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Papier

Papier n° 2008-08

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Mars 2008

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Abstract

Bank loan syndicate structure can be considered as an organizational response to agency problems stemming from the syndication process. The banking environment also influences the syndication process. We investigate how syndicate structure is influenced by the characteristics of the banking environment, such as banking market structure, financial development, banking regulation and supervision, and legal risk. The results of a cross-country analysis performed on a sample of 15,586 syndicated loan facilities from 24 countries over a period of 15 years confirm that syndicate structure is influenced by banking environments consistent with agency costs minimization and efficient re-contracting objectives.

Key words: Banking environment, Agency costs, Loan syndication, Syndicate structure.

JEL Classification: C31, F30, G21, G32.

1. INTRODUCTION

In 2006, the market for syndicated loans[1] reached 2.8 trillion USD (Thomson Financial, 2006) and represented more than one third of the funds raised on the worldwide financial markets (Altunbas, Gadanecz and Kara, 2006). This tremendous growth can be attributed to the advantages inherent in syndicated lending for borrowers and lenders. Lenders can diversify loan portfolios and sources of income. Furthermore, lenders can exploit comparative advantages of syndicate members through financing and information sharing. Syndication leads to more competitive pricing and more flexible funding structure, which benefit borrowers. In addition, the borrower is restricted to negotiation with one bank and he can benefit from potential bilateral relationships with other syndicate members.

Informational frictions between the members of the syndicate can lead to agency problems. Therefore, the numerous advantages come at a cost. In a syndicated loan setting, the participants delegate monitoring to an arranger whose efforts are unobservable, which may generate moral hazard problems. Additionally, if the private information collected by the arranger through due diligence or through previous lending relationships cannot be credibly communicated to the participants, an adverse selection problem arises. Furthermore, the syndicate is also exposed to the influence of the banking environment. The latter influences corporate ownership, financing policies, capital allocation and the terms of bank loan contracts.

The structure of a syndicate can be considered as an organizational response to agency costs (Pichler and Wilhelm, 2001). The arranger's role is to monitor the efforts of

[1] A syndicated loan is a loan which is provided to the borrower by two or more banks, which is governed by a single loan agreement. We present the process of bank loan syndication in section 2.

participants and he or she can consequently adapt the size and the composition of the syndicate, which involves explicit and implicit costs and revenue tradeoffs. For instance, the arranger decides on the institutions to invite, chooses the initial menu of designated amounts for participation, and the dollar size and associated fees for each bracket. Furthermore, the arranger can adjust his or her portion of the loan to align with monitoring incentives, establish a signal of borrower's quality, and form a smaller syndicate to fund opaque and risky borrowers. Finally, the presence of multiple co-arrangers can mitigate adverse selection problems by over-seeing a lead arranger.

In this article, we empirically investigate how the banking environment influences the structure of syndicates, which is designed to be adapted to agency problems stemming from the syndication process. After controlling for various loan agreement terms and borrower's financial characteristics, we focus on several characteristics of this environment, including banking sector structure, financial development, bank prudential regulation, and legal risk. Using the power of cross-country analysis, we perform our study on a sample of more than 15,000 syndicated loan facilities covering 24 markets over a period of 15 years.

This article completes and further develops existing empirical research on syndicate structure by Lee and Mullineaux (2004), Jones, Lang and Nigro (2005), Bosch and Steffen (2006), and Sufi (2007). The above authors demonstrate that syndicates on the US and the UK markets are structured to enhance monitoring efforts and to facilitate renegotiation. These studies focus solely on single markets and do not account for the influence of the banking environment on syndicate structure. However, following a large body of research on law and finance pioneered by La Porta, Lopez-De-Silanes, Shleifer

and Vishny (1997) and recently by Qian and Strahan (2007), the banking environment has a significant impact on the design of loan contracts, banking performance and economic and financial development. In regards to syndicated lending, Esty and Megginson (2003) found that syndicates funding project finance are larger and more diffuse in countries with poorly defined creditor rights and weak banking legal systems. However, Esty and Megginson's (2003) results addressed a specific loan purpose and did not provide in depth insights into the influence of other components of the banking environment on syndicate structure.

In the remaining sections of this article, we discuss the theoretical and empirical background of syndication in section 2 and we present the empirical design of our work and discuss our results in section 3. Finally we provide an overview of our conclusions in section 4.

2. LOAN SYNDICATION AND SYNDICATE STRUCTURE

(i) Loan syndication and agency problems

The members of a syndicate can be divided into two groups. The senior banks bearing mandated arrangers, arrangers, or agents titles, are typically appointed by the borrower to bring together the bank syndicate. These lenders are often the borrower's relationship banks and form the "core" of the syndicate – the arrangers – who retain a portion of the loan and look for junior members – the participants. The latter, typically bearing manager or participant titles, earn a spread for funding a portion of the loan.

