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Bank Equity Stakes in Borrowing Firms and Credit Market Competition

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Abstract

In this paper we analyse the effect of banks holding equity stakes in borrowing firms on the equilibrium level of interest rates and on the tendency of the borrowing firm to establish tighter links with the shareholding bank. Equity claims are defined as rights to receive dividend payments as well as private information about the firm. By modeling competition as an asymmetric common value auction, we show that when one of the competing banks in the credit market holds an equity claim in the firm, the equilibrium expected cost of debt increases with the size of the equity stake and the firm tends to concentrate his credit relationships around the shareholding bank.

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1 Introduction

The range of services that can be offered by banking institutions differs widely across the globe. Two general models can be distinguished: universal banking and functionally separated banking. In a universal banking system, banks perform both investment and commercial banking functions while, in a functionally separated system, these functions are allocated to different institutions. The debate on the relative efficiency of the two alternative models is still lively in financial economics. One of the most controversial issues is whether universal banks should engage in securities underwriting and be allowed to acquire equity stakes in non-financial firms. Many of the pertinent issues regarding increased banking-commerce linkages have been analysed in the recent finance and economics literature. The general argument in favor of universal banking appears to be that artificial limitations on bank activities could potentially constrain optimal configurations that would arise endogenously. On the other hand, a commonly raised concern is the fear that the affiliation of a bank with a commercial firm could increase the risks of bank failure and thereby impose greater costs on the safety net. This paper aims at contributing to this debate by investigating an issue that, to our knowledge, has been neglected by the existing literature. Namely, the impact the presence of banks holding mixed debt-equity claims in a firm might have on the degree of competition in *credit* markets.

We model the problem of a wealth-constrained owner-manager who needs to finance its project. The only investors firms can approach are Bertrand-competing universal banks, operating in the form of conglomerates, one of which holds an equity claim in the firm itself. We claim that, in this setting, competition is distorted in favour of the shareholding bank. The latter benefits of a monopoly power which is found to be a function not only of her informational advantage to competitors but also of the size of the equity share she holds. The firm ends up with paying higher interest rates in expectation, as compared to the case of no bank equity participation.

Bank equity stakes acquisitions in non-financial firms are generally associated to board representation, which ensures the shareholding bank easy access to private, non verifiable information about the firm's prospects. If the bank is universal, information synergies between banking activities can result. The information collected by the investment banking department (or subsidiary[1]) could also be used by the commercial banking department when assessing the creditworthiness of the firm. This would make the shareholding bank an "insider" and give her a competitive advantage on the market for loans.

Informational asymmetries between competing lenders are known to generate a "lemons" problem for the less informed investors as it becomes difficult for one bank to draw off another bank's good customers without attracting the less desirable ones as well. The innovation of our model, compared to this classical paradigm, is that, by modeling loan pricing competition as a common value auction between asymmetrically informed traders, the monopoly power of the informed bank turns out to be a function not only of the *degree* of informational asymmetries between competitors (*information effect*), but also of the *size* of the equity stake hold by the shareholding bank, which determines the entity of dividends accruing to her (*dividend effect*)[2].

Informational advantages can increase the shareholding bank's expected profits also in the absence of dividend payments. Nevertheless, they do not eliminate the risk of the borrowing firm switching to outside cheaper sources of finance. We show that the possibility for banks to hold equity stakes and receive dividend payments can strengthen the credit relationship with the participated firm and reduce the probability of a switch. Indeed, dividends represent an additional source of profit of which the bank benefits regardless of her being also a debt financier. By increasing the shareholding bank's expected profits from the loan pricing competition, dividends reinforce her competitive advantage by worsening the "winner's curse" effect for the outside uninformed bank. As the size of the equity stake increases, the outsider optimally chooses not to take part to the competition with a higher probability, thus reducing the chance of the firm switching to outside uninformed sources of finance.

[1]Universal banking does not come with a single operational model. Two operational models can be distinguished: the German style universal bank, in which a full range of banking and financial services is provided within a single legal entity (conglomeration), and the British model, where activities are legally separated into subsidiaries.

[2]In our model, for the dividend effect to take place, though, a certain extent of informational asymmetry between competing banks is needed.

2 Related Literature

Our definition of equity claims not only as rights to surplus, but also as rights to receive private information about the firm refers to the literature on *Universal Banking.* Many commentators (e.g.Cable [1985], Flath [1993], Hoshi-Kashyap-Sharfstein [1991] , Krosner-Strahan [1999] , Prowse [1990, 1992], Sheard [1989]) have emphasised that, by owning equity in a firm as well as debt, the bank becomes even more of an insider than if it remained just a privileged creditor. This argument is justified not only by the fact that being a shareholder implies additional informational rights compared to other stakeholders, but also by the fact that, in general, shareholding banks do have their representative in the firm's supervisory board or in the board of directors. Through board representation the bank acquires a *full* insider status, which internalises and perfects the information flow from the firm to the bank.

Competition among investors is modeled after the correction article that von Thadden [1998] made of Sharpe [1990] . A setting is considered in which the presence of asymmetric information between potential lenders leads to a "winner's curse" type of distortion that reduces the degree of competition and leads to a *limited* informational capture of the borrower. Other theoretical studies (Shaffer [1997] , Rajan [1992] , Broecker [1990]) have identified a winner's curse in bank lending, resulting from the ability of rejected applicant to apply at additional banks. With regard to this strand of the literature, the original contribution of our model is that the monopoly power of the informed (shareholding) bank is found to be a function not only of the *degree* of informational asymmetries between competitors, but also of the *size* of the equity stake hold by the shareholding informed bank.

The present paper is organised as follows.

In section 3 we present the model. In particular we describe the sequence of moves by the agents, the characteristics of the projects available to entrepreneurs, the information structure of the game. In section 4 we characterise the equilibrium bidding strategies of players. In section 5 we analyse the equilibrium interest rate and the probability with which the firm can switch to outside bank credit in a comparative statics framework. Final considerations conclude the paper.

3 The Model

Assume a risk neutral world where there is an entrepreneur who intends to undertake a one-period investment project. The project can be of a good or bad quality; its quality determines the random stream of returns to the investment at the end of the period. The good project requires an initial investment I at t=0 and pays out $S \geq I$ at the end of the period (t=1). The bad project, on the contrary, is doomed to fail at t=1 with probability one. The output produced by each project is observable and verifiable.

The are only two universal banks operating in the credit market which the entrepreneur can approach for finance. One of the banks holds an equity stake in the firm itself, which implies that she is entitled to receive a fraction α of the firm's net surplus at t=1[3].

