowers, and unrated loans.

4.3 Shared Syndicated Loans and Risk Considerations

Earlier, we documented that increased risk considerations may reduce the beneficial impact of increased co-lending. We investigate the impact of risk concentration from the interbank lender's point of view more formally by including a proxy for the intensity of the asset sharing. We first construct a variable similar to *Syndicated Loans Share*, but this time scale by the interbank *lender's* syndicated loan portfolio instead of the borrower's. *Risk Concentration* thus is a more adequate measure of concentration, as it captures the amount of shared syndicated loans as a percentage of the interbank lender's portfolio. We argue that from a risk perspective, the interbank lender is likely to carefully monitor its common asset exposure relative to its total position. The variable *High Risk Concentration* is a dummy equal to one if the *Risk Concentration* variable is in the top tercile of the distribution, and zero otherwise. Similar to the corporate loan bank variable, we expect that a high risk concentration at the interbank borrower may adversely affect the interbank interest spread due to increased credit risk. Table 8 shows results. The coefficients on the *High Risk Concentration* variable in columns 1 and 4 largely reject our hypothesis. Only when we control for observed bank heterogeneity in Panel A do we observe a liquidity rationing effect of high risk concentration. When interbank lenders share a larger proportion of their loan portfolio with their interbank borrower, the former reduce liquidity provision to the latter. However, when we proxy for fixed effects (Panel B), the impact disappears.

In an extension to the results in the previous subsection, we aim to investigate whether interbank lenders monitor the *quality* of the shared syndicated loan portfolio. If we assume that syndicated loan relationships are simply a proxy for the wider relationship between interbank lender and borrower, then we expect that the quality of shared syndicated loans would have no impact on interbank loan terms. If, however, interbank lenders actively monitor their syndicated loan dealings with potential interbank borrowers, then we expect a positive relationship between the quality of syndicated loans and the leniency of interbank loan terms. We test this question empirically by defining two measures that relate to the quality of the shared syndicated loan portfolio. *Low Grade Syndicate Borrowers* is a dummy

variable equal to one if the average quality of the shared syndicated loan portfolio is below investment grade, and zero otherwise. We expect lower quality shared syndicated loans to be associated with higher interbank spreads and lower interbank loan sizes. In previous specifications, we found that *overall* loan quality (*Loan Loss Provisions*) negatively impacts the pricing of interbank loans and loan sizes for borrowers. The question is whether or not there is any additional effect caused by the quality of the shared assets. *Secured Syndicated Loans (High)* is a dummy equal to one if the proportion of secured syndicated loans within the total shared syndicated loan portfolio is in the top tercile of the distribution. On the one hand, secured loans are in principle issued to less creditworthy borrowers (higher risk). On the other hand, secured loans may be deemed safer because of the value of the underlying collateral. Results are shown in columns 2-4 and 5-6 of Table 8.

The standalone variable *Low Grade Syndicate Borrowers* remains insignificant, suggesting that interbank lenders disregard sharing of low-quality syndicated loans when pricing interbank loans. However, the interaction term with our syndicated loan sharing variable shows that interbank lenders issue more expensive interbank loans to co-lending interbank borrowers as the intensity of sharing low-quality syndicated loans increases. Similarly, interbank borrowers obtain significantly less liquidity if they increasingly share low-quality syndicated loans. Sharing secured syndicated loans is associated with higher interbank interest spreads, which corroborates the hypothesis that riskier corporate borrowers reduce the information content shared between interbank counterparties.

4.4 Endogeneity

To address the issue of endogeneity of interbank and syndicated loan market relationships we estimate our model using instrumental variables (IV). If borrowing banks choose syndicated loan participation based partly on any other variable that may impact interbank loan terms, then the residuals in our baseline model (1) would be correlated with the *Syndicated Loans Share* variables. Consequently, coefficient estimates will be biased. The validity of our IV approach depends mainly on the quality of our instrument. To be a good instrument, the variable excluded from the second-stage regression must be significantly correlated with the potentially endogenous regressors and be uncorrelated with the error term. We use the time dimension of our data and use the one-month lagged value for *Syndicated Loan Share* as an instrument. To confirm the validity of the chosen instrument, we report that the R^2 of

the first-stage regressions ranges from 49% to 57%. Estimation results for the second-stage regression are shown in Table 9.

We compare the results in column 1 to those in Table 3, column 2. The point estimates for the second-stage IV regressions are similar, but we find that the *Syndicated Loans Share* turns out statistically significant at the 5% level in Table 9 whereas before this was not the case. The coefficient estimates remain largely unchanged for all individual control variables. Next, we investigate the instrumental variable specification for loan size in column 3 and compare the results to Table 3, column 4. Our main conclusion that larger degrees of syndicated loan sharing is associated with wider access to interbank liquidity remains unchanged, and coefficient estimates for control variables are fairly close in terms of magnitude and levels of significance. We obtain similar results when controlling for unobserved bank heterogeneity in columns 2 (compared to Table 4, Panel A, column 4) and 4 (compared to Table 4, Panel B, column 4). In all, our results remain unaffected when we employ an instrumental variable approach to account for endogeneity issues.

4.5 Additional Robustness

In this section we perform two additional robustness tests related to (i) the network structure of the interbank and syndicated loan market, and (ii) any unobserved heterogeneity that may exist after proxying for fixed effects using AKS control variables.

4.5.1 Network Structure

The *Lender Preference Index* and *Borrower Preference Index* are generally used to represent relationships in the interbank market (e.g. Cocco et al. (2009), and Bräuning and Fecht (2017)). While the *LPI* and *BPI* capture bilateral relationships, due to their scaled nature they fail to take into account the bank's overall position in the network. This is an important observation, as the Euro Area interbank market has been found to exhibit a two-tiered structure where core banks in the network distribute liquidity throughout the network to less-connected banks in the network (Craig and Von Peter, 2014; in 't Veld and van Lelyveld, 2014). If the bank's network position in the interbank or syndicated loan market affects interbank loan terms, then our coefficients may be biased.

