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Competition or Collaboration? The Reciprocity Effect in Loan Syndication

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It is well recognized that loan syndication generates a moral hazard problem by diluting the lead arranger's incentive to monitor the borrower. This paper proposes and tests a novel view that reciprocal arrangements among lead arrangers serve as an effective mechanism to mitigate this agency problem. Lender arrangements in about seven out of ten syndicated loans are reciprocal in the sense that lead arrangers also participate in loans that are led by their participant lenders. I develop a model in which syndicate lenders share reciprocity through such arrangements in a repeated-game setting as monitoring effort enhances lead arrangers' ability to profit from participating in loans led by others. The model generates specific predictions that I then confront with the data. I find strong and consistent empirical evidence on the reciprocity effect. Controlling for lender, borrower, and loan characteristics, I show that: (i) lead arrangers retain on average 4.3% less of the loans with reciprocity than those without reciprocity, (ii) the average interest spread over LIBOR on drawn funds is 11 basis points lower on loans with reciprocity, and (iii) the default probability is 4.7% lower among loans with reciprocity. These results indicate a cooperative equilibrium in loan syndication and have important implications to lending institutions, borrowing firms, and regulators.

Key words: Loan syndication, moral hazard, reciprocity, relationship lending

JEL Codes: G21, G32, D82

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1 Introduction

The syndicated loan market has experienced tremendous growth and become an increasingly important source of corporate finance since the early 1990s.[1] Based on the loan origination data from *DealScan*, the amount of newly originated syndicated loans in the U.S. increased six times from about $240 billion in 1992 to over $1.7 trillion in 2006. It is equivalent to a compound annual growth rate of 15% during these 15 years.

In spite of its rising importance and many benefits to both lenders and borrowers,[2] syndicated lending presents an inherent moral hazard problem that lies in the very nature of syndication. A syndicated loan is a credit facility that two or more lending institutions *jointly* agree to provide to a borrowing firm. A syndicate consists of two groups of members: lead arranger(s) and participant lenders. In its typical role as the borrower's relationship bank, the lead arranger forms the syndicate and acts as the managing agent for the group of lenders. Its main responsibilities include monitoring the borrower,[3] distributing interests and principal repayments, enforcing financial covenants, etc. On the other hand, the role of participant lenders is mainly funding part of the loan.

Based on Holmstrom (1979) and Holmstrom and Tirole (1997), moral hazard exists in this market because: (i) the lead arranger is the informed lender, whereas participant lenders are usually less informed, (ii) the lead arranger's due diligence and monitoring effort is costly but often unobservable, and (iii) syndication leads to a smaller stake in the loan for the lead arranger, which dilutes its incentive to monitor the borrower.[4]

These issues suggest that opportunistic behavior by lead arrangers should be commonplace and moral hazard induced by syndication may be so severe as to jeopardize the value of the intermediation service. There has, however, been little empirical evidence on this. Simon (1993) shows that a larger portion of quality loans are syndicated, Panyagometh and Roberts (2002) conclude that agency problems do *not* prevail in loan syndication, and Sufi (2007) states that default rates in the syndicated loan market are indeed quite low. This presents us with an interesting conundrum: How does the syndicated loan market overcome the obvious moral hazard problem of opportunistic behavior by lead arrangers?

Two explanations have been offered thus far. One is that *incentive* mechanisms to cope with moral hazard are put in place by virtue of the lead arranger retaining a larger share of a loan that presents more severe information asymmetry and/or requires more intense

[1] Among others, Armstrong (2003), Gadanecz (2004), and Rhodes (2000) are excellent references for the history and current condition of the syndicated loan market.

[2] For example, syndication diversifies risk in lenders' loan portfolios by lowering risk exposure to individual borrowers. Syndicating a portion of the loan may be necessary when the lead arranger faces capital constraints or binding regulatory requirements such as minimum capital-asset ratio and maximum size of any single loan to a bank's equity capital.

[3] Monitoring responsibilities are typically delegated to the lead arranger in the sense of Diamond (1984).

[4] A paper in which there are multiple lenders who benefit from each other's monitoring/screening efforts is Ramakrishnan and Thakor (1984). In that paper, the free-riding problem is resolved by assuming that these lenders are all part of the *same* intermediary and hence can monitor each other.

monitoring and due diligence. Empirical evidence appears to support this hypothesis [e.g., Lee and Mullineaux (2004), Jones, Lang and Nigro (2005), and Sufi (2007)]. Another explanation is that *reputation* concerns of the lead arranger mitigate the agency problems in loan syndication [e.g., Diamond (1991) and Boot, Greenbaum and Thakor (1993)]. Dennis and Mullineaux (2000) show that a loan is more likely to be syndicated as the lead arranger becomes more reputable. Gopalan, Nanda and Yerramilli (2007) further show that the lead arranger suffers a loss of reputation following borrower bankruptcy. Sufi (2007) finds that reputation mitigates, but does not completely eliminate, agency problems. Some aspects of the syndicated loan market, however, *cannot* be explained by the existing theories, even combined. For example, while the theories predict that a less reputable lead arranger is unable to syndicate a large amount of a loan that is lent to an informationally opaque firm, there exist a significant number of syndicated loans showing just the opposite. Such unresolved puzzles call for a third explanation.

I provide in this paper a novel view on how the moral hazard problem is mitigated in loan syndication. It starts with some interesting observations about the data pertaining to the syndicated loan market. First, many lenders are engaged in both leading and participating in syndicated loans. In the U.S. market, 77% of lead arrangers are also participants of some other loans. Second, the largest lead arrangers are typically the largest participant lenders. For example, JPMorganChase is both the Number 1 lead arranger and the Number 3 participant lender in the U.S. market during 2004-2006. Meanwhile, seven of the ten largest lead arrangers are also among the ten largest participant lenders. Third, it is a common practice for lenders to maintain stable relationships with certain other lenders and rotate their roles between leading and participating within the group. Consider, for example, the relationship between the two largest lead arrangers. During 2004-2006, Bank of America participated in 1,133 syndicated loan facilities (39%) that were arranged by JPMorganChase as a sole lead in the U.S. market. At the same time, JPMorganChase participated in 875 loan facilities (28%) that were arranged solely by Bank of America.[5] Thus, lender arrangements in loan syndication are *reciprocal* in the sense that lead arrangers often participate in loans that are led by their participant lenders.

The main contribution of this paper is to show that such reciprocal arrangements serve as an effective mechanism to mitigate moral hazard in the syndicated loan market by providing lead arrangers *additional* incentive to monitor borrowers through loan participation. I call this effect the "*reciprocity*" effect in loan syndication as lead arrangers mutually benefit from each another's monitoring effort and improve Pareto efficiency.[6]

[5] See *Tables 1* and *2* for detailed statistics.

[6] Another agency problem loan syndication presents is adverse selection. That is, lead arrangers have the incentive to syndicate loans that are of inferior quality while keeping the good loans to themselves. Although the focus of this paper is on moral hazard, the rationale behind the mitigation of moral hazard by reciprocal arrangements can be similarly applied to reducing adverse selection.

The first part of the paper develops the theory. The model assumes two banks in an infinitely repeated game, each leading a loan and participating in the loan led by the other in every period. This reciprocal participation allows both banks to free-ride on each other's origination expertise and monitoring effort and enjoy the rents from relationship lending on both loans as long as they both monitor their respective borrowers as the lead arrangers. The key to the cooperative equilibrium is the threat of not inviting a lead arranger whose loan previously failed. The lead arrangers infer each other's monitoring effort by observing the outcomes of the loans. This lends credibility to the threat faced by each lead arranger that it will not be invited to participate in a future syndicate led by its participant lender in case the present loan defaults, and thereby results in an equilibrium in which the lead arranger always monitors. The model generates specific predictions on syndicate structure, loan pricing, and default probability. That is, the moral hazard problem is *reduced* among loans whose lead arrangers share reciprocity with one or more participant lenders; this reduced moral hazard results in: (i) a *smaller* share of the loan retained by the lead arranger, (ii) a *lower* interest rate charged to the borrower, and (iii) a *lower* probability of loan default.

The second part of the paper then empirically tests these predictions. Using the loan information available from *DealScan*, I construct a sample of 46,448 syndicated loan facilities made to non-financial U.S. firms between 1992 and April 2007. A syndicated loan is defined as "having reciprocity" if its lead arranger and at least one of the participant lenders switch their roles as lead and participant in another syndicated loan. I further define different forms of reciprocity, i.e., current, past, and future reciprocity, based on how the periods of two loans that share reciprocity overlap. Four measures of reciprocity are designed to examine the existence, breadth, depth, and length of reciprocity at the syndicated loan facility level. Moreover, in order to show that reciprocity matters to the structure of the syndicate as well as the design of the loan contract, I differentiate reciprocity that is in existence at the time of origination (*ex ante* only) from reciprocity that is observed over the entire sample period (both *ex ante* and *ex post*). These empirical measures of reciprocity are novel additions to the literature. About seven out of ten (71%) syndicated loan facilities in my sample present *current reciprocity at origination*, abbreviated as "reciprocity."

With the data and reciprocity measures described above, I find strong and consistent empirical evidence on the reciprocity effect. Controlling for lender, borrower, and loan characteristics, I show that: (i) lead arrangers retain on average 4.3% *less* of the loans with reciprocity than those without reciprocity, (ii) the average interest spread over LIBOR on drawn funds is 11 basis points *lower* on loans with reciprocity, and (iii) the default probability is 4.7% *lower* among loans with reciprocity. These results are both statistically and economically significant. For example, the average share of the loan retained by the lead arranger is 29.5%, so a share that is 4.3% less is a reduction of 15%; with an average loan amount of $217 million, this implies that funds of $9 million per syndicated loan can

be freed up for the lead arranger if it shares reciprocity with one of the participant lenders. Similarly, reciprocity means that loans are on average charged a 5% lower interest spread and have a 52% lower chance of default. Furthermore, I find that the greater the magnitude of reciprocity, the stronger the effect.

One may argue that the reciprocity effect is mostly an effect of some borrower, loan, and lead arranger characteristics since reciprocity is more likely to exist if the borrower is larger or more informationally transparent, if the loan amount is greater, or if the lead arranger and/or the borrower have better reputation. To address this endogeneity problem, other than having control variables and various fixed effects in the regressions, I examine the interaction terms of reciprocity and information asymmetry, borrower size, loan size, and lead arranger and borrower reputation. I find that the reciprocity effect persists even for informationally opaque borrowers, smaller borrowers, smaller loans, less reputable lead arrangers, and less reputable borrowers. Meanwhile, the results are robust to various reciprocity and information asymmetry measures.

However, this is not to say that reciprocity is a stand-alone mechanism for overcoming moral hazard, independent of the *incentive* and *reputation* effects. On the contrary, it complements both effects. First, the *incentive* effect requires that the lead arranger hold a sufficiently high stake of the loan itself to assure participant lenders that it will monitor the borrower. Reciprocity enhances this effect in that the share of profits the lead arranger expects to receive from being invited to participate in loans led by its participants generates a propensity to monitor that works in concert with the *incentive* effect. Thus, the model predicts that the lead arranger needs to retain a smaller fraction of the loan with reciprocity than without, which is precisely what my empirical results reveal.

Second, the *reputation* effect implies that only reputable lead arrangers with good track records are able to form future syndicates while others lose market shares in the long run. In the presence of reciprocity, the lead arranger's reputation affects not only the number or amount of loans it is able to lead but also the business it receives as a participant lender. To put it differently, the punishment in the *reputation* effect is the inability to lead, whereas the punishment in the *reciprocity* effect is the inability to participate. Meanwhile, reciprocity makes it possible for lenders with lesser reputation to retain smaller shares of the loans and charge lower interest spreads to the borrowers.

This paper is related to both the theoretical and empirical strands of the growing literature on loan syndication. Focusing on the rationale for loan syndication, theoretical papers include Wilson (1968), Chowdhry and Nanda (1996), and Pichler and Wilhelm (2001). The main results in this literature are that syndicates are formed for risk-sharing reasons and to circumvent regulations regarding bank capital requirements and lending limits.[7]

[7]Recently, Tykvová (2007) has analyzed the role of reputation in the syndication dynamics, i.e., the know-how transfer between syndication partners and their ability to learn.

Empirical studies on syndicated loans have examined the determinants of the ownership structure of the syndicate. The main questions addressed are how information asymmetry affects syndicate structure and what role lead arranger and borrower reputation plays in syndication decisions. Examples are Simons (1993), Dennis and Mullineaux (2000), Panyagometh and Roberts (2002), Lee and Mullineaux (2004), Jones, Lang and Nigro (2005), Sufi (2007), François and Missonier-Piera (2007), and Gopalan, Nanda and Yerramilli (2007).[8,9] Empirical papers on the pricing of syndicated loans are fewer. Examples are Focarelli, Pozzolo and Casolaro (2008), Gupta, Singh and Zebedee (2008), and Ivashina (2009).[10] In contrast to this literature, I not only examine both syndicate structure and loan pricing but also show how reciprocity reduces the probability of borrower default.