At t=0, both banks know that the probability of the entrepreneur being a good type is $\theta \in (0,1)$. Nevertheless, before competition starts, the shareholding bank observes an informative private signal ξ of the project's quality. The signal delivers message $\xi = 1$ with probability one if the borrower is a good type. If the borrower is a bad one, the signal delivers $\xi = 0$ with probability $(1-q)$, and $\xi = 1$ with the complementary probability. The parameter q measures the precision of the signal received by the insider. The smaller is q the more informative is the signal. In particular, if $q = 0$, the insider can perfectly screen out bad from good types at t=1. The outsider receives no signal. Implicit in the assumption of asymmetric information between the insider shareholding bank and outsider is the idea that banks do not readily divulge information concerning the profitability of current commercial clients. Clearly, such an information sharing would help competing banks to bid away their best customers.

Let the risk-free interest rate as well as the discounting rate be zero.

In summary, the sequence of events is the following.

t=0

1. The shareholding bank observes the signal ξ.

[3] The circumstances that have led the bank to acquire the equity stake in the past are not considered, as we are only concerned in describing the asymmetric competition between shareholding and non-shareholding banks in the market for loans.

2. The entrepreneur approaches the two banks operating in the market and apply for a loan of size I.

3. The shareholding insider bank and the outside bank respond by simultaneously quoting an interest rate (i^{in} and i^{out}, respectively) that gives them an expected return greater than or equal to their cost of funds (normalised to 1).

4. The entrepreneur accepts to write a contract with the bank that quotes the lowest interest rate, borrows and invest I. If indifferent, he chooses the inside bank's offer.

t=1 At the end of the first period the output is realised and the borrower will repay the face value of debt only if the output $S \neq 0$. All cash flow from the project is paid out in the form of dividends or debt service.

4 The Equilibrium

Competition on loan pricing between banks is described as a sealed-bid, first-price common-value auction with asymmetrically informed bidders. The loan contract is the common "object" bidders compete for. The "price" is represented by the interest rate *simultaneously* offered by competing banks to the borrower. The "seller" (i.e. the entrepreneur offering the loan contract) accepts the offer of the bank who makes the *lowest* bid. The value of the object is the project's cash flow realized at time t=1.

Bidders differ from two respects. Firstly, one of the bidders (the insider) holds an equity stake in the firm offering the loan contract. Secondly, they have different information about the value of the contract. The information structure is determined at the beginning of period one, by Nature's random choice of the borrowers' types, and by the observation of the signal ξ by the insider. The outsider bank only knows the prior θ, which represents the probability of the entrepreneur being a good one and the distribution of the signal received by the insider at t=1. The insider can observe a signal ξ of the borrower's type. After receiving the signal, the inside bank updates her beliefs on the type of borrower being financed. If the signal reports $\xi = 0$, the insider believes that the borrower is a bad one, and that his project is to fail with probability one. If $\xi = 1$, the insider expects the borrower to be a good type with a probability $\beta(\theta, q) = \frac{\theta}{\theta+(1-\theta)q}$, where q measures the precision of the signal received by the insider. The probability $\beta(\theta, q)$ also represents the probability of success of period-two projects, conditional on the signal being $\xi = 1$, and it is derived using Bayes' rule.

Before describing the equilibrium, we need to define important benchmark loan rates.

F.1. $i_0^{out}(\theta) \equiv \frac{1-\theta}{\theta}$

F.2. $i_0^{in}(\theta, q, \alpha) \equiv \frac{1}{1-\alpha}\left(\frac{1}{\beta(\theta,q)} - \alpha\frac{S}{I}\right) - 1$

F.3. $u \equiv \frac{S}{I} - 1$

The interest rate $i_0^{out}(\theta)$ in F.1. is the one that ensures the outside, uninformed bank with zero expected profits, conditional on winning the bidding game. It is only a function of the prior θ, which represents the public information available in the market. The interest rate in F.3. leaves the entrepreneur with zero profits and allows the winning bank to extract all the surplus from the firm through interest rate payments.

Expression in F.2. represents the zero-profit interest rate for the insider in case of win, conditional on having received a good signal. If she observes $\xi = 0$, then the zero-profit interest rate is obviously $i = +\infty$, which we conventionally identify with the choice of "not bidding at all". [4]
Using [F.2] and [F.1] we get the following relation between the insider's and the outsider's zero profit interest rate:

R.1 $i_0^{in}(\theta, q, 0) = \frac{1}{\beta(\theta)} - 1 = \frac{(1-\theta)q}{\theta} = q i_0^{out}$

where $i_0^{in}(\theta, q, 0)$ denotes the zero-profit interest rate for the insider in case of pure-debt claims ($\alpha = 0$). Result R.1 implies that the insider earns additional profits, compared to the outsider, by winning the auction with an interest rate $i \geq i_0^{out}$. The sources of these additional profits are, on the one hand, the informational advantage of the insider to the outsider, and, on the other hand the possibility to receive dividend payments regardless of her being also a debt financier (i.e. regardless of her winning the auction on loan pricing).

[4] It is worth reminding that we have assumed that universal banks operate in the form of conglomerate, so that the investment and the commercial banking department operate as part of a unique legal entity. Expression [F.2] represents the zero-profit interest rate for the entire conglomerate.

Banks' bidding decisions at t=0 depend on various factors. Firstly, the degree of informational asymmetries between the insider shareholding bank and the outsider bank, which depends on the parameters θ and q. Secondly, the *size* of the equity share α, which determines the entity of profits the investor earns in addition to interest payments. According to the value taken by these parameters, we might have equilibria in pure strategies or in mixed strategies.

We rule out the trivial case in which $u < i_0^{in}$. For these values of the parameters it is not worthwhile investing in the project not even for the informed inside bank. Both the insider and the outsider refuse credit to the entrepreneur with probability one.

In the case in which $i_0^{in} \leq u \leq i_0^{out}$, the pricing game has a unique Bayesian Nash equilibrium in *pure strategies.* For the outsider to take part to the competition, a necessary condition is that the project yealds an expected positive net present value, given the prior probability θ of the borrower being a good one. Namely, it must be that $S - \frac{1}{\theta}I \geq 0$. Rearranging this inequality we get exactly the condition $i_0^{out} \leq u$. If this inequality does not hold, i.e. $i_0^{out} > u$, then there is room nor for the outsider's undercutting (she already makes an expected loss by bidding $i = i_0^{out}$) nor for her overbidding (the interest rate that extracts the whole surplus from the firm is lower than i_0^{out}). Therefore, the competition game has a unique equilibrium in *pure strategies*, in which the outsider refuses finance (i.e. plays $i^{out} = +\infty$ with probability one), and the insider "squeezes" the firm by bidding an interest rate $i = u$ with probability one. And this outcome delivers zero expected profits for the entrepreneur.

