# Close Relationships between Banks and Firms: Is it Good or Bad?

By

Vittoria Cerasi
and
Sonja Daltung

DISCUSSION PAPER 293

June 1998

FINANCIAL MARKETS GROUP
AN ESRC RESEARCH CENTRE

LONDON SCHOOL OF ECONOMICS



ISSN 0956-8549-293

# Close-Relationships between Banks and Firms: Is it Good or Bad?[¤]

Vittoria Cerasi
Universita' degli Studi di Milano
E-mail: vittoria.cerasi@unimi.it

Sonja Daltung
Sveriges Riksbank, Stockholm
E-mail: Sonja.Daltung@riksbank.se

June 1998

## Abstract

This paper investigates the issues involved in cross-ownership between banks and ¯rms. The idea is that congruity among the parties in control of the bank and the ¯rm allows to save on monitoring costs, but it gives rise to a con°ict of interest between on one hand the parties in control of the bank and on the other hand the outside investors, as for example depositors, of the bank. Nevertheless, the paper shows that there are bene¯ts from cross-ownership, whenever the bank involved in the relationship is debt ¯nanced and well diversi¯ed.

J.E.L. classi¯cation: G21; G28; G32.
Keywords: Banks; Regulation; Ownership structure.

[¤]Corresponding author: Vittoria Cerasi, Dipartimento di Economia Politica e Aziendale - Via Conservatorio 7 - 20122 Milan - Italy. This paper was prepared for the Conference "The Microeconomics of Financial Intermediation" organized by Research in Economics in Venice, January 1998. We would like to thank Antoine Faure-Grimaud for improving the paper with a very helpful discussion as well as Sudipto Bhatthacarya and participants at the FMG Lunch Seminar. The ¯rst author acknowledges ¯nancial support from Universita' Bocconi (grant: Struttura della proprieta' azionaria, mercato dei capitali e regolamentazione).

## Summary

In this paper we investigate the issues involved in cross-ownership between banks and firms. The idea is that congruity among the parties in control of the bank and the firm allows savings in monitoring costs, but gives rise to a conflict of interest with outside investors of the bank, as for instance depositors.

In a world of asymmetric information between investors and entrepreneurs, monitoring can be valuable for creditors, by improving entrepreneurial incentives to choose good projects whenever external finance is needed. However, monitoring is costly. Closer relationships between banks and firms, as for instance in the case of cross-ownership between banks and firms, reduce monitoring costs. The increased congruence between the parties in control of the bank and of the firms reduces the need of information for the banker about the projects that seek finance. However it might give rise to a conflict of interests, in particular on the choice of the project to be financed by the bank, for which depositors pay the cost through an increasing risk of bankruptcy. In other words, when the banker, by acting as an entrepreneur, chooses to finance a bad project on his own project, he might increase the risk of bankruptcy for the bank, reducing the value of the claims in the hands of depositors.

Nevertheless, we show in the paper that there are benefits from cross-ownership, under the condition that the bank involved in the relationship is debt financed and well diversified. The conflict of interest is in fact less of a problem when the bank is debt financed and diversified. The reason is that, as diversification increases, debt claims converge to a fixed promise to depositors. Thus the banker becomes residual claimant of all the gains from choosing the good project and can credibly commit to make the right choice when financing his own business.

# 1 Introduction

It has always been debated among regulators in both the US and Europe whether to allow close-relationships between banks and ¯rms.[1] Close-relationship can take several forms, but for long time there has been a general agreement that it should be avoided. In fact, relationships intended both as equity participations of banks in non-bank ¯rms, and as equity ownership of non-bank ¯rms in banks, are restricted in most OECD countries.[2]

There are several arguments brought against relationships between banks and ¯rms that can be summarized in three general concerns: 1) relationships may give rise, at di®erent levels, to a con°ict of interest between the close bank and outside investors, when the close bank operates in the interest of its own ¯rm, 2) relationships increases the fragility of the banking system, 3) relationships generate foreclosures in the product market, due to credit rationing by the close bank to product markets competitors. On the other hand, the main argument for relationships is that it reduces information costs.

The motivation of this paper is to show that close-relationship can be bene¯cial and that, ignoring the issue about foreclosures, con°ict of interest and ¯nancial fragility (notably, probability of bank failure) can be partly avoided, by diversi¯cation of the bank involved in the close-relationship.

