The Agency Structure of Loan Syndicates

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We challenge two arguments that explain the agency structure of loan syndicates. The *specialization* hypothesis claims that multiple co-agents arise in loan syndicates because of their different competitive advantages for performing administrative tasks. According to the *monitoring* hypothesis, co-agents act as delegated monitors to mitigate informational asymmetry problems. Using syndicated loan characteristics from the Dealscan database, we find strong evidence for both hypotheses. A sub-sample analysis reveals that specialization effects are more pronounced for small-size and short-term loans. Monitoring effects are also reduced by repeated contracting among syndicate players.

1. Introduction

Loan syndication is a widely used financing channel for corporations. According to the Loan Pricing Corporation, the annual volume of syndicated loans has been stable around $ 1 trillion between 1999 and 2003. The loan syndication process starts with negotiations between the borrower and a bank (the "arranger" or the "leader") on the terms and provisions of the debt contract. The arranger then collects confidential bids from other banks (the "members") regarding their contributions to the loan. Finally, she proceeds to the allocation of the loan parcels. In addition to initiating and setting up the syndicate, the arranger has to issue the legal documents, administer the loan, and hold the collateral, if any. In practice however, the arranger often delegates these administrative tasks to other banks, acting as co-agents. For instance, the "documentation agent" drafts the loan documents, the "administrative agent" calculates the interest payments and collects loan repayments, and the "collateral agent" is in charge of the pledged collateral. The decision to delegate some of these tasks is made solely by the arranger.

Our research aims to investigate what drives this decision, or, in other words, why multiple co-agents arise in the syndication process. We address the issue of the *agency structure* of the loan syndicate both theoretically and empirically.

First, we present two competing hypotheses on the agency structure of loan syndicates. On one hand, the *specialization* hypothesis, consistent with Das and Nanda (1999), states that multiple co-agents arise in loan syndicates because of the different competitive advantages they have for performing all the administrative tasks. On the other hand, the *monitoring* hypothesis

states that multiple co-agents arise in loan syndicates to mitigate informational asymmetry problems. As shown by Strausz (1997), the delegation of monitoring to a third party (in our case, co-agents) can effectively reduce agency conflicts. Based on this theoretical discussion, we derive six testable implications on observable characteristics of syndicated deals. Next, we test these implications on a sample of 1,181 loans between 1992 and 2003 taken from the Dealscan database. Overall, we find strong evidence supporting both the specialization and monitoring effects. A sub-sample analysis reveals that specialization effects are more pronounced for small-size loans while monitoring effects are dominant for short-term loans. Finally, we provide evidence of repeated contracting between leaders and co-agents (which is consistent with the specialization hypothesis), and between leaders and participants (which attenuates monitoring effects).

The rest of the paper is organized as follows. In Section 2 we briefly review the related literature on loan syndication, and we present the two competing hypotheses on the agency structure of loan syndicates. We derive their testable implications in Section 3. The empirical model is detailed in Section 4. We analyze the results in Section 5, and Section 6 concludes.

2. Literature review and hypotheses

2.1. Related literature

Earlier theoretical works focus on the rationales for loan syndication. The risk-sharing function of the syndicate is put forward by Wilson (1968) and Chowdhry and Nanda (1996). According to Pichler and Wilhelm (2001), syn-

dication emerges as the structure that best copes with moral hazard in team production. The existence of a lead bank, subject to reputational concerns, combined with implicit barriers at entry, makes syndicates Pareto-dominant forms. Simons (1993) argues that syndication helps lenders circumvent the stringent bank regulation regarding capital requirements and lending limits.

Papers most closely related to ours are those that investigate the *ownership structure* of the syndicate, i.e. the number of participating banks and the concentration of the holdings in the syndicate. Lee and Mullineaux (2004) find a positive association between large and/or diffuse syndicates and the available information about the borrower, the credit risk of the loan, the collateral, the reputation of the lead bank, the constraints relative to the loan re-sale activity, the loan maturity, and the importance of the borrower's growth options. Their results hold when controlling for the listing status or the rating of the borrowers, and support the argument that group monitoring matters in the loan market as agency and information costs affect the syndicate structure. Sufi (2005) finds evidence suggesting that lead arrangers look for more participants in the syndicate to make renegotiation more difficult, which discourages opportunistic behavior by the borrower. Esty and Megginson (2003) focus on the impact of political risk on syndicate structure. They find that, in the international context of the project finance loan market, a diffuse ownership structure (i.e. number of banks and the concentration of the holdings) is also associated with weak creditors' rights and poor legal enforcement. Jones, Lang and Nigro (2005) conclude that agents reduce their share of a syndicated loan when they face capital constraints or an informational disadvantage.

Though all of these studies contribute to our understanding of the syndication procedure, they consider that the syndicate is managed by a *single* entity. Our paper contributes to the field in that we analyze the syndication structure at a finer level, namely the distinction between the lead arranger and co-agents. To the best of our knowledge, the *agency structure* of loan syndicates has not been addressed.

2.2. The specialization hypothesis

We identify two explanations for the participation of several co-agents in the syndicate. The first rationale for multiple co-agents is based on a *specialization* argument. Das and Nanda (1999) present a model of a banking structure where, in equilibrium, banks involved in relationship-specific transactions tend to underspecialize in their skills, whereas banks involved in deal-specific transactions tend to overspecialize. Within this framework, syndication appears to be an efficient way to allow banks to specialize optimally. In other words, banks would act in the syndication process according to the competitive advantage that they have acquired in performing different administrative tasks.