In the rest of this paper we will consider values of the parameters such that $i_0^{out} < u$.

Let us formulate the following Lemma.

Lemma 1 *If* $i_0^{out} < u$, *the pricing game at t=0 might have a pure or mixed strategy equilibrium according to the value taken by the parameter* α :
[*a*] *If* $\alpha = 1$, *the game has a unique Bayesian Nash equilibrium in pure strategies in which the outsider refuses finance with probability one, the insider refuses finance if the signal received is* $\xi = 0$, *and bids the interest rate* $i^{in} = i_0^{out}$ *if the signal is* $\xi = 1$.
[*b*] *If* $0 \leq \alpha < 1$, *the game has no Nash equilibrium in pure strategies.*

Proof. See appendix A. ■

Let us further restrict our attention to the sub-case in which $i_0^{out} < u$ and $0 \leq \alpha < 1$, in which the game turns out to be characterised, as it will be shown, by a unique Bayesian Nash Equilibrium in mixed strategies. Under these restrictions of the parameters, the mixed strategies are a direct consequence of the information structure of the game. First of all, the shareholding bank knows everything the outsider knows, i.e. players are asymmetrically informed. If the outsider tries to play according to a pure and therefore predictable strategy, the insider will respond by bidding the same interest rate as the outsider's[5] if worthwhile and nothing if not. Moreover, the outsider knows that the set of possible informational types (signals) for the insider is *discrete*.

The mixed strategies are nevertheless also a consequence of the pay-off structure of the game. In particular, if the expected profits the insider benefits in case of loss would be sufficiently high, the insider would not be interested in winning the competition, and a pure strategy equilibrium would result in which the outsider would get the debt contract with probability one. Therefore, a mixed strategies equilibrium exists because the insider still prefers to win the "auction" regardless of the dividends payments she gets when losing it.

For any interest rate bid, in case of win the insider gets the following expected profits:

$(\beta(\theta)(1+i)-1) I_1 + \beta(\theta)\alpha [S_2 - (1+i) I_1]$

in case she loses the auction, the upper limit of her expected profits is given by:

$\alpha\beta(\theta)[S_2 - (1+i_0^{out}) I_1]$

therefore, the insider gets strictly higher profits from winning the auction than from losing it if the following relation holds:

$i - i_0^{in}(\theta, q, 0) > \alpha (i - i_0^{out})$

Since $i_0^{in}(\theta, q, 0) < i_0^{out}$ and $\alpha < 1$, it follows that the above inequality holds at least for every $i \geq i_0^{in}(\theta, q, 0)$ and, consequently, for every $i \geq i_0^{out}$.

We can now start to characterise the players' bidding strategies. In Lemma 2 we derive lower and upper bounds to the equilibrium strategies' support.

Lemma 2 [*a*] *The lower limit ℓ of the insider's and outsider's bidding strategies' support is $i_0^{out} = \frac{1-\theta}{\theta}$.* [*b*] *The upper limit of the insider's bidding strate-*

[5] We are indeed assuming that, in case of ties, the insider wins the auction.

gies support, given the borrower is not detected as a bad one, is $u \equiv \frac{S_2}{I_1} - 1.$
[*c*] *The outsider bids with zero probability on the interval* $(u, +\infty)$

Proof. [*a*] The outsider will never bid below $i_0^{out}(\theta)$, as she would make negative expected profits. Therefore $i^{out} \geq i_0^{out}(\theta)$ and the insider expects to win the auction with probability one for every $i \leq i_0^{out}$. Therefore, if we assume that the insider bids an interest rate $i < i_0^{out}$ with positive probability, her expected pay-off will be:
$(\beta(\theta, q)(1 + i) - 1) I_1 + \beta(\theta, q) \alpha [S_2 - (1 + i) I_1] = \beta(\theta, q)(1 - \alpha)(1 + i) I_1 + \beta(\theta, q) \alpha S_2 - I_1$ which is strictly increasing in i as $0 \leq \alpha < 1$. Therefore the insider could bid $i + \varepsilon$, $\varepsilon > 0$ and be strictly better off without reducing the probability of winning the auction. Therefore $i^{in} \geq i_0^{out}(\theta)$. It follows that $\ell = i_0^{out}(\theta)$.
[*b*] Assume that the insider bids, in equilibrium, an interest rate $i > u$ with positive probability. In case she wins the auction, though, she gets no higher pay-off than bidding u (i.e. $uI_1 = S_2 - I_1$) Therefore, by bidding a lower interest rate $i - \varepsilon$, $\varepsilon > 0$, she could reduce the probability of losing the auction without affecting the pay-off in case of win.
[*c*] The outsider knows only the probability distribution over the insider's information types. She knows the probability with which the insider will receive a certain signal about the borrower's type. She can also anticipate the result expressed in point [*b*]. Therefore she knows that any bid above u will only attract bad borrowers. Therefore the only interest rate above u she will bid in equilibrium is $i = +\infty$, which is the interest rate competing banks bid in case they decide to refuse finance to the borrower. ■

Given point [*a*] in Lemma 2, in what follows we will let i_0^{out} be simply ℓ.

In order to proceed with the characterisation of the equilibrium strategies, we need to formally derive the players' expected pay-off functions. The outsider's and the insider's expected profits are given by expressions [F.4] and [F.5] respectively:

F.4 $P^{out}(i) = \{[\theta + (1 - \theta) q] (1 - G^{in}(i)) [\beta(\theta)(1 + i) - 1] - (1 - \theta)(1 - q)\} I$

F.5 $P^{in}(i, \alpha) = (1 - G^{out}_{\sim}(i)) [(\beta(\theta)(1 + i) - 1) I + \beta(\theta) \alpha [S - (1 + i) I]] +$

$+ G^{out}_{\sim}(i) \beta(\theta) \alpha [S - (1 + E(i^{out} | \ell \leq i^{out} < i)) I]$

where $G^{in}(i)$ and $G^{out}(i)$ represent the insider's and the outsider's bidding strategies, $G^{out}(i^-) \equiv \lim_{x \to i^-} G^{out}(x)$, ℓ represents the lower limit of the players' bidding strategy support, and $E(i^{out} | \ell \leq i^{out} < i)$ denotes the expected interest rate bid by the outsider conditional on her winning the auction. The first additional term in [F.5] represents the profits (interest rate payments plus dividends) the insider gets in case she wins the auction. The second term represents the profits (dividends) she gets in case she loses, and they are a function of the average interest rate bid by the outsider, given that the outsider wins the auction.