To this end, we create two scale-invariant network measures that capture the lender's and borrower's importance in the syndicated loan and interbank market. *Number of Inter-*

actions SL (12 months) is the natural logarithm of (1 + the total number of interactions the interbank counterparty had on the syndicated loan market in the prior 12 months). We equate a (one) syndicated loan interaction to the participation in a syndicate. *Number of Interactions IB (12 months)* is the natural logarithm of (1 + the total number of interactions the interbank counterparty had on the interbank market in the prior 12 months). An (one) interbank loan interaction is the participation in an interbank loan, either as lender or borrower. Our objective is twofold. First, we aim to provide a more robust estimation of the *Syndicated Loans Share* variable by accounting for lender and borrower network position and importance in the interbank and syndicated loan market. Second, we explore whether being a more dominant bank in the syndicated loan market removes information asymmetry in the interbank market, regardless of whether interbank counterparties share the same loans. Table 10 shows results.

After controlling for the banks' market dominance, we reaffirm our earlier finding that syndicated loan sharing is associated with more beneficial borrowing conditions, as evidenced by the negative (positive) and statistically significant coefficients on *Syndicated Loans Share* in the interest spread (loan size) regressions. When we omit controls for unobserved bank heterogeneity (column 1), we document a positive relationship between the number of interactions an interbank lender has had in the previous 12 months, and the interest spread they charge, which may be an exhibit of dominant lenders' pricing power. Yet, controlling for unobserved heterogeneity (column 2) renders the effect insignificant. In column 2, interbank borrowers with more interactions on the syndicated loan market are able to obtain lower funding cost, as are borrowers with increased presence on the interbank market. Loan size regressions (columns 3 and 4) show that it are the more active interbank market banks (higher *Number of Interactions IB*) that obtain and commit larger liquidity in the interbank market.

4.5.2 Fixed Effects

One could argue that the proxies for borrower and lender fixed effects, i.e. the AKS control specifications, are unable to capture all unobserved bank heterogeneity, leaving the possibility that our point estimates are inflated. To address these concerns, we add bank fixed effects by including a dummy variable for every individual lender and every individual borrower. Results are shown in Table 11. We incrementally add fixed effects for lender and borrower

in columns 1-3 (interest spread), and columns 4-6 (loan size). Compared to our baseline results in Tables 3 and 4, the absolute value of the coefficient on *Syndicated Loans Share* in Table 11 is substantially higher, especially in the interest spread specifications. Contrary to the mixed evidence thereof in previous results, this suggests that syndicated loan sharing is associated with more favorable loan spreads. We confirm the strong association between sharing syndicated loans and access to interbank liquidity (loan size).

5 Conclusion

The interbank market plays a vital role in the functioning of the entire financial system. Yet, informational frictions have caused large disruptions in recent years; the period following the Lehman Brothers collapse serving as the prime example. In this paper we study the impact of corporate loan co-lending by banks on the conditions they receive when borrowing on the interbank market. So-called syndicated loans are loans funded by at least two banks. By sharing these assets, banks acquire valuable private information about each other's outstanding loans. The objective is to investigate whether banks use the private information they gain about other banks in syndicated loan markets when they subsequently engage in interbank lending.

For our study we construct a measure of the syndicated loans share between two banks, based on a large syndicated loans sample obtained from the Dealscan database for the period 1987 to 2014. We relate the intensity of syndicated loan sharing to their interbank loan conditions, namely pricing and volumes. The interbank loan data is obtained from TARGET2, which is the major platform of interbank lending in the euro area, and covers the period July 2008 to December 2013.

Our main finding is that interbank borrowing banks that share more syndicated loans with an interbank lender obtain more favorable borrowing conditions. The effect of syndicated loan sharing is most pronounced when we consider interbank loan size, suggesting that co-lending increases the *access* to liquidity for interbank borrowers. We also document a less pronounced impact on the pricing of liquidity. This result supports the hypothesis that lending banks possess an informational advantage when lending to syndicate partners which allows them to reduce informational asymmetries and the associated uncertainty about the asset quality of the interbank borrower. Our results are consistent with findings reported by Cocco et al. (2009) and Affinito et al. (2012, 2013) who provide evidence of the existence of

relationship lending in the interbank market. While Cocco et al. (2009) and Bräuning and Fecht (2017) hint at informationally driven relationship lending between banks, they assume that interbank market dealings are the main source of private information production. This seems to be at odds with the nature and characteristics of the interbank market. In this paper, we show that syndicated lending may be an additional source of private information about the asset quality of the co-lending banks. The reduced information asymmetry may (partially) explain the more beneficial loan conditions that interbank borrowers receive following the involvement in syndicated lending with potential interbank lenders. However, we also find that the beneficial effect of information sharing is subject to risk considerations. A very high co-lending intensity increases default risk concentration and this is shown to cause the interbank lenders to restrict the favorable loan conditions. Similarly, sharing low-quality assets also reduces the beneficial effect of syndicated loan sharing on the interbank borrowing spread, although the effect on the offered interbank loan size is less pronounced.

Our analysis contributes to a better understanding of how information sharing in one market (here the syndicated loan market) may spill over to the conditions offered in other markets (here the interbank market). They show that bank interconnectedness through shared asset exposures does not necessarily pose a threat to financial stability, because the sharing of assets provides banks with valuable private information about other banks' assets. This information can subsequently be transferred to the interbank market, where the lowering of informational asymmetry may contribute to a more efficient liquidity allocation among banks, thereby contributing to the stability of the financial system. Hence, our work highlights a potential link between asset sharing and systemic risk mitigation. Going forward, we expect that the Basel 3 capital and liquidity regulations may force banks to restrict the maturities in their corporate loan portfolios, thereby providing an additional impetus for the development of the syndicated loan market. We demonstrate that this market can constitute a valuable source of information which may aid in overcoming information asymmetry in the interbank market.