There are other lines of research on syndicated loans. For example, Nandy and Shao (2007) examine institutional investors that have recently arrived in this market. Boehmer and Megginson (1990), Esty (2001), Esty and Megginson (2003), Nini (2004), and Qian and Strahan (2007) focus on how the global syndicated loan markets function, in particular those in emerging economies.

This paper is also related to the literature on syndicate structure in venture capital and securities underwriting markets [e.g., Melnik and Plaut (1996), Song (2004), Corwin and Schultz (2005), and Hochberg, Ljungqvist and Lu (2007)]. In spite of the unique characteristics of relationship lending and bank monitoring that are part of the model developed in this paper, the results here are broadly consistent with the view that reciprocity strengthens network effects. Meanwhile, there may exist a similar reciprocity effect in syndicates of other financial markets. The measures of and the tests on reciprocity developed in this paper provide some guidelines for exploring this.

There is also a literature on reciprocity [e.g., Gouldner (1960), Berg, Dickhaut and McCabe (1995), Fehr, Gächter and Kirchsteiger (1997), Bolton and Ockenfels (2000), Fehr and Gächter (2000), and Falk and Fischbacher (2006)]. However, the reciprocity analyzed here is subtly different. While reciprocity in the literature is an in-kind response to beneficial or harmful acts and does *not* depend on material rewards, reciprocity in this paper is induced by self-interest due to higher expected payoffs from cooperation.

The rest of the paper is organized as follows. In Section 2, I analyze the reciprocity effect from the theoretical viewpoint. Empirical implementation is summarized in Section 3 with discussions on data employed, summary statistics, and measures of reciprocity. Section 4 examines empirical results in detail on the role of reciprocity. I conclude in Section 5 with implications of the results to lending institutions, borrowing firms, and regulators.

[8] A recent addition to this strand of literature is Gatev and Strahan (2008) in which the effect of liquidity risk management considerations on syndicate structure is studied.

[9] Mora and Sowerbutts (2008) provide an alternative perspective that the lead arranger's monitoring effort, as reflected in its syndicate lending stake, matters to the borrower's long-run performance.

[10] Another paper related to syndicated loan pricing is Saunders and Steffen (2009). They evaluate the cost of being private by examining syndicated loan pricing for private versus comparable public firms.

2 Reciprocity: A Theoretical Analysis

This section develops the theory of reciprocity in syndicated lending.

I show that lead arrangers' participation in one another's loans can provide sufficient incentive for them to monitor their own loans and hence improve the Pareto efficiency of the equilibrium. The threat of not inviting a lead arranger whose loan previously failed is key to the result: lead arrangers must exert effort to monitor borrowers in order to improve their probabilities of receiving a share of profits from loans led by others. A number of empirical predictions are derived on the relationship between reciprocity and moral hazard.

2.1 Model Setup

I model loan syndication as an infinitely repeated game in which all players are risk neutral and the discount factor is $\delta \in (0, 1]$.

Suppose that in each period, there exist two firms, Firm A and Firm B, that live only for that period. Both firms have access to a project that requires capital \$1 at the beginning of the period and produces at the end of the period a payoff of $Z > 0$ if the project succeeds and 0 if it fails. Neither firm has any endowment and hence needs to borrow the entire amount of the initial investment \$1. If a firm exerts effort, the project is a safe one, i.e., it produces Z with probability one. However, if a firm shirks, the project becomes risky, producing a payoff of Z with probability $p \in (0, 1)$ and 0 otherwise. Assume that each firm enjoys a private benefit v if it shirks and $v > (1 - p) Z$. Thus, both firms shirk after borrowing if not monitored.

Let Bank A be the relationship bank for Firm A and Bank B be the relationship bank for Firm B in every period. In contrast to firms' one-period short lives, banks can live infinitely long.

The risk-free rate of return is r_f and the market-required return for relationship lending is $r_m > r_f$ for one period. The gross returns from investing in risk-free assets and relationship lending are then written as $R_f = 1 + r_f$ and $R_m = 1 + r_m$, respectively.

In order to fund the investments for both firms, two syndicated loans are created: Bank A leads the loan to Firm A and participates in the loan to Firm B, whereas Bank B leads the loan to Firm B and participates in the loan to Firm A. That is, Bank A and Bank B reverse their roles in these two loans – I call this a *reciprocal arrangement*, and the two lead arrangers exhibit *reciprocity* through this arrangement as they each receive a share of profits from the other's loan. Suppose that for Bank A and Bank B, the share of the loan they each retain as a lead arranger is $\alpha \geq 0$ and the share they are given as a participant lender is $\beta > 0$. Assume $\alpha + \beta \leq 1$ and the remaining share of each syndicated loan $1 - \alpha - \beta$ is taken by other banks that do not lead in any syndicated loans.[11]

[11] Banks that do not lead in any syndicated loans are not of interest of this paper.

Bank monitoring and proprietary information generation are at the heart of relationship lending and justify the above-risk-free-return rent r_m [e.g., Allen (1990), Rajan (1992), Boot and Thakor (2000), and Boot (2000)]. It is assumed that if the lead arranger monitors the borrowing firm, the firm exerts effort on the project and hence produces Z with certainty. On the other hand, if the lead arranger does not monitor, the firm always shirks and produces Z with probability p. Thus, bank monitoring creates value.[12] Meanwhile, monitoring incurs a cost $m > 0$ to the lead arranger.

Let the interest rate charged on both loans be r. Both the lead share α and the interest rate r are assumed exogenous for now and will become endogenous when empirical predictions are discussed.

The following assumptions are made regarding the parameter values.

- Assumption 1: $R_f \leq pZ < R_m \leq Z$.
- Assumption 2: $m > (1-p)\,\alpha\,(1+r)$.
- Assumption 3: $m < (1-p)\,(\alpha+\beta)\,(1+r)$.

The implications of Assumption 1 are two-fold. First, the project does not produce a payoff high enough to repay the lenders R_m if the borrower is not monitored. That is, the lead arranger must monitor in order to earn the rent for the entire syndicate. Second, the NPV of the project is *not* negative even without monitoring, which justifies the making of the loan in any situations. Assumption 2 can be rearranged to show that $\alpha\,(1+r) - m < p\alpha\,(1+r)$, which indicates that with only α share of its own loan, the lead arranger has no incentive to monitor. Similarly, Assumption 3 can be rearranged to show that $(\alpha+\beta)\,(1+r) - m > p\,(\alpha+\beta)\,(1+r)$, which says that with α share of the loans they lead and β share of the loans they participate in, it is better for both banks to monitor than to not monitor.

2.2 Stage Game

In each period, both Bank A and Bank B need to decide (1) whether to invite the other bank by offering β share of the loans they lead, and (2) whether to monitor the borrowers of the loans they lead. In this subsection, I analyze lead arrangers' optimal strategy in the stage game supposing that $\beta > 0$ is fixed and already given so that the strategy set for both banks is {monitor, not monitor}.

Let $R_i\,(s_i, s_j)$ be the return to Bank i given (s_i, s_j), where $i, j \in \{A, B\}$, $i \neq j$, and $s_i, s_j \in$ {monitor, not monitor}.

I compute the following payoffs contingent on both banks' strategies:

[12] Bank monitoring includes both the *ex post* cash flow verification and the interim quality screening [e.g., Bhattacharya, Boot and Thakor (1998)].

1. R_i (monitor, monitor) $= (\alpha + \beta)(1 + r) - m \equiv R^*$. This is the cooperative outcome if both banks monitor.

2. R_i (monitor, not monitor) $= (\alpha + p\beta)(1 + r) - m = R^* - (1 - p)\beta(1 + r)$. Let $l \equiv (1 - p)\beta(1 + r)$, then R_i (monitor, not monitor) $= R^* - l < R^*$. Here, l is the loss due to the other bank's deviation from monitoring.

3. R_i (not monitor, monitor) $= (p\alpha + \beta)(1 + r) = R^* + [m - (1 - p)\alpha(1 + r)]$. Let $b \equiv m-(1 - p)\alpha(1 + r)$. Due to Assumption 2, $b > 0$. Hence, R_i (not monitor, monitor) $= R^* + b > R^*$. Here, b is the gain from the bank's own deviation from monitoring.

4. R_i (not monitor, not monitor) $= p(\alpha + \beta)(1 + r) = R^* + b - l$. Due to Assumption 3, $b < l$. Hence, R_i (not monitor, not monitor) $< R^*$.

The payoff matrix of this stage game is summarized as follows:

		Bank B	
		Monitor	Not Monitor
Bank A	Monitor	(R^*, R^*)	$(R^* - l, R^* + b)$
	Not Monitor	$(R^* + b, R^* - l)$	$(R^* + b - l, R^* + b - l)$

Based on the payoff matrix, it is straightforward to show that the unique pure-strategy Nash equilibrium in this stage game is (not monitor, not monitor). That is, neither lead arranger monitors its borrower. This is *de facto* a *prisoner's dilemma* game. Meanwhile, there does not exist any mixed-strategy Nash equilibrium.

Clearly, both banks would be better off if (monitor, monitor) is played since $R^* > R^* + b - l$. However, both banks also have the incentive to deviate unilaterally from monitoring in the one-shot or even finitely repeated game.[13]

2.3 Infinite Horizon

Now, the question is whether it is possible to improve the equilibrium to (monitor, monitor) by going beyond a one-shot game. I show below that it can be achieved if the stage game is repeated infinitely and the next-period reciprocity is offered contingent on the project success in the current period. That is, future reciprocity can provide sufficient incentive for lead arrangers to monitor.

I assume that the outcome of the loan (success or failure) in the previous period does *not* affect its lead arranger's business of leading loans in the future. That is, Bank A and Bank B are able to lead their respective loans in every period regardless of the past performance

[13] In the finitely repeated game, (monitor, monitor) is not subgame perfect because both banks will deviate from monitoring in the last subgame.

of the loans they led. This assumption distinguishes the effect of reciprocity predicted by the model from the effect of reputation established in the literature.[14]

Now, consider the following trigger strategy for each bank to decide whether to offer the participation share $\beta > 0$ to the other bank:

- When $t = 0$, Bank i offers β share of the loan it leads to Bank j.
- When $t \geq 1$, Bank i continues to offer β share of the loan it leads to Bank j as long as the outcome of the loan Bank j leads is "success" from the previous period; otherwise, it *never* invites Bank j to participate in the loan it leads again, i.e., the participation share for Bank j becomes zero forever.[15]

The punishment in the trigger strategy is considered "fair." With the model setup, project failure does *not* always happen when the lead arranger shirks on monitoring; but when it happens, it sends a perfect signal that the lead arranger did not monitor. Furthermore, Gopalan, Nanda and Yerramilli (2007) find that a large number of borrower bankruptcies lead to a significant decline in the number of loans the lead arranger is invited to participate in. This shows empirically the validity of such a punishment.

Proposition 1 *Suppose Assumptions 1-3 hold. Given the reciprocal arrangement ($\beta > 0$) and the trigger strategy, (monitor, monitor) in each period is a subgame-perfect Nash equilibrium for this infinitely repeated game of loan syndication depicted above if the participation share β is sufficiently high, i.e.,*

$$\beta \geq \underline{\beta} \equiv \left(\frac{1-\delta p}{\delta}\right)\left[\frac{m}{(1-p)(1+r)} - \alpha\right]. \tag{1}$$

Proof. See Appendix. ■

Proposition 1 says that the reciprocal arrangement can solve lead arrangers' moral hazard problem in loan syndication. The intuition behind it is as follows. When given a piece of the syndicated loan one of its participants leads, the lead arranger obtains a share of the profits r_m by free-riding on this other lead arranger's monitoring effort. As a return, it must allow this other lead arranger (who is also one of the participants of the loan it leads) to free-ride on its own monitoring effort and provide the profits r_m to the entire syndicate. In the finitely repeated game, the lead arranger always has the incentive to shirk in the final stage. However, when the lead arranger is given a sufficiently high participation share on an

[14] The implication of the *reputation* effect is that a lead arranger will no longer be able to lead loans if the loan it leads fails, whereas the implication of the *reciprocity* effect is that it will no longer be able to participate in others' loans following the failure of the loan.

[15] The β share of the loan, if not given to Bank j, will be offered to other banks who may or may not lead any loans. Meanwhile, a punishment of not inviting Bank j for N periods upon the failure of the loan Bank j leads also works when N and β satisfy certain conditions.

infinite horizon that is conditional on the lead arranger exerting *constant* effort to monitor the borrower, the moral hazard problem evaporates.[16,17] I call this effect the "*reciprocity*" effect in loan syndication as lead arrangers mutually benefit from each another's monitoring effort and reach a cooperative equilibrium that improves Pareto efficiency.