One can notice that the asymmetry between the insider and the outsider stems from two facts. Firstly, the insider's information set partition is finer than the outsider's. Secondly, whenever $\alpha > 0$, the insider gets positive expected dividends not only in case she wins the competition but also in case she loses. We will later on extensively discuss the role played by these asymmetries in the characterisation of the equilibrium.

In order to derive the actual functional form of the players' bidding strategies we need to verify continuity of $G^{in}(i)$ and $G^{out}(i)$ - and of their derivatives - at least over the interval $[\ell, u)$. We therefore formulate the following lemma:

Lemma 3 *In equilibrium, both the insider and the outsider bid atomlessly within the interval $[\ell, u)$. In addition, the outsider's bidding strategy $G^{out}(i)$ is continuous on $i = u$. Moreover, in equilibrium, both $G^{in}(i)$ and $G^{out}(i)$ are strictly increasing on $[\ell, u]$.*

Proof. See appendix B. ■

Lemma 3 enables us to reformulate the expected profits of the insider as follows:

F.5' $$P^{in}(i,\alpha) = (1 - G^{out}(i))\left[(\beta(\theta)(1+i) - 1) I_1 + \beta(\theta)\alpha\left[S_2 - (1+i) I_1\right]\right] +$$
$$+G^{out}(i)\beta(\theta)\alpha\left[S_2 - \left(1 + \frac{1}{G^{out}(i)}\int_{-\infty}^{i} t dG^{out}(t)\right) I_1\right]$$

The equilibrium mixed bidding strategies for the insider and the outsider are described in Proposition 1:

Proposition 4 *The continuation game at t=1 has a unique Bayesian Nash Equilibrium in mixed strategies in which:*
[a] The insider refuses finance with probability one if the borrower is detected as a bad one. If the signal received at t=0 is good, then the insider bids u

with probability $\mu = \frac{\ell - i_0^{in}(0)}{u - i_0^{in}(0)}$ *and atomlessly over the interval* $[\ell, u)$ *according to the cumulative probability distribution function:* $G^{in}(i) = 1 - \frac{\ell - i_0^{in}(0)}{i - i_0^{in}(0)}$, *where* $i_0^{in}(0)$ *is given by expression* $[R.1]$ *and represents the zero-profit interest rate for the insider in case of pure debt claims* ($\alpha = 0$)*.*
$[b]$ *The outsider refuses finance with probability* $\mu^{(1-\alpha)}$ *and with the complementary probability she bids atomlessly over the whole range* $[\ell, u]$ *according to the cumulative distribution function:* $G^{out}(i) = 1 - \left(\frac{\ell - i_0^{in}(0)}{i - i_0^{in}(0)}\right)^{1-\alpha}$.

Proof. See appendix C. ■

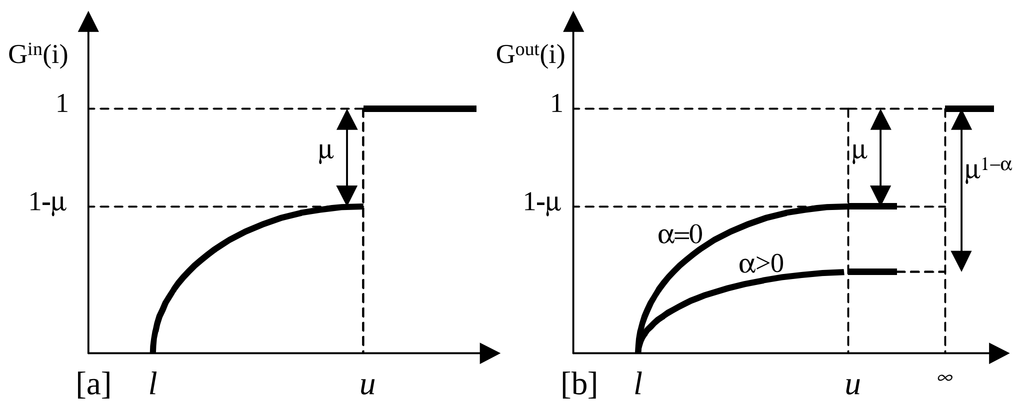

Fig. 1. The insider's and the outsider's bidding strategies.

The equilibrium strategies are represented in picture 1. Proposition 1 shows that the equilibrium bidding strategy of the insider does not depend on α (the outsider's expected pay-off not being affected by the insider holding equity stakes in the firm). Otherwise, the outsider bids finite interest rates with a lower probability the higher is the stake held by the inside investor (see picture 1). Equivalently, she refuses finance with a higher probability the larger is α. In particular, if $\alpha = 0$, it comes out that $G^{in}(i) = G^{out}(i)$ at least over the interval $[\ell, u)$. In addition, the probability with which the insider refuses finance in equilibrium reduces to μ, i.e. the probability with which the insider bids the highest interest rate u. Therefore, in this particular case, the insider's and the outsider's cumulative distribution functions differ only in that, in equilibrium, the insider puts probability mass μ on the point $i = u$, extracting the entire surplus from the firm, whilst the outsider puts the same probability mass on $i = +\infty$. Nevertheless, as α gets larger, the outsider's strategy turns into a less aggressive one. Indeed, the outsider optimally decides to refuse finance with a probability $\mu^{1-\alpha}$ which is increasing in α.

5 The equilibrium interest rate and the "switching" probability

In this section we will complete the characterisation of the equilibrium by formally deriving the interest rate the good borrower expect to pay in equilibrium and the probability with which he switches from the inside informed shareholding bank to the outside uninformed bank. Both are a measure of the monopoly power of the insider.

The switching probability is given by (see intermediate steps in appendix D):

R.2 $\sigma(\alpha) \equiv \Pr\left(i^{out} < i^{in} | i^{out} \ or \ i^{in} \leq u\right) = \frac{1-\alpha}{2-\alpha}\left[1 - \mu^{2-\alpha}\right]$

Result R.2 shows that the switching probability is proportional to the probability with which the outsider refuses finance. If this probability increases, the switching probability decreases.