Appendix A

Variable definitions

Variable	Source	Description
Interest Spread	TARGET2	Normalized interest rate defined for every pair of lender and borrower as the difference between the monthly average interest rate on the loans between those two banks and the market interest rate in the same month, divided by the standard deviation of interest rates for the month (pairwise measure).
Loan Size	TARGET2	Natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower (pairwise measure).
Borrower Preference Index	TARGET2	Ratio of euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month.
Lender Preference Index	TARGET2	Ratio of euro amount the interbank lender has lent to the interbank borrower in a given month, divided by the total euro amount the interbank lender has lent in the interbank market during that same month.
BPI(lagged)	TARGET2	Borrower Preference Index lagged one month.
Average Spread Borrower (Lender)	TARGET2	Average monthly spread the interbank borrower (lender) paid (charged) on interbank loans.
Average Loan Size Borrower (Lender)	TARGET2	Average monthly loan size borrowed (lent) by the interbank borrower (lender).
Within Core	TARGET2	Dummy variable equal to one if both interbank lender and interbank borrower are from non-GIIPS countries.
GIIPS to Core	TARGET2	Dummy variable equal to one if the interbank lender is from a GIIPS country and the interbank borrower is from a non-GIIPS country, and zero otherwise.
Core to GIIPS	TARGET2	Dummy variable equal to one if the interbank lender is from a non-GIIPS country and the interbank borrower is from a GIIPS country, and zero otherwise.
Number of Interactions IB (12 months)	TARGET2	Natural logarithm of (1 + the total number of interactions the interbank counterparty had on the interbank market in the prior 12 months. An (one) interbank loan interaction is the participation in an interbank loan, either as lender or borrower.
Syndicated Loans Share	Dealscan	Monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet).
Size of facility	Dealscan	Loan volume in euro of syndicated loans in our primary loan sample.
Number of lenders	Dealscan	Total number of lenders (lead arrangers and participants) per facility in our primary syndicated loan sample.
Number of lead arrangers	Dealscan	Number of lead arrangers per facility in our primary syndicated loan sample.

Variable	Source	Description [Bankscope item code]
% retained by lead arranger	Dealscan	The individual commitment by each lender in our primary syndicated loan sample.
Small Syndicate Borrowers	Dealscan	Dummy variable equal to one if the average syndicate borrower in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the bottom tercile with respect to size (sales as reported in LPC Dealscan), and zero otherwise.
New Syndicate Borrowers	Dealscan	Dummy variable equal to one if the proportion of new syndicate borrowers in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise. Syndicate borrowers are considered new if they have not accessed the syndicated loan market in the previous five years.
Unrated Syndicated Loans (High)	Dealscan	Dummy variable equal to one if the proportion of unrated syndicated loans in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise.
Risk Concentration	Dealscan	The monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank lender, divided by the total euro amount of syndicated loans the interbank lender has on its balance sheet).
High Risk Concentration	Dealscan	Dummy variable equal to one if <i>Risk Concentration</i> is in the top tercile of the distribution, and zero otherwise.
Low Grade Syndicate Borrowers	Dealscan	Dummy variable equal to one if the average syndicated loan rating of the shared syndicated loan portfolio between interbank lender and interbank borrower is below investment grade, and zero otherwise.
Secured Syndicated Loans (High)	Dealscan	Dummy variable equal to one if the proportion of secured syndicated loans in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise.
Number of Interactions SL (12 months)	Dealscan	Natural logarithm of (1 + the total number of interactions the interbank counterparty had on the syndicated loan market in the prior 12 months). A (one) syndicated loan interaction is the participation in a syndicate.
Assets	Bankscope	Total assets [data2025].
Size	Bankscope	Natural logarithm of total assets [ln(data2025)].
Return on Assets	Bankscope	Net income divided by average assets [data4024 = data2115 / data2025AVG * 100].
Loan Loss Provisions	Bankscope	Loan loss provisions divided by net loans [data2095 / data11090].
Small Bank Borrower	Bankscope	Dummy variable equal to one if the interbank borrower is in the bottom tercile of the distribution with respect to <i>Assets</i> , and zero otherwise.
Corporate Loan Bank	Bankscope	Dummy variable equal to one if the interbank borrower is in the top tercile of the distribution with respect to <i>Corporate Loans / Assets</i> , and zero otherwise.
Corporate Loans / Assets	Bankscope	Ratio of the corporate and commercial loan portfolio to total assets [data11060 / data2025].

Appendix B

Construction of Syndicated Loans Share

Corporate loans are subject to substantial private information. Banks that participate to the same corporate syndicated loan hold the same private information about the value of the loan. As a result, the more a bank participates to the syndicated loans of another bank, the more the former holds private information about the value of the latter's corporate loan portfolio. For each pair of banks, we construct *Syndicated Loans Share*, a ratio that reflects the relative amount of private information a bank holds about another bank's corporate loan portfolio through co-lending.

Here is an example of how we construct *Syndicated Loans Share*. Suppose we want to compute $Syndicated\ Loans\ Share_{A,B,31.01.2010}$, i.e. the share of Bank A's syndicated corporate loan portfolio for which Bank B holds private information on 31 January 2010. Table A1 describes Bank A's syndicated loan participations with information on maturity date, retained amount by bank A, and other syndicate members.

The first step consists of reconstructing the euro volume of Bank A's total syndicated loan portfolio on 31 January 2010 ($Volume\ Outstanding_{A,31.01.2010}$). We sum all loan volumes retained by Bank A that were on Bank A's balance sheet on this day. Loan 2's maturity date is 29 October 2009, thus it is not part of Bank A's syndicated loan portfolio on 31 January 2010. Conversely, Loan 4 is issued after the date of interest, on 9 February 2010. Neither of these loans will be used for the calculation of $Volume\ Outstanding_{A,31.01.2010}$. Loan 1 and Loan 3, however, are recorded on bank A's balance sheet on 31 January 2010, with respective euro volume of 20 million and 15 million. The $Volume\ Outstanding_{A,31.01.2010}$ thus equals $\text{€}20\text{m} + \text{€}15\text{m} = \text{€}35$ million.

The second step consists of calculating the euro volume of syndicated loans retained by Bank A as of January 2010, for which Bank B participated as well ($Volume\ Outstanding_{A,B,31.01.2010}$). Loans 1, 2, and 4 are the loans that Banks A and B co-lent, but of these three loans, only Loan 1 is active on 31/01/10. Therefore on 31 January 2010, Bank B held private information about $\text{€}20\text{m}$ of Bank A's syndicated loan portfolio.

Table B1: Bank A's syndicated loan participations and Bank B's information, 31/01/2010.