To support this view, several papers provide international evidence of productive specialization in the banking sector (see, for instance, Maudos, Pastor, and Perez, 2002; Mukherjee, Ray, and Miller, 2001). Little is known, however, about how much this specialization affects the structure of bank syndication. Melnik and Plaut (1996) study the structure of the Eurocredit underwriting market. They find that leaders of these syndicates are recruited mostly to share the costs of bearing the risk. However, additional managers of

the syndicate do not seem to arise for risk-sharing reasons. Rather, they assist the leader in dealing with an expanded underwriting distribution, which suggests that they help in splitting the costs of managing the syndicate. Song (2004) finds evidence of clientele effects in loan syndication. She suggests that highly-specialized underwriters co-manage deals to enhance their services in response to clients' specific needs.

2.3. The monitoring hypothesis

The second rationale for multiple co-agents is based on the *monitoring* hypothesis. Syndication enables the arranger to transfer some of the borrower's credit risk to other banks. However, since the arranger is the only bank to negotiate with the borrower, she is usually the best informed bank on the corporation's financial status. As a result, the syndication process leaves room for adverse selection and moral hazard. Adverse selection occurs if the arranger systematically decides to syndicate the most risky loans.[1] Moral hazard occurs if the arranger loosely monitors the borrower because she has a very limited stake in the loan.

A classic topic in agency theory is the study of moral hazard problems in team production (e.g., Alchian and Demsetz, 1972; Holmström, 1982). The syndication process can be analyzed as an example of this issue. Pichler and Wilhelm (2001) develop an agency model to explain the formation of syndicates. They consider that the syndicate is managed by a *single* arranger

[1] Dai (2002) suggests that adverse selection problems may worsen if banks have heterogeneous screening abilities. Loan syndicates would then be subject to herd behavior from inferior banks who rely on superior banks' (i.e. the arrangers') credit decisions.

and therefore they do not address the issue of its agency structure. In this paper, we conjecture that agency theory can also account for the presence of co-agents in loan syndicates.

In the agency theory framework, we interpret the role of co-agents in the syndicate as banks mandated to supervise the arranger-principal. In other words, the arranger delegates the syndication agency to co-agents to mitigate the informational asymmetries between the agents and the members of the syndicate. In a model where signals are private information and commitment to monitoring is not possible, Strausz (1997) studies the impact on the principal-agent relationship of the introduction of a third player, namely a supervisor who has been delegated as monitor. Strausz (1997) shows that delegation of monitoring is profitable in that the principal can better regulate incentives. First, as co-agents get involved in the syndication deal, they acquire more accurate information on the borrower. They are able to monitor the arranger on behalf of the members and determine whether the creditworthiness of the borrower is acceptable for the benefit of the syndicate (note that the reputation of the co-agents is at stake). The adverse selection behavior is therefore partially controlled by co-agents. Second, if the arranger delegates the agency to other banks, a bigger portion of the loan will be held by agents. Consequently, members should expect these agents to monitor the borrower more closely. Thus, moral hazard behavior is also partially controlled by co-agents.

Narayanan, Rangan, and Rangan (2004) study the market for seasoned equity offerings, and examine whether underwriting banks use their lending-generated private information at the expense of investors. They find evidence

that the syndication structure, through the involvement of co-managers, induces these banks to credibly commit against any opportunistic behavior. In this paper, we investigate whether a comparable phenomenon applies to the loan syndication market.

3. Testable implications

According to the agency theory framework, the presence of co-agents in the syndicate stems from the delegation of monitoring that helps mitigate adverse selection and moral hazard problems. We will refer to this as the *monitoring hypothesis*. Alternatively, the specialization argument claims that co-agent roles are shared between several banks according to the competitive advantage they have in performing their tasks. We will refer to this as the *specialization hypothesis*. The difference between the two hypotheses can be summarized as follows: The agency structure of the syndicate responds to characteristics of the deal to (i) mitigate informational asymmetries according to the monitoring hypothesis, or (ii) reduce the total cost structure according to the specialization hypothesis.

Our analysis relies on the following testable implications, which relate the extent of delegation in the syndicate to the main characteristics of the syndicated loan, namely the level of fees, the borrower's credit quality, the number of covenants, the loan maturity, the number of participants (i.e. mere lenders not acting as co-agents), and the lead arranger's share of the loan.

We expect that competition among specialized banks brings down the cost of managing the syndicate. Thus, according to the specialization hypothesis,

the leader will charge low fees for deals that are going to be handled by many co-agents. Supporting this view, Melnik and Plaut (1996) find evidence that co-agents in the market for syndicated Euroloans mostly act as "service-for-fee" players.

By contrast, the monitoring hypothesis states that fees represent a liquidity transfer to compensate for the monitoring costs (see Gorton and Kahn, 2000). Thus, we expect that if the leader charges high fees, this indicates a deal requiring an expensive monitoring activity.

Implication 1 *The specialization hypothesis predicts a negative relation between fees and delegation.*

Adverse selection and moral hazard problems are likely to be more severe when the borrower's credit quality is poor. The monitoring hypothesis predicts that in this case, the arranger will choose a higher delegation. Sufi (2005) finds the size of the syndicate to increase with the borrower's estimated risk of default. However, he does not analyze the agency structure of the syndicate.