2.4 Empirical Predictions

I have shown that if Bank i is not invited to participate in the loan Bank j leads, then Bank i's share α in its own loan does not provide sufficient incentive for Bank i to monitor its borrower. In this case, however, participant lenders in the syndicate who are able to lead loans themselves will not allow Bank i to lead as a return of r_m is demanded for relationship loans and syndicated loans are considered relationship loans to lead arrangers. Thus, Bank i must change its lead share α and/or the interest rate charged on the loan r to satisfy the following IC condition for it to monitor the borrower:[18]

$$\alpha' \left(1 + r'\right) - m \geq p\alpha' \left(1 + r'\right), \tag{2}$$

where α' and r' are the lead share and the interest rate that satisfy (2).

From (2), I get

$$\alpha' \geq \frac{m}{(1-p)\left(1+r'\right)}, \tag{3}$$

$$r' \geq \frac{m}{(1-p)\,\alpha'} - 1. \tag{4}$$

Suppose that $r' = r$, then the minimum lead share that satisfies (2) is $\alpha'_{\min} = \frac{m}{(1-p)(1+r)}$, which is higher than the initial α since $\alpha < \frac{m}{(1-p)(1+r)}$ with Assumption 2.

Now, suppose that $\alpha' = \alpha$, then the minimum interest rate charged on the loan that satisfies (2) is $r'_{\min} = \frac{m}{(1-p)\alpha} - 1$, which is higher than the initial r since Assumption 2 also implies that $r < \frac{m}{(1-p)\alpha} - 1$.

Meanwhile, if no participant lenders in the syndicate are able to lead loans, then they don't have the bargaining power to make the lead arranger increase its lead share and/or the interest rate. If both stay at their initial levels (α and r), the market expects the loan to default with probability $1 - p$ since the lead arranger will shirk on monitoring while the making of the loan is still feasible with $pZ \geq R_f$ (Assumption 1). That is, a loan that does

[16] To justify the infinite horizon, I examine the survivability/financial health of lending institutions in the sample that ends in April 2007. I find that only three out of 830 lead arrangers ($< 0.4\%$) ever filed bankruptcies or were in financial distress, and these three lenders did not lead another syndicated loan after they claimed financial trouble. Thus, it is reasonable to assume that lead arrangers face an infinitely repeated game and are always concerned about their future profits, at least during my sample period. This, however, may no longer be the case following the global financial crisis that began in July 2007.

[17] Meanwhile, cooperation may also sustain in a finite horizon (e.g., the stage game repeated twice) if the decision on offering the participation share β is added to the strategy space.

[18] This IC condition is the same for both the one-shot game or the infinitely repeated game.

not share reciprocity with another loan has a higher default probability than an otherwise identical loan that shares reciprocity with another loan ($1-p$ vs. 0 based on the model).

In summary, the model predicts that the moral hazard problem is *reduced* among loans whose lead arrangers share reciprocity with one or more participant lenders, and this reduced moral hazard is reflected in the following empirical predictions:

- *Prediction 1.* Lead arrangers retain a *smaller* share (on average) of the loans they lead if they are invited to participate in loans led by their participant lenders.
- *Prediction 2.* Interest rates are *lower* (on average) for loans whose lead arrangers have reciprocal arrangements with their participant lenders.
- *Prediction 3.* The default rate is *lower* among loans that present reciprocity between their lead arrangers and participant lenders.

Note that lead share, loan pricing (interest rate charged on the loan), and loan default rate are commonly used in the literature to empirically measure the severity of the moral hazard problem in syndicated loans. The reciprocity effect on moral hazard, i.e., how reciprocal arrangements reduce moral hazard, will be tested in the empirical analysis.

3 Data and Empirical Implementation

In this section, I outline steps I take to implement the empirical analysis in the paper. First, I describe briefly the data and summary statistics. Then I discuss in some detail how reciprocity is empirically defined and measured.

3.1 Data

Three data sources are employed for the empirical tests: *DealScan*, *Compustat*, and the bankruptcies data for public firms.

Provided by Reuters Loan Pricing Corporation (LPC), *DealScan* is a database that contains extensive information on new loan originations in the global commercial loan market since 1988.[19] It is hence the primary data source on syndicated loans.[20] I obtain from *DealScan* detailed data on each individual loan, including: (i) loan terms and conditions such as loan amount, maturity, pricing, and covenants, (ii) information on the borrower such as its sales at closing, whether it is a private or public firm, and whether it has an

[19] Selected coverage may go back as early as 1981. According to Carey and Hrycray (1999) and Carey and Nini (2007), DealScan is a fairly complete and reliable data source for syndicated loans in the U.S. market.

[20] In *DealScan*, a loan facility is identified as a syndicated loan if its distribution method is "syndication." I further exclude from the sample loans that are distributed through "syndication" but for which only one lender is identified because the lead-participant relationship cannot be studied for these loans.

S&P or Moody's bond rating readily available, and (iii) information on the lenders and their roles in the syndicate as well as shares of the loan.

The sample I employ consist of 46,448 closed or completed syndicated loan facilities originated for 12,857 non-financial U.S. firms in 74 2-digit SIC industries between 1992 and April 2007. These loans involved 830 lead arrangers from 31 countries, of which 623 (75%) are headquartered in the U.S. Based on Standard & Poor's *A Guide to the Loan Market* (October 2007), I classify lenders as lead arrangers if their lender titles are among the following: administrative agent, agent, arranger, bookrunner, coordinating arranger, lead arranger, lead bank, lead manager, and mandated arranger.[21] I exclude loans with more than one lead arranger identified because it is hard to identify for these loans with which lead arranger a participant lender intends to build or share reciprocity. This exclusion does not affect the sample size to any significant degree as 96% of syndicated loan facilities in the U.S. market have only one lead arranger.

I evaluate syndicated loans at the facility level. A loan facility is also called a loan tranche, and one syndicated loan deal (also called package) may contain multiple tranches. In my sample, there are 30,546 syndicated loan deals, of which 65% contain only one tranche, 22% contain two tranches, 9% contain three tranches, and the remaining contain four to as many as eleven tranches. The average number is 1.5 tranches per syndicated loan deal. The reason for a facility-level analysis as opposed to a deal-level analysis is that different tranches within the same loan deal may have different loan types (e.g., term loan, letter of credit, etc.), maturities, interest spreads, and syndicate structures (e.g., share retained by the lead arranger). Sometimes a loan deal has one tranche made through syndication and another through a sole lender. All these are key pieces of information for the empirical analysis, so ignoring them and treating facilities as homogenous within each loan deal would cause a loss of valuable information.

In order to obtain richer financial information on individual firms, I manually match *DealScan* with *Compustat* based on firm name, ticker, and location for borrowers that are public firms, have a ticker, and/or a credit rating. I am able to retrieve financial data from *Compustat* for 20,140 loan facilities (43% of the sample).

Lastly, I search bankruptcies data compiled by New Generation Research through SDC. This database contains all U.S. public companies that have $10 million or more in assets and have filed for Chapter 11 bankruptcy protection since 1988. Companies with assets over $50 million that have had a default or an exchange offer at a substantial discount to face value are also included. Hence, the rule is that a loan is considered in default if the borrowing firm appears in this bankruptcies database at a time while the loan is active (i.e., after the beginning date of the loan but before the maturity date). The bankruptcies data

[21] If no lead arranger or multiple lead arrangers are identified using the list, I then cross-check the information with a variable named *LeadArrangerCredit* in *DealScan*.

are matched with *DealScan* first through *Compustat* based on firms' 6-digit CUSIP, i.e., the issuer code, and then directly based on firm name, location, and industry if no match is found in the first step. I am able to identify 1,317 incidents of default (6.4%) among 20,696 loans made to public firms or firms that can be matched in *Compustat*.

In contrast to what is typically done in the empirical literature on syndicated loans, I do *not* aggregate financial institutions to their parent companies. The reason for this lies in the specificness of both the lender-borrower and lead-participant relationships. Holding companies are usually *not* the ones engaged in developing relationships with specific borrowers (i.e., monitoring) or other lenders (i.e., sharing reciprocity), especially those that gained control through mergers and acquisitions. Although results are mainly reported based on individual firms rather than their parent companies, I will show later that this is not an issue in either the measures or the effect of reciprocity.

3.2 Summary Statistics

Table 3 presents summary statistics for the sample of syndicated loans. All statistics are provided at the loan facility level, including those describing borrower and lead arranger characteristics.

An average borrowing firm has sales of $2.54 billion at loan closing. A slim majority (60%) have previously borrowed from the syndicated loan market at least once, and the average number of previous syndicated loans among all the borrowers is 1.9 loan facilities. Among borrowers whose firms type is known, 45% are identified as private firms, whereas 24% are public firms without bond ratings and 31% are public firms with bond ratings.[22,23] Among borrowers who are or have been public firms, 4% had loans that were previously in default. Among borrowers who have *Compustat* data available, the average book value of total assets is $5.1 billion, the average book leverage ratio is 36%, the average earnings to assets ratio is 7%, and 47% have S&P debt ratings.

Lead arrangers of these loans have an average market share of 5% in the previous year, measured by the amount of loans led by each lead arranger as a percentage of the total amount originated in the U.S. syndicated loan market. About six out of seven loans (87%) have lead arrangers that are banks (as opposed to finance companies, institutional investors, etc.) and hence are considered having expertise in relationship lending.

An average syndicated loan facility has a size (loan amount) of $217 million and maturity of 50 months. The average interest spread on drawn funds is 221 basis points over LIBOR;

[22] For a little over 11,000 loan facilities (24% of the sample), the type of the borrowing firm is unknown.

[23] The firm type indicated in *DealScan* is the most current status for the borrower and hence does not reflect the change between public and private, nor between rated and unrated. I cross-check the firm type with *Compustat* data, i.e., whether a borrower can be found in *Compustat* at the time the loan was originated and whether a credit rating was available then. Note that no borrowers that are indicated as private firms in *DealScan* are identified as becoming or once being publicly traded during the sample period.

netting the upfront fee, this average drops to 173 basis points. About one-third (32%) of facilities are classified as term loans. On average, there are 7.2 lenders in one syndicate, and the lead arranger retains 29.5% of the loan.[24] The most common reason for borrowing is working capital or corporate purposes (60%), followed by refinancing (26%), acquisitions (26%), and backup lines (7%).

Default can be identified among 20,696 loan facilities whose borrowers are/were public firms. The average default rate for the entire sample period (1992-2007) is 6.4%. There is, however, a right-censoring issue with the default data since loans originated in more recent years have a smaller probability of default given a shorter period of time. This issue is confirmed when I move the ending point of the sample earlier. For example, the default rate is elevated to 9.1% if I shorten the sample period to 1992-2001. I will deal with the right-censored default data when I test the effect of reciprocity on loan default.

3.3 Measures of Reciprocity

Reciprocal arrangements among lead arrangers in the syndicated loan market are of central interest in this paper. In order to study their impact on the moral hazard problem, I define reciprocity as follows:

Definition 1 *A syndicated loan, Loan A, is considered having* ***reciprocity*** *with another syndicated loan, Loan B, if (1) Loan A's lead arranger is one of the participant lenders of Loan B, and (2) one of Loan A's participant lenders is Loan B's lead arranger. Loan A (B) is called the* ***reciprocal loan*** *of Loan B (A), and Loan B's (A's) lead arranger is Loan A's (B's)* ***reciprocal participant lender****.*

Reciprocity can exist in any of the following three *forms* based on how the periods of the two loans that share reciprocity overlap:

Definition 2 *Suppose that Loan A and Loan B have reciprocity with each other according to Definition 1. If the loan periods of Loan A and Loan B overlap, then both Loan A and Loan B are considered having* ***current reciprocity*** *with each other. If Loan A matures before Loan B begins, then Loan A is considered having* ***future reciprocity*** *with Loan B, whereas Loan B is considered having* ***past reciprocity*** *with Loan A.*

I then define the following four *measures* to examine the existence and magnitude of reciprocity for each syndicated loan facility in the sample:

1. *Reciprocity existence* is an indicator variable that equals 1 if the loan shares reciprocity with another loan and 0 otherwise.

[24] The share retained by the lead arranger is available for only 11,083 loan facilities (24% of the sample). Thus, there may be some sample selection bias in spite of the fact that this is a widely used variable in the empirical literature on syndicated loans.

2. *Reciprocity breadth* is the fraction of reciprocal participant lenders among all participant lenders in the syndicate. In general, the lead arranger's profits from loan participation increase in the number of reciprocal participants as each of them shares some profits with the lead. Thus, the hypothesis is that the broader the reciprocity, the stronger the effect in reducing moral hazard.

3. *Reciprocity depth* is the average fraction of reciprocal loans taken by the lead arranger. This is essentially the average participation share, say $\overline{\beta}$. Thus, the hypothesis is that the deeper the reciprocity, the stronger the reciprocity effect.

4. *Reciprocity length* is the average fraction of the loan period (maturity) overlapped with reciprocal loans. The total profits from participation for the lead arranger equal to the profits provided by its reciprocal participant lenders summed over time units (e.g., months) overlapped with the period of the loan it leads. Thus, the hypothesis is that the longer the reciprocity, the stronger the reciprocity effect.