The expected interest rate for the good borrower is given by:

R.3 $i^e(\alpha) = E\left[\min\left(i^{in}, i^{out}\right)\right] =$

$$= \int_\ell^u i\left(g^{in}(i)\left(1 - G^{out}(i)\right) + g^{out}(i)\left(1 - G^{in}(i)\right)\right) di +$$
$$+ u\left(1 - G^{in}(u^-)\right)\left(1 - G^{out}(u)\right)$$
$$= (2-\alpha)\int_\ell^u \frac{i}{\left(i - i_0^{in}(0)\right)^{3-\alpha}} di + u\left(\frac{\ell - i_0^{in}(0)}{u - i_0^{in}(0)}\right)^{2-\alpha}$$

where $G^{out}(i)$ and $G^{in}(i)$ are described in Proposition 1, $g^{in}(i)$ and $g^{out}(i)$ are their first derivatives and $i_0^{in}(0)$ is the interest rate that gives the insider zero expected profits when $\alpha = 0$.

5.1 The Information Effect

In this section we investigate the effect of the degree of information differential between the insider and the outsider on the equilibrium characterisation.

The precision of information acquired by the insider bank is measured by the parameter q. Changes in the parameter q are captured by variations in the conditional probability $\beta(\theta) = \frac{\theta}{\theta+(1-\theta)q}$, which measures the probability of success of the project, given the signal observed by the insider is a good one ($\xi = 1$). This probability is monotonically decreasing in q: as q gets larger, the informational advantage of the insider gets less relevant. On the contrary, if q decreases, the good signal gets more informative about type. In particular, if $q = 0$, the insider (shareholding) bank knows perfectly the borrower's type at t=0 and we have $\beta(\theta) = 1$.

Rearranging [R.3], we get an expression of the insider's optimal bidding strategy as a function of the probability $\beta(\theta)$. Decrements in the parameter q are reflected in a progressive movement of the probability mass to the upper edge of the interval of feasible bids $[\ell, u]$, so that we have:

$$G^{in}(i) = \frac{i-i_0^{out}(0)}{i-i_0^{in}} = \beta(\theta)\frac{i-\ell}{\beta(\theta)(1+i)-1} \underset{q\to 0}{\longrightarrow} 1-\frac{\ell}{i}$$

This implies that the point mass at $i = u$ progressively increases up to a maximum of $\mu^+ = \frac{\ell}{u}$ as the informational gap between insider and outsider gets larger. Correspondingly, the outsider's bidding strategy tends to $G^{out,+}(i) = 1 - \left(\frac{\ell}{i}\right)^{1-\alpha}$, which implies that the outsider refuses finance with an increasing probability up to a maximum of $(\mu^+)^{1-\alpha}$. As a result, we should find that, for a given size of the equity share α, as the informational advantage of the insider gets more significant, the expected interest rate for good borrowers increases and the probability of a switch to outside sources of finance decreases, due to an increased informational capture of the borrower to its shareholding bank. Indeed, the expected interest rate and the switching probability for good borrowers are given by (take $\alpha = 0$ for simplicity):

$$i^e(q) = \ell q + \left[\frac{\ell(1-q)}{u-\ell q}\right][2u - \ell(1-q)]$$

$$\sigma(q) = \frac{1}{2}\left(1-\left(\frac{\ell(1-q)}{u-\ell q}\right)^2\right)$$

where $\frac{\partial i^e(q)}{\partial q} < 0$ and $\frac{\partial \sigma(q)}{\partial q} > 0$.

Note that, when the insider has no informational advantage on the outsider ($q = 1$, $\alpha \geq 0$), the expected interest rate for the borrower is $i^e = \ell$, and the switching probability is $\sigma = 0$ (we have assumed that, in case of ties, the borrower chooses the insider) and function $\sigma(q)$ has a discontinuity in $q = 1$. As the informational advantage gets larger, the expected interest rate increases and tends to $i^e = \ell\left(2 - \left(\frac{\ell}{u}\right)\right)$ when information is perfectly asymmetric ($q = 0$, $\alpha = 0$). Correspondingly:

$\sigma = \frac{1}{2}\left(1 - \left(\frac{\ell}{u}\right)^2\right)$

In a one-shot game, if good borrowers could commit to transfer verifiable information about their type, then they would obviously reveal their type to both competing banks. Otherwise, in this setting of simultaneous competition, they would rather have none of the competitors being informed than give an informational advantage to one lender only.

5.2 The Dividend Effect

For simplicity, let us consider the case in which the insider shareholding bank receives a perfect knowledge about the borrower's type (i.e. q=0), so that the informational gap between the insider and the outsider is maximised. In this case the expected interest rate for the good borrower is given by:

$$i^e(\alpha) = E\left[\min\left(i^{in}, i^{out}\right)\right] =$$
$$= \int_{\ell}^{u} i\left(g^{in}\left(1 - G^{out}\right) + g^{out}\left(1 - G^{in}\right)\right) di + u\left(\frac{\ell}{u}\right)^{2-\alpha}$$
$$= \frac{\ell}{1-\alpha}\left[2 - \alpha - \left(\frac{\ell}{u}\right)^{1-\alpha}\right]$$

It can be easily shown that $\frac{\partial}{\partial\alpha}\left[i^e(\alpha)\right] > 0$, which implies that the expected cost of debt finance for the borrower is increasing with the size of the equity share α. This is consistent with the fact that, as α gets larger, the outsider decides to stay out of the game with a higher probability, thus reducing the degree of competition in the credit market. Indeed, if we consider the probability σ with which the borrower switches from the insider to the outsider in equilibrium (see $[R.2]$:

$$\sigma = \frac{1-\alpha}{2-\alpha}\left(1 - \left(\frac{\ell}{u}\right)^{2-\alpha}\right)$$

Since $0 < \mu < 1$ and $0 \leq \alpha < 1$, we also have $\frac{\partial\sigma(\alpha)}{\partial\alpha} = -\left(1-\alpha\right)\mu^{out} < 0$, which implies that the switching probability decreases monotonically in the size of the equity stake α. This result is consistent with the empirical evidence on the phenomenon of bank equity stakes acquisition available for the Italian case (see Bianco and Chiri [1997]). Indeed, there seems to be a positive correlation between the presence of a bank in the ownership structure of a firm and the tendency by the firm to concentrate its credit relationships around the shareholding bank. Also in Germany, a firm with relevant ownership links with a bank tends to establish a one-to-one credit relationship with the shareholding bank itself.

We can try to give an interpretation to the results illustrated in this section and in section 5.1.

