Lead Arranger Reputation and the Structure of Loan Syndicates

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Abstract
This study explores the effects of information asymmetry and arranger reputations on syndicated loan structures. The moral hazard problem arising from information asymmetries between borrowers and a syndicate can be overcome only by the most reputable arrangers. When arrangers have an information advantage over participants, both moral hazard and adverse selection problems appear. However, the adverse selection problem arises only when low-reputation arrangers lend to opaque borrowers.

Keywords
Syndicated loans, syndicate structure, information asymmetry, reputation.

JEL codes
D82, G21

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1. Introduction

There are two types of lenders in a loan syndicate: first, lead arrangers who structure and arrange the loan and who monitor the borrower after loan signing and, second, participants who passively fund the loan. Information asymmetry problems arise between syndicates and borrowers as well as within syndicates. If arrangers have limited information about borrowers, then the arrangers must overcome their resulting moral hazard problem, e.g. shirking from monitoring because lead arrangers' efforts are unobservable (Holmstrom and Tirole, 1997; Sufi, 2007; Bharath et al., 2011). Lending shares and arranger reputation[1] can serve as devices promoting commitment, whereas prior interactions with borrowers and borrower reputation directly reduce monitoring costs and thus the moral hazard problem (Dennis and Mullineaux, 2000; Jones et al., 2005; Lee and Mullineaux, 2004; Panyagometh and Roberts, 2010; Ross, 2010; Simons, 1993; Sufi, 2007). In sum, moral hazard considerations are driven by the fact that *all* lenders have limited information about borrowers. In contrast, the signaling argument postulates that arrangers know more about borrowers than participants do. Participants anticipate adverse selection problems (e.g., arrangers attempting to syndicate more loans of poor quality), but arrangers can signal loan quality through their lending shares (Sufi, 2007).

We build on the empirical syndicate structure literature, particularly the work of Sufi (2007), with the primary objective of gaining additional insights into the role of arranger reputation in loan syndication. Whereas Sufi (2007) investigates only loans arranged by the 100 most reputable lead arrangers, we consider the total population of arrangers who are active in the syndicated loan market. By analyzing *all* arrangers, including those with poor or unestablished reputations, we are able to test whether the benefits of reputation documented i.e. by Sufi (2007) are universal or

[1] Arrangers are repeat players, and shirking would lead to a loss of reputation and to future quasi-rents (Pichler and Wilhelm, 2001).

restricted only to the most reputable arrangers. Our findings indicate the latter: only the most reputable arrangers are able to use their reputations as credible commitment devices, thereby reducing the moral hazard problem. In contrast, arrangers of average or moderate reputation are not able to overcome the moral hazard problem. Furthermore, we provide new evidence. Whereas Sufi (2007) and Bosch and Steffen (2011)[2] find that moral hazard rather than adverse selection determines the lending shares of the 100 most reputable arrangers, we are the first to document an adverse selection problem that is driven by low-reputation arrangers but that the most reputable arrangers can mitigate.

2. Data and Methodology

From the LPC's Dealscan database, we collect a sample of 17,839 loan deals advanced to 8,701 US firms between January 1986 and August 2007.[3] We conduct our analysis on the deal level and include all deals for which the sales volume of the borrower, the maturity of the loan, the deal amount and the lending shares of syndicate members are available. Our resulting sample is substantially larger than those used in comparable studies and provides a stronger foundation for our conclusions: Sufi (2007) uses 4,414 loans to US borrowers, and Dennis and Mullineaux (2000) rely on a sample of 3,410 loans. Based on this sample, we estimate an empirical model of syndicate structure that closely follows the work of Sufi (2007). We use Dealscan's "Lead Arranger" and "All Lenders" fields to identify lead arrangers and participants[4] and use the

[2] Bosch and Steffen (2011) support the moral hazard aspect of information asymmetry by using a very small sample of 115 observations of non-listed firms and 252 observations of listed firms.