I further differentiate the following two *types* of reciprocity based on at what time reciprocity is measured:

1. *Total reciprocity* is the reciprocity that is observed over the entire sample period. It includes the reciprocity that is formed both before and after the loan is in place, and hence, it is the reciprocity that exists both *ex ante* and *ex post*.

2. *Reciprocity at origination* is the reciprocity that is in existence before the loan starts, i.e., at the time of origination. Thus, it is the reciprocity formed *ex ante* when the lead arranger can decide with whom it shares the reciprocity.

Table 4 presents summary statistics on various types, forms, and measures of reciprocity discussed above. *Panel A* shows *reciprocity at origination*: 71% of loans have *current reciprocity*, 63% have *past reciprocity*, 1.5% have *future reciprocity*, and 80% of loans possess reciprocity of at least one form.[25] Furthermore, when only *current reciprocity* is considered, the average *reciprocity breadth* is 45% of participant lenders being reciprocal, the average *reciprocity depth* is 8.5% of reciprocal loans taken by the lead arranger, and the average *reciprocity length* is 46% of the loan period overlapped with reciprocal loans.

Panel B of *Table 4* compares *reciprocity at origination* with *total reciprocity*. Only means on the form of *current reciprocity* are reported in this panel. The fact that measures of *reciprocity at origination* are only slightly lower than *total reciprocity* in spite of being a subset of the latter indicates that reciprocity is formed mostly *ex ante*.

[25] The existence of *future reciprocity at origination* is extremely low because the definition of *reciprocity at origination* restricts considerations of reciprocal arrangements among those formed prior to origination.

Reciprocity at origination is more appropriate than *total reciprocity* for the purpose of examining how reciprocity affects the structure of the syndicate as well as the design of the loan contract because the lead arranger decides whether and with whom it will build reciprocity *before* the loan starts. Therefore, for the rest of the paper, I focus on *current reciprocity at origination* while the main results also hold for other types and forms of reciprocity. I also abbreviate the term *current reciprocity at origination* as "reciprocity."

Lastly, *Panel B* of *Table 4* also shows the measures of *current reciprocity at origination* among lead arrangers that have *different* parent companies. This way reciprocity shared within the same holding company is excluded. However, the summary statistics rarely change with this exclusion, which then indicates that it is *not* an issue not aggregating financial institutions to their parent companies since reciprocity is usually not shared among subsidiaries of the same holding company.

4 Empirical Evidence on the Reciprocity Effect

In this section, I present empirical results on the role of reciprocity in mitigating moral hazard in loan syndication. First, results from bivariate tests including t-tests and simple correlations are discussed briefly. Then, I provide the general regression specification for testing the reciprocity effect, followed by discussions of how reciprocity impacts syndicate structure, loan pricing, and loan default. Lastly, I discuss the robustness of the results by examining the interactions between reciprocity and information asymmetry, borrower size, loan size, and lead arranger and borrower reputation.

4.1 Bivariate Tests

Table 5 reports results from bivariate tests including t-tests and correlations.

Panel A compares a number of loan characteristics between two groups of syndicated loans – (1) loans with reciprocity and (2) loans without reciprocity – through t-tests. Consistent with *Predictions 1-3*, lead arrangers retain on average 21% less of the loans with reciprocity than those without reciprocity (25% vs. 46%), the average interest spread on drawn funds over LIBOR is 72 basis points lower for loans with reciprocity (202 vs. 274), and the default rate is also 5.9% lower among loans with reciprocity for the entire sample period (5.2% vs. 11.0%). All these mean differences are statistically significant at the 1% level. Furthermore, the differences between the two groups in loan pricing and loan default remain substantial and statistically significant when I use the interest spread net upfront fee as an alternative measure of loan pricing (159 vs. 219) and examine the loan default rate during a shortened sample period, i.e., 1992-2001 (7.5% vs. 14.1%).

Panel B shows correlations between reciprocity and loan characteristics. Lead share, interest spreads, and loan default rates are all significantly and negatively correlated with

reciprocity at the 1% level. This result is consistent across all four reciprocity measures.

In untabulated results, I find that among loans with reciprocity, it is more like to have secured loans and impose various types of covenants, including dividend restriction, financial ratios, asset sale sweep, debt issuance sweep, and equity issuance sweep. As a result, the covenant intensity index based on Bradley and Roberts (2004) is higher among loans with reciprocity than those without reciprocity. *Reciprocity existence*, *reciprocity depth*, and *reciprocity length* are also positively correlated with the usage of collateral and covenants. These bivariate test results seem to indicate that collateral and covenants as monitoring mechanisms are set up more frequently in the presence of reciprocity (i.e., when the moral hazard problem is mitigated).[26]

4.2 Regression Specification

Now, I examine the effect of reciprocity on moral hazard with more control variables. The general regression specification is

$$\begin{aligned} Syndicate_{i,j,k,t} \;=\; & \beta_0 + \beta_1 \cdot Reciprocity_i + \beta_2 \cdot InformationAsymmetry_j \\ & + \beta_3 \cdot LeadReputation_k + \beta_4 \cdot OtherLeadCharacteristics_k \\ & + \beta_5 \cdot BorrowerReputation_j + \beta_6 \cdot OtherBorrowerCharacteristics_j \\ & + \beta_7 \cdot LoanCharacteristics_i + Year_t + \varepsilon_{i,j,k,t}. \end{aligned} \tag{5}$$

The left-hand-side (dependent) variables are characteristics variables of the syndicated loan i made to borrowing firm j by lead arranger k in year t, including the share retained by the lead arranger, the interest spread on drawn funds over LIBOR, and the loan default indicator. The key right-hand-side (independent) variable is *Reciprocity* and the parameter of interest is β_1, which measures how change in reciprocity affects syndicate structure, loan pricing, and the probability of default. Recall that reciprocity is measured by four variables, i.e., *reciprocity existence*, *reciprocity breadth*, *reciprocity depth*, and *reciprocity length*.

A number of control variables are included in the regressions. First, due to their significant effects on syndicated loans that have been documented in the literature, I control for the degree of information asymmetry of the borrower and the reputation of both the lead arranger and the borrower. As in Sufi (2007), information asymmetry is measured by indicator variables for private versus public ownership of the borrower, and for whether the borrowing firm has a bond rating or not. Lead arranger reputation is measured by two variables: (1) the lead arranger's market share in the previous year, which is same as in Sufi (2007), and (2) the repeat participant ratio in the previous year, which is similar to

[26] The analysis on covenants is beyond the scope of this paper. The data available on covenants are very limited – for a large number of loans in *DealScan*, information on covenants is completely missing – and hence can possibly produce biased results.

what Dennis and Mullineaux (2000) and Ivashina (2009) use. The latter is the maximum number of loan facilities participated in by the same lender, scaled by the total number of loan facilities arranged by the lead. I use both variables as proxies for the lead arranger reputation because with a significant, negative correlation (-0.11), they can cover different perspectives of the lead arranger reputation. Borrower reputation is measured by the natural logarithm of one plus the number of previous syndicated loans by the borrower. The same approach can also be found in Sufi (2007).

Then, I introduce controls for (1) other lead arranger characteristics (whether the lead is a bank), (2) other borrower characteristics (the natural logarithm of sales at closing, whether any previous loans were in default), and (3) loan characteristics (the natural logarithm of loan amount and maturity in days, the term loan indicator, and indicator variables for the interest rate type and the purpose of the loan). Year fixed effects are included in all the regressions, whereas 2-digit SIC industry, borrower, and lead arranger fixed effects are added properly under different regression specifications. These fixed effects are employed to deal with the issue of omitted variables. Lastly, I use robust standard errors clustered within borrowers, lead arrangers, or borrower-lead groups to deal with heteroskedasticity. All these are standard approaches seen in the literature [e.g., Peterson (2009)].

4.3 Reciprocity and Syndicate Structure

Table 6 reports coefficient estimates from regressions of five specifications relating the share of the loan retained by the lead arranger to *reciprocity existence*. The regression coefficient on reciprocity β_1 is significantly negative across all these specifications at the 1% level. *Specifications (I)-(V)* mainly differ in the types of fixed effects included in the regressions as well as the variable within which robust standard errors are clustered. One other difference between *Specification (I)* and the rest is that *Specification (I)* does *not* include two important control variables: (1) the natural logarithm of one plus the number of participant lenders in the syndicate, and (2) the sum of all the participants' market shares in the previous year.[27] I include these two variables as additional controls in *Specifications (II)-(V)* to remove the mechanic effect that more and larger participants may have on the likelihood of the loan having reciprocity. *Specification (I)* shows that, without them, $\beta_1 = -10\%$, whereas this coefficient estimate decreases by half to about 4-5% under *Specifications (II)-(V)*. This verifies the importance of these two additional control variables. I consider *Specification (V)* the most conservative (and hence the best) test for examining the effect of reciprocity on syndicate structure as it controls for both borrower and lead arranger fixed effects with robust standard errors allowing for clustering within each unique borrower-lead group. It

[27] Note that participants' market shares are computed based on the total amount of the loans they lead globally since reciprocity is measured among all the loans in *DealScan* which include loans in countries other than the U.S., whereas the lead arranger's reputation is partly measured by its market share in the U.S. as the focus of this paper is on the U.S. syndicated loan market.

shows that lead arrangers retain on average 4.3% *less* of the loans with reciprocity than those without reciprocity. This result is both statistically and economically significant. I have shown that the average share of the loan retained by lead arrangers is 29.5%, so a share that is 4.3% less is a reduction of 15%. With an average loan amount of $217 million, this implies that reciprocity can save lead arrangers about $9 million per syndicated loan for other uses, which then may make better diversification feasible for lenders.

Table 7 reports coefficient estimates from regressing the lead share on each of the four reciprocity measures. All regressions reported in *Table 7* follow *Specification (V)* in *Table 6*. The coefficient on reciprocity β_1 is significantly negative across all four measures of reciprocity at the 1% level. *Column (II)* indicates that while *reciprocity breadth* increases from zero to 100% reciprocal participants in the syndicate, the lead arranger can retain nearly 7% less of the loan. Similarly, *Column (III)* says that if hypothetically *reciprocity depth* moves from a 0% share the lead arranger holds in loans led by the participants to 100%, the share the lead retains in its own loan decreases by 13%. *Column (IV)* further shows that as *reciprocity length* improves from 0% to 100% of the loan period that is overlapped with reciprocal loans, the lead share drops by nearly 5%. All these results consistently point to an increasing reciprocity effect on syndicate structure with a higher degree of reciprocity.

Without controlling for the number and size of the participant lenders in the syndicate, I find the expected effects of information asymmetry, lead arranger reputation, and borrower reputation [*Specification (I)* in *Table 6*]. First, the average lead share of loans to public, unrated firms is significantly higher than that to public, rated firms by 2%, whereas the average lead share of loans to private firms is not significantly higher. Second, lead arranger reputation proxied by the market share in the previous year plays a significant role in lowering the share retained by the lead arranger as in the literature. Third, borrower reputation also has a significant, negative relation with the lead share, which implies that if the borrower is a repeat customer in the syndicated loan market, the lead arranger is required to take less share of the loan as the moral hazard problem is less severe. Once the additional control variables are included in the regression, the effects of information asymmetry and borrower reputation are no longer significant, while the coefficient on lead arranger's previous-year market share remains significantly negative under *Specification (V)* in *Table 6*. The significantly negative coefficients on the number of participant lenders in the syndicate and the lead arranger being a bank indicator as well as the significantly positive coefficient on the term loan indicator have straightforward economic interpretations.

4.4 Reciprocity and Loan Pricing

Table 8 reports coefficient estimates from regressions of five specifications relating the interest spread over LIBOR on drawn funds to *reciprocity existence*. *Specifications (I)-(V)* replicate their counterparts in *Table 6* in terms of independent variables, fixed effects, and

types of robust standard errors. The coefficient on reciprocity β_1 is also negative and significant at the 1% level across all these specifications. *Specification (V)* is again considered the most conservative among all with both borrower and lead arranger fixed effects as well as robust standard errors clustered within borrower-lead groups. It shows that on average the interest spread is 11 basis points *lower* on loans with reciprocity than those without reciprocity. This is a 5% reduction from the average interest spread of 221 basis points. Consider the average loan amount of $217 million and the average maturity of 50 months, 11 basis points mean $238,700 savings in interest payments per year and $994,583 savings for the entire life of the loan.[28] Thus, reciprocity among syndicate lenders implies significantly lower borrowing costs to corporations, both statistically and economically.