The shareholding bank manages to capture the firm thanks to two interdependent effects. Her informational advantage gives the shareholding bank the status of incumbent in the market for loans; incumbents have always the most to lose from an unsuccessful bid, and so place a higher value on winning. This value is even higher if the shareholding bank is to receive dividend payments on top of interest payments in case she wins the auction[6]. New entrants - in our setting, the outside bank - therefore calculate that, if they win the auction, they must have overpaid. Accordingly, they back off, allowing incumbents to win cheaply. In auction theory, this is what is called the "winner's curse" effect for common value auctions. In summary, in our model, both an increment in the precision of information and an increment in the entity of dividend payments would worsen this effect, through an increase of the incumbent's expected profits in case of win. Also the dividends accruing to the shareholding bank in case of loss affect the outcome: the higher the profit in case of loss, the less attractive is, for the insider, to win the auction. This additional term *partly* counter-balances the winner's curse effect due to the dividends perceived by the insider in case of win, thus playing a "disciplinary" role on the insider.

6 Concluding remarks

The analysis carried out in this paper showed that pay-off asymmetries, if combined with informational asymmetries, may exacerbate the competitive advantage of an informed bank when competing for the pricing of a loan.

In von Thadden [1998] it is shown that, in equilibrium, as a consequence of informational asymmetries, competing banks bid randomly over a range of feasible interest rates. Due to a "winner's curse" type of problem, the outside uninformed bank decides not to compete with a positive probability. Correspondently, the insider decides to "squeeze" the borrower by bidding the highest possible interest rate. In this paper we extended this analysis by assuming that the informed bank also holds an equity stake in the firm which demands the loan. We showed that an increment of the informational gap

[6]It is important to emphasise, though, that for the dividend effect to take place a certain informational advantage is needed.

between the insider and the outsider increases the probability with which the outsider refuses finance to the applicant borrower and, correspondently, the probability with which the insider attempts to "squeeze" the firm by bidding the highest interest rate (*information effect*). In addition, if the insider holds a positive share of rights on the firm's net surplus, her bidding strategy remains unaffected while, ceteris paribus, the outsider would refuse finance with a higher probability the larger is the share (*dividend effect*). Indeed, dividend payments adds up to information rents and increase the expected profits of the informed bidder in case of win, thereby leading to a worsening of the "winner's curse" for the uninformed bidder. Equity stakes reinforce the competitive advantage of the informed bank by resulting in a higher *expected* interest rate on loans for the good borrower and, for the inside shareholding bank, in a lower probability of losing the borrower to the outsider as a consequence of randomisation. The "switching" probability turns out to be in fact decreasing in her *informational advantage* and in the *size* of her equity share. This result is consistent with the empirical evidence on the phenomenon of bank equity stakes acquisition available for the Italian case provided by Bianco and Chiri [1997]. Indeed, there seems to be a positive correlation between the presence of a bank in the ownership structure of a firm and the tendency for the firm to concentrate its credit relationships at the shareholding bank.

The model we have examined can be easily extended to allow for alternative forms of pay-off asymmetries between competing banks. For example, one can assume that the shareholding bank might want to trade the equity stake on capital market some time in the future and realize capital gains instead of dividends. Winning the competition on loan pricing in early stages could be important for the shareholding bank as being a debt-financier at the time of the sale could deliver a good signal to the market and yield to higher sale revenues. Alternatively, one may think of any future cash flow accruing to the informed bank as a consequence of its relationship with the firm, and whose value could be affected by the outcome of the competition on loan pricing today. For example, the banks might be competing for the sale of "information-intensive" service to the firm that could make monitoring or screening activity on the borrower either cheaper or more precise. The informed bank's expected value of any existing contract with the firm might therefore be increased by the possibility of winning loan pricing competition today. As far as the outside uninformed bank perceives that the value that the insider attaches to "winning" is somewhat increased by this "link", the winner's curse effect will worsen and increase the competitive advantage of the inside bank.

We can summarise these results by saying that the monopoly power of an informed bank in *credit markets* can be reinforced by the possibility of extracting surplus from the firm through alternative channels. The firm might be captured not only as a consequence of information asymmetries, but also as a consequence of pay-off asymmetries between competing banks.

A Proof of Lemma 1

[a] If the shareholding bank holds an equity stake $\alpha = 1$, then she will appropriate of all the net surplus produced by the project, regardless of the entity of the interest rate i^e. It will be an optimal strategy for her to bid the interest rate that gives zero expected profits to the outsider, i.e. $i^{in} = \ell$. By bidding an interest rate $i^{in} > \ell$ with a positive probability, the insider just increases the probability of losing, thus decreasing her expected payoff.

[b] Consider an arbitrary i^{out} such that $i^{out} \leq i_0^{in}$. Under this circumstance both bad and good firms will be attracted by the outsider's offer. But, given that $i_0^{in} < i_0^{out}$, the outsider is bearing a loss in correspondence of this interest rate. Provided that i^{out} has been chosen arbitrarily, this implies that no interest rate smaller than or equal to i_0^{in} can be a best response for the outsider.

Consider now the case $i_0^{in} < i^{out} < +\infty$. If $i^{out} < i^{in}$, then the outsider would be better off bidding $i^{out} + \varepsilon$, $\varepsilon > 0$ sufficiently small, as she would attract no worse mix of borrowers and she would expect higher profits in case of win. Therefore it must be $i^{out} \geq i^{in}$. Under this circumstance, though, the outsider offer would attract only bad borrowers and make a strictly positive expected loss. Therefore, also this choice implies a non optimal response on the part of the outsider.

The only alternative left to the outsider is to refuse finance with probability one, which implies bidding an interest rate $i^{out} = +\infty$. In this case, the outsider refuses finance but she makes zero expected profits. Given the outsider's strategy, the insider's best response will be to refuse finance to bad type borrowers and, given $\alpha < 1$, to extract all the surplus from good project by bidding $i^{in} = \frac{S}{I} - 1$. It is therefore evident that, given $i^{in} = \frac{S}{I} - 1$, to "stay out" is no longer a best response for the outsider. The latter could indeed find more profitable to undercut, bidding any $i^{out} = \frac{S}{I} - 1 - \varepsilon$, $\varepsilon > 0$.

B Proof of Lemma 5

A) Neither player puts positive probability on $i = \ell$, in equilibrium. If the insider puts positive mass on the lower bound $i = \ell$, then the outsider would not be indifferent between playing ℓ (he would expect negative profits) and not playing at all (zero expected profits).