[3] We exclude loans from our sample only when the underlying loan documentation has missing values for our dependent or independent variables. Consistent with Ivashina and Scharfstein (2010) and Haselmann and Watchel (2011), we end our sample period in August 2007 to exclude the 2007-2008 financial crisis. The crisis-induced credit rationing will allow only the best borrowers to raise syndicated loans, and the nature and effects of information asymmetry may differ greatly for this specific sub-sample of borrowers.

[4] We aggregate all syndicate members to their parent company and assume that the information about the borrowers and the participants is shared between subsidiaries and parent companies. Moreover, we assume an exchange of

average percentage share held by all lead arrangers as a proxy for syndicate structure. Dennis and Mullineaux (2000) use a similar proxy but focus on the percentage share held by the participants. We consider information asymmetry, borrower reputation, arranger reputation, arranger-borrower relationship as well as borrower and loan characteristics as potential determinants syndicate structure. Among these groups, our main explanatory variables of interest are arranger reputation for the analysis of moral hazard and arranger-borrower relationship for the analysis of adverse selection.

The opaqueness of the borrower determines the degree of information asymmetry between the borrower and the lender before screening, monitoring, prior relationships or other information asymmetry-reducing actions take effect. The banking literature often uses accounting ratios, such as market value of assets to the book value of assets or the ratio of gross total assets to gross physical assets of the borrower, as a measure of opacity (Strahan, 1999; Piatti and Dell'Ariccia, 2004). In contrast, we follow Dennis and Mullineaux (2000), Sufi (2007) and Bosch and Steffen (2011) who argue that information is more likely to be transparent when the borrower has a credit rating or is a listed firm. Based on the information about the borrower's rating and ticker given in the Dealscan database, we identify *opaque borrowers* as those who lack a rating, a ticker or both. However, even an opaque borrower can have a reputation in the loan market. If a borrower accessed the loan market in the past, he is already known among banks and information asymmetry may therefore be reduced. Thus the borrower is considered to be reputable (Sufi, 2007). *Previous borrower* is our proxy for borrower reputation and is measured as the natural log of 1 plus the number of prior loans raised by the borrower in the five years prior to the loan signing.

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information when there is a merger or an acquisition because acquiring banks inherit both previous lead arranger-participant relationships and previous borrowing firm relationships of the acquired bank.

Our main explanatory variable of interest is *lead arranger reputation*, which is measured as an arranger's market share in the year prior to loan signing. We also identify different levels of arranger reputation by splitting the arrangers into percentiles based on their market share in any given year: The most reputable arrangers fall into the top 10% of the market share distribution (90^{th} *percentile* $\leq$ *market share*), followed by arrangers in the next 10% of the distribution (*80th percentile* $\leq$ *market share* < *90th percentile)* , and so on. We consider all 1,080 arrangers who are involved in our sample of 17,839 loans. For an average (median) syndicate, the arranger's reputation is reflected by a market share of only 0.79% (0.07%). In contrast, Sufi (2007) reports an average (median) market share of 9% (5%) for his sample of loans arranged by the top 100 arrangers.[5]

When measuring the borrower-lead arranger relationship, we use a dummy variable equal to 1 if the current lead arranger has also served as lead arranger for the borrower in the past 5 years. As Sufi (2007) explains, such a *former lead* proxy allows the distinction between the adverse selection aspect and the moral hazard aspect of information asymmetry between lead arranger and participants. On the one hand, if lead arrangers have private information from prior interactions with the borrower, they may be tempted to syndicate out more of the loan if the private information is negative. To prevent this adverse selection problem, participants require a higher lending share from these lead arrangers. On the other hand, if lead arrangers have private information from prior interactions with the borrower, then lead arrangers have already made an effort to acquire information and there is less need to commit to monitoring. Thus, the moral hazard problem between lead arrangers and participants is reduced, and the lead arranger can hold a smaller share in the loan.

[5] Descriptive statistics for all our variables are available in Panel A of Table A1 in the Appendix.