The process of bank loan syndication can be separated into three main stages. During the *pre-mandated phase*, the borrower solicits competitive offers to arrange and manage the syndication with one or more banks. The borrower chooses one or more

arrangers that are mandated to form a syndicate, and consequently negotiates a preliminary loan agreement. The arranger acts as the syndicate's agent, which involves such tasks as funds administration, interest calculation, and covenants enforcement. During the *post-mandated phase*, the arranger begins the syndication process. This involves drafting a preliminary loan contract and preparing a documentation package for the potential syndicate members, called an *information memorandum*. The memorandum contains information about a borrower's creditworthiness and the loan terms. A *roadshow* is then organized to present and discuss the content of the memorandum, to present fees, establish a timetable for commitments and closing, formally invite potential participants and determine allocations. The third and last phase takes place after completion, when the loan becomes operational, binding the borrower and the syndicate members to the debt contract.

Loan syndication results in several agency problems. First, private information about the borrower can create adverse selection issues, as the arranger may be inclined to syndicate loans from unreliable borrowers. However, such opportunistic behavior generates a reputation risk for the arranger and negatively affects the success of future syndications (Pichler and Wilhelm, 2001). Second, the participating banks delegate monitoring tasks to the arranger. However, participant banks are not privy to the efforts of the arranger, leading to moral hazard problems. Nonetheless, the arranger has less incentive to monitor the borrower than if it were to lend the full amount of the loan (Pennacchi, 1988). Third, an important issue in syndication is related to borrower's financial distress. Funding is more complicated in such settings because lenders must reach a collective decision (Bolton and Scharfstein, 1996).

The structure of the syndicate should be equipped to tackle such agency problems. For instance, to provide credible signal regarding the quality of the borrower and to align monitoring incentives, the arranger adjusts its own loan portion (Jones, Lang and Nigro, 2005; Sufi, 2007). Syndicates are usually smaller and more cohesive when little information about the borrower is available, when credit risk is relatively high and when a loan is secured (Lee and Mullineaux, 2004). Furthermore, the presence of multiple specialized co-agents can mitigate adverse selection problems through arranger monitoring (François and Missonier-Piera, 2007).

The business, regulatory and competitive environment in which the syndicate operates can also affect its structure. For instance, as shown by La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997, 1998), the legal environment has a significant influence on corporate ownership, financing policies and capital allocation. Recently, Qian and Strahan (2007) have shown that the price and non-price terms of bank loan contracts are adjusted to the legal and financial environment. Regarding cases in bank loan syndication, Esty and Megginson (2003) show that the size and concentration of bank syndicates funding project finance are influenced by the legal risk involved in the loan process.

(ii) Determinants of syndicate structure

Following the theoretical and empirical background related to the bridge between syndicate structure, agency problems and the banking environment, we now turn to the various country-level determinants expected to influence syndicate size. Syndicate size is defined by two dependent variables: *Number of Lenders* and *Number of Arrangers*. We make this distinction because senior members of the syndicate have different concerns

and motivations compared to other participants. For example, the same factors can influence the terms of a loan depending on the lender's status in the syndicate hierarchy[2].

Banking structure is a two variable proxy. *Overheads*, defined as the ratio of banking overhead costs to total assets, measures cost inefficiency in a banking industry. Cost efficient banks should be more effective in risk management, screening and monitoring and consequently less exposed to hidden information problems within the syndicate. Also, since syndicated loans imply the sharing of administration and origination costs, cost inefficiency is expected to encourage the formation of larger syndicates. Consequently, we can expect a positive coefficient for this variable. *Concentration*, defined as the assets of the three largest banks as a share of all bank assets, proxies market structure in the industry. Several arguments suggest this variable should have a negative influence on syndicate size. First, a greater concentration means a lower number of potential participants to join a syndicate. Second, banks with greater market shares in a banking industry already benefit from diversified loan portfolios and have little incentive to diversify further. Finally, the motivation provided by increased revenue from syndicated loans should exert a lower effect for banks with greater profitability, generally due to stronger market power.

We also include two variables that consider the development of financial markets. *Stock Markets* is defined as the value of listed shares to GDP and measures the development of stock markets. Allen and Gottesman (2006) have shown that stock markets and syndicated loan markets are highly integrated, facilitating information flow among markets. The development of stock markets contributes to information disclosure.

[2] To avoid biased results, we do not distinguish the number of participants, as the same financial institution can have several roles in a syndicate, being simultaneously an arranger and a participant.

The availability of information mitigates the adverse selection problems resulting from the private information owned by the lead bank on the borrower. Consequently, we should observe a positive coefficient for this variable. However, one may also consider that for some companies, stock markets are an alternative source of financing for large loans. Therefore, the more developed the stock market the greater potential for a reduction in the syndicated loan potential. Subsequently, an increase in the share of non syndicated bank loans is observed. Such influences should be even more prominent for the development of bond markets, measured by the sum of private and public domestic debt securities to GDP. In regards to large financing needs of companies, bonds directly compete for syndicated loans. However, this negative influence may also be offset by the positive effect of the existence of bond markets, which contribute to increased information for participant banks in loan syndicates and therefore limits the adverse selection problems.