B) The second step is to prove that both $G^{in}(i)$ and $G^{out}(i)$ are continuous on (ℓ, u). Let us start with the proof that $G^{in}(i)$ is continuous on $[\ell, u)$ and assume, by contradiction, that $G^{in}(x^-) < G^{in}(x)$, for some $x \in (\ell, u)$. From [F.5] and Lemma 3, we get that $P^{out}(x^-) > P^{out}(x)$. Moreover, given right continuity of $G^{in}(i)$ on x, i.e. $G^{in}(x^+) = G^{in}(x)$, there exists an ε positive and sufficiently small such that $G^{in}(i) = G^{in}(x) = \text{constant}$ for any $i \in [x, x+\varepsilon]$. Therefore, $P^{out}(x^-) > P^{out}(i)$ for $i \in [x, x+\varepsilon]$. This implies that the outsider will put no probability mass on this interval and that, consequently, G^{out} (as well as the expectation $E(i^{out} | \ell \leq i^{out} \leq i)$ is continuous on x and constant on $[x, x+\varepsilon]$. Correspondently, we have that $P^{in}(i)$ is continuous on x and also strictly increasing on the same interval. This means that the insider will put no probability mass on x, or equivalently, $G^{in}(x^-) = G^{in}(x)$. Obviously, this is a contradiction to our assumption. Hence, given x arbitrary, we can conclude that $G^{in}(i)$ is continuous on (ℓ, u). Continuity of $G^{out}(i)$ just follows from continuity of $G^{in}(i)$. Indeed we have that $G^{in}(x^-) = G^{in}(x^+) = G^{in}(x)$. This means that we can assume $G^{in}(i)$ constant on $(x-\varepsilon, x+\varepsilon)$. Therefore, $P^{out}(i)$ is strictly increasing in $(x-\varepsilon, x+\varepsilon)$ which means that the outsider puts no probability mass on x, or, equivalently, $G^{out}(x^-) = G^{out}(x)$.

C) The third step is to show that the outsider puts no probability mass, L_ε say, on $i = u$. This is the case because, in correspondence of this interest rate, we have $G^{in}(u) = 1$ and the outsider's expected profits are negative (see [F.5]). On the contrary, the outsider will be strictly better off by concentrating the mass L_ε on $i = +\infty$ and expecting zero profits.

D) Given Lemma 1 (point 3.c), in equilibrium, the outsider chooses $G^{out}(i)$ so that the insider's expected profits are constant on $[\ell, u]$. Now, suppose $G^{in}(i)$ is constant on some interval $[a, b] \subseteq [\ell, u]$. Let $[a', b] \supseteq [a, b]$ be the maximal of such interval with respect to $G^{in}(i)$. By definition of ℓ, $\ell \equiv \inf\{i; G^{in}(i) > 0\}$, and continuity of $G^{in}(i)$, we have $a > \ell$. If $G^{in}(i)$ is constant, it follows that $P^{out}(i)$ is strictly increasing on $[a', b]$ and, consequently, $G^{out}(i)$ is constant on $[a', b)$. Since $G^{out}(i)$ is continuous, $G^{out}(i)$ is constant on the whole interval $[a', b]$. It follows that $P^{in}(i)$ is strictly increasing on $[a', b]$, a contradiction to Lemma 1.

C Proof of proposition 1

Lemma 1.b ensures the non existence of pure strategies equilibria. Lemma. Lemma 2 ensures that the bidding support of the insider's optimal strategy is $[\ell, u]$. Lemma 3 proves continuity over $[\ell, u)$ for both the insider and the outsider bidding strategies,and their derivatives, over the relevant support. Given Lemma 1.b, the insider chooses $G^{in}(i)$ so that the outsider's expected pay-off is constant on $[\ell, u)$. Hence, the following equation must hold in equilibrium, where the LHS of the expression is given by [F.3]:

$$\{[\theta + (1-\theta)q](1 - G^{in}(i))[\beta(\theta)(1+i) - 1] - (1-\theta)(1-q)\} I_1 = c$$

The value of the constant c can be obtained by evaluating the value of the expression at any interest rate included in the admissible support. If we set $i = \ell$, then $G^{in}(\ell) = 0$ by Lemma 2. Therefore the constant c is given by the following expression:

$I_1 \{\theta(1+i) - \theta - (1-q) - (1-\theta)(1-q)\} = c$

$I_1 (\theta i - (1-\theta)) = c$

$\Rightarrow c = 0$

This result implies that the outside bidder makes zero expected profits in equilibrium[7]. Hence, the insider's optimal bidding strategy $G^{in}(i)$ is given by the solution of the following equation:

$[\theta + (1-\theta)q](1 - G^{in}(i))[\beta(\theta)(1+i) - 1] - (1-\theta)(1-q) = 0$

Rearranging the above expression we get the following result:

R.6 $G^{in}(i) = \frac{i - i_0^{out}}{i - i_0^{in}} = 1 - \frac{\ell - i_0^{in}}{i - i_0^{in}}$

It can be easily shown that $G^{in}(i^-) = \frac{1-\frac{\ell}{u}}{1-\frac{q\ell}{u}} \equiv 1 - \mu < 1$. Given continuity of $G^{in}(i)$ on $[\ell, u)$ and Lemma 4, which implies $G^{in}(u) = 1$, we can conclude that the distribution has a point mass of $\mu \equiv 1 - \frac{1-\frac{\ell}{u}}{1-\frac{q\ell}{u}}$ at $i = u$. [b] The outsider will randomise over the support $[\ell, +\infty)$ so as to leave the insider indifferent between her bidding alternatives. The insider can be of two different information types. If the borrower turns out to be bad, the dominant strategy for the insider is to refuse finance. Given that the equilibrium has to be in mixed strategies, the insider chooses $G^{out}(i)$ so as to guarantee the outsider an expected pay-off equal to a constant k. In order to derive a solution for $G^{out}(i)$ we need to maximise $P^{in}(i, \alpha)$ (see [F.6']) with respect to i and solve the associated differential equation.

$\frac{\partial P^{in}(i,\alpha)}{\partial i} =$

[7] This is consistent with the results in Elgebreight-Wiggans, Milgrom and Weber [1982].