Implication 2 *The monitoring hypothesis predicts a negative relation between the borrower's creditworthiness and delegation.*

As initially put forward by Smith and Warner (1979), covenants serve as an *ex post* monitoring device. According to the monitoring hypothesis, covenants and co-agents can be seen as substitutes because they both help mitigate the moral hazard problem. Goyal (2005) and Harvey, Lins, and Roper (2004) conduct empirical studies supporting this view on the U.S.

bank debt market and on the emerging debt market, respectively. Bradley and Roberts (2004) focus on the syndicated loan market and also find that the use of covenants is consistent with agency theory. However, all studies are not unanimous on the monitoring role of covenants. On the U.S. bond market, Nash, Netter, and Poulsen (2003) find evidence that high-growth firms include few covenants in their debt contracts because they prefer maintaining flexibility in financing rather than reducing agency costs.

Nevertheless, the monitoring role of covenants must be balanced with their implementation cost. For instance, Viswanath and Eastman (2003) model the use of covenants as a trade-off between the cost of implementing the contract and the residual agency costs. If the specialization hypothesis holds, a deal with many covenants is more expensive to manage, all things equal. In this case, the lead arranger is more likely to look for additional co-agents to split the cost of managing the syndicate. Thus, according to specialization hypothesis, deals with many covenants should exhibit a higher delegation.

Implication 3 *The monitoring hypothesis predicts a negative relation between the number of covenants and delegation. The specialization hypothesis predicts the opposite relation.*

In the agency theory, short-term debt is more efficient in alleviating conflicts between shareholders and creditors (see e.g. Myers, 1977, or Berglöf and Van Thadden,1994). Barclay and Smith (1995), Guedes and Opler (1996), and Johnson (2003) provide evidence on short-term debt mitigating the underinvestment problem. Gonas, Highfield, and Mullineaux (2004) find that

longer maturity loans are more prone to collateralization to reduce adverse selection and moral hazard. Thus, according to the monitoring hypothesis, co-agents would more likely arise in deals with long-term debt.

Narayanan, Rangan, and Rangan (2004) document economies of scale in managing loans. A longer maturity helps the leader amortize the fixed cost component of the loan. For short-term loans, however, the leader will seek to lower these costs by increasing the level of delegation. The specialization hypothesis therefore predicts a negative relation between the loan maturity and delegation.

Implication 4 *The monitoring hypothesis predicts a positive relation between the loan maturity and delegation. The specialization hypothesis predicts the opposite relation.*

If agency conflicts matter, a highly delegated syndicate is more likely to attract many participants since information asymmetry is mitigated. If there is no agency effect in the process of loan syndication, a simple mechanical relation indicates that, *all other things being equal* (i.e. for a fixed number of banks involved in the deal), more participants in the syndicate reduces the number and the financial implication of co-agents. Furthermore, if the total number of banks involved increases, the level of delegation cannot rise in the same proportion because the number of co-agent roles is in practice limited to a few specific administrative tasks.

Implication 5 *According to the monitoring hypothesis, the number of participants (i.e. mere lenders not acting as co-agents) and delegation should*

be positively related. In the absence of any agency effect, the specialization hypothesis predicts the opposite relation.

The syndicate will rely on a lower delegation if the lead arranger has a big stake in the deal. In this case, indeed, mere participants are more likely to trust the leader and her non-opportunistic behavior. Leaders with a lower stake will, however, need more co-agents to persuade participants of a low risk of adverse selection and moral hazard in the syndicate.

Implication 6 *The monitoring hypothesis predicts a negative relation between the share of the leader and delegation.*

We now present the model that will serve to test the previous implications.

4. The empirical model

4.1. Description of the variables

To measure the extent of delegation in the syndicate, we analyze the agency structure along three dimensions: (i) the number of co-agents (NCA), (ii) the proportion of the loan held by all the co-agents (PCA), which measures how much the delegated monitors are financially involved, and (iii) the level of concentration among co-agents (CCA) (measured by the Herfindahl index), which measures the dispersion of the delegation of monitoring (which could in particular lead to collusion). Delegation is a positive function of NCA and PCA and a negative function of CCA. Each of these variables will serve as the dependent variable of our models.

Specifically, NCA is simply the number of banks in the syndicate acting with a co-agent role (that is, with a responsibility in the administration of the loan). These banks have to be distinguished from the leader and from other banks who only act as mere lenders. PCA is the sum of all co-agents' shares in the loan expressed as a percentage. CCA is the Herfindahl index of the co-agents' shares expressed as a percentage. Denoting m_i the amount lent by co-agent i in a loan with total facility M, we have that

$$\begin{aligned} PCA &= 100 \times \frac{1}{M} \sum_{i=1}^{NCA} m_i \\ CCA &= 100 \times \sum_{i=1}^{NCA} \left(\frac{m_i}{\sum_j m_j} \right)^2 . \end{aligned}$$

Consistent with our testable implications, the explanatory variables are as follows. Total fees ("Fee") are expressed in basis points as the sum of upfront fees, commitment fees, other fees, and annual fees. Note that these total fees are shared between the leader and co-agents. The information regarding the fraction of total fees that specifically accrues to co-agents is not available in general. As a measure of the borrower creditworthiness, we use the Standard & Poor's senior long term debt rating prevailing at the deal inception. This piece of information is in most cases provided by the Dealscan database. We retrieved the rating for around 50 additional deals in the Fixed Investment Securities Database (FISD). The variable "Rating" is a dummy with value 1 if the borrower's rating belongs to the investment grade category and zero otherwise. The variable "Covenants" counts the number of financial covenants included in the deal.[2] The loan maturity ("Maturity") is expressed

[2] Admittedly, this criterion does not capture how tight the covenant is. This is however the only information available in the database.

in months. The number of participants ("Participants") is simply the number of banks in the syndicate that are neither leader nor co-agents. The variable "Leader share" is the share of the leader expressed as a percentage.