Banking regulation is our third category of banking environment variables. We first construct the variable *Mincar x Credit Risk*. This variable is the product of the minimum capital requirement value and a dummy variable equal to one if the minimum regulatory capital ratio varies with bank credit risk. On the one hand, we expect a positive coefficient for this variable. The existence of capital requirements should favor syndication through the motivation of lending limit respect. This considers the fact that a stronger requirement increases the motivation relevance. On the other hand, a negative coefficient can also be observed. This capital requirement reduces the number of potential syndication participants eligible in terms of adequate capitalization and therefore in terms of funding advantages. The regulation on lending abroad should

positively influence syndicate size, because such regulation reduces diversification opportunities for domestic banks. We therefore expect a positive coefficient of *Abroad Loan Prohibited*, a dummy variable equal to one under the prohibition of loan funding abroad, because such prohibitions make syndication more attractive to gain more diversified loan portfolios.

Supervisory mechanisms are introduced with three variables: *NPL Definition* (a dummy variable equal to one if a formal definition of non performing loans exists), *Public Risk Disclosure* (a dummy variable equal to one if regulations are imposed to a bank's public disclosure of their risk management procedures), and *Examination Frequency* (a variable equal to one, two or three if the frequency of onsite inspections occurs one, two or three times a year). If binding, these regulatory features should have a positive influence on syndicate size as they enhance transparency on participant banks loan portfolios through supervisory discipline[3].

Our fourth and final category of banking environment variables considers the legal environment as one that operates contracts and enforcement depends on the legal system where the borrower is located. Two legal institution indicators are included in our analysis. Protection of creditor rights and law enforcement is measured with the *Creditor Rights* and *Rule of Law* indices. The *Rule of Law* ranges from zero to ten with a higher score indicating better law enforcement while *Creditor Rights* are scored on a scale from zero to four with a higher score indicating better creditors' protection. The expected sign of the coefficient for both variables is ambiguous. Esty and Megginson (2003) find that syndicates funding project finance are larger and more diffuse in countries with poorly

[3] Additional candidate variables for regulatory discipline and disclosure were the obligation to publicly disclose off-balance sheet items and the presence of public or private credit registry, but we do not include them in our estimations as they account for more than 95% of the loans in the sample.

defined creditor rights and weak banking legal systems. Thus, lenders structure syndicates to facilitate re-contracting in countries where creditors have strong and enforceable rights. Additionally, better bank legal protection mitigates the moral hazard problem induced by syndicated loans. Indeed, better creditor protection decreases the need to monitor the borrower. This reduces agency problems resulting from bank monitoring efforts involved in the syndicate. Furthermore, in high legal risk countries, efficient reorganization of a distressed borrower might be difficult. Hence, larger syndicate structure is better suited to deal with these issues as they minimize hold-up problems. However, on a more global basis, agency problems resulting from lending decisions should also be mitigated, which may favor the choice of a standard loan rather than a syndicated loan for the lead bank. Indeed, the motive for risk sharing should play a decreased role in well-protected legal environments. Hence, monitoring should be more important in the presence of high legal risk (few legal rights and low contract enforcement), through a smaller syndicate and/or a larger number of arrangers. Finally, we also control for the origin of the legal structure in the borrower country through a dummy variable equal to one if it is French.

Following previous studies of syndicate structure (Lee and Mullineaux, 2004; Sufi, 2007), we control for several different loan agreements and borrower characteristics. We include the following loan characteristics: size and maturity, the availability of public information (dummy variable equal to one if a Standard and Poor's senior debt rating is available) and borrower's reputation (equal to the occurrence of a particular borrower in the sample[4]), and four dummies taking lender's protection into

[4] Bharath, Dahiya, Saunders and Srinivasan (2007) construct similar indicators to investigate the benefits of lending relationships for banks.

account (*Guarantors, Sponsors, Covenants, Senior Debt*). We also consider the number of syndicated loan facilities by country to control for syndicated lending market development and type (*Term Loan*), purpose (*General Corporate*, *Debt Repayment*, *Project Finance*, *Working Capital*) and the loan benchmark rate (*Libor* and *Euribor*) through the inclusion of dummy variables[5]. Dummy variables for year, region and industry are also included in the regressions. Regarding borrower's characteristics, following Sufi (2007) and Bosch and Steffen (2007), we focus on its creditworthiness, through the inclusion of four variables, controlling for size (logarithm of *Total Assets*), profitability (*EBIT / Total Assets*), interest coverage (*EBITDA / Interest Expenses*), and leverage (*Total Debt / Total Capital*).