Loan	Issuance date	Maturity date	Amount retained by A	Active on 31/01/10	Outstanding 31/01/2010	Syndicate members	Bank B holds information
Loan 1	19/07/08	19/07/10	€20m	Yes	€20m	A, B, C	€20m
Loan 2	29/10/08	29/10/09	€40m	No	€0m	A, B, D	€0m
Loan 3	09/12/09	09/12/11	€15m	Yes	€15m	A, C	€0m
Loan 4	09/02/10	09/02/12	€10m	No	€0m	A, B, E	€0m
Total:					€35m		€20m

Finally, $Syndicated\ Loans\ Share_{A,B,31.01.2010}$ is equal to the ratio of the outstanding volume of syndicated loans that is co-lent by bank A and Bank B on Bank A's syndicated loan portfolio, namely $20/35=57.1\%$.

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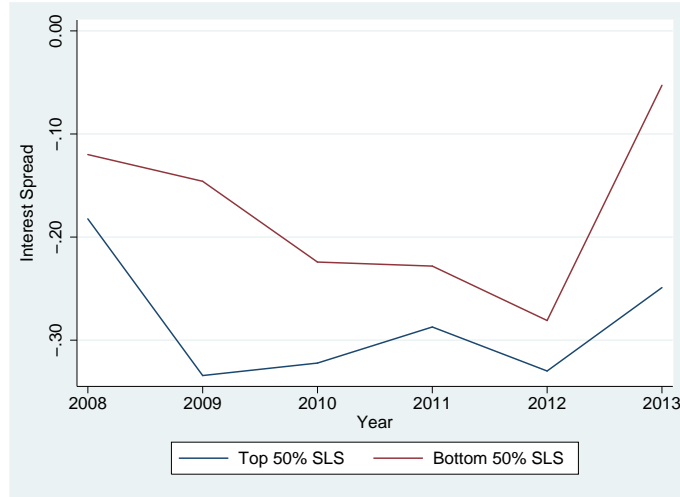
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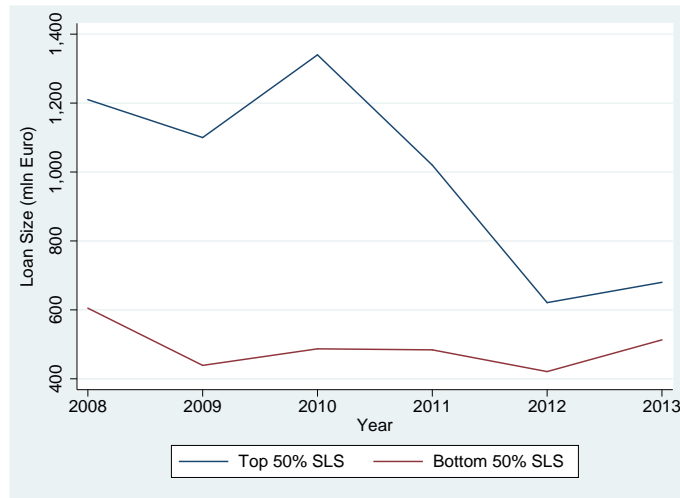
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Figure 1: Interbank Interest Spread, by degree of Syndicated Loan Sharing



This figure shows the evolution of the interbank *Interest Spread* in our sample for two levels of Syndicated Loan Sharing (SLS). *Top (Bottom) 50% SLS* are observations in the top (bottom) 50th percentile of *Syndicated Loan Sharing*. *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet).

Figure 2: Interbank Loan Size, by degree of Syndicated Loan Sharing



This figure shows the evolution of the interbank *Loan Size* in our sample for two levels of Syndicated Loan Sharing (SLS). *Top (Bottom) 50% SLS* are observations in the top (bottom) 50th percentile of *Syndicated Loan Sharing*. *Loan Size* is the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet).

TABLE 1. Summary Statistics

This table provides descriptive statistics for our sample, which covers the period July 2008 to December 2013. We report the mean, standard deviation, and quartile values for interbank loan characteristics, syndicated loan data, and bank-specific characteristics. *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower (pairwise measure). *Lender Preference Index* is the ratio of the euro amount the interbank lender has lent to the interbank borrower in a given month, divided by the total euro amount the interbank lender has lent in the interbank market during that same month. *Borrower Preference Index* is the ratio of the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. The construction of our preference indices closely follows Cocco et al. (2009) and Afonso et al. (2013). *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Size of Facility* is the loan volume in euro of syndicated loans in our primary loan sample. *Number of Lenders* is the total number of lenders (lead arrangers and participants) in our primary syndicated loan sample. *Number of Lead Arrangers* is the number of lead arrangers in our primary syndicated loan sample. *% Retained by Lead Arranger* is the individual commitment by each lender in our primary syndicated loan sample. *Assets* is total assets. *Return on Assets* is return on assets, defined as the ratio of net income to average assets. *Loan Loss Provisions / Net Loans* is the ratio of loan loss provisions to net loans.

Variable	N	Mean	St. Dev.	25%	50%	75%
<i>INTERBANK LOAN</i>						
Interest Spread	19,484	-0.24	0.98	-0.77	-0.39	0.13
Loan Size (mln Euro)	19,484	787	2,000	60	200	641
Lender Preference Index (percent)	19,484	8.42	15.56	0.78	2.75	8.34
Borrower Preference Index (percent)	19,484	8.40	16.28	0.63	2.20	7.82
<i>SYNDICATED LOANS</i>						
Syndicated Loans Share (percent)	19,484	21.26	17.29	6.69	18.99	30.55
Size of Facility (million Euro)	129,363	160.00	330.00	6.60	44.00	160.00
Number of Lenders	129,363	5.84	5.18	2.00	4.00	7.00
Number of Lead Arrangers	129,363	2.18	2.32	1.00	1.00	2.00
% Retained by Lead Arranger	28,889	28.49	27.08	8.57	19.04	40.00
<i>INTERBANK BORROWER</i>						
Assets (million Euro)	646	354,860	489,454	34,308	125,000	427,127
Return on Assets (percent)	646	0.12	1.30	0.03	0.24	0.53
Loan Loss Provisions / Net loans (percent)	646	1.09	1.45	0.38	0.76	1.29
<i>INTERBANK LENDER</i>						
Assets (million Euro)	695	338,731	483,694	27,121	116,857	411,694
Return on Assets (percent)	695	0.10	1.49	0.03	0.26	0.58
Loan Loss Provisions / Net loans (percent)	695	1.31	2.24	0.40	0.79	1.43

