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ABSTRACT

This paper estimates the cost arising from information asymmetry between the lead bank and members of the lending syndicate. In a lending syndicate, the lead bank retains only a fraction of the loan but acts as the intermediary between the borrower and the syndicate participants. Theory predicts that asymmetric information will cause participants to demand a higher interest rate and that a large loan ownership by the lead bank should reduce this effect. In equilibrium, however, the asymmetric information premium demanded by participants is offset by the diversification premium demanded by the lead. Using shifts in the idiosyncratic credit risk of the lead bank's loan portfolio as an instrument, I measure the asymmetric information effect of the lead's share on the loan spread and find that it accounts for approximately 4% of the total cost of credit.

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1. Introduction

Theory suggests that ownership should be an important mechanism for mitigating the effects of asymmetric information. According to the Leland and Pyle (1977) model, an increase in the informed party's share of ownership would signal a higher quality of the underlying project, thereby reducing the cost of asymmetric information. However, there is little, if any, direct evidence supporting this prediction. The effect of ownership on asymmetric information is difficult to show because

ownership is endogenous. The syndicated loan market offers a special case of asymmetric information between the lead bank and participants in the lending syndicate. Consistent with theoretical predictions, the lead bank's ownership of the loan should reduce asymmetric information between the lead and participants, which should lower the overall loan spread. The advantage of looking at the syndicated loan market is that the lead bank's loan portfolio is observable. This enables me to identify shifts in the lead's ownership that are driven by the lead bank's loan portfolio diversification and that are exogenous to the asymmetric information in the lending syndicate. Using the diversification shifts as an instrument, I can isolate the asymmetric information effect of the lead's loan ownership on the spread.

Over the past two decades, the syndicated loan market has become the largest source of worldwide corporate financing. In the United States, syndicated loan issuance grew from approximately \$150 billion in 1987 to \$1.7 trillion in 2006, surpassing corporate bond issuance, which in 2006 reached a record \$1.04 trillion. The US market accounts for half of the worldwide activity. In contrast to a traditional bank loan, which involves a single lender, a syndicated loan involves a group of lenders. The loan is originated by a lead bank which sells pieces of the

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loan to other (participant) banks. Although the lead bank retains only part of the loan, it acts as the manager for the loan with primary responsibility for *ex ante* due diligence and for *ex post* monitoring of the borrower. Participant banks depend on the information collected by the lead bank. However, there is an adverse selection problem because the lead bank has incentives to syndicate bad or risky loans. In addition, there is a moral hazard problem because, after the lead bank sells parts of the loan to syndicate participants, its incentive to continue monitoring is reduced. Thus, whereas spread in a traditional bank loan is determined by borrower characteristics, in a syndicated loan the private content of the information collected by the lead bank induces an additional premium, driven by the degree of information asymmetry between the lead and participant banks.

An increase in the lead bank's share of the loan would reduce asymmetric information between the lead and participants, thus *decreasing* the premium demanded by the participant banks. This prediction is the same for the adverse selection and moral hazard effects. On the other hand, an increase in the lead bank's share of the loan would also increase the lead's credit-risk exposure, thus *increasing* the premium demanded by the lead bank. Indeed, Pavel and Phillis (1987), Pennacchi (1988), Gorton and Pennacchi (1995), and Demsetz (1999) showed that credit-risk diversification is among the main reasons for loan sales by the lead bank. Thus, two opposing effects—*asymmetric information and diversification—simultaneously* influence the loan spread. The loan spreads and syndicate structures observed in the data represent a set of equilibrium points; therefore, the adverse selection/moral hazard effect cannot be identified without an exogenous instrument.

The instrument proposed here builds on the intuition of Leland and Pyle (1977). The lead bank typically retains a very large share of the loan and is therefore uniquely exposed to idiosyncratic credit risk. Thus, controlling for overall credit risk, a *unique* contribution to the lead bank's portfolio credit risk would shift the diversification premium demanded by the lead bank without affecting the premium required by the participant banks. To construct the instrument, I build the lead bank's loan portfolio for each loan and use annual information on industry-level default correlations to construct the standard deviation of the probability of default of the lead's loan portfolio, a measure that positively correlates with the credit-risk premium demanded by the lead bank.

After instrumenting the lead bank's share, I find the asymmetry of information amongst the syndicate participants to have a large economic cost reflected in the spread charged to the borrower: A 9 percentage points change in lead share (from 10% to 19%) translates to a change in loan spread of approximately 29 basis points (bps). This estimate implies that information asymmetry within the lending syndicate accounts for approximately 4% of the total credit cost. This result is robust to controls for credit ratings and lead bank reputation.

Several previous papers have looked at the determinants of the lending syndicate, including Simons (1993), Preece and Mullineaux (1996), Dennis and Mullineaux

(2000), Jones, Lang, and Nigro (2000), Lee and Mullineaux (2004), Panyagometh and Roberts (2002), Esty and Megginson (2003), and Sufi (2007). Their common finding is that syndicate structure is determined by the availability of public information about the borrower as much as by loan-contract characteristics and borrower credit risk. As there is more public information available about a borrower, a larger fraction of a loan is likely to be syndicated. This relation was previously interpreted as evidence of an information asymmetry problem between the lead bank and the participants in a lending syndicate. However, as discussed earlier, the lead share observed in the data is a set of equilibriums resulting from interactions between the lead and participant banks. In the absence of instruments, interpretation of the observed data is problematic.

To the best of my knowledge, Gorton and Pennacchi (1995) is the only other paper that focuses on the effect of the lead bank's share on the loan spread. In the context of secondary-market loan sales, the authors find a negative relation between the selling bank's share and the premium demanded by purchasing banks. However, the economic effect is insignificant. More recently, Carey and Nini (2007) found, in a cross-country study of the interest rate spreads, that, for a given loan size, larger lending syndicates tend to be associated with higher loan spread. This result is consistent with my findings.¹ Overall, the novelty of my paper is that I instrument the asymmetric information and diversification effects.

The remainder of the paper is structured in four sections: empirical framework and data, results, robustness checks, and conclusions.

2. Empirical framework and data

2.1. Empirical framework

Loan syndication is a process whereby a lead bank initiates a loan and then sells shares of that loan to other financial institutions. Before and after the syndication, the lead bank acts as an agent for the lending syndicate by collecting and processing information about the borrower. Prior to syndication, the lead bank conducts due diligence on the borrower and presents a confidential memorandum to potential buyers, summarizing its assessment of the borrower's quality. After syndication, the lead bank is in charge of monitoring the borrower. Before the loan is syndicated, then, there is an adverse selection problem because the lead bank has an incentive to syndicate loans of lower quality.² After the loan is syndicated, there is a

¹ For the US sample, the correlation between the loan share retained by the lead bank and the number of lenders in the syndicate is -0.70 .

² Lead banks may have an incentive to originate high-risk loans due to the private benefits of building a relationship with the borrower and/or to the underwriting fees charged to the borrower at the origination of the loan. Examples of wrongdoing by lead banks include the collapse of Penn Square Bank, which was servicing in excess of \$2 billion in participations when it defaulted, and Chase Manhattan's \$245 million loan to AroChem (Bank Brussels Lambert and Skopbank v. Chase Manhattan Bank, 1996 US Dist. LEXIS 15631). In general, litigation between syndicate members is rare because: (a) syndicate loans are not

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