We use a number of additional control variables that have been shown to determine syndicate structure. We use the sales of the borrower (*borrower size*) and deal size of the loan (*loan size*) as proxies for the size of the firm and the loan, respectively. Consistent with Sufi (2007), we also divide the deal size of the loan into three size groups based on the bottom, mid and top 33% of the distribution and define dummies for medium-sized (*middle*) and large loans (*large*) to capture the effects of different loan size groups – both directly as well as in interaction with loan size itself. Because longer-term loans have different dynamics compared to shorter ones, we include *loan maturity* as a control. From the lender's perspective, term loans entail less liquidity problems because they are drawn down immediately at the beginning of the loan; thus, we include a *term loan* dummy in our analysis. To capture the impact of deals with *multiple tranches*, we use dummies for loans that belong to such multiple-tranche deals. We also include dummies for the year of loan signing, the loan purpose and the industry of the borrower to capture their effects in our regressions.[6]

Panel B of Table 1 provides descriptive statistics regarding the lead arranger's lending share for different types of borrowers and arrangers. These initial results confirm our expectations: On average, the arranger's lending share is higher for opaque than for transparent borrowers (67.30% versus 27.68%) and for first-time than for previous borrowers (62.11% versus 45.73%). Furthermore, the lending share increases steadily as the lead arranger's reputation level decreases. In line with Sufi, we use OLS regression analysis to investigate the relationship between syndicate structure and its potential determinants in more detail. For all regressions, we report standard errors that are heteroskedasticity robust and clustered at the borrower level.

[6] We do not control for spreads because Ivashina (2009) highlights that loan spreads and syndicate structure are simultaneously determined (see also Bosch and Steffen, 2011).

3. Results

Table 1 provides our results regarding the syndicate structure determinants with specific focus on the role of lead arranger reputation in reducing information asymmetry. Our dependent variable is the average percentage share held by the lead arranger. Our results in regression (1) are consistent with existing empirical evidence in terms of borrower opaqueness: The positive and significant coefficient for an *opaque borrower* confirms that syndicates are more concentrated for borrowers who need more monitoring. Thus, by holding a higher lending share, lead arrangers signal their monitoring commitment to participants. The insignificant coefficient for a *previous borrower* indicates that the reputation of the borrower in the syndicated loan market cannot reduce the problems of information asymmetry. In contrast to borrower reputation, however, arranger reputation can reduce the problem of information asymmetry as the negative and significant coefficient for the *lead arranger market share* shows.[7] The coefficients of our control variables are generally consistent with the literature. Nevertheless, our information asymmetry proxy is still significant. In particular, our results for term loans are consistent with Gatev and Strahan (2009). Term loans create a less significant liquidity problem for lenders because they are disbursed at the beginning of the loan term and lenders face no uncertainty regarding their liquidity position. Due to this lower liquidity risk in the term loans, the lead arrangers are willing to hold more.

In regression (2) we explore the *level of lead arranger reputation* in more depth: The most reputable lead arrangers with a market share above the 90th percentile of the distribution can reduce their lending shares by 4.26% compared to a non-reputable lead arranger.[8] In contrast, a less reputable lead arranger with a market share between the 80th and 90th percentile of the distribution can only reduce his lending share by 2.27%. These effects are not only statistically but also economically significant as compared to the average lending share of 55.34% in our sample. For lower levels of lead arranger reputation, the effect becomes smaller and less significant and finally disappears for lead arrangers below the 60th percentile of the distribution.

[7] When we include an interaction term of borrower reputation and opaque borrower, its coefficient is statistically insignificant indicating that borrower reputation cannot even reduce the information asymmetry problem for opaque borrowers. Similarly, the coefficient of an interaction term of lead arranger reputation and opaque borrower is statistically insignificant indicating that the lead arranger reputation effect is universal and not restricted to opaque borrowers. The results are available upon request.

[8] The excluded dummy represents lead arrangers with a market share below the 50th percentile of the distribution. These lead arrangers are considered to be non-reputable.