Finally, the following control variables are used. The loan facility ("Loan size") is the nominal amount of the loan expressed in U.S. dollars. The logarithm of the annual sales of the borrower in U.S. dollars ("Firm size") is a proxy for firm size. We also add dummy variables to control for the loan purpose,[3] for the borrower's industry (SIC codes are grouped in eight categories based on the first digit of the code), and for the *year* of the deal inception (there are 12 years in our sample). Hence there is a total of 24 control variables.

4.2. The data

Data on syndicated loan deals are obtained from Dealscan provided by the Loan Pricing Corporation, a Reuters subsidiary focusing on the international private debt market. Recent studies on syndicated loans use this database (see e.g., Angbazo, Mei, and Saunders, 1998; Dennis and Mullineaux, 2000; Dichev and Skinner, 2002; Esty and Megginson, 2003). The size of this database is constantly growing as new deals are regularly added (around 2,000 deals are added every three months since 1996). At the time of our data extraction (as of July 7, 2003), the total sample was comprised of 91,063 loans

[3]Purposes reported in the database have been grouped in five categories: (1) Capital budgeting (including capital expenditure, project finance, acquisition), (2) Long-term financing (including recapitalization, debt repayment), (3) Short-term financing (including working capital, CP backup), (4) Restructuring (including takeover, LBO/MBO, spinoff, debtor-in-possession, stock buyback), and (5) Other general purpose.

during the 1987-2003 period.[4] We first restricted the sample to syndicated loans, which left us with 60,239 observations. We then excluded tranches with a nominal amount below $100 million, since these tranches are too small to have complex agency structures, which left us with 28,407 loans.[5] Excluding financial and government institutions (SIC codes between 6000 and 6999, and between 9100 and 9999) yielded 23,665 loans. Furthermore, we had to select the loans disclosing the information about the agency structure of the syndicate and about covenant information. Specifically, identification of a lead arranger, information on the number of co-agents and participants, and covenant information were required. These three additional restrictions cut our final sample to 11,639, 3,275 and 1,609 tranches respectively. Still, indications of the borrower's sales and SIC code were sometimes missing. This piece of information was retrieved from Mergent Online and the borrowers' own web sites. Furthermore, we excluded the 92 deals for which the information on co-agents' shares is not disclosed, which left us with 1,517 deals. Finally, we only kept the deals for which a rating was available at the time of loan inception. This yielded a total of 1,181 observations.[6] Our final sample size is comparable to previous studies that used Dealscan. Esty and Megginson (2003) or Dichev and Skinner (2002) use samples of 495 and 1,313 loans,

[4] In the Dealscan dataset, the basic unit of observation is the loan facility or tranche. In practice many firms group these tranches into "deals." However, tranches (that we shall call "loans") are the focus of our analysis since they exhibit very different patterns in terms of maturity, size, syndication structure, and so forth.

[5] Altman and Suggitt (2000) as well as Esty and Megginson (2003) also exclude the smallest tranches in their analysis of syndicated loans.

[6] We also excluded two observations, interpreted as outliers, that reported a total of 188 and 56 co-agents, respectively.

respectively.

Deal dates range from January 21, 1992 to June 23, 2003. The year, industry and purpose distributions of the final sample are presented in Table 1.

Insert Table 1 Here

Most loans were issued within the last five years, which justifies the use of time dummies in our regressions. There are two reasons for this over-representation of recent deals. First, the Dealscan database is growing and more deals have been added in the recent years. Second, our selection criteria require knowledge of the agency structure of loans. Old deals seldom disclose this piece of information. These two effects are graphically represented in Figure 1. Our bias to recent loans should be kept in mind when interpreting the results.

Insert Figure 1 Here

We also note in Table 1 that all industries have observations in our samples. Manufacturing companies and utilities are the most represented, which is symptomatic of developed economies. Syndicated loans are contracted for various purposes, although the capital budgeting argument seems under-represented. This may not reflect the real economic activity, however. Many firms opt not to disclose the purpose of capital budgeting for strategic reasons. Rather, these firms choose to fall in the "other general purpose" category, which explains the relatively large number of observations in this category.

The descriptive statistics of the variables are summarized in Table 2.

Insert Table 2 Here

Table 2 reveals the diverse and sometimes complex agency structure of syndicated loans. Theoretical models that consider syndicates as being managed by a single bank (and not a group of banks) may therefore fail to capture an important feature of the loan syndication process. Specifically, the number of co-agents varies from zero (the arranger administrates the loan all by herself) to 38, with a mean value of 6.00. The financial involvement of co-agents is very significant because their average stake in the loan is 42.55%. But beyond this mean value, the financial participation of co-agents can take on very extreme values. The same remark applies to the financial concentration among co-agents (measured by the Herfindahl index).