TABLE 2. Univariate Analysis - Syndicated Loans Share and Interbank Loan Terms

This table displays results for a standard t-test for differences in interbank loan terms for different levels of Syndicated Loans Share (SLS). Panel A shows results for differences in interbank loan term means between below-median (Bottom) and above-median (Top) values of SLS. Panel B shows results for the bottom and top quartile values of SLS, and Panel C compares interbank loan terms for the bottom 75% and the top 25% values of SLS. Column 1 shows the mean for bottom SLS, and column 2 shows the mean for top SLS. In column 3, we report the difference in means, with ***, **, and * indicating statistical significance at the 1%, 5%, and 10% level, respectively. Column 4 shows t-statistics for the difference in means. *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower (pairwise measure). *Syndicated Loans Share (SLS)* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet).

Panel A: t-test for differences in interbank loan terms along median SLS

Variable	Bottom 50% SLS Mean	Top 50% SLS Mean	Mean Difference Top - Bottom	t-statistic for Difference in Means
Interest Spread	-0.19	-0.29	-0.10***	-7.27
Loan Size (mln euro)	494	1,079	585***	20.66

Panel B: t-test for differences in interbank loan terms for bottom 25 % SLS and top 25% SLS

Variable	Bottom 25% SLS Mean	Top 25% SLS Mean	Mean Difference Top - Bottom	t-statistic for Difference in Means
Interest Spread	-0.14	-0.24	-0.10***	-4.64
Loan Size (mln euro)	347	1,083	736***	18.10

Panel C: t-test for differences in interbank loan terms for bottom 75% and top 25% SLS

Variable	Bottom 75% SLS Mean	Top 25% SLS Mean	Mean Difference Top - Bottom	t-statistic for Difference in Means
Interest Spread	-0.24	-0.24	0.00	-0.03
Loan Size (mln euro)	688	1,083	395***	11.99

TABLE 3. Syndicated Loan Sharing and Interbank Loan Terms: CGM Controls

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 and 2), or *Loan Size* (columns 3 and 4). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Lender Preference Index* is the ratio of the euro amount the interbank lender has lent to the interbank borrower in a given month, divided by the total euro amount the interbank lender has lent in the interbank market during that same month. *Borrower Preference Index* is the ratio of the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. The construction of our preference indices closely follows Cocco et al. (2009) and Afonso et al. (2013). *Size* is the natural logarithm of total assets. *Return on Assets* is return on assets, defined as the ratio of net income to average assets. *Loan Loss Provisions* is the ratio of loan loss provisions to net loans. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Interest Spread	Interest Spread	Loan Size	Loan Size
Syndicated Loans Share	0.015 (0.053)	-0.098 (0.059)	1.341*** (0.075)	0.888*** (0.082)
Loan Size	-0.047*** (0.008)	-0.029*** (0.008)		
<i>INTERBANK RELATIONSHIP</i>				
Lender Preference Index	0.004*** (0.001)	0.003*** (0.001)	0.029*** (0.002)	0.033*** (0.002)
Borrower Preference Index	0.001 (0.001)	-0.000 (0.001)	0.031*** (0.001)	0.032*** (0.001)
<i>BORROWER</i>				
Size		-0.121*** (0.014)		0.289*** (0.022)
Return on Assets		5.144*** (1.890)		-25.572*** (3.658)
Loan Loss Provisions		4.103*** (1.452)		-17.587*** (3.138)
<i>LENDER</i>				
Size		-0.031** (0.012)		0.308*** (0.013)
Return on Assets		-2.817** (1.205)		-7.952*** (1.732)
Loan Loss Provisions		-0.400 (0.719)		0.200 (1.136)
Cons.	0.641*** (0.145)	2.103*** (0.244)	18.113*** (0.064)	11.350*** (0.324)
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484
<i>Adj.R</i> ²	0.07	0.09	0.23	0.29

TABLE 4. Syndicated Loan Sharing and Interbank Loan Terms: AKS Controls

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing to interbank loan terms. The dependent variable is either *Interest Spread* (Panel A), or *Loan Size* (Panel B). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *BPI (lagged)* is the lagged Borrower Preference Index, defined as the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. *Average Spread Borrower (Lender)* is the average monthly spread the interbank borrower (lender) paid (charged) on interbank loans. *Average Loan Size Borrower (Lender)* is the average monthly loan size borrowed (lent) by the interbank borrower (lender). All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Interest Spread Specifications

	Interest Spread	Interest Spread	Interest Spread	Interest Spread
Syndicated Loans Share	-0.017 (0.054)	-0.083* (0.048)	-0.079 (0.049)	-0.115** (0.047)
Loan Size	-0.034*** (0.007)	-0.019*** (0.006)	-0.036*** (0.007)	-0.023*** (0.006)
BPI (lagged)	-0.001 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.000 (0.001)
Average Spread Borrower		4.419*** (0.317)		3.659*** (0.312)
Average Spread Lender			4.312*** (0.323)	2.989*** (0.347)
Cons.	0.428*** (0.132)	0.551*** (0.113)	0.724*** (0.125)	0.735*** (0.112)
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484
R^2	0.07	0.21	0.17	0.26

Panel B: Loan Size Specifications

	Loan Size	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	1.099*** (0.087)	1.135*** (0.071)	0.615*** (0.075)	0.717*** (0.062)
BPI (lagged)	0.041*** (0.002)	0.043*** (0.002)	0.029*** (0.001)	0.033*** (0.002)
Average Loan Size Borrower		1.089*** (0.013)		0.979*** (0.013)
Average Loan Size Lender			0.915*** (0.013)	0.781*** (0.012)
Cons.	18.403*** (0.052)	-1.597*** (0.256)	1.490*** (0.246)	-13.995*** (0.383)
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484
R^2	0.17	0.37	0.31	0.47