3. EMPIRICAL DESIGN AND RESULTS

(i) Data and methodology

Syndicated loans sample is obtained from the Dealscan database, provided by the Loan Pricing Corporation (LPC, Reuters). Financial structure and regulatory and supervisory characteristics data are gathered from Beck, Demirgüç-Kunt and Levine (2000) and Barth, Caprio and Levine (2005). Indicators of legal environment come from La Porta, Lopez-De-Silanes, Shleifer and Vishny (1998). Borrower's characteristics are extracted from the Compustat database[6].

Sample size is determined by data availability from variables used in regression analyses. Following Lee and Mullineaux (2004), we employ only completed and fully confirmed deals, excluding private placements. We ultimately generate a full sample of

[5] We do not provide variables for other types and purposes in our regressions, since they represent less than 5% of the loans in the sample.

[6] We match borrowers by their country, name and industry sector. This procedure reduces somehow the size of the full sample. Borrower's variables are one year lagged to the syndicated loan completion year.

15,586 loan facilities from 24 countries for the period between 1990 and 2005. The number of loan facilities, the average number of lenders and arrangers, and lending amount by country are displayed in Table 1, while Table 2 provides descriptive statistics for the variables. The definitions of variables are provided in Table A.1 in the appendix.

- **Insert Table 1 about here –**

Japan appears as the largest syndicated loan market with more than 4,000 loan facilities operating over the period under investigation, followed by Australia, Germany, Spain, South Korea and Taiwan, each with more than 1,000 facilities. On average, the number of lenders ranges between five and 14 and two and seven arrangers. Finally, the average loan size is between 100 and 1,000 million USD, with the largest average deals approved in Germany.

- **Insert Table 2 about here –**

Results from the full sample descriptive statistics reveals that the average syndicate has almost nine lenders and three arrangers, with an average loan size of 333 million USD for an average maturity of five years. In comparison, from 1987 to 1995 in the USA, Lee and Mullineux (2004) report an average number of nine lenders, with average loan size equal to 221 million USD and an average four-year maturity. On a more recent time span (1992-2003), Sufi (2007) observes an average number of eight lenders and two arrangers. The average loan amount was 364 million USD with an average maturity of three years.

On average, bank markets are concentrated and rather cost efficient, and stock and bond markets' capitalization are important. Regulatory mechanisms such as non-performing loans are quite common, contrary to abroad lending prohibition and public

risk disclosure. On-site inspection of banks occur more than once per year. Finally, the average legal environment is satisfactory, with creditor rights indices above seven and the rule of law index fell in the mid-range of the scale[7].

Following Sufi (2007) and Bosch and Steffen (2007) and due to the fact that the dependent variables take large numbers of values (from two to 80 for *Number of Lenders* and from one to 27 for *Number of Arrangers*), we estimate the following set of individual equations using OLS regressions with robust standard errors and clusters at the borrower level[8]:

$$\text{Number of Lenders} = f(\text{Banking Environment, Loan Characteristics, Borrower Characteristics}) \quad (1)$$

$$\text{Number of Arrangers} = g(\text{Banking Environment, Loan Characteristics, Borrower Characteristics}) \quad (2)$$

(ii) Results and discussion

We perform three series of regressions for equations (1) and (2) with different sets of explanatory variables. Results are provided in Table 3. The first set of regressions (1.1 and 1.2) is a benchmark displaying only loan agreement and borrower characteristics. We drop loan characteristics in the second set (2.1 and 2.2) and we instead include banking environment characteristics. Finally, the third set (3.1 and 3.2) includes all characteristics and also serves to evaluate the robustness of our results.

- **Insert Table 3 about here –**

We first observe that all regression analyses have satisfactory explanatory power with R^2 equal to at least 30%. We also remark that most of the loan agreement characteristics are significant and robust across regression analyses. *Loan Size* reveals a

[7] The most represented industry sectors are Financial Services, General Manufacturing, Utilities, Transportation and Construction.
[8] As a robustness check, we also perform Poisson and Tobit regressions and obtain virtually similar results.

positive coefficient and is significant over all regressions, suggesting that larger syndicates form around larger loans in accordance with diversifying loan portfolios and regulatory-driven issues (as in Lee and Mullineaux, 2004; Sufi, 2007). The coefficient of *Maturity* demonstrates significantly positive results for most estimates. This finding can be explained by a negative coefficient between maturity and credit risk (Sharpe, Dennis and Debarshi, 2000) and is congruent with prior research on the US syndicated market. We also observe that borrower transparency positively influence syndicate size, in accordance with previous results by Lee and Mullineaux (2004) and Sufi (2007). These results confirm that increased transparency reduce both adverse selection and moral hazard problems within the syndicate. This result is confirmed by a significant and positive coefficient for *Borrower Presence*, as increased reputation leads to lower information asymmetry and thus less syndicate agency problems.