Table 9 then reports coefficient estimates from regressing the interest spread on each of the four reciprocity measures. All regressions reported in *Table 9* follow *Specification (V)* in *Table 8*. Columns (II)-(IV) show that the coefficients on *reciprocity breadth*, *reciprocity depth*, and *reciprocity length* are -17, -23, and -16 basis points, respectively. While all being very negative, they are significant at the 1% level *except* that the coefficient on *reciprocity depth* is marginally significant at the level of 15%. Thus, the evidence is quite strong to say that the reciprocity effect on loan pricing is increasing in the magnitude of reciprocity.

Table 8 also shows the following results. Private firms bear higher interest spreads, which are on average 10-13 basis points higher than those for public, rated firms. Results on interest spreads charged for public, unrated firms are mixed, i.e., sometimes higher and sometimes lower than interest spreads charged for their rated counterparts. Lead arranger reputation does not have a significant impact on the price of the loan. However, loans have significantly lower interest spreads if their lead arrangers are banks and/or the total market share of the participants is higher. Regarding borrower and loan characteristics, the interest spread decreases with borrower sales and loan amount, and the average interest spread on terms loans is estimated to be about 40-70 basis points higher.

4.5 Reciprocity and Loan Default

In order to correct for the right-censored loan default data, I shorten the sample period by the median maturity, which is about 60 months (1,799 days). As a result, the sample for the reported loan default tests consists of loan facilities that were originated during 1992-2001. However, the main results on loan default are *not* sensitive to such sample selection.

Table 10 reports coefficient estimates from regressions of five specifications (three OLS, one Probit, and one Logit) relating loan default to *reciprocity existence*. The coefficient on reciprocity β_1 is again significantly negative across all these specifications at the 1% level. *Specifications (I)-(III)* use OLS to estimate the linear probability of loan default, and meanwhile, they differ in the selection of independent variables, fixed effects, and types of

[28] Annual interest payments and zero amortization are assumed here.

robust standard errors. Borrower fixed effects are not included in this group of tests because first, loan default is defined at the borrower level during the same period, and second, there are few cases in which variations in *reciprocity existence* and loan default coexist for the same borrower. *Specifications (IV)* and *(V)* use Probit and Logit, respectively, with year and borrower industry fixed effects. Lead arranger and borrower fixed effects are not included in these two specifications due to concerns of the "incidental parameters problem" [e.g., Green (2004)]. I consider *Specification (III)* the most conservative test among all with borrower industry and lead arranger fixed effects as well as robust standard errors clustered within borrowers. The coefficient on *reciprocity existence* under *Specification (III)* is -0.047, which translates into a 4.7% *lower* chance of loan default. Compared to an overall 9.1% default rate of loans originated during 1992-2001, this reduces the default rate by half (52%) and hence has strong economic significance.

Table 11 then reports coefficient estimates from regressing loan default on each of the four reciprocity measures. All regressions reported in *Table 11* follow *Specification (III)* in *Table 10*. Columns (II)-(IV) show that the coefficients on *reciprocity breadth*, *reciprocity depth*, and *reciprocity length* are -4.8%, -20.5%, and -4.5%, respectively, all of which indicate a significantly negative relation between the probability of default and the magnitude of reciprocity at the 1% level.

Default probability is about 2% higher for loans made to public, unrated firms, 2-3% higher for term loans, but 5-7% lower for borrowers who experienced default previously. Meanwhile, it decreases in the market shares of the lead arranger and participants, but increases in loan maturity, the number of previous loans by the borrower, and the number of participants in the syndicate.

4.6 Robustness

Thus far I have shown evidence that is consistent with *Predictions 1-3*. One may argue that the existence and/or magnitude of reciprocity is highly related to various characteristics of borrowers, loans, and lead arrangers such as firm size, loan size, lead arranger and borrower reputation, etc. For example, larger borrowers tend to work with larger banks who are more likely to form networks among themselves and hence share reciprocity. Similarly, larger loans requires more funds; with capital constraints and binding regulatory requirements, lenders may be forced to team up. Meanwhile, as the borrower becomes more informationally transparent or the lead arranger/borrower becomes more reputable, it is easier to syndicate the loan with more participant lenders, which then increases the likelihood of having reciprocity. As a result, the reciprocity effect may be mostly an effect of these variables. That is, reciprocity is endogenously determined by other independent variables in the regression. Due to potentially omitted variables, the estimated coefficient β_1 may not be an unbiased estimator of the *true* reciprocity effect.

To address this endogeneity problem, other than having control variables and various fixed effects in the regressions, I take a step further to examine the interactions between reciprocity and (1) information asymmetry, (2) borrower size, (3) loan size, (4) lead arranger reputation, and (5) borrower reputation. I find that the reciprocity effect remains significant for informationally opaque borrowers, smaller borrowers, smaller loans, less reputable lead arrangers, and less reputable borrowers. Meanwhile, I show that the results are robust to alternative information asymmetry and reciprocity measures and persist in various subsamples.

Each panel of *Table 12* reports detailed results from regressions of three dependent variables: the lead share, the interest spread, and the loan default indicator. Other than some additional interaction terms with reciprocity, all the regressions of lead share follow *Specification (V)* in *Table 6*, all the regressions of interest spread follow *Specification (V)* in *Table 8*, and all the regressions of loan default follow *Specification (III)* in *Table 10*. The independent variables of interest are *reciprocity existence* and the interaction terms with *reciprocity existence*.

4.6.1 Information Asymmetry

In order to examine whether the reciprocity effect is different between informationally transparent and opaque borrowers, I add to the regression specifications an interaction term of reciprocity and information transparency, i.e., *reciprocity existence* $\times$ *transparent*, where *transparent* is an indicator variable that equals 1 if the borrower is a public, rated firm and 0 otherwise. Now, β_1 indicates the reciprocity effect when the borrowers are informationally opaque (i.e., private or public, unrated firms), and the coefficient on *reciprocity existence* $\times$ *transparent*, say β_1', indicates the *incremental* reciprocity effect when borrowers are informationally transparent (i.e., public, rated firms).

Panel A of *Table 12* shows that the coefficient on reciprocity β_1 remains significantly negative at the 1% level in the regressions of lead share, interest spread, and loan default. However, the coefficient on the interaction term β_1' is not significant in any of the three regressions. These coefficients indicate that (1) the reciprocity effect exists regardless of whether the borrower is informationally transparent or opaque, and (2) there is no additional benefit from reciprocity for borrowers that are informationally transparent.

In a robustness check, I split the sample by whether the borrower had *Compustat* data available one year before the loan was originated and use accounting information such as earnings to assets ratio, book leverage ratio, and accruals to assets ratio as additional control variables for borrowers with *Compustat* data. *Panel B* of *Table 12* shows that the reciprocity effect survives for borrowers both with and without *Compustat* data. The coefficient on reciprocity β_1 is not significant only in the regression of loan default for borrowers without *Compustat* data. This is, however, probably due to the fact that most borrowers that had

no *Compustat* data available one year prior to borrowing are private firms for which loan default cannot be identified. Note that the sample size for this particular regression is only 290 observations.

4.6.2 Borrower Size

To examine whether the reciprocity effect is driven by the size of the borrower, I run the regressions with the interaction terms of reciprocity and borrower size. I split the sample into three groups based on the borrower's sales at closing, define small, mid-sized, and large borrowers as the smallest, middle, and largest one-third of the borrowers, and construct two interaction terms, *reciprocity existence* × *mid-sized borrower* and *reciprocity existence* × *large borrower*, as additional regressors. Hence, the coefficient on reciprocity β_1 indicates the reciprocity effect for the group of small borrowers, whereas the coefficients on *reciprocity existence* × *mid-sized borrower* and *reciprocity existence* × *large borrower*, say β_1' and β_1'', indicate the *incremental* reciprocity effect for mid-sized and large borrowers, respectively.

Panel C of *Table 12* shows that the reciprocity effect on lead share and loan default remains significant and strong even among loans to small borrowers. The effect on interest spread is not significant among small borrowers, but the incremental reciprocity effect in reducing interest spread is significant for mid-sized borrowers, which indicates that this effect is not dominated by large borrowers. These results are not sensitive to how many groups I split the sample into based on borrowers' sales at closing.

4.6.3 Loan Size

I employ a similar approach to examine the interaction between reciprocity and loan size. I first split the sample into three groups based on the loan amount, define small, mid-sized, and large loans as the smallest, middle, and largest one-third of the loans in the sample, and then construct two interaction terms, *reciprocity existence* × *mid-sized loan* and *reciprocity existence* × *large loan*, as additional regressors. Hence, the coefficient on reciprocity indicates the reciprocity effect for small loans, whereas the coefficients on *reciprocity existence* × *mid-sized loan* and *reciprocity existence* × *large loan* indicate the *incremental* reciprocity effect for mid-sized and large loans, respectively.

Panel D of *Table 12* shows that the reciprocity effect on loan default is significant even for small loans. Although the effect on lead share and interest spread is not significant among small loans, the incremental reciprocity effect in reducing lead share and interest spread is significant for mid-sized loans, which indicates that the effect does not only exist among large loans. These results are also not sensitive to how many groups I split the sample into based on the size of the loan.

4.6.4 Lead Arranger Reputation

To examine whether the reciprocity effect is driven by the lead arranger reputation, I add to the regressions an interaction term, *reciprocity existence* × *reputable lead*, where *reputable lead* is an indicator variable that equals 1 if the lead arranger's previous-year share in the U.S. syndicated loan market is greater than the median market share, i.e., 1%. Then, the coefficient on reciprocity indicates the reciprocity effect when the lead arranger is less reputable, and the coefficient on *reciprocity existence* × *reputable lead* indicates the *incremental* reciprocity effect when the lead arranger has better reputation.

Panel E of *Table 12* shows that the reciprocity effect on lead share, interest spread, and loan default is all significant and strong regardless of the lead arranger reputation. This means that reciprocity helps less reputable lead arrangers convince their participant lenders that there is little moral hazard in loans they lead and hence make it feasible for them to retain smaller shares of the loans and charge lower interest spreads to the borrowers.

4.6.5 Borrower Reputation

I examine whether the reciprocity effect is driven by the borrower reputation in a similar way. That is, I add to the regressions an interaction term, *reciprocity existence* × *reputable borrower*, where *reputable borrower* is an indicator variable that equals 1 if the borrower has previously borrowed from the syndicated loan market. Then, the coefficient on reciprocity indicates the reciprocity effect when the borrower is a new customer and hence has no reputation in this market, whereas the coefficient on *reciprocity existence* × *reputable borrower* indicates the *incremental* reciprocity effect when the borrower is a repeat customer of this market.

Panel F of *Table 12* shows that the reciprocity effect on lead share, interest spread, and loan default is all significant and strong regardless of whether the borrower is a new or repeat customer of the syndicated loan market. Meanwhile, there is a significant incremental reciprocity effect on lead share for reputable borrowers.

4.6.6 Other Robustness Tests

In order to reduce the possibility that the reciprocity effect is driven by the largest lead arrangers, I exclude loans that were arranged by the top three lead arrangers (of the year in which each loan was originated) from the sample. *Panel G* of *Table 12* shows that the reciprocity effect on lead share, interest spread, and loan default is still significant and strong among the remaining loans that were arranged by smaller lead arrangers.

Banks are typically considered having expertise in monitoring borrowers. If this is true, then the reciprocity effect must remain significant among loans arranged by banks. *Panel H* of *Table 12* shows that this is indeed the case as the regressions of lead share, interest spread,

and loan default all estimate an expected significant, negative coefficient on reciprocity β_1 using a subsample of loans whose lead arrangers were banks.

Lastly, I run the set of regressions on reciprocity that is measured only among lead arrangers that have *different* parent companies. *Panel I* of *Table 12* shows that results are very close to those obtained earlier without this restriction. Hence, whether financial institutions are aggregated to their parent companies does *not* affect the evidence on the reciprocity effect.

5 Conclusion

This paper explores the widespread phenomenon of reciprocity in loan syndication and examines its significant effect (net the *direct* effect of information asymmetry and reputation) in mitigating agency conflicts between lead arrangers and participant lenders.

Reciprocal arrangements in the syndicated loan market make it incentive compatible for lead arrangers to monitor borrowers as it is the *implicit* condition that enables lenders to participate in others' loans and obtain a share of profits from these loans as free-riders. This then leads to a cooperative equilibrium outcome: the rents for relationship lending become sustainable as lead arrangers persistently monitor their borrowers and share the resulting surplus with participant lenders. This is the *reciprocity* effect.

The theoretical model predicts that this reciprocity effect and the resulting reduced moral hazard are reflected in a smaller share of the loan retained by the lead arranger, a lower interest rate charged to the borrower, and a lower default probability of the loan. When I confront these predictions with the data, I uncover strong and consistent empirical evidence. The fact that the reciprocity effect exists even for informationally opaque borrowers and less reputable lead arrangers indicates that this effect is indeed distinct from the *incentive* and *reputation* effects that have been documented in the literature.

These results thus show important implications to both lending institutions and borrowing firms. For lenders, the reciprocity effect translates into smaller shares retained of loans they lead, and hence less capital tied to individual loans and possibly better risk diversification from being able to participate in more loans. For corporations, reciprocity shared among lead arrangers means lower borrowing costs, which may have made the syndicated loan market more attractive than other channels of borrowing in recent years.