In addition, F-tests indicate that the reputational effect for the most reputable lead arrangers is significantly larger than the effect for the other reputation levels.[9] Overall, these findings are consistent with the work of Sufi (2007:650), who argues that "only lead arrangers with reputation in the extreme right tail of the distribution can completely offset the effect of information asymmetry". While Sufi (2007) documents the existence of this effect for the 100 most reputable lead arrangers only, our results explicitly show that this effect is indeed weakening and ultimately absent for the remaining, less reputable lead arrangers.

[Insert Table 1 about here]

In Panel A of Table 2, the past relationship between a lead arranger and a borrower allows us to distinguish between the adverse selection and moral hazard aspects of information asymmetry. If the private information that is obtained by arrangers from prior interactions with a borrower leads to an adverse selection problem, then participants require a higher lending share from these arrangers, and we would expect to find a positive coefficient for our *former lead* proxy. If, in contrast, the private information that is obtained from prior interactions with the borrower reduces monitoring costs and results in a decrease in the moral hazard, then arrangers can hold a smaller lending share. In this case, the *former lead* proxy should show a negative coefficient. In support of the moral hazard aspect of information asymmetry, we find a negative coefficient for *former lead* in regression (1) indicating that arrangers hold less when they have a previous relationship with the borrower. However, the positive coefficient of the "Former lead * Opaque borrower" interaction term in regression (2) indicates the existence of an adverse selection problem for opaque borrowers. Note that once we include this interaction term, the coefficient of opaque borrower becomes insignificant indicating that the adverse selection problem fully explains the higher lending share for opaque borrowers.

[9] The results of these F-tests are available upon request.

The presence of *both* moral hazard and adverse selection contrasts with the work of Sufi (2007) and Bosch and Steffen (2011), who finds evidence only for moral hazard. However, the inclusion of many low-reputation arrangers in our sample may be the driver for our results. In regression (3), we therefore add triple interaction terms between former lead, opaque borrower and different levels of lead arranger reputation. For the most reputable lead arrangers, the coefficient of this triple interaction effect of -4.56 is almost identical in absolute size to the coefficient of the "opaque borrower * former lead" interaction effect of 4.35 indicating that the most reputable lead arrangers can fully overcome the adverse selection problem. For lead arrangers with market shares above the 60th percentile, the triple interaction effects also have negative and significant coefficients but the absolute size and statistical significance of the coefficients decreases with decreasing reputation. Panel B of Table 2 confirms our interpretation. Here we calculate F-tests on the joint significance of the coefficients of the "Former lead * Opaque borrower" interaction effect and the triple interaction effect. For reputable lead arrangers with market shares above the 60th percentile, these F-tests indicate that jointly the two coefficients are not significantly different from zero. In other words, lead arranger reputation can overcome adverse selection problems such that the adverse selection problem remains only when low-reputation arrangers lend to opaque borrowers.

[Insert Table 2 about here]

4. Conclusions

Overall, our results show that information asymmetry has a substantial influence on the structure of loan syndicates. The reputation of lead arrangers but not of borrowers is crucial in overcoming information asymmetry problems. In particular, the moral hazard problem arising

from information asymmetries between borrowers and syndicates can be mitigated only by the most reputable arrangers. When arrangers have an information advantage over participants, both moral hazard and adverse selection problems arise. Here, adverse selection problems occur only in loans to opaque borrowers, in which participants expect arrangers to behave opportunistically. Only the most reputable arrangers can mitigate this adverse selection problem.

The finding that low-reputation arrangers in particular behave opportunistically and create adverse selection problems has important implications for participants and for policy makers. Participating banks must correctly anticipate an arranger's behavior and appropriately manage their risk exposure in syndicated lending. Policy makers should realize that the exposure and contribution of arrangers to the overall systemic risk of the lending market depends on the reputations of lead arrangers. Thus, a uniform policy to mitigate such risk may have asymmetric effects, whereas a policy to limit the opportunistic behaviors of average low-reputation lead arrangers may not be effective.