Variables assessing lender's protection mechanisms reveale that *Senior Debt* always result in a negative coefficient and is significant in equation (2) and positive in equation (1), while the presence of financial covenants positively affects both the number of lenders and of arrangers, the latter also being influenced by the presence of guarantors. Hence, debt seniority works as an effective protection device for all lenders, reducing agency problems within the syndicate and allowing for larger syndicates with fewer arrangers. The presence of a guarantor suggests an increased loan risk (Berger and Udell, 1990; Jimenez and Saurina, 2004) and, consequently, a loan plagued by greater agency problems, for which a larger syndicate "core" composed of numerous arrangers promotes more effective monitoring. Finally, the restriction of discretionary power of the borrower through the presence of covenants effectively reduces the risk of loan default (Rajan and

Winton, 1995), and enhances the ability to monitor the borrower, thereby reducing the monitoring costs and leading to larger syndicates[9]. In regards to borrower characteristics, larger firms are associated with larger syndicates, in a similar manner as loan size. Also, more profitable borrowers reveal smaller syndicate structures, while leverage has no statistically significant effect on syndicate size[10].

In the analysis of banking environment variables in specifications (1.2) and (2.2), the results show significance among most variables. Our results demonstrate that all forms of banking environment characteristics are important for the syndicate structure in the sense that we observe significant coefficients for legal environment, financial development, and banking structure and regulation.

As expected, the cost level of the banking industry exerts a positive influence on the number of arrangers. Inefficient banks might have less incentive to monitor the borrower and therefore require a greater larger number of arrangers to perform the activity. Also, administration and origination cost sharing among the arrangers can explain such results. Our results show that banking industry concentration is negatively correlated to the number of lenders. As expected, greater concentration lowers the number of potential participants to join and form a syndicate. Also, banks holding greater market shares already benefite from diverse loan portfolios and have little incentive to diversify further. In addition, the development of bond markets is positively correlated with the number of lenders and negatively to the number of arrangers, implying that

[9] Most of the dummies controlling for loan type, purpose and benchmark rate appear as significant in the regressions, suggesting that all loan agreement characteristics influence syndicate structure.
[10] Including alternative proxies for borrower risk, such as the *Quick Ratio* or the ratio of *Net Income to Total Assets*, gives similar results.

better financial development can improve information flow and transparency, mitigating agency problems in the syndicate, which can grow larger with fewer arrangers[11].

The coefficient of *Mincar x Credit Risk* shows a negative coefficient (2.2) suggesting that binding capital requirements can reduce the number of syndicate members eligible in terms of adequate capitalization and subsequently in terms of funding advantages. As expected, the regulation on lending abroad positively influenced syndicate size. Therefore, regulation reduces diversification opportunities for domestic banks and increases their "appetite" to fund a share of a syndicated loan while diversifying their portfolio. Among the proxies for regulatory discipline and transparency, we observe that *Examination Frequency* and *Public Risk Disclosure* have negative coefficients. *Public Risk Disclosure* influences the number of lenders only, suggesting that such supervisory devices tend to inform the arrangers that a large portion of the local potential lenders have weak or inefficient risk management procedures and thus do not qualify to participate in the syndication. Less frequent on-site inspections are negatively related to the number of arrangers, suggesting this supervisory feature substitutes to the monitoring activity of the arrangers. The coefficient of *NPL Definition* is significant and positive in both specifications. These results suggest that greater transparency regarding problem loan classification could reduce informational friction within the syndicate and allow the establishment of larger group of lenders.

Finally, we observed that enhanced creditor rights protection has a negative and significant influence on the number of lenders but no effect on the number of arrangers. A better protection of creditors might reduce lenders' incentives to monitor borrowers.

[11] These results are robust to the use of alternative proxies for financial structure, such as the ratio of private credit of financial institutions to GDP.

However, this may exacerbate free-riding problems, which can be tackled through an adapted small size syndicate structure. Furthermore, creditors could benefit from such protection and monitoring of the borrower by the syndicate to avoid inefficient re-contracting in case of distress. Therefore, smaller syndicates with larger cores are more suitable for such tasks. As the quality of institutions increases (i.e. legal risk decreases), the number of arrangers diminishes as monitoring is more effective in such a legal environment. These results are congruent with the findings of Esty and Megginson (2003). Qualitatively, our results are unaffected by the use of the *Creditor Rights* index components from La Porta, Lopez-De-Silanes, Shleifer and Vishny (1998)[12]. Replacing *Rule of Law* with alternative proxies from La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997, 1998) such as *Risk of Expropriation*, *Repudiation of Contracts*, *Corruption* or *Judicial System Efficiency* does not alter our results[13]. Finally, we obtain similar results when we replace the legal origin variable with the *English Law* dummy.