4.3. The regression models

We test our six implications using three separate ordinary least squares (OLS) regressions on our sample, one for each dependent variable (NCA, PCA and CCA). However, results for the PCA regressions and the CCA regressions (both available upon request) are very similar, so we do not report them. Note that the terms of the deal are negotiated by the arranger and the borrower *before* the agency structure of the syndicate is set, which rules out endogenous relations between explanatory and dependent variables.[7]

Since the number of co-agents is a count data, the errors for the NCA linear model may not be normally distributed and the OLS regression may

[7]There is a caveat for the variable "Participants." In practice, the arranger often begins the syndication process with informal rounds to determine the banks interested in participating in the syndicate. In some cases however, co-agents and mere participants may arise *simultaneously* in the syndicate. Results concerning the variable "Participants" should therefore be interpreted with care.

not be well specified. We therefore choose to complement the OLS regressions with a negative binomial regression for the variable NCA.

We perform a collinearity diagnostic before estimating the regression models. Table 3 reports the Pearson correlations involving explanatory and control variables.

Insert Table 3 Here

On the whole, correlation coefficients are of moderate magnitude. We note, however, that among explanatory variables, "Rating" and "Covenants" are involved in the highest two Pearson coefficients. To control for potential endogeneity problems, we shall estimate the NCA regression four times: (i) with all six explanatory variables, (ii) excluding the variable "Rating," (iii) excluding the variable "Covenants," and (iv) excluding these two variables. This procedure serves as a robustness check for the signs of the coefficients.

5. Analysis of results

5.1. Results for the whole sample

Results for the NCA regressions are presented in Table 4. Reported t-statistics are corrected for potential heteroskedasticity using the White correction. The results for the negative binomial regressions for the variable NCA are shown in Table 5.

Insert Tables 4 and 5 Here

All regressions have a substantial explanatory power. As far as OLS regressions are concerned, the adjusted R^2 is 43%. Regarding the negative

binomial regression, the scaled Pearson chi-square is about 1.14. Robustness checks confirm that the collinearity between two of the explanatory variables does not alter the results in a significant manner.

Four of the six explanatory variables are consistently significant in all of our regressions. Another variable (Rating) is occasionally significant. This suggests that most selected variables are important determinants of the agency structure of loan syndicates. We now scrutinize them in greater detail.

The level of fees We find strong evidence that fees are negatively associated with the extent of delegation in the syndicate. The evidence is much stronger for the negative binomial model. The coefficients for the variable Fee are negative, which validates the predictions of the specialization hypothesis. Results, therefore, suggest that co-agents compete in the syndicate to reduce the total cost of the deal.

The borrower's rating The variable Rating is significant in two regressions (see Tables 4 and 5) and at the 10% level only. This is very weak evidence for the monitoring hypothesis, suggesting that deals with a risky borrower need to rely on more co-agents to mitigate informational asymmetries between the lead arranger and the borrower.

The number of covenants The coefficient for the variable Covenants is never significant.[8] Contrary to Dichev and Skinner's (2002) results, finan-

[8]We only find one significant (at the 10% confidence level) and positive coefficient for the variable Covenant in the PCA model (not reported). This result provides very weak evidence for the specialization hypothesis. Consistent with

cial covenants do not seem to act as a device to mitigate agency problems in syndicated loans. However, one should keep in mind that our variable is the *number* of covenants: It is therefore an imperfect proxy for implementation costs as well as for monitoring effects, which are both influenced by the *tightness* of covenants.

The loan maturity Our results provide very strong evidence that loan maturity is positively correlated with delegation in the syndicate. The coefficients for the variable Maturity are all significant at the 1% level in all regressions (see Tables 4 and 5). Their signs are always consistent with the monitoring hypothesis. Agency theory suggests that longer loans are riskier and more loosely monitored. A stronger participation of co-agents is required to handle agency conflicts with those deals.

The number of participants The coefficients for the variable Participants are all significant at the 1% level in all regressions (see Tables 4 and 5). Their signs always confirm a negative relation with the level of delegation. This very strong evidence sharply conflicts with the prediction of the monitoring hypothesis. If the function of co-agents is to mitigate informational asymmetries, then mere lenders would recognize their monitoring role by participating more actively in highly delegated deals. This is not the case in our sample.

Viswanath and Eastman (2003), it indicates that the number of covenants increases the deal implementation costs that are split by additional co-agents.

The share of the leader We find very strong evidence of a negative relation between delegation and the share of the leader. The coefficients for the variable Leader share are all significant at the 1% level in all regressions (see Tables 4 and 5). This result strongly supports the monitoring hypothesis. It indicates that when the leader is substantially involved in the deal, his interests are more aligned with those of the participating members. Hence, the leader does not need to rely on additional co-agents to mitigate agency problems.

Overall, our findings support both hypotheses. Regarding the monitoring hypothesis, we find that two predictions (related to the variables Maturity and Leader share) are strongly confirmed. Another prediction (related to Rating) is weakly confirmed. In addition, one prediction (related to the variable Participants) is strongly rejected. Regarding the specialization hypothesis, we find that two predictions (related to the variables Fee and Participants) are strongly confirmed. In addition, one prediction (related to the variable Maturity) is strongly rejected.

A possible explanation for these mixed results is that the specialization and the monitoring hypotheses are not exclusive. For a given deal, the lead arranger may select co-agents for cost splitting *and* monitoring purposes. Another explanation is that some deals may be more costly to manage and co-agents' specialization will be more necessary, and some other deals may be subject to higher informational asymmetries and monitoring will be the main reason for co-agents. The next sub-section investigates this latter explanation.

5.2. Results for sub-samples

Taking the two extreme quartiles, we select the four sub-samples that contain the deals with the smallest and biggest amounts as well as the deals with the shortest and the longest maturities. We report OLS regressions results in Table 6.