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Appendix

[Insert Table A1 here]

Table 1
Moral hazard in syndicated lending

	Lead arranger's lending share	
	(1)	(2)
Information asymmetry		
Opaque borrower	2.33 ***	2.28 ***
	(4.12)	(4.03)
Borrower reputation		
Previous borrower	-0.43	-0.43
	(-1.35)	(-1.33)
Lead arranger reputation		
Lead arranger market share	-0.74 ***	
	(-6.33)	
Dummy indicating level of lead arranger reputation:		
90 pct ≤ market share		-4.26 ***
		(-6.35)
80 pct ≤ market share < 90 pct		-2.27 ***
		(-3.40)
70 pct ≤ market share < 80 pct		-1.50 **
		(-2.44)
60 pct ≤ market share < 70 pct		-1.23 **
		(-1.99)
50 pct ≤ market share < 60 pct		-0.46
		(-0.70)
Control variables		
Borrower size	-0.75 ***	-0.73 ***
	(-4.07)	(-3.94)
Loan size	-9.24 ***	-9.22 ***
	(-28.27)	(-28.12)
Loan size * Middle	-10.01 ***	-9.99 ***
	(-25.30)	(-25.24)
Loan size * Large	2.06 ***	2.04 ***
	(4.61)	(4.57)
Loan maturity	-3.64 ***	-3.65 ***
	(-12.91)	(-12.95)
Term loan	3.57 ***	3.57 ***
	(6.21)	(6.21)
Multiple tranches	0.66	0.65
	(1.52)	(1.50)
Adjusted R^2	0.693	0.693
Observations	17,839	17,839

This table presents OLS regression results. All regressions include loan purpose, loan size, industry and year dummies. For variable definitions see Table A1. For each independent variable, the top row reports the estimated coefficient, and the bottom row reports the t-statistic in parentheses. Standard errors are heteroskedasticity-robust and clustered at the borrower level.

* indicates significance at the 5% level.

** indicates significance at the 1% level.

Table 2
Moral hazard versus adverse selection in syndicated lending

	Lead arranger's lending share		
	(1)	(2)	(3)
Information asymmetry			
Opaque borrower	2.35 **	0.91	1.13
	(4.18)	(1.27)	(1.57)
Borrower reputation			
Previous borrower	-0.13	-0.08	-0.05
	(-0.37)	(-0.24)	(-0.14)
Lead arranger reputation			
Lead arranger market share	-0.75 **	-0.75 **	-0.65 **
	(-6.45)	(-6.46)	(-5.26)
Lead arranger's information advantage			
Former lead	-1.31 **	-3.48 **	-3.48 **
	(-3.65)	(-5.68)	(-5.69)
Opaque borrower * Former lead		3.15 **	4.35 **
		(4.29)	(5.62)
Opaque borrower * Former lead * Lead arranger reputation level			
90 pct ≤ market share			-4.56 **
			(-3.25)
80 pct ≤ market share < 90 pct			-4.41 **
			(-3.24)
70 pct ≤ market share < 80 pct			-3.61 **
			(-3.01)
60 pct ≤ market share < 70 pct			-2.63 *
			(-2.42)
50 pct ≤ market share < 60 pct			-0.87
			(-0.71)
Control variables			
Borrower size	-0.75 **	-0.77 **	-0.76 **
	(-4.10)	(-4.22)	(-4.15)
Loan size	-9.24 **	-9.23 **	-9.14 **
	(-28.29)	(-28.26)	(-28.04)
Loan size * Middle	-9.99 **	-9.96 **	-9.96 **
	(-25.28)	(-25.25)	(-25.26)
Loan size * Large	2.06 **	2.11 **	2.03 **
	(4.62)	(4.77)	(4.58)
Loan maturity	-3.65 **	-3.66 **	-3.67 **
	(-12.97)	(-13.03)	(-13.07)
Term loan	3.55 **	3.58 **	3.58 **
	(6.18)	(6.23)	(6.23)
Multiple tranches	0.65	0.63	0.59
	(1.50)	(1.48)	(1.38)
Adjusted R^2	0.693	0.694	0.694
Observations	17,839	17,839	17,839

This table presents OLS regression results. All regressions include loan purpose, loan size, industry and year dummies. For variable definitions see Table A1. For each independent variable, the top row reports the estimated coefficient, and the bottom row reports the t-statistic in parentheses. Standard errors are heteroskedasticity-robust and clustered on the borrower level.