Our last set of regressions (1.3 and 2.3) control for all individual characteristics (both loan agreement and borrower) and the banking environment, and serves as a robustness check. We note that most of the borrower risk proxies are significant and the more risky firms are associated with smaller syndicates, which serve to mitigate agency problems. Furthermore, we also observe that when we control for borrower risk, several banking environment characteristics influence both lenders and arrangers, in areas such

[12] The components are: *Secured Creditor Paid First*, *Restriction on Reorganization*, or *Management Stays*. These dummies equal to one if secured creditors are ranked first in the distribution of proceeds that result from the disposition of assets of a bankrupt firm, if the reorganization procedure imposes restrictions, such as creditors' consent, to file for reorganization, or if the debtor keeps the administration of its property pending the resolution of the reorganization process respectively.

[13] These variables are defined as indexes, scaled from 0 to 10 with lower scores for higher risks, corruption or inefficiency, assessing the risk of "outright confiscation" or "forced nationalization" and of the ''risk of a modification in a contract", the level of corruption in government or assessing the "efficiency and integrity of the legal environment as it affects business" respectively.

as bank concentration and examination frequency, while most of the remaining coefficients gain in magnitude. Thus, controlling for borrower characteristics reinforces the influence of the banking environment on syndicate structure.

4. CONCLUSION

Our study addressed the influence of the banking environment on syndicate structure in 24 countries over a period of 15 years. Our results demonstrated that most banking environment characteristics, such as financial development, banking regulation, and legal environment, have a significant influence on syndicate structure. Overall, the structures of syndicates are adapted to enhance monitoring of the borrower and to increase the efficiency of the re-contracting process in case of borrower distress. Primary syndication motives include loan portfolio diversification, regulatory pressure and management cost reduction.

The observed influence of tested variables suggests a prominence for certain motives in the formation of syndicates with adapted structures. Syndicates are structured to minimize agency problems related to loan and borrower characteristics and country financial, regulatory and institutional environments. More costly banking industries involve larger syndicates while more concentrated banking industries reduce the number of lenders. Financial development in particular bond markets positively affects the size of the syndicate. Bank capital and banking activity regulation, as well as loan portfolio transparency, have a positive influence on syndicate size. Finally, syndicates are structured in a consistent manner with legal risk mitigation.

Our results are congruent with previous research, which shows that syndicate structure is adapted to the specific agency problems related to syndication and re-

contracting issues (Esty and Megginson, 2003; Lee and Mullineaux, 2004; Jones, Lang and Nigro, 2005; Sufi, 2007). Our results are obtained using a cross-country sample of more than 15,000 syndicated loan facilities from 24 countries and over a period of 15 years, further strengthening previous findings. Furthermore, we also show that apart from legal risk, syndicate structure is also influenced by other components of the banking environment, such as banking market structure, financial development, banking regulation, and prudential supervision. Therefore, we can infer normative policy recommendations for financial regulators to take all of the banking environment components into account to promote efficient syndicated lending markets with adequate syndicate design.

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APPENDIX

- **Insert Table A.1 about here –**

Table 1

Syndicated loan facilities and average number of lenders, arrangers and loan size by borrower country

Borrower Country	*Syndicated loans*	*Number of Lenders*	*Number of Arrangers*	*Loan Size*
Argentina	246	8.59	2.92	195
Australia	1,146	7.02	2.59	407
Austria	43	11.33	5.26	370
Belgium	170	14.18	4.40	847
Brazil	330	9.11	2.85	218
Chile	226	9.98	3.65	231
Denmark	115	10.35	3.84	666
Finland	116	10.78	7.09	585
Germany	1,006	11.65	5.66	1,000
India	429	8.61	2.63	119
Indonesia	686	10.49	2.44	128
Ireland	165	11.24	3.91	464
Italy	688	11.59	3.52	758
Japan	3,954	5.91	1.25	162
Korea (South)	1,636	8.61	3.37	201
Malaysia	377	7.52	2.36	204
Mexico	463	10.73	3.72	302
Netherlands	722	9.86	3.34	604
Peru	39	5.46	2.67	123
Philippines	146	9.31	2.75	162
South Africa	124	14.23	5.63	359
Spain	1,042	11.64	4.07	526
Taiwan	1,163	10.11	2.03	169
Thailand	554	9.58	2.68	116
	15,586	8.86	2.53	333

Notes : The table above provides frequencies of loan facilities, the average number of lenders and of arrangers, and the mean loan size (in million USD) by country for the full sample.