Insert Table 6 Here

Due to the presence of fixed costs, we expect deals of small size to be more expensive to manage. Hence, specialization effects should be more pronounced. Furthermore, the stakes of agency conflicts should increase with the loan size. Monitoring effects should therefore be stronger. As a matter of fact, the negative coefficient for the variable Fee is no longer significant and the negative coefficient for the variable rating becomes significant when it comes to big loans. Interestingly, Panyagometh and Roberts (2002) argue that lead banks do not seem to act as if they benefited from private information about the borrower's credit quality, thereby denying the adverse selection problem that could be associated with loan syndication. One should note, however, that their sample contains, on average, deals of smaller size (mean facility is 132 m$ compared to 591 m$ in our sample). Their conclusion regarding the absence of agency effect is therefore partly driven by a sample bias.

We also expect long-term loans to be more subject to monitoring effects and less subject to specialization effects. This is confirmed in Table 6. The positive coefficient for Rating becomes negative as we move from short- to long-term loans. Also, the coefficient for Covenant is only significant and negative for long-term loans.

5.3. Associations in the syndication process

Another direction to explain the mixed results about the specialization and the monitoring hypotheses is to investigate the associations among banks in the syndication process. In this sub-section, we investigate if identical leaders and co-agents are involved in the same syndicates.[9] We repeat the investigation for leaders and participants.

We run a Chi-square test to determine if the identity of the leader affects the occurrence of banks acting as co-agents. Specifically, we compare the unconditional distribution of co-agents across deals with the same distribution conditional on bank L being the leader. Let N denote the total number of deals involving N_B banks. Let N_C denote the total number of co-agent roles played by bank C. The unconditional probability of bank C acting as a co-agent is N_C/N. Suppose bank L is the leader in N_L deals. Within these N_L deals, bank C is a co-agent in N_{CL} deals. The conditional probability of bank C acting as a co-agent in a deal led by bank L is N_{CL}/N_L.

The bias in leader L's co-agent selection is measured by the Chi-square distance between the conditional and the unconditional distributions given by

$$D_{\chi^2} = \sum_{1}^{N_B-1} \frac{\left(\frac{N_{CL}}{N_L} - \frac{N_C}{N}\right)^2}{\frac{N_c}{N}}.$$

Under the null hypothesis that the two distributions are the same, the law of the variable $N_L \cdot D_{\chi^2}$ converges to a Chi-square law with $N_B - 1$ degrees of freedom as N_L goes to infinity.

Since the market for leading syndicates is strongly oligopolistic, we need

[9] We thank one referee for making this suggestion.

to restrict our sample to deals led by the top three lead banks to maintain the validity of the asymptotic test (all these leaders have led at least a hundred deals in our sample). We get a total of $N = 672$ deals (57% of the 1,181 initial observations) that involve $N_B = 192$ different co-agents. The top three leaders are JP Morgan (321 leads), Bank of America (195 leads), and Citigroup (156 leads).[10] We repeat the same procedure to test if leaders are biased when selecting *participants*. The total 672 deals involve $N_B = 554$ different participants. Results are reported in Table 7.

Insert Table 7 Here

First, we find very strong evidence that co-agents are not uniformly distributed across top leaders. For all top three leaders, the conditional probability of being a co-agent is statistically different from the unconditional probability. This result indicates that leaders tend to work with specific co-agents. Consistent with the specialization hypothesis, leaders do not randomly select co-agents but rather choose those whose administrative skills are complementary. Also, this finding limits the importance of the monitoring effect as participants can interpret the repeated contracting as a risk of collusion between leaders and co-agents.

Second, we find the same very strong evidence that participants are not uniformly distributed across leaders. Rather, we observe that banks cluster their participations around deals led by specific leaders. We interpret this result as evidence that syndicates arise as repeated contracting relations with

[10]Note that this oligopoly is *not* a bias in our sample. According to Dealscan, the average market share for syndication lead over the 1999-2003 period of JP Morgan, Bank of America, and Citigroup was 19%, 13%, and 11.5%, respectively.

the same participants. Such repeated contracting relations reduce adverse selection and moral hazard problems between the leader and participants. This explains why our previous analysis finds mixed support for the monitoring hypothesis.

6. Conclusion

The process of loan syndication typically involves the participation of co-agents. These banks share administrative tasks with the lead arranger. Hence, their presence can be justified by cost reduction reasons. Since they work in collaboration with the leader, co-agents can also have an informational advantage over other members of the syndicate. Their role can therefore consist of mitigating potential agency conflicts between the informed leader and the other members of the syndicate.

We have challenged the specialization and the monitoring hypotheses to explain the agency structure of loan syndicates. Using the Dealscan database to examine the observable characteristics of the syndicated loans, we find strong evidence for both hypotheses. One possible explanation for this finding is that specialization and monitoring effects may not be exclusive.

We provide support for alternative explanations. First, the specialization and monitoring effects do not apply for the same deals. A sub-sample analysis reveals that co-agents arise for cost-cutting reasons when loans are of short term and small in size. In contrast, co-agents act as delegated monitors when informational conflicts are potentially severe: that is, when loans are of long term and large in size. Second, we find evidence of repeated contracting

between leaders and participants and also between leaders and co-agents, which attenuates the monitoring effect.