TABLE 5. Nonlinear Effects of Syndicated Loan Sharing on Interbank Loan Terms

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and its squared term to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 and 2), or *Loan Size* (columns 3 and 4). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Syndicated Loans Share*² is *Syndicated Loans Share* squared. Columns 1 and 3 include control variables as in Table 3: *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. *Lender Preference Index* is the ratio of the euro amount the interbank lender has lent to the interbank borrower in a given month, divided by the total euro amount the interbank lender has lent in the interbank market during that same month. *Borrower Preference Index* is the ratio of the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. The construction of our preference indices closely follows Cocco et al. (2009) and Afonso et al. (2013). *Size* is the natural logarithm of total assets. *Return on Assets* is return on assets, defined as the ratio of net income to average assets. *Loan Loss Provisions* is the ratio of loan loss provisions to net loans. Columns 2 and 4 include control variables as in Table 4: *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. *BPI (lagged)* is the lagged Borrower Preference Index, defined as the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. *Average Spread Borrower (Lender)* is the average monthly spread the interbank borrower (lender) paid (charged) on interbank loans. *Average Loan Size Borrower (Lender)* is the average monthly loan size borrowed (lent) by the interbank borrower (lender). Interest Spread specifications include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Interest Spread		Loan Size	
	CGM Controls	AKS Controls	CGM Controls	AKS Controls
Syndicated Loans Share	-0.302** (0.150)	-0.482*** (0.113)	3.804*** (0.218)	1.491*** (0.141)
Syndicated Loans Share ²	0.310 (0.197)	0.587*** (0.149)	-4.463*** (0.335)	-1.234*** (0.218)
Cons.	2.074*** (0.248)	0.731*** (0.112)	11.631*** (0.327)	-13.804*** (0.387)
Loan Control Variables	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	0.09	0.26	0.30	0.47
<i>Adj. R</i> ²	19,484	19,484	19,484	19,484

TABLE 6. The Effect of Syndicated Loan Sharing on Interbank Loan Terms: Opaque Interbank Borrowers

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and its interaction with bank opacity to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 4), or *Loan Size* (columns 5 - 8). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Small Bank Borrower* is a dummy variable equal to one if the interbank borrower is in the bottom tercile of the distribution with respect to *Assets*, and zero otherwise. *Corporate Loan Bank* is a dummy variable equal to one if the interbank borrower is in the top tercile of the distribution with respect to *Corporate Loans / Assets*, and zero otherwise. *Corporate Loans / Assets* is the ratio of the corporate and commercial loan portfolio as reported in Bankscope to total assets. Panel A includes control variables as in Table 3 (CGM): *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. Panel B includes control variables as in Table 4 (AKS): *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Borrowing Bank Opacity and Interbank Loan Terms - CGM Controls

	Interest Spread	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	-0.021 (0.056)	0.091 (0.063)	-0.104* (0.059)	-0.073 (0.060)	1.674*** (0.081)	0.642*** (0.081)	0.870*** (0.082)	1.000*** (0.087)
Small Bank Borrower	0.516*** (0.081)	0.491*** (0.082)			-0.750*** (0.136)	-0.567*** (0.133)		
Syndicated Loans Share x Small Bank Borrower	-0.368** (0.163)	-0.386** (0.164)			-0.881*** (0.215)	-0.628*** (0.232)		
Corporate Loan Bank			-0.056 (0.038)	0.029 (0.070)			-0.157*** (0.040)	-0.195** (0.078)
Syndicated Loans Share x Corporate Loan Bank				-0.378* (0.206)				-1.566*** (0.283)
Cons.	0.517*** (0.144)	0.843*** (0.188)	2.176*** (0.248)	2.150*** (0.249)	18.176*** (0.062)	14.550*** (0.172)	11.545*** (0.340)	11.411*** (0.348)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484	19,484	19,484	19,484	19,484
Adj. R ²	0.08	0.08	0.09	0.09	0.24	0.28	0.29	0.29

Table 6 Continued
 Panel B: Borrowing Bank Opacity and Interbank Loan Terms - AKS Controls

	Interest Spread	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	-0.064 (0.056)	-0.138*** (0.050)	-0.117** (0.046)	-0.077 (0.048)	1.399*** (0.091)	0.890*** (0.059)	0.726*** (0.062)	0.729*** (0.061)
Small Bank Borrower	0.516*** (0.080)	0.042 (0.066)		-0.307*** (0.107)	-0.323*** (0.078)			
Syndicated Loans Share x Small Bank Borrower	-0.352** (0.162)	0.060 (0.123)		-1.073*** (0.204)	-1.152*** (0.152)			
Corporate Loan Bank			0.032 (0.025)	0.151*** (0.042)			-0.242*** (0.032)	-0.234*** (0.056)
Syndicated Loans Share x Corporate Loan Bank				-0.539*** (0.146)				-0.036 (0.214)
Cons.	0.339** (0.131)	0.719*** (0.111)	0.713*** (0.109)	0.702*** (0.108)	18.434*** (0.050)	-13.942*** (0.375)	-13.779*** (0.376)	-13.778*** (0.376)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484	19,484	19,484	19,484	19,484
Adj. R ²	0.08	0.26	0.26	0.26	0.18	0.47	0.47	0.47

TABLE 7. The Effect of Syndicated Loan Sharing on Interbank Loan Terms: Opaque Syndicate Borrowers

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and its interaction with shared syndicate borrower opacity to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 3), or *Loan Size* (columns 4 - 6). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Small Syndicate Borrowers* is a dummy variable equal to one if the average syndicate borrower in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the bottom tercile with respect to size (sales as reported in LPC Dealscan), and zero otherwise. *New Syndicate Borrowers* is a dummy variable equal to one if the proportion of new syndicate borrowers in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise. Syndicate borrowers are considered new if they have not accessed the syndicated loan market in the previous five years. *Unrated Syndicated Loans (High)* is a dummy variable equal to one if the proportion of unrated syndicated loans in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise. Panel A includes control variables as in Table 3 (CGM): *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. Panel B includes control variables as in Table 4 (AKS): *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Shared Syndicated Loan Opacity and Interbank Loan Terms - CGM Controls