Table 2
Descriptive statistics

Variable	*Number of observations*	*Mean*	*Std. dev.*	*Min.*	*Max.*
Dependent variables					
Number of Lenders	15,586	8.8611	7.4639	2.0000	80.0000
Number of Arrangers	11,550	2.5324	2.7058	1.0000	27.0000
Banking environment variables					
Overheads	15,586	0.0275	0.0160	0.0023	0.1448
Concentration	15,586	0.5008	0.1551	0.2701	1.0000
Stock Markets	15,586	0.7012	0.3701	0.0773	2.8243
Bond Markets	15,586	0.8706	0.5859	0.0168	1.8780
NPL Definition	15,586	0.7005	0.4581	0.0000	1.0000
Mincar	15,586	8.1578	0.6387	8.0000	11.500
Credit Risk	15,586	0.1600	0.3666	0.0000	1.0000
Abroad Loan Prohibited	15,586	0.2236	0.4167	0.0000	1.0000
Examination Frequency	15,586	1.6148	0.6882	1.0000	3.0000
Public Risk Disclosure	15,586	0.3947	0.4888	0.0000	1.0000
Rule of Law	15,586	7.7484	1.9307	2.5000	10.0000
Creditor Rights	15,586	2.2029	0.9272	0.0000	4.0000
Loan agreement control variables					
Loan Size	15,586	333	1020	22230	81100
Maturity	15,586	56.5119	42.8570	1.0000	480.0000
Guarantors	15,586	0.0932	0.2908	0.0000	1.0000
Sponsors	15,586	0.0956	0.2940	0.0000	1.0000
Covenants	15,586	0.1759	0.3807	0.0000	1.0000
Senior Debt	15,586	0.7350	0.4414	0.0000	1.0000
S & P Rating	15,586	0.0694	0.2542	0.0000	1.0000
Borrower Presence	15,586	8.0387	12.5907	1.0000	314.0000
Borrower control variables					
Log(Total Assets)	12,473	6.9727	1.6869	2.9929	12.9182
EBITDA / Interest Expenses	11,311	19.0546	264.4381	-6.6916	18668.0000
EBIT / Total Assets	8,655	0.1443	0.0990	-0.1898	2.5506
Total Debt / Capital	12,249	81.4441	581.7350	3.7590	58404.5500

Notes: The table below provides descriptive statistics computed on our dataset of loan facilities. Definition of variables appears in table A.1 in the appendix. *Std. dev.*: standard deviation, *Min.*: minimum, *Max.*: maximum.

Table 3

OLS regressions explaining the structure of syndicates

Specifications	*(1.1)*		*(2.1)*		*(1.2)*		*(2.2)*		*(1.3)*		*(2.3)*	
Variables	*coef.*	*s.e.*	*coef.*	*s.e.*	*coef.*	*s.e.*	*coef.*	*s.e.*	*coef.*	*s.e.*	*coef.*	*s.e.*
Intercept	-33.9686***	5.88	-12.7928***	1.21	-36.5257***	2.33	-8.0426***	1.08	-29.6724***	3.83	-4.0459*	2.43
Log(Loan Size)	2.18175***	0.09	0.9740***	0.08	2.5906***	0.06	0.5617***	0.02	2.2915***	0.12	0.3962***	0.05
Maturity	0.0087***	0.00	-0.0027	0.00	-0.0024	0.00	0.0026***	0.00	0.0146***	0.00	0.0036*	0.00
Guarantors	-0.0005	0.21	0.3903**	0.15	0.126	0.17	0.0186	0.07	-0.1163	0.27	0.8367***	0.16
Sponsors	0.5164*	0.30	0.9436***	0.23	-0.2587	0.18	-0.1116	0.07	-0.4464*	0.27	0.0025	0.11
Covenants	1.7881***	0.23	0.4564**	0.18	0.8582***	0.16	0.0872	0.08	1.8098***	0.29	0.0556	0.12
Senior Debt	2.6624***	0.44	-2.7349***	0.30	1.1604***	0.23	-0.6835***	0.11	1.5146***	0.54	-0.9982***	0.34
S & P Rating	1.7679***	0.26	0.3292**	0.16	0.1101	0.20	0.1499*	0.09	0.9337***	0.29	0.5268***	0.15
Borrower Presence	0.0371*	0.02	-0.0176	0.01	0.0424***	0.01	0.0099***	0.00	0.0830***	0.03	0.0125	0.01
Log (Total Assets)	0.3189***	0.07	0.0356	0.05					-0.2383***	0.09	0.055	0.03
EBITDA / Interest Expenses	-0.0002	0.00	-0.0001**	0.00					-0.0007***	0.00	-0.0001***	0.00
EBIT / Total Assets	-4.1963***	0.75	-1.4216***	0.45					-1.9728**	0.80	0.4389	0.35
Total Debt / Capital	-0.0001	0.00	-0.0001	0.00					-0.0001***	0.00	-0.0001	0.00
Overheads					-12.6337	6.57	23.1500***	3.31	55.8104***	12.31	33.9359***	10.80
Concentration					-2.9464***	0.80	0.9108	0.47	-3.2173*	1.66	-3.9612***	1.40
Stock Markets					0.4243	0.25	0.0052	0.10	-1.7274***	0.58	-0.0381	0.36
Bond Markets					0.4746**	0.23	-0.6840***	0.12	1.8175***	0.39	-2.1948***	0.22
Mincar x Credit Risk					0.0205	0.03	-0.0336**	0.02	-0.2137***	0.07	0.0752	0.06
Abroad Loan Prohibited					3.2922***	0.23	0.1132	0.12	3.1469***	0.58	0.1716	0.43
NPL Definition					0.8296***	0.30	0.3141*	0.19	-0.2205	0.74	1.5261***	0.52
Public Risk Disclosure					-2.7688***	0.30	0.0399	0.17	-2.3506***	0.60	-0.1615	0.47
Examination Frequency					-0.0132	0.14	-0.2506***	0.09	-0.9509***	0.32	-1.1076***	0.22
Creditor Rights					-0.8529***	0.14	0.0643	0.06	-0.5447***	0.15	-0.068	0.12
Rule of Law					-0.1007	0.07	-0.1960***	0.03	-1.2156***	0.38	0.4281	0.25
N	8,516		4,997		15,586		11,550		4,721		3,699	
R^2	0.3544		0.4026		0.3157		0.3052		0.3889		0.5512	