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Figures

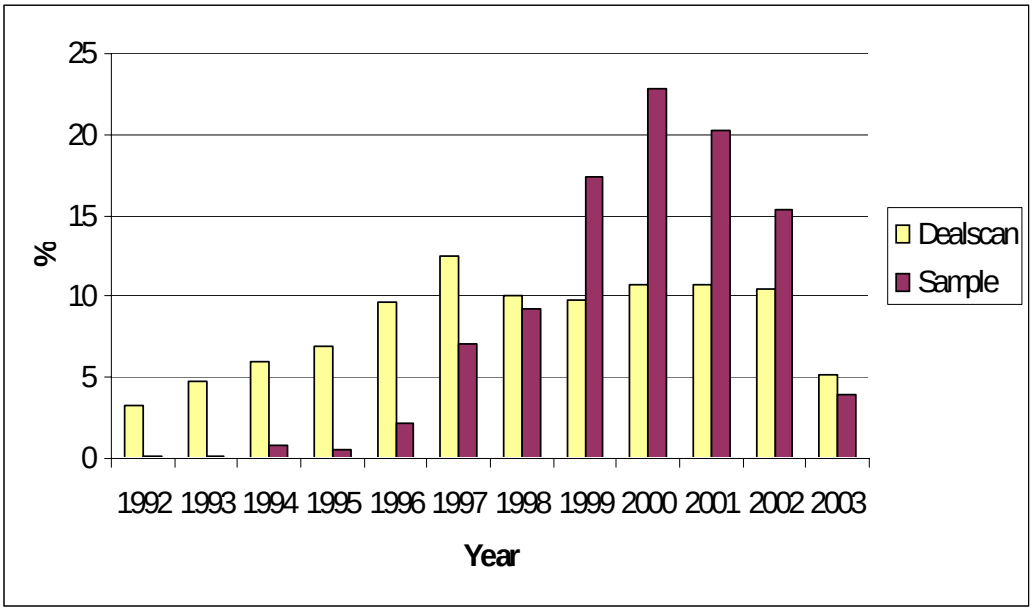

Figure 1

Annual distributions for the sample and for the whole Dealscan database

Tables

Table 1

Year, industry, and loan purpose distributions

The distributions of the 1,181 loans of the final sample with respect to the year of loan activation (Panel A), the borrower's industry (Panel B) and the loan purpose (Panel C).

Panel A: Year Distribution		Panel B: Industry Distribution		Panel C: Loan Purpose Distribution	
Year	# deals	SIC code	# deals	Loan purpose	# deals
1992	1	0-999	2	Capital budgeting	32
1993	1	1000-1999	100	Long-term financing	384
1994	10	2000-2999	221	Short-term financing	341
1995	7	3000-3999	253	Restructuring	250
1996	26	4000-4999	322	Other general purpose	174
1997	84	5000-5999	139		
1998	109	7000-7999	98		
1999	206	8000-8999	46		
2000	268				
2001	240				
2002	182				
2003	47				
Total	1,181		1,181		1,181

Table 2

Descriptive statistics of the final sample

The mean, median, standard deviation, minimum and maximum values for the dependent variables, the explanatory variables and the control variables that are not dummies.

	Mean	Median	Standard Deviation	Minimum Value	Maximum Value
Dependent variables					
NCA	6.00	4.00	6.14	0.00	38.00
PCA (%)	42.55	42.22	25.56	0.00	95.37
CCA (%)	39.00	25.98	32.61	2.76	100.00
Explanatory variables					
Fee (basis points)	100.97	42.50	122.60	0.00	900.00
Rating	0.59	1.00	0.49	0.00	1.00
Covenants	1.80	2.00	0.97	0.00	5.00
Maturity (months)	40.19	36.00	27.03	3.00	301.00
Participants	8.87	7.00	7.81	0.00	106.00
Leader share (%)	18.38	13.33	16.02	0.00	100.00
Control variables					
Loan size (m$)	590.64	300.00	982.88	100.00	18469.00
Firm size (log of sales)	21.60	21.62	1.36	16.57	24.94

Table 3

Pearson correlations

Pearson correlations involving explanatory and control variables are reported.

	Fee	Rat.	Cov.	Mat.	Partic.	Lead. sh.	Loan size
Rating	-.479**	1					
Covenants	.252**	-.437**	1				
Maturity	.184**	-.377**	.361**	1			
Participants	-.078**	-.043	.113**	.057*	1		
Leader share	.115**	-.149**	.030	.157**	-.294**	1	
Loan size	-.165**	.238**	-.210**	-.171**	.198**	-.167**	1
Firm size	-.277**	.369**	-.373**	-.324**	.215**	-.233**	.438**

** Indicates statistical significance at the 1% level (two-tailed).

* Indicates statistical significance at the 5% level (two-tailed).

Table 4

OLS regression results for the NCA model

The corresponding t-statistics are in parentheses. Regression (1) includes all six explanatory variables. Regression (2) excludes the variable Rating. Regression (3) excludes the variable Covenants. Regression (4) excludes the variables Rating and Covenants.