$= (1-\alpha)\left[1 - G^{out}(i)\right] + \frac{dG^{out}(i)}{di}\left(i_0^{in} - i\right) = 0$

$\int \frac{di}{i_0^{in}-i} = \int \frac{dG^{out}(i)}{(1-\alpha)(1-G^{out}(i))} + c$

$\ln\left(i_0^{in} - i\right) = \ln\left(1 - G^{out}(i)\right)^{-\frac{1}{1-\alpha}} + c$

and setting $i = \ell$ we get $c = \ln\left(\ell - i_0^{in}\right)$ and therefore:

$\left(1 - G^{out}(i)\right)^{1-\alpha} = \frac{\ell - i_0^{in}}{i - i_0^{in}}$

$\Rightarrow G^{out}(i) = 1 - \left(\frac{\ell - i_0^{in}}{i - i_0^{in}}\right)^{1-\alpha}$

Given continuity of $G^{out}(i)$ on $i = u$, the outsider will put no positive probability mass on u. As a result, since $\lim_{i \to u^-} G^{out}(i) = G^{out}(i) = 1 - \left(\frac{\ell - i_0^{in}}{u - i_0^{in}}\right)^{1-\alpha} \equiv 1 - \mu^{1-\alpha} < 1$, the outsider refuses finance with probability $\mu^{1-\alpha}$.

D Proof of Result [R.9]

We need to show that $\sigma^{\alpha} = \frac{1-\alpha}{2-\alpha}\left(1 - \mu^{2-\alpha}\right)$.

$\sigma^{\alpha} = \int_{\ell}^{u}\int_{\ell}^{i^{in}} g^{in}\left(i^{in}\right) g^{out}\left(i^{out}\right) di^{out} di^{in} + \left[1 - \left(\frac{\ell - i_0^{in}}{u - i_0^{in}}\right)^{1-\alpha}\right] \frac{\ell - i_0^{in}}{u - i_0^{in}}$

$= \int_{\ell}^{u} g^{in}(i)\left[G^{out}(i) - G^{out}(\ell)\right] di + \left(1 - \mu^{1-\alpha}\right)\mu$

$= \int_{\ell}^{u} g^{in}(i)\, G^{out}(i)\, di + \left(1 - \mu^{1-\alpha}\right)\mu$

$= \int_{\ell}^{u} G^{out}(i)\, dG^{in}(i) + \left(1 - \mu^{1-\alpha}\right)\mu$

$= \left[G^{out}(i)\, G^{in}(i)\right]_{\ell}^{u} - \int_{\ell}^{u} G^{in}(i)\, dG^{out}(i) + \left(1 - \mu^{1-\alpha}\right)\mu$

$= 1 - \mu^{1-\alpha} - \int_{\ell}^{u}\left(1 - \frac{\ell - i_0^{in}}{i - i_0^{in}}\right)(1-\alpha)\frac{\left(\ell - i_0^{in}\right)^{1-\alpha}}{\left(i - i_0^{in}\right)^{2-\alpha}} di$

$= (1-\alpha)\left(\ell - i_0^{in}\right)^{2-\alpha} \int_{\ell}^{u} \frac{1}{\left(i - i_0^{in}\right)^{2-\alpha}} di$

$= \frac{(1-\alpha)}{2-\alpha}\left[1 - \left(\frac{\ell - i_0^{in}}{u - i_0^{in}}\right)^{2-\alpha}\right] = \frac{(1-\alpha)}{2-\alpha}\left[1 - (\mu)^{2-\alpha}\right]$

Q.E.D.

E Notation

θ : proportion of good firms in the industry;
S : output produced by the good project at t=1;
q : probability of detecting a bad borrower as a good one at t=1 by the insider;
I : initial investment;
α : size of the equity stake offered to investors at t=0;
i : interest rate bid at t=1 by competing banks;
i_0^{out} : zero-profit interest rate for the outsider bank;
i_0^{in} : zero-profit interest rate for the insider bank in case of pure-debt claims;
ℓ : lower limit of time t=1 players' bidding strategies support;
u : upper limit of the insider's bidding strategy support;
$G^{out}(i)$: outsider's bidding strategy at t=1;
$G^{in}(i)$: insider's bidding strategy at t=1;
$F(x^-) = \lim_{i \to x^-} F(x)$;
$F(x^+) = \lim_{i \to x^+} F(x)$;
σ : switching probability;

References

[1] **Akerlof G.** [1970], The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism,

[2] **Bianco, M. and Chiri, S.** [1997], "Le Partecipazioni Bancarie nelle Imprese in Italia: Investimenti e Ristrutturazioni Finanziarie", *Banca Impresa e Societa'*, 393-425.

[3] **Broecker T.** [1990] , "Credit-Worthiness Tests and Interbank Competition", *Econometrica*, 429-452.

[4] **Cable J.** [1985], "Capital Market Information and Industrial Performance: The Role of West German Banks", *The Economic Journal*, 95, 118-132.

[5] **Engelbrecht-Wiggans R., Milgrom P.R., Weber R.J.** [1983], "Competitive Bidding and proprietory Information", *Journal of Mathematical Economics,* 161-169.

[6] **Flath D.** [1993] , "Shareholding in the Keiretsu, Japan's Financial Groups", *Review of Economics and Statistics*, vol LXXV, No 2, pp. 249-257.

[7] **Hoshi T.-Kashyap A.-Scharfstein D.** [1991], "Corporate Structure, Liquidity and Investment: Evidence from Japanese Industrial Groups", *The Quarterly Journal of Economics*, vol.106, 33-60.

[8] **Kroszner R.S. - Strahan P.E.** [1999] , "Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability", *NBER Working Paper n. 7319.*

[9] **Prowse S.D.** [1990] , "Institutional Investment Patterns and Corporate Financial Behavior in The United States and Japan", *Journal of Financial Economics,* 43-66.

[10] **Prowse S.D.** [1992], The Structure of Corporate Ownership in Japan, *The Journal of Finance*, 11211140.

[11] **Rajan R.** [1992], "Insiders and Outsiders: The Choice Between Informed and Arm's Length Debt", *Journal of Finance*, vol. 47, 1367-99.

[12] **Shaffer S.** [1997] , "The Winner's Curse in Banking", *Federal Reserve Bank of Philadelphia Working Paper N. 97-25.*

[13] **Sharpe S.A.** [1990], "Asymmetric Information, Bank Lending, and Implicit Contracts: A Stylized Model of Customer Relationships", *The Journal of Finance,* 1069-86.

[14] **Sheard P.** [1989], "The Japanese General Trading Company as an Aspect of Interfirm Risk", Journal of The Japanese and International Economies", 308-322.

[15] **von Thadden E.L.** [1998], "Asymmetric Information, Bank Lending and Implicit Contracts: the Winner's Curse", Cahiers de Recherche n.9798, Universite' de Lausanne.