The reciprocity effect is also of regulatory significance. The fact that the banking industry is competitive and fragile at the same time makes regulation a crucial device to maintain stability [e.g., Vives (2008)]. The cooperative equilibrium due to reciprocity and the resulting lower default rate in the syndicated loan market may improve social welfare. Thus, this paper provides potential policy suggestions for regulators.

For future research, it may be interesting to examine whether there are any changes in

the structure of reciprocal arrangements and the resulting reciprocity effect in the syndicated loan market following the 2007-2009 global financial crisis. As the financial system has become more vulnerable and many financial institutions have failed or are facing significantly higher risk of failure, lead arrangers may be shortsighted and not care about their future profits as much as in the "normal" time, especially those on the verge of collapsing. As a result, the infinite horizon may not exist during the crisis period, which will then cause the long-run cooperation among lenders to break down. Exploring syndicated loan data after July 2007 will provide us some understanding in this regard.

Appendix: Proof of Proposition 1

Proof. There are two types of subgames for Bank i. In one type the previous-period outcome of the project for which the loan it leads is borrowed is "success," whereas in the other type the project outcome is "failure." Using the one-shot deviation principle, I show that Bank i deviates from the equilibrium in neither type of subgames.

First, suppose that no participation share is given, then with only α share of the loan it leads, Bank i does not monitor (due to Assumption 2) and gets $R^0 \equiv p\alpha(1+r)$ each period. Thus, its expected payoff over the infinite horizon is $\frac{R^0}{1-\delta}$.

Next, I examine each of the two types of subgames.

Subgame (I): The project outcome of the previous period is "success."

On the equilibrium path where both banks monitor, Bank i has a payoff of

$$R_I^E = \frac{R^*}{1-\delta}. \tag{6}$$

If Bank i deviates for one period and then returns to the equilibrium strategy, its payoff becomes

$$R_I^D = (R^* + b) + \delta p\left(\frac{R^*}{1-\delta}\right) + \delta(1-p)\left(\frac{R^0}{1-\delta}\right). \tag{7}$$

In order for no bank to deviate at any time, $R_I^E \geq R_I^D$ must be satisfied. Then, I get

$$R^* \geq \left[\frac{1-\delta}{\delta(1-p)}\right] b + R^0. \tag{8}$$

Substituting in (8) with $R^* = (\alpha+\beta)(1+r) - m$, $b = m - (1-p)\alpha(1+r)$, and $R^0 = p\alpha(1+r)$, I obtain the following condition on β that satisfies $R_I^E \geq R_I^D$:

$$\beta \geq \underline{\beta} \equiv \left(\frac{1-\delta p}{\delta}\right)\left[\frac{m}{(1-p)(1+r)} - \alpha\right]. \tag{9}$$

(9) says that if $\beta \geq \underline{\beta}$, both lead arrangers monitor in all periods.

Subgame (II): The project outcome of the previous period is "failure."

In this case, Bank i no longer receives the participation share β from the loan Bank j leads. Due to Assumption 2, there is not a sufficiently high incentive for Bank i to monitor. I show below that Bank i does not deviate from the "do not monitor" strategy.

I write Bank i's payoff on the equilibrium path as

$$R_{II}^{E} = p\alpha\left(1+r\right) + \delta p\alpha\left(1+r\right) + \delta^{2} p\alpha\left(1+r\right) + ..., \tag{10}$$

and its one-shot deviation payoff as

$$R_{II}^{D} = \alpha\left(1+r\right) - m + \delta p\alpha\left(1+r\right) + \delta^{2} p\alpha\left(1+r\right) + ... \tag{11}$$

Then, $R_{II}^{E} \geq R_{II}^{D}$ if $p\alpha\left(1+r\right) \geq \alpha\left(1+r\right) - m$, which holds trivially with Assumption 2. Hence, when no participation share is given, Bank i never monitors its borrower as the lead arranger of the loan. ■

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Table 1: Top Ten Lead Arrangers and Participant Lenders The U.S. Market, 2004-2006

This table lists the top ten lead arranges (by total loan facility amount originated) and the top ten participant lenders (by total number of loan facilities participated) in the U.S. syndicated loan market during 2004-2006. Lead arrangers' total loan facility amounts originated are reported in billion of U.S. dollars. Lead arrangers' market shares are calculated based on the total loan amount originated during this period, whereas each participant lender's percent of facilities participated is based on the total number of syndicated loan facilities originated. Loan amounts as well as market share figures are split equally over all lead arrangers for loans with multiple leads. All financial institutions are aggregated to their parent companies. These results are compiled using LPC's *DealScan* data and hence are close to (but may not be identical to) LPC's League Tables.

A. Top Ten Lead Arrangers
(by Total Loan Facility Amount Originated)

Rank	Lead Arranger	Total Loan Facility Amount Originated	Market Share	Number of Facilities Led
1	JPMorganChase	1,536.1	33.1%	3,095
2	Bank of America	843.4	18.2%	3,331
3	Citigroup	610.9	13.2%	967
4	Wachovia	282.5	6.1%	1,359
5	Deutsche Bank	140.6	3.0%	412
6	Credit Suisse	127.3	2.7%	656
7	Wells Fargo	85.2	1.8%	932
8	GE Capital	64.7	1.4%	1,113
9	UBS	60.5	1.3%	242
10	ABN AMRO	58.4	1.3%	701

B. Top Ten Participant Lenders
(by Number of Loans Participated)

Rank	Participant Lender	Number of Facilities Participated	Percent of Facilities Participated
1	Bank of America	3,502	18.5%
2	Wachovia	3,198	16.9%
3	JPMorganChase	2,920	15.4%
4	ABN AMRO	2,913	15.3%
5	Wells Fargo	2,728	14.4%
6	U.S. Bancorp	2,455	12.9%
7	GE Capital	2,340	12.3%
8	Citigroup	2,197	11.6%
9	National City Corp.	2,099	11.1%
10	Royal Bank of Scotland	1,878	9.9%

Table 2: Reciprocal Arrangements in Loan Syndication
The U.S. Market, 2004-2006

This table lists the top ten pairs of lead arrangers who participated in syndicated loan facilities led by each other in the U.S. market during 2004-2006. To clearly identify the relationship between a lead arranger and a participant lender, loan facilities with multiple lead arrangers are excluded. The rank is based on the total number of loan facilities that involved both institutions in each pair as either the lead arranger or a participant lender. The percent of facilities led by lead arranger is based on the total number of loan facilities led by each lead arranger as the *sole* lead of the syndicate. All financial institutions are aggregated to their parent companies.

Rank	Lead Arranger – Participant Lender	Number of Facilities	% of Facilities Led by Lead Arranger
1	JPMorganChase – Bank of America	1,133	39.4%
	Bank of America – JPMorganChase	875	28.0%
2	JPMorganChase – Citigroup	857	29.8%
	Citigroup – JPMorganChase	422	51.7%
3	Bank of America – Wachovia	802	25.7%
	Wachovia – Bank of America	460	35.6%
4	JPMorganChase – Wachovia	916	31.8%
	Wachovia – JPMorganChase	282	21.8%
5	Bank of America – Citigroup	532	17.0%
	Citigroup – Bank of America	384	47.0%
6	Bank of America – Wells Fargo	713	22.8%
	Wells Fargo – Bank of America	132	16.9%
7	JPMorganChase – ABN AMRO	649	22.6%
	ABN AMRO – JPMorganChase	93	14.3%
8	JPMorganChase – Wells Fargo	565	19.6%
	Wells Fargo – JPMorganChase	99	12.7%
9	Bank of America – ABN AMRO	590	18.9%
	ABN AMRO – Bank of America	51	7.9%
10	JP Morgan – US Bancorp	589	20.5%
	US Bancorp – JP Morgan	45	16.8%

Table 3: Summary Statistics for Syndicated Loan Facilities

This table presents summary statistics for the sample of 46,448 syndicated loan facilities made to 12,857 non-financial U.S. firms by 830 lead arrangers between 1992 and April 2007. All statistics are calculated at the loan facility level, including those for borrower and lead arranger characteristics.

	$N =$	Mean	SD	10^{th}	50^{th}	90^{th}
Borrower characteristics:						
Sales at closing ($mm)	35,345	2,540	10,600	60	445	5,330
# of previous syndicated loans	46,448	1.92	2.72	0	1	5
Private firm indicator	35,309	0.45	0.50	0	0	1
Public, unrated firm indicator	35,309	0.24	0.43	0	0	1
Public, rated firm indicator	35,309	0.31	0.46	0	0	1
Previous default indicator	20,696	0.04	0.19	0	0	0
Borrowers with *Compustat* data:						
Total book assets ($mm)	18,046	5,073	21,927	121	914	11,376
Book leverage ratio	18,006	0.36	0.26	0.06	0.33	0.64
Earnings to assets ratio	17,903	0.07	0.57	-0.00	0.08	0.16
S&P debt rating indicator	20,140	0.47	0.50	0	0	1
Lead arranger characteristics:						
Market share, previous year	46,448	0.05	0.07	0.00	0.01	0.17
Bank indicator	46,324	0.87	0.34	0	1	1
Syndicated loan characteristics:						
Facility amount ($mm)	46,447	217	491	15	82	500
Maturity (days)	41,702	1,500	759	359	1,799	2,520
Spread on drawn funds (bps)	40,577	221	143	50	225	375
Upfront fee (bps)	6,154	56	58	10	38	125
Spread minus upfront fee (bps)	5,975	173	119	43	163	311
Term loan indicator	46,448	0.32	0.47	0	0	1
Default indicator (full sample)	20,696	0.064	0.244	0	0	0
Default indicator (1992-2001)	12,563	0.091	0.288	0	0	0
Syndicate structure:						
# of lenders in the syndicate	46,448	7.19	7.80	2	4	16
% retained by lead arranger	11,083	29.50	20.31	8.18	24.17	59.77
Purpose of loan indicator:						
Working capital/corporate	46,448	0.60	0.49	0	1	1
Refinancing	46,448	0.26	0.44	0	0	1
Acquisitions	46,448	0.26	0.44	0	0	1
Backup lines	46,448	0.07	0.26	0	0	0

Table 4: Measures of Reciprocity

This table presents summary statistics on the four measures of reciprocity at the loan facility level: (i) *reciprocity existence* indicates whether the syndicated loan facility shares reciprocity with another, (ii) *reciprocity breadth* measures the fraction of reciprocal participants among all participant lenders, (iii) *reciprocity depth* measures the average fraction of reciprocal loans taken by the lead arranger as a participant lender, and (iv) *reciprocity length* measures the average fraction of the loan period overlapped with reciprocal loans. Panel A presents detailed statistics on reciprocity that exists at the time of origination (*ex ante* only). Panel B compares three types of reciprocity: (1) reciprocity that exists at the time of origination (*ex ante* only), (2) total reciprocity, i.e., reciprocity that exits over the entire sample period (both *ex ante* and *ex post*), and (3) reciprocity that exists not only at origination but also among lead arrangers that have *different* parent companies.