	Predicted sign		Regression			
	Special.	Monit.	(1)	(2)	(3)	(4)
Intercept			-13.199***	-13.298***	-13.891***	-13.668***
			(-4.113)	(-4.142)	(-4.505)	(-4.435)
Fee	−	?	-0.003**	-0.002*	-0.003**	-0.002*
			(-2.208)	(-1.705)	(-2.245)	(-1.783)
Rating	?	−	-0.613*		-0.549	
			(-1.676)		(-1.540)	
Covenants	+	−	-0.135	-0.069		
			(-0.780)	(-0.412)		
Maturity	−	+	0.034***	0.036***	0.034***	0.035***
			(5.657)	(5.933)	(5.606)	(5.977)
Participants	−	+	-0.176***	-0.173***	-0.178***	-0.174***
			(-8.941)	(-8.820)	(-9.158)	(-9.030)
Leader share	?	−	-0.124***	-0.123***	-0.124***	-0.123***
			(-13.463)	(-13.358)	(-13.444)	(-13.361)
Loan size			0.003***	0.003***	0.003***	0.003***
			(16.001)	(15.929)	(16.086)	(16.012)
Firm size			1.020***	0.995***	1.041***	1.008***
			(7.666)	(7.521)	(7.986)	(7.835)
Adjusted R^2			43.0%	42.9%	43.0%	42.9%
F-statistic			30.669***	31.580***	31.716***	32.725***

*** Indicates statistical significance at the 0.01 level.

** Indicates statistical significance at the 0.05 level.

* Indicates statistical significance at the 0.10 level.

Table 5

Negative binomial regression results for the NCA model

The corresponding Chi-square statistics are in parentheses. Regression (1) includes all six explanatory variables. Regression (2) excludes the variable Rating. Regression (3) excludes the variable Covenants. Regression (4) excludes the variables Rating and Covenants.

	Predicted sign		Regression			
	Special.	Monit.	(1)	(2)	(3)	(4)
Intercept			-0.8237*	-0.8637*	-0.8092*	-0.8091*
			(2.93)	(3.23)	(3.04)	(3.04)
Fee	−	?	-0.0007***	-0.0005***	-0.0007***	-0.0005***
			(9.18)	(6.83)	(9.18)	(6.64)
Rating	?	−	-0.0966		-0.0979*	
			(2.65)		(2.82)	
Covenants	+	−	0.0031	0.0117		
			(0.01)	(0.19)		
Maturity	−	+	0.0047***	0.0050***	0.0047***	0.0051***
			(24.32)	(27.49)	(25.23)	(29.66)
Participants	−	+	-0.0243***	-0.0238***	-0.0243***	-0.0235***
			(55.88)	(53.78)	(57.30)	(54.66)
Leader share	?	−	-0.0322***	-0.0319***	-0.0322***	-0.0320***
			(276.92)	(274.32)	(277.32)	(274.66)
Loan size			0.0003***	0.0003***	0.0003***	0.0003***
			(89.31)	(88.18)	(89.49)	(88.14)
Firm size			0.1525***	0.1498***	0.1520***	0.1478***
			(59.27)	(57.56)	(61.75)	(59.31)
Scaled deviance			1.1605	1.1602	1.1595	1.1594
Scaled Pearson χ^2			1.1445	1.1457	1.1431	1.1433

*** Indicates statistical significance at the 0.01 level.

** Indicates statistical significance at the 0.05 level.

* Indicates statistical significance at the 0.10 level.

Table 6

Regression results for sub-samples

This table reports the coefficient estimations of the OLS regressions of the NCA model for two sub-samples. In regressions (1) and (2), the sub-sample is the first and last quartiles of loan size, respectively. In regressions (3) and (4), the sub-sample is the first and last quartiles of loan maturity, respectively.

Sub-sample	Predicted sign		Loan size		Loan maturity	
Quartile	Special.	Monit.	Smallest	Biggest	Shortest	Longest
Intercept			-5.883	-12.099**	-8.770	-28.732***
			(-0.682)	(-2.250)	(-1.228)	(-3.959)
Fee	−	?	-0.010*	-0.001	0.007	0.001
			(-1.963)	(-0.893)	(1.483)	(0.364)
Rating	?	−	-1.072	-1.135**	1.931**	-3.075***
			(-0.875)	(-2.120)	(2.192)	(-3.878)
Covenants	+	−	0.851	-0.210	0.050	-0.608*
			(1.417)	(-0.872)	(0.122)	(-1.852)
Maturity	−	+	0.084***	0.006	0.231	0.007
			(4.547)	(0.768)	(1.286)	(0.453)
Participants	−	+	-0.313***	-0.091**	-0.230***	-0.128***
			(-7.197)	(-2.282)	(-4.520)	(-4.358)
Leader share	?	−	-0.231***	-0.073***	-0.162***	-0.080***
			(-7.358)	(-5.467)	(-6.422)	(-4.652)
Loan size			0.003***	-0.005	0.003***	0.004***
			(7.108)	(-0.740)	(9.446)	(7.462)
Firm size			0.849**	0.975***	0.436	1.753***
			(2.285)	(4.540)	(1.557)	(5.977)
Adjusted R^2			41.2%	22.4%	40.2%	51.8%
F-statistic			8.344***	4.034***	8.315***	12.725***

*** Indicates statistical significance at the 0.01 level.

** Indicates statistical significance at the 0.05 level.

* Indicates statistical significance at the 0.10 level.

Table 7

Chi-square tests for associations in syndicates

This table reports chi-square tests about the difference between the conditional and the unconditional probabilities of banks acting as co-agent (panel A) or participant (panel B) for the top three leaders.

Panel A: Associations between leader and co-agents			
Leader	JP Morgan	Bank of America	Citigroup
Chi-square	278.91***	356.07***	518.11***
Degree of freedom	191	191	191
Panel B: Associations between leader and participants			
Leader	JP Morgan	Bank of America	Citigroup
Chi-square	929.03***	895.06***	796.57***
Degree of freedom	553	553	553

*** Indicates statistical significance at the 0.01 level.

** Indicates statistical significance at the 0.05 level.

* Indicates statistical significance at the 0.10 level.