Notes: The table below shows the results of OLS regressions with robust standard errors (*s.e.*) and clusters at the borrower level. The dependent variables are *Number of Lenders* and *Number of Arrangers* (equations 1 and 2 respectively), equal to the number of lenders and arrangers forming the syndicate. Definitions of variables appear in table A.1 in the appendix. Dummy variables for loan type (*Term Loan*), loan purpose (*General Corporate, Debt Repayment, Working Capital, Project Finance*), benchmark rate *(Libor, Euribor*), year, region, industry sector, and *Syndicated Loans* and *French Law* variables are included in the regressions but are not reported. ***, **, and * indicate coefficients statistically significant at the 0.01, 0.05, and 0.1 level respectively.

Table A.1

Brief description of all variables and their sources

Variable	*Description*	*Source*
	Dependent variables	
Number of Lenders	Number of lenders in the syndicate.	Dealscan
Number of Arrangers	Number of arrangers in the syndicate.	Dealscan
	Banking environment variables	
Overheads	Ratio of banking overhead costs to total banking assets	Beck et al. (2000)
Concentration	Assets of the three largest banks as a share of total banking assets	Beck et al. (2000)
Stock Markets	Value of listed shares to GDP	Beck et al. (2000)
Bond Markets	Public and private domestic debt securities to GDP	Beck et al. (2000)
Mincar	Minimum capital requirement value	Barth et al. (2005)
Credit Risk	=1 if the minimum regulatory capital ratio varies with bank credit risk	Barth et al. (2005)
Abroad Loan Prohibited	=1 if banks are prohibited from granting loans abroad	Barth et al. (2005)
NPL Definition	=1 if a formal definition of non-performing loans exists	Barth et al. (2005)
Public Risk Disclosure	=1 if regulation impose to banks public disclosure of their risk management procedures	Barth et al. (2005)
Examination Frequency	=1, 2 or 3 if the frequency of onsite inspections is 1, 2 or 3 times a year	Barth et al. (2005)
Creditor rights	An index aggregating four aspects of creditor rights. The index ranges from zero (weak creditor rights) to four (strong creditor rights)	La Porta et al. (1998)
Rule of Law	An index indicating the law enforcement. The index ranges from zero (weak enforcement) to ten (strong enforcement)	La Porta et al. (1998)
French Law	=1 if the legal system is based on the French law	La Porta et al. (1998)
	Loan agreement control variables	
Loan Size	Size of the loan in million USD	Dealscan
Maturity	Maturity of the loan in months	Dealscan
Guarantors	=1 if there is at least one guarantor	Dealscan
Covenants	=1 if the loan agreement includes covenants	Dealscan
Senior Debt	=1 if debt is senior	Dealscan
S&P Rating	=1 if the borrower has a senior debt rating by Standard & Poor's	
Borrower Presence	Number of times a particular borrower is present in the full sample	Dealscan
Syndicated Loans	Number of syndicated loan facilities by country	Dealscan
Term Loan	=1 if the loan is a term loan	Dealscan
Corporate Purposes	=1 if the loan purpose is general corporate purposes funding	Dealscan
Debt Repayment	=1 if the loan purpose is debt repayment funding	Dealscan
Working Capital	=1 if the loan purpose is working capital funding	Dealscan
Project Finance	=1 if the loan purpose is project finance funding	Dealscan
Euribor	=1 if the benchmark rate is Euribor	Dealscan
Libor	=1 if the benchmark rate is Libor	Dealscan
	Borrower control variables	
Log(Total Assets)	Logarithm of total assets	Compustat
EBITDA / Interest Expenses	Earnings before interest, tax, depreciation and amortization / Interest expenses	Compustat
EBIT / Total Assets	Earnings before interest and tax / total assets	Compustat
Total Debt / Capital	Total debt / total capital	Compustat

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