A. Reciprocity at Origination (*ex ante* only)

	$N =$	Mean	SD	10^{th}	50^{th}	90^{th}
Reciprocity existence						
Current reciprocity	46,448	0.708	0.455	0	1	1
Past reciprocity	46,448	0.633	0.482	0	1	1
Future reciprocity	46,448	0.015	0.120	0	0	0
Anytime reciprocity	46,448	0.799	0.401	0	1	1
Reciprocity breadth - *current*						
Fraction of reciprocal participants	46,448	0.447	0.370	0	0.5	1
Reciprocity depth - *current*						
Average fraction of reciprocal loans taken by the lead arranger	42,069	0.085	0.080	0	0.087	0.175
Reciprocity length - *current*						
Average fraction of loan period overlapped with reciprocal loans	46,435	0.457	0.339	0	0.526	0.883

B. Alternative Measures of Reciprocity
Means on *Current* Reciprocity

	Reciprocity Existence	Reciprocity Breadth	Reciprocity Depth	Reciprocity Length
1. Reciprocity at origination (*ex ante* only)	0.708	0.447	0.085	0.457
2. Total reciprocity (*ex ante* & *ex post*)	0.762	0.530	0.094	0.457
3. Reciprocity at origination (*ex ante* only) among lead arrangers that have *different* parent companies	0.696	0.442	0.083	0.449

Table 5: Effect of Reciprocity – Bivariate Tests

This table reports results of bivariate tests on the effect of reciprocity. Panel A compares means on loan characteristics variables between two sub-samples: syndicated loan facilities with reciprocity (32,900 facilities) and syndicated loan facilities without reciprocity (13,548 facilities). Panel B presents bivariate correlation between the four measures of reciprocity (existence, breadth, depth, and length) and loan characteristics variables. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. The entire sample contains 46,448 syndicated loan facilities, of which 11,083 contain the information about the share the lead arranger retains, 40,577 contain the interest spread on drawn funds, and 5,975 contain both the interest spread on drawn funds and the upfront fee. Default can be defined for 20,696 loan facilities (whose borrowers are public firms) during the entire sample period and for 12,563 loan facilities originated during the years 1992-2001. The standard errors of the mean differences are in parentheses in Panel A. * indicates that the mean difference in Panel A or the correlation coefficient in Panel B is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

A. Mean Differences
Loan with vs. without Reciprocity

	Total Sample	Loans with Reciprocity	Loans without Reciprocity	Mean Difference
Syndicate structure:				
% retained by lead arranger	29.50	24.93	46.31	-21.38*** (0.425)
Loan pricing:				
Spread on drawn funds (bps)	221	202	274	-72*** (1.575)
Spread net upfront fee (bps)	173	159	219	-60*** (3.580)
Loan default:				
Default indicator (full sample)	0.064	0.052	0.110	-0.059*** (0.004)
Default indicator (1992-2001)	0.091	0.075	0.141	-0.066*** (0.006)

B. Bivariate Correlation
Reciprocity and Loan Characteristics

	Reciprocity Existence	Reciprocity Breadth	Reciprocity Depth	Reciprocity Length
Syndicate structure:				
% retained by lead arranger	-0.432***	-0.120***	-0.189***	-0.351***
Loan pricing:				
Spread on drawn funds (bps)	-0.222***	-0.184***	-0.124***	-0.241***
Spread net upfront fee (bps)	-0.210***	-0.157***	-0.101***	-0.224***
Loan default:				
Default indicator (full sample)	-0.097***	-0.101***	-0.065***	-0.103***
Default indicator (1992-2001)	-0.099***	-0.114***	-0.077***	-0.127***

Table 6: Effect of Reciprocity on Syndicate Structure
Regressions of Various Specifications on Reciprocity Existence

This table reports coefficient estimates from regressions relating syndicate structure to the existence of reciprocity, i.e., whether the syndicated loan facility shares reciprocity with another. The dependent variable is the share of the loan retained by the lead arranger in percentage, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(V) vary in the selection of independent variables, fixed effects, and robust standard errors. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. All regressions include year, loan purpose, interest rate type, and other specified fixed effects. Robust standard errors allowing for clustering by specified variables are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

% retained by lead arranger	(I)	(II)	(III)	(IV)	(V)
Reciprocity existence	-10.36***	-4.18***	-3.80***	-5.02***	-4.31***
	(0.804)	(0.663)	(0.869)	(0.641)	(1.008)
Private firm indicator	0.13	0.04	-	0.17	-
	(0.603)	(0.473)		(0.454)	
Public, unrated firm indicator	2.12***	-0.09	-7.70	0.02	-1.77
	(0.587)	(0.478)	(5.655)	(0.427)	(2.721)
Lead's market share (lagged)	-15.85**	2.02	-2.95	4.41	-9.83*
	(6.329)	(2.722)	(3.212)	(4.425)	(5.813)
Repeat participant ratio (lagged)	0.91	-0.47	0.96	0.49	1.99*
	(1.544)	(1.042)	(0.989)	(0.945)	(1.205)
Lead being a bank indicator	-4.47**	-3.46**	-3.80**	-	-
	(1.865)	(1.356)	(1.717)		
Ln [1 + # previous loans by borrower]	-1.94***	-0.27	0.03	-0.24	-0.40
	(0.371)	(0.265)	(0.736)	(0.235)	(0.669)
Ln [borrower's sales at closing]	-1.74***	-0.19	-0.65**	-0.08	-0.35
	(0.193)	(0.147)	(0.300)	(0.158)	(0.346)
Ln [loan amount]	-4.54***	1.29***	0.95***	1.25***	1.04***
	(0.299)	(0.236)	(0.326)	(0.230)	(0.355)
Ln [maturity in days]	-1.58***	0.49**	0.46*	0.41*	0.29
	(0.304)	(0.238)	(0.244)	(0.227)	(0.267)
Term loan indicator	0.69	5.17***	3.79***	4.95***	3.73***
	(0.653)	(0.677)	(0.765)	(0.524)	(0.546)
Ln [1 + # participants]		-20.22***	-19.17***	-19.42***	-18.47***
		(0.737)	(0.988)	(0.430)	(0.725)
Participants' market share (lagged)		11.06***	2.36	10.35***	-0.28
		(2.219)	(4.026)	(1.892)	(3.069)
Borrower industry fixed effects	Yes	Yes	-	Yes	-
Borrower fixed effects	No	No	Yes	No	Yes
Lead arranger fixed effects	No	No	No	Yes	Yes
S.E. clustered within borrower/lead	Lead	Lead	Lead	Borrower	Joint
$N =$	8,795	8,795	8,802	8,802	8,802
Adjusted R^2	0.423	0.670	0.769	0.701	0.783

Table 7: Effect of Reciprocity on Syndicate Structure
Regressions on Various Measures of Reciprocity

This table reports coefficient estimates from regressions relating syndicate structure to reciprocity shared among syndicated loan facilities. The dependent variable is the share of the loan retained by the lead arranger in percentage, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(IV) use each of the four reciprocity measures (existence, breadth, depth, and length), respectively. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. All regressions include borrower, lead arranger, year, loan purpose, and interest rate type fixed effects. Robust standard errors allowing for clustering within borrower-lead groups are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

% retained by lead arranger	(I)	(II)	(III)	(IV)
Reciprocity existence	-4.31***			
	(1.008)			
Reciprocity breadth		-6.69***		
		(1.251)		
Reciprocity depth			-13.17***	
			(4.324)	
Reciprocity length				-4.68***
				(1.085)
Public, unrated firm indicator	-1.77	-1.55	-1.75	-1.61
	(2.721)	(2.806)	(2.933)	(2.712)
Lead's market share (lagged)	-9.83*	-6.62	-10.57*	-8.71
	(5.813)	(5.821)	(5.917)	(5.821)
Repeat participant ratio (lagged)	1.99*	1.67	1.35	1.91
	(1.205)	(1.200)	(1.213)	(1.191)
Ln [1 + # previous loans by borrower]	-0.40	-0.30	-0.44	-0.37
	(0.669)	(0.663)	(0.676)	(0.670)
Ln [borrower's sales at closing]	-0.35	-0.32	-0.35	-0.34
	(0.346)	(0.342)	(0.345)	(0.345)
Ln [loan amount]	1.04***	1.08***	1.00***	1.03***
	(0.355)	(0.354)	(0.363)	(0.355)
Ln [maturity in days]	0.29	0.30	0.17	-0.53
	(0.267)	(0.265)	(0.273)	(0.328)
Term loan indicator	3.73***	3.70***	3.85***	3.77***
	(0.546)	(0.538)	(0.562)	(0.546)
Ln [1 + # participants]	-18.47***	-19.98***	-18.49***	-18.57***
	(0.725)	(0.734)	(0.757)	(0.727)
Participants' market share (lagged)	-0.28	3.90	-0.11	-0.50
	(3.069)	(3.150)	(3.046)	(3.071)
Borrower fixed effects	Yes	Yes	Yes	Yes
Lead arranger fixed effects	Yes	Yes	Yes	Yes
S.E. clustered within borrower/lead	Joint	Joint	Joint	Joint
$N =$	8,802	8,802	8,366	8,802
Adjusted R^2	0.783	0.784	0.786	0.782

Table 8: Effect of Reciprocity on Loan Pricing
Regressions of Various Specifications on Reciprocity Existence

This table reports coefficient estimates from regressions relating loan pricing to the existence of reciprocity, i.e., whether the syndicated loan facility shares reciprocity with another. The dependent variable is the interest spread over LIBOR on drawn funds in basis points, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(V) vary in the selection of independent variables, fixed effects, and robust standard errors. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. All regressions include year, loan purpose, interest rate type, and other specified fixed effects. Robust standard errors allowing for clustering by specified variables are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Spread on drawn funds	(I)	(II)	(III)	(IV)	(V)
Reciprocity existence	-24.68***	-21.74***	-15.37***	-16.22***	-11.09***
	(3.455)	(3.375)	(2.765)	(2.763)	(3.090)
Private firm indicator	12.12***	12.19***	-	10.62***	-
	(3.088)	(3.148)		(2.898)	
Public, unrated firm indicator	-11.23***	-12.06***	15.47*	-8.22***	18.58**
	(3.537)	(3.581)	(8.088)	(3.015)	(10.772)
Lead's market share (lagged)	15.74	13.94	-0.85	23.51	32.98
	(32.995)	(34.220)	(11.150)	(24.434)	(24.339)
Repeat participant ratio (lagged)	1.33	1.69	-1.47	-3.62	-7.32
	(7.354)	(7.510)	(4.986)	(5.429)	(5.788)
Lead being a bank indicator	-69.07***	-69.17***	-45.77***	-	-
	(7.833)	(7.867)	(5.819)		
Ln [1 + # previous loans by borrower]	3.28*	3.42**	-1.25	2.45	-0.42
	(1.709)	(1.680)	(2.858)	(1.587)	(2.833)
Ln [borrower's sales at closing]	-10.10***	-8.90***	-3.20***	-8.97***	-3.87***
	(0.947)	(1.081)	(1.194)	(0.943)	(1.430)
Ln [loan amount]	-20.94***	-18.99***	-13.01***	-19.29***	-13.29***
	(1.118)	(1.190)	(1.459)	(0.981)	(0.987)
Ln [maturity in days]	6.30***	6.17***	-1.93	2.97*	-1.59
	(1.578)	(1.523)	(1.200)	(1.553)	(1.399)
Term loan indicator	72.34***	71.75***	47.09***	65.93***	44.33***
	(2.644)	(2.652)	(3.206)	(1.838)	(1.546)
Ln [1 + # participants]		-0.24	-3.62*	0.50	-2.86*
		(2.763)	(2.006)	(1.617)	(1.584)
Participants' market share (lagged)		-81.06***	-55.65***	-92.92***	-64.10***
		(13.321)	(11.873)	(11.863)	(11.701)
Borrower industry fixed effects	Yes	Yes	-	Yes	-
Borrower fixed effects	No	No	Yes	No	Yes
Lead arranger fixed effects	No	No	No	Yes	Yes
S.E. clustered within borrower/lead	Lead	Lead	Lead	Borrower	Joint
$N =$	26,043	26,043	26,109	26,109	26,109
Adjusted R^2	0.507	0.509	0.691	0.555	0.708

Table 9: Effect of Reciprocity on Loan Pricing Regressions on Various Measures of Reciprocity

This table reports coefficient estimates from regressions relating loan pricing to reciprocity shared among syndicated loan facilities. The dependent variable is the interest spread over LIBOR on drawn funds in basis points, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(IV) use each of the four reciprocity measures (existence, breadth, depth, and length), respectively. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. All regressions include borrower, lead arranger, year, loan purpose, and interest rate type fixed effects. Robust standard errors allowing for clustering within borrower-lead groups are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Spread on drawn funds	(I)	(II)	(III)	(IV)
Reciprocity existence	-11.09***			
	(3.090)			
Reciprocity breadth		-16.55***		
		(3.783)		
Reciprocity depth			-23.11	
			(15.928)	
Reciprocity length				-15.84***
				(3.800)
Public, unrated firm indicator	18.58*	19.57*	16.09	18.82*
	(10.772)	(10.781)	(12.104)	(10.787)
Lead's market share (lagged)	32.98	42.86*	35.95	34.58
	(24.339)	(24.452)	(25.349)	(24.362)
Repeat participant ratio (lagged)	-7.32	-7.94	-5.48	-7.00
	(5.788)	(5.786)	(6.289)	(5.789)
Ln [1 + # previous loans by borrower]	-0.42	-0.15	-0.68	-0.36
	(2.833)	(2.829)	(2.974)	(2.830)
Ln [borrower's sales at closing]	-3.87***	-3.85***	-4.21***	-3.90***
	(1.430)	(1.432)	(1.546)	(1.430)
Ln [loan amount]	-13.29***	-13.12***	-13.06***	-13.33***
	(0.987)	(0.988)	(1.043)	(0.987)
Ln [maturity in days]	-1.59	-1.68	-1.89	-4.43***
	(1.399)	(1.398)	(1.422)	(1.587)
Term loan indicator	44.33***	44.18***	42.20***	44.15***
	(1.546)	(1.552)	(1.599)	(1.546)
Ln [1 + # participants]	-2.86*	-6.71***	-2.37	-2.91*
	(1.584)	(1.713)	(1.676)	(1.586)
Participants' market share (lagged)	-64.10***	-52.34***	-69.24***	-65.15***
	(11.701)	(11.956)	(12.128)	(11.734)
Borrower fixed effects	Yes	Yes	Yes	Yes
Lead arranger fixed effects	Yes	Yes	Yes	Yes
S.E. clustered within borrower/lead	Joint	Joint	Joint	Joint
$N =$	26,109	26,109	23,747	26,109
Adjusted R^2	0.708	0.708	0.717	0.708