	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	0.017 (0.070)	-0.068 (0.061)	-0.026 (0.061)	0.977*** (0.099)	1.029*** (0.101)	1.225*** (0.098)
Small Syndicate Borrowers	0.168*** (0.044)			-0.252*** (0.070)		
New Syndicate Borrowers		0.071** (0.030)			0.115*** (0.041)	
Unrated Syndicated Loans (High)			0.184*** (0.057)			0.353*** (0.062)
Syndicated Loans Share x Small Syndicate Borrowers	-0.171 (0.148)			-0.638** (0.244)		
Syndicated Loans Share x New Syndicate Borrowers		-0.182* (0.095)			-0.540*** (0.169)	
Syndicated Loans Share x Unrated Syndicated Loans (High)			-0.248* (0.129)			-1.535*** (0.202)
Cons.	1.326*** (0.245)	2.089*** (0.249)	1.902*** (0.250)	12.276*** (0.449)	11.102*** (0.342)	11.106*** (0.342)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,072	19,183	19,082	17,072	19,183	19,082
<i>Adj.R</i> ²	0.07	0.09	0.08	0.31	0.29	0.29

Table 7 Continued

Panel B: Shared Syndicated Loan Opacity and Interbank Loan Terms - AKS Controls

	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	-0.100* (0.057)	-0.139** (0.053)	-0.074 (0.053)	0.987*** (0.080)	0.757*** (0.068)	0.985*** (0.066)
Small Syndicate Borrowers	0.140*** (0.038)			-0.084** (0.041)		
New Syndicate Borrowers		0.020 (0.027)			0.010 (0.043)	
Unrated Syndicated Loans (High)			0.179*** (0.046)			0.258*** (0.048)
Syndicated Loans Share x Small Syndicate Borrowers	-0.176 (0.124)			-0.767*** (0.154)		
Syndicated Loans Share x New Syndicate Borrowers		0.050 (0.084)			0.059 (0.143)	
Syndicated Loans Share x Unrated Syndicated Loans (High)			-0.260** (0.110)			-1.088*** (0.134)
Cons.	0.511*** (0.122)	0.712*** (0.114)	0.680*** (0.115)	-14.458*** (0.409)	-14.139*** (0.400)	-14.176*** (0.395)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	17,072	19,183	19,082	17,072	19,183	19,082
<i>Adj.R</i> ²	0.22	0.25	0.25	0.45	0.46	0.46

TABLE 8. The Effect of Shared Syndicated Loan Characteristics on Interbank Loan Size: Risk Considerations

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and its interaction with measures of risk considerations to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 3), or *Loan Size* (columns 4 - 6). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *High Risk Concentration* is a dummy variable equal to one if *Risk Concentration* is in the top tercile of the distribution, and zero otherwise. *Risk Concentration* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank lender, divided by the total euro amount of syndicated loans the interbank lender has on its balance sheet). *Low Grade Syndicate Borrowers* is a dummy variable equal to one if the average syndicated loan rating of the shared syndicated loan portfolio between interbank lender and interbank borrower is below investment grade, and zero otherwise. *Secured Syndicated Loans (High)* is a dummy variable equal to one if the proportion of secured syndicated loans in the shared syndicated loan portfolio between interbank lender and interbank borrower is in the top tercile of the distribution, and zero otherwise. Panel A includes control variables as in Table 3 (CGM): *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. Panel B includes control variables as in Table 4 (AKS): *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

Panel A: Risk Considerations and Interbank Loan Terms - CGM Controls

	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	-0.095 (0.059)	-0.032 (0.057)	-0.058 (0.061)	0.904*** (0.083)	1.202*** (0.105)	1.046*** (0.092)
High Risk Concentration	-0.046 (0.032)			-0.232*** (0.046)		
Low Grade Syndicate Borrowers		-0.051 (0.048)			-0.042 (0.051)	
Secured Syndicated Loans (High)			0.144*** (0.045)			0.202*** (0.047)
Syndicated Loans Share x Low Grade Syndicate Borrowers		0.538*** (0.147)			-1.956*** (0.233)	
Syndicated Loans Share x Secured Syndicated Loans (High)			-0.045 (0.140)			-0.619*** (0.180)
Cons.	2.105*** (0.244)	1.698*** (0.286)	1.913*** (0.258)	11.343*** (0.325)	11.928*** (0.458)	10.827*** (0.392)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,484	16,685	18,548	19,484	16,685	18,548
<i>Adj.R</i> ²	0.09	0.06	0.09	0.29	0.32	0.29

Table 8 Continued

Panel B: Risk Considerations and Interbank Loan Terms - AKS Controls

	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	-0.116** (0.047)	-0.187*** (0.058)	-0.053 (0.051)	0.720*** (0.062)	1.056*** (0.080)	0.849*** (0.065)
High Risk Concentration	-0.017 (0.027)			0.051 (0.044)		
Low Grade Syndicate Borrowers		-0.066 (0.041)			0.038 (0.045)	
Secured Syndicated Loans (High)			0.165*** (0.041)			0.079* (0.042)
Syndicated Loans Share x Low Grade Syndicate Borrowers		0.433*** (0.122)			-0.639*** (0.181)	
Syndicated Loans Share x Secured Syndicated Loans (High)			-0.378*** (0.113)			-0.194 (0.170)
Cons.	0.736*** (0.112)	0.581*** (0.120)	0.668*** (0.116)	-14.017*** (0.390)	-14.567*** (0.466)	-14.217*** (0.420)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,484	16,685	18,548	19,484	16,685	18,548
<i>Adj.R</i> ²	0.26	0.22	0.25	0.47	0.45	0.46