* indicates significance at the 5% level.

** indicates significance at the 1% level.

Table 3
Overcoming adverse selection

	H_0: coefficient(Opaque borrower * Former lead) + coefficient(Opaque borrower * Former lead * Lead arranger reputation level) = 0	
	F statistic	significance level
F-test for lead arranger reputation level		
90 pct ≤ market share	0.02	0.887
80 pct ≤ market share < 90 pct	0.00	0.966
70 pct ≤ market share < 80 pct	0.32	0.570
60 pct ≤ market share < 70 pct	2.05	0.153
50 pct ≤ market share < 60 pct	6.93	0.009

This table presents F-tests regarding regression (3) of Table 2.

Table A1
Variable definitions and descriptive statistics

Panel A: Information for the full sample of 17,839 loans

variable	definition	mean	median	standard deviation	N
Lead arranger's lending share	Percentage of the loan deal funded by lead arranger (1.0=1%). In case of multiple arrangers, the average across all arrangers is used.	55.35	50.00	37.97	17,839
Opaque borrower	Dummy=1 if the borrower is lacking an S&P senior debt rating, a ticker or both.	0.70	1.00	0.46	17,839
Previous borrower	Natural logarithm of 1 plus the number of prior loans raised by the borrower in the 5 years prior to loan signing.	0.47	0.00	0.62	17,839
Lead arranger market share	Market share of the lead arranger in the year prior to loan signing (1.0=1%). In case of multiple arrangers, the average across all arrangers is used.	0.79	0.07	1.71	17,839
Borrower size	Natural logarithm of the borrower's sales volume in millions of US dollar at the time of loan signing.	19.31	19.28	2.05	17,839
Loan size	Natural logarithm of the deal amount in millions of US dollar.	17.81	17.92	1.95	17,839
Loan maturity	Natural logarithm of average maturity in days across all tranches belonging to the same deal.	6.81	6.98	0.83	17,839
Term loan	Dummy=1 if the loan deal includes term loan.	0.15	0.00	0.35	17,839
Multiple tranches	Dummy=1 if the loan deal consists of multiple tranches.	0.25	0.00	0.43	17,839

Panel B: Lead arranger's lending share for different sub-samples

variable	sub-sample	mean	median	standard deviation	N
lead arranger's lending share if	opaque borrower = 1	67.30	95.83	35.59	12,457
lead arranger's lending share if	opaque borrower = 0	27.68	16.67	27.39	5,382
lead arranger's lending share if	previous borrower = 0	62.11	60.00	37.42	10,475
lead arranger's lending share if	previous borrower > 0	45.73	30.77	36.63	7,364
lead arranger's lending share if	level of lead arranger reputation:				
	90 pct ≤ market share	34.18	20.00	32.52	1,706
	80 pct ≤ market share < 90 pct	36.29	22.86	32.09	1,864
	70 pct ≤ market share < 80 pct	41.70	26.51	35.40	1,783
	60 pct ≤ market share < 70 pct	47.54	34.00	35.60	1,783
	50 pct ≤ market share < 60 pct	57.60	50.00	36.38	1,795
	market share < 50 pct	67.23	100.00	36.67	8,908

In Panel B, the levels of lead arranger reputation are defined as follows: "90 pct ≤ market share" identifies a lead arranger whose market share is equal or above the 90th percentile of the lead arranger market share distribution in the year prior to loan signing. "80 pct ≤ market share < 90 pct" identifies a lead arranger whose market share is equal or above the 80th percentile but below the 90th percentile of the lead arranger market share distribution in the year prior to loan signing. The remaining levels are defined accordingly.