Table 10: Effect of Reciprocity on Loan Default
Regressions of Various Specifications on Reciprocity Existence

This table reports coefficient estimates from regressions relating loan default to the existence of reciprocity, i.e., whether the syndicated loan facility shares reciprocity with another. The dependent variable is the loan default indicator, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(III) report results from OLS specifications that vary in the selection of independent variables, fixed effects, and robust standard errors. Columns (IV) and (V) report results from a Probit specification and a Logit specification, respectively. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. In order to deal with the right-censoring issue of loan default, the sample is limited to loan facilities that were originated during years 1992-2001. All regressions include year, loan purpose, interest rate type, and other specified fixed effects. Robust standard errors allowing for clustering by specified variables for the OLS specifications and standard errors for the Probit and Logit specifications are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

	(I)	(II)	(III)	(IV)	(V)
Default indicator (1992-2001)	OLS	OLS	OLS	Probit	Logit
Reciprocity existence	-0.034**	-0.038***	-0.047***	-0.265***	-0.487***
	(0.014)	(0.014)	(0.014)	(0.059)	(0.112)
Private firm indicator	-	-	-	-	-
Public, unrated firm indicator	0.021**	0.022**	0.022*	0.185***	0.343***
	(0.010)	(0.010)	(0.012)	(0.050)	(0.096)
Lead's market share (lagged)	-0.001	-0.016	-0.294**	-0.036	-0.088
	(0.036)	(0.034)	(0.127)	(0.290)	(0.555)
Repeat participant ratio (lagged)	-0.012	-0.011	-0.015	-0.052	-0.092
	(0.021)	(0.021)	(0.023)	(0.112)	(0.214)
Lead being a bank indicator	-0.029	-0.031	-	-0.198***	-0.332**
	(0.026)	(0.025)		(0.077)	(0.143)
Ln [1 + # previous loans by borrower]	0.022***	0.020***	0.019**	0.183***	0.368***
	(0.007)	(0.007)	(0.008)	(0.037)	(0.074)
Ln [borrower's sales at closing]	-0.003	-0.002	-0.004	-0.041*	-0.069
	(0.003)	(0.003)	(0.004)	(0.023)	(0.044)
Borrower previous default indicator	-0.050*	-0.054*	-0.068**	-0.416***	-0.871***
	(0.028)	(0.028)	(0.031)	(0.148)	(0.295)
Ln [loan amount]	-0.004	-0.007	-0.007	-0.062**	-0.130***
	(0.004)	(0.005)	(0.005)	(0.026)	(0.051)
Ln [maturity in days]	0.044***	0.042***	0.042***	0.565***	1.139***
	(0.005)	(0.005)	(0.005)	(0.053)	(0.109)
Term loan indicator	0.030***	0.025***	0.022***	0.058	0.102
	(0.009)	(0.008)	(0.008)	(0.051)	(0.097)
Ln [1 + # participants]		0.023***	0.026***	0.166***	0.323***
		(0.007)	(0.008)	(0.037)	(0.070)
Participants' market share (lagged)		-0.114***	-0.127***	-1.110***	-2.204***
		(0.043)	(0.045)	(0.295)	(0.587)
Borrower industry fixed effects	Yes	Yes	Yes	Yes	Yes
Lead arranger fixed effects	No	No	Yes	No	No
S.E. clustered within borrower/lead	Lead	Lead	Borrower	-	-
$N =$	9,920	9,920	9,923	9,541	9,541
Adjusted R^2 / Pseudo R^2	0.088	0.090	0.131	0.191	0.191

Table 11: Effect of Reciprocity on Loan Default Regressions on Various Measures of Reciprocity

This table reports coefficient estimates from regressions relating loan default to reciprocity shared among syndicated loan facilities. The dependent variable is the loan default indicator, and the independent variables include (1) reciprocity, (2) information asymmetry, (3) lead arranger characteristics including reputation, (4) borrower characteristics including reputation, and (5) loan characteristics. Columns (I)-(IV) use each of the four reciprocity measures (existence, breadth, depth, and length), respectively. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. In order to deal with the right-censoring issue of loan default, the sample is limited to loan facilities that were originated during years 1992-2001. All regressions include borrower industry, lead arranger, year, loan purpose, and interest rate type fixed effects. Robust standard errors allowing for clustering within borrowers are in parentheses. * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

Default indicator (1992-2001)	(I)	(II)	(III)	(IV)
Reciprocity existence	-0.047***			
	(0.014)			
Reciprocity breadth		-0.048***		
		(0.015)		
Reciprocity depth			-0.205***	
			(0.061)	
Reciprocity length				-0.045***
				(0.016)
Public, unrated firm indicator	0.022*	0.022*	0.023**	0.023**
	(0.012)	(0.012)	(0.012)	(0.012)
Lead's market share (lagged)	-0.294**	-0.269**	-0.290**	-0.286**
	(0.127)	(0.127)	(0.130)	(0.127)
Repeat participant ratio (lagged)	-0.015	-0.015	-0.014	-0.015
	(0.023)	(0.023)	(0.025)	(0.023)
Ln [1 + # previous loans by borrower]	0.019**	0.020**	0.020**	0.019**
	(0.008)	(0.008)	(0.008)	(0.008)
Ln [borrower's sales at closing]	-0.004	-0.004	-0.005	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)
Borrower previous default indicator	-0.068**	-0.069**	-0.053*	-0.067**
	(0.031)	(0.031)	(0.031)	(0.031)
Ln [loan amount]	-0.007	-0.006	-0.008	-0.007
	(0.005)	(0.005)	(0.005)	(0.005)
Ln [maturity in days]	0.042***	0.041***	0.041***	0.034***
	(0.005)	(0.005)	(0.005)	(0.005)
Term loan indicator	0.022***	0.022***	0.022***	0.022***
	(0.008)	(0.008)	(0.008)	(0.008)
Ln [1 + # participants]	0.026***	0.013	0.027***	0.024***
	(0.008)	(0.008)	(0.008)	(0.008)
Participants' market share (lagged)	-0.127***	-0.095**	-0.160***	-0.132***
	(0.045)	(0.046)	(0.045)	(0.045)
Borrower industry fixed effects	Yes	Yes	Yes	Yes
Lead arranger fixed effects	Yes	Yes	Yes	Yes
S.E. clustered within borrower/lead	Borrower	Borrower	Borrower	Borrower
$N =$	9,923	9,923	9,422	9,923
Adjusted R^2	0.131	0.130	0.130	0.130

Table 12: Effect of Reciprocity – Robustness

This table reports results of robustness tests on the effect of reciprocity. In all panels, the dependent variables are the share retained by the lead arranger in Column (I), the interest spread over LIBOR on drawn funds in Column (II), and the default indicator in Column (III). In order to deal with the right-censoring issue of loan default, the sample is limited to loan facilities that were originated during years 1992-2001 for results reported in Column (III). Reciprocity existence is an independent variable of interest in all panels. Additional independent variables of interest include: (1) the interaction term of reciprocity existence and information transparency in Panel A, (2) the interaction terms of reciprocity existence and borrower size in Panel C, (3) the interaction terms of reciprocity existence and loan size in Panel D, (4) the interaction term of reciprocity existence and lead arranger reputation in Panel E, and (5) the interaction term of reciprocity existence and borrower reputation in Panel F. Panel B examines the effect of reciprocity among two subsamples – borrowers with and without *Compustat* data, whereas Panels G and H report the results among loans that were *not* arranged by the top three lead arrangers (of the year in which the loan was originated) and loans that were arranged by banks (as opposed to finance companies, institutional investors, etc.), respectively. Reciprocity is defined during the current loan period (i.e., current reciprocity) and at the time of origination for each loan facility. Panel I further restricts reciprocity to be among lead arrangers that have *different* parent companies. A borrower is considered informationally transparent if it is a public, rated firm. Small, mid-sized, and large borrowers are defined as the smallest, middle, and largest one-third of borrowing firms in the sample by sales at closing. Similarly, small, mid-sized, and large loans are defined as the smallest, middle, and largest one-third of loans in the sample by loan amount. A lead arranger is considered reputable if its previous-year share in the U.S. syndicated loan market is greater than the median market share, i.e., 1%. A borrower is considered reputable if it has previously borrowed from the syndicated loan market.

All regressions control for (1) information asymmetry variables (i.e., whether the borrower is a private firm and whether it is a public, unrated firm), (2) lead arranger characteristics including reputation (i.e., the lead arranger's previous-year market share in the U.S. syndicated loan market, the previous-year repeat participant ratio, the bank indicator, and lead arranger fixed effects), (3) borrower characteristics including reputation (i.e., the natural logarithm of one plus the number of previous syndicated loan facilities by the borrower and the natural logarithm of sales at closing), (4) loan characteristics (i.e., the natural logarithm of loan amount, the natural logarithm of maturity in days, the term loan indicator, indicator variables for the interest rate type and the purpose of the loan, the natural logarithm of one plus the number of participant lenders in the syndicate, and the sum of all participant lenders' previous-year market shares in the global syndicated loan market), and (5) year fixed effects. For the subsample of loans with *Compustat* data available for borrowers in Panel B, additional control variables include the borrower's previous loan default indicator, previous-year earnings to assets ratio, book leverage ratio, and accruals to assets ratio. Regressions of both the share retained by the lead arranger and the interest spread on drawn funds [Columns (I) and (II)] also control for borrower fixed effects, whereas regressions of loan default [Column (III)] control for the borrower's previous loan default indicator and borrower 2-digit SIC industry fixed effects.

Robust standard errors are in parentheses, allowing for clustering within borrower-lead groups in Columns (I) and (II) and within borrowers in Column (III). * indicates that the estimated coefficient is significantly different from zero at the 10% level, ** at the 5% level, and *** at the 1% level.

A. Reciprocity and Information Transparency

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-3.59***	-11.74***	-0.046***
	(1.069)	(3.681)	(0.017)
Reciprocity × transparent	-2.52	2.18	-0.001
	(2.159)	(6.197)	(0.025)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.783	0.708	0.131

Table 12 (continued)

B. Alternative Information Asymmetry Measures: Availability of *Compustat* Data

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Compustat data available:			
Reciprocity existence	-4.54*** (1.263)	-8.47* (4.396)	-0.035** (0.015)
$N =$	5,263	12,928	7,660
Adjusted R^2	0.786	0.729	0.144
Compustat data unavailable:			
Reciprocity existence	-5.47** (2.532)	-14.17*** (5.105)	-0.040 (0.109)
$N =$	2,414	10,231	290
Adjusted R^2	0.794	0.673	0.613

C. Reciprocity and Borrower Size

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-3.72*** (1.123)	-5.50 (4.005)	-0.041** (0.016)
Reciprocity × mid-sized borrower	-0.79 (1.051)	-7.80** (3.906)	-0.003 (0.016)
Reciprocity × large borrower	-1.13 (1.491)	-9.97* (5.236)	-0.024 (0.021)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.783	0.708	0.132

Table 12 (continued)

D. Reciprocity and Loan Size

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-1.63	-3.06	-0.030*
	(1.134)	(3.933)	(0.017)
Reciprocity × mid-sized loan	-3.46***	-6.81**	-0.024**
	(0.793)	(3.129)	(0.012)
Reciprocity × large loan	-3.86***	-18.73***	-0.023
	(1.191)	(4.062)	(0.017)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.784	0.709	0.131

E. Reciprocity and Lead Arranger Reputation

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-4.26***	-9.78***	-0.045***
	(1.040)	(3.280)	(0.015)
Reciprocity × reputable lead	-0.17	-4.18	-0.007
	(0.930)	(3.566)	(0.018)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.783	0.708	0.131

F. Reciprocity and Borrower Reputation

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-2.84**	-9.79**	-0.044***
	(1.127)	(3.967)	(0.016)
Reciprocity × reputable borrower	-1.98**	-1.67	-0.005
	(0.812)	(3.364)	(0.015)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.783	0.708	0.131

Table 12 (continued)

G. Reciprocity and Loans that Were *Not* Arranged by the Top Three Lead Arrangers

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-3.40*** (1.305)	-11.70*** (3.758)	-0.058*** (0.015)
$N =$	6,507	18,143	6,788
Adjusted R^2	0.806	0.702	0.148

H. Reciprocity and Loans that Were Arranged by Banks

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-4.55*** (1.045)	-11.69*** (3.303)	-0.040*** (0.013)
$N =$	8,100	22,728	9,291
Adjusted R^2	0.788	0.708	0.118

I. Reciprocity among Lead Arrangers that Have *Different* Parent Companies

	(I) % Retained by Lead	(II) Spread on Drawn Funds	(III) Loan Default (1992-2001)
Reciprocity existence	-4.07*** (0.992)	-10.62*** (2.979)	-0.054*** (0.013)
$N =$	8,802	26,109	9,923
Adjusted R^2	0.779	0.708	0.132