TABLE 9. Multivariate Model for Interbank Loan Terms: Instrumental Variables

This table reports coefficient estimates from OLS regressions with an instrumental variable relating syndicated loan sharing to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 2), or *Loan Size* (columns 3 - 4). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). The instrument is *Syndicated Loans Share*_{*t-1*}, which is the one-month lagged value for Syndicated Loans Share. Columns 1 and 3 include control variables as in Table 3 (CGM): *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. Columns 2 and 4 include control variables as in Table 4 (AKS): *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Interest Spread		Loan Size	
	CGM Controls	AKS Controls	CGM Controls	AKS Controls
Syndicated Loans Share	-0.120** (0.051)	-0.130*** (0.039)	0.928*** (0.088)	0.734*** (0.062)
Loan Size	-0.029*** (0.005)	-0.023*** (0.004)		
<i>INTERBANK RELATIONSHIP</i>				
Lender Preference Index	0.003*** (0.001)		0.033*** (0.001)	
Borrower Preference Index	-0.000 (0.001)		0.032*** (0.001)	
Borrower Preference Index (Lagged)		-0.000 (0.001)		0.033*** (0.001)
<i>BORROWER</i>				
Size	-0.122*** (0.010)		0.291*** (0.015)	
Return on Assets	5.126*** (1.433)		-25.529*** (2.781)	
Loan Loss Provisions	4.083*** (1.378)		-17.546*** (1.991)	
Average Spread Borrower		3.660*** (0.143)		
Average Loan Size Borrower				0.979*** (0.014)
<i>LENDER</i>				
Size	-0.030*** (0.009)		0.306*** (0.013)	
Return on Assets	-2.845*** (1.082)		-7.898*** (1.480)	
Loan Loss Provisions	-0.395 (0.629)		0.190 (1.016)	
Average Spread Lender		2.990*** (0.145)		
Average Loan Size Lender				0.780*** (0.013)

Continued

Table 9 Continued

	Interest Spread		Loan Size	
	CGM Controls	AKS Controls	CGM Controls	AKS Controls
Loan Control Variables	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484
<i>Adj. R</i> ²	0.09	0.26	0.29	0.47

TABLE 10. Scale-Invariant Network Measures

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and the market power of interbank lender and borrower to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 2), or *Loan Size* (columns 3 - 4). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). *Number of Interactions SL (12 months)* is the natural logarithm of (1 + the total number of interactions the interbank counterparty had on the syndicated loan market in the prior 12 months). A (one) syndicated loan interaction is the participation in a syndicate. *Number of Interactions IB (12 months)* is the natural logarithm of (1 + the total number of interactions the interbank counterparty had on the interbank market in the prior 12 months. An (one) interbank loan interaction is the participation in an interbank loan, either as lender or borrower. Columns 1 and 3 include control variables as in Table 3 (CGM): *Lender Preference Index*, *Borrower Preference Index*, *Size*, *Return on Assets*, and *Loan Loss Provisions*. Columns 2 and 4 include control variables as in Table 4 (AKS): *BPI (lagged)*, *Average Spread Borrower (Lender)*, and *Average Loan Size Borrower (Lender)*. Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year, borrower country, and lender country. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Interest Spread		Loan Size	
	Cocco Controls	AKS Controls	Cocco Controls	AKS Controls
Syndicated Loans Share	-0.164*** (0.056)	-0.159*** (0.044)	0.673*** (0.106)	1.024*** (0.084)
Loan Size	-0.031*** (0.009)	-0.019*** (0.006)		
<i>BORROWER</i>				
Number of Interactions SL (12 months)	-0.020 (0.016)	-0.019** (0.008)	0.016 (0.022)	-0.012 (0.015)
Number of Interactions IB (12 months)	-0.018 (0.023)	-0.031* (0.017)	0.551*** (0.044)	0.353*** (0.024)
<i>LENDER</i>				
Number of Interactions SL (12 months)	0.002 (0.012)	-0.0004 (0.007)	-0.020 (0.020)	-0.089*** (0.010)
Number of Interactions IB (12 months)	0.048*** (0.016)	-0.013 (0.011)	0.324*** (0.036)	0.122*** (0.020)
Cons.	1.906*** (0.315)	0.969*** (0.142)	9.524*** (0.485)	-15.698*** (0.354)
Loan Control Variables	Yes	Yes	Yes	Yes
Bank Control Variables	Yes	Yes	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19484	19,484
R ²	0.07	0.20	0.02	0.22

TABLE 11. The Effect of Syndicated Loan Sharing on Interbank Loan Terms: Fixed Effects

This table reports coefficient estimates from OLS regressions relating syndicated loan sharing and the market power of interbank lender and borrower to interbank loan terms. The dependent variable is either *Interest Spread* (columns 1 - 3), or *Loan Size* (columns 4 - 6). *Interest Spread* is defined as follows. First, we calculate the difference between the interest rate on a given transaction between banks and the (market-wide) interest rate on overnight transactions on that day. Second, we divide by the standard deviation of overnight interest rates for that day. Third, we average the interest spread measure thus obtained to a monthly level for all loans between two banks. *Loan Size* is the natural logarithm of the monthly sum of interbank loan amounts lent by an interbank lender to an interbank borrower. *Syndicated Loans Share* is the monthly average of (the euro amount two interbank counterparties have co-lent in the syndicated loan market that is on the balance sheet of the interbank borrower, divided by the total euro amount of syndicated loans the interbank borrower has on its balance sheet). Loan Control variables include *Lender Preference Index* and *Borrower Preference Index*. *Lender Preference Index* is the ratio of the euro amount the interbank lender has lent to the interbank borrower in a given month, divided by the total euro amount the interbank lender has lent in the interbank market during that same month. *Borrower Preference Index* is the ratio of the euro amount the interbank borrower has borrowed from the interbank lender in a given month, divided by the total euro amount of funds the interbank borrower has borrowed in the interbank market during that same month. The construction of our preference indices closely follows Cocco et al. (2009) and Afonso et al. (2013). Interest Spread specifications also include *Loan Size* as control variable. All specifications include dummies for month-year. Dummies for interbank lender and borrower are added incrementally. Standard errors corrected for heteroscedasticity are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% level, respectively.

	Interest Spread	Interest Spread	Interest Spread	Loan Size	Loan Size	Loan Size
Syndicated Loans Share	0.160*** (0.052)	-0.331*** (0.044)	-0.257*** (0.065)	-0.040 (0.087)	1.953*** (0.067)	0.942*** (0.098)
Loan Size	-0.045*** (0.006)	-0.004 (0.006)	-0.001 (0.006)			
Cons.	0.691*** (0.140)	-1.475*** (0.107)	-2.034*** (0.191)	19.395*** (0.148)	13.432*** (0.155)	15.190*** (0.368)
Loan Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	No	Yes	Yes	No	Yes
Borrower FE	No	Yes	Yes	No	Yes	Yes
Month-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,484	19,484	19,484	19,484	19,484	19,484
R^2	0.15	0.16	0.23	0.34	0.42	0.53