In a world with asymmetric information between entrepreneurs and ¯nanciers external ¯nance involves incentive costs. In particular, when the choice of the project is not observed, ¯nancing may require that the ¯nancier monitors the project. There may be scope for delegating monitoring of the project to a bank, whenever monitoring is costly and thus free riding prevents investors from monitoring directly the borrower. But what if investors do not trust the bank monitoring the project? We show elsewhere[3] that, by diversifying enough, the bank can commit to a high enough level of monitoring.

Since monitoring is costly, an alternative could be to have a close-relationship

[1] See for example Saunders (1994) with reference to the debate in US.

[2] See OECD (1992), Chap.6, for a detailed description of the legislation, up to 1992, in several OECD countries, concerning restrictions on cross-ownership between banks and ¯rms.

[3] This is the focus of another paper, Cerasi and Daltung (1996), in which it is shown that, whenever the bank is debt ¯nanced, diversi¯cation of the portfolio of the bank strengthen the incentives to monitor of the banker.

between the bank and the ¯rm, as congruity among the parties in control both of the bank and the ¯rm allows to save on monitoring costs.[4] However, this may give rise to a con°ict of interest among, on one side, the parties in control and, on the other side, outsiders, as for example depositors of the bank. In particular, we refer to "con°ict of interest" in the close-relationship, whenever the bank behaves in a way which harms depositors of the bank.[5] In our model the bank can choose a bad project in the closely related ¯rm, shifting some of the losses deriving from this choice on the shoulders of depositors.

Is there a value from relationship between ¯rms and banks then? This paper shows that solving the moral hazard involved in close-relationship is equivalent to strengthen incentives to monitor of the bank. Therefore, when a bank is debt ¯nanced and diversi¯ed enough, not only it would have stronger incentives to monitor, but also the con°ict of interest in close-relationship should be less of a concern.

The framework developed in this paper, allows us to de¯ne the basic trade-o® in a close-relationship between banks and ¯rms; namely, close-relationship allows to save on monitoring costs, but this comes at the cost of bad project choices on the business owned by the banker. We therefore ask whether there are mechanisms to enforce the choice of good projects in this case. The reason why the banker may not be able to raise money from investors is that he may not have the correct incentives to choose the good project on his own business, therefore reducing the overall probability of success of the bank. We show that one of such mechanisms is diversi¯cation of the bank portfolio, given that the bank gets external ¯nance mainly in the form of debt. In other words, we show that diversi¯cation strengthens the banker's incentives to make the right choice on his own project.

As said before, relationships between banks and ¯rms are restricted in most OECD countries. Indeed there are important exceptions, as for example the universal bank-

[4]Daltung (1997) shows that the informational gain of having congruity among the control parties in the ¯rm and the bank may be a reason for multiplicity of banks, although there are economies of scale in ¯nancial intermediation. However, in that framework no con°ict of interest arises between the bank and its ¯nanciers.

[5]In general, citing BrÄker (1989), "a con°ict of interest situation arises for a bank dealing with a client if it has a choice between two solutions of a deal, one which is preferable from its own interest point of view while the other represents a better deal for the client." However in the literature there are many di®erent de¯nitions of con°ict of interest. For example Rajan (1991) refers to the con°ict arising between the underwriter and outsider investors.

ing system in Germany and the main bank system in Japan. There is a very interesting literature on each of these financial systems. For example, concerning the universal banking system in Germany, we refer to Edwards and Fischer (1994) for a discussion of the merits, while to Gorton and Schmid (1996) for an econometric evaluation of the benefits. Aoki and Patrick (1994) analyze the main banking system in Japan, while Hoshi et al. (1990) measure the benefits of the main bank system in terms of investment performance.

Furthermore, there has been a discussion on the potential benefits and costs of adopting the universal banking system both in the US, see for example Benston (1994), Kroszner and Rajan (1994) and Saunders and Walter (1994), and in Europe, before several restrictions to universal banking have been relaxed, see for example Porta (1990).

To start with, our paper focuses on a very special case, notably that of a banker who is the unique owner of a non-bank firm. This allows us to set the stage to analyze the nature of the trade-off in close-relationships and to discuss remedies to conflict of interest. We relax this assumption in the last part of the paper, when we allow also outsiders to own a non-controlling equity stake in the bank, so that the entrepreneur is not the sole owner of the bank. This case captures the main bank system, where a bank is controlled by a large industrial firm. However, this framework does not allow to capture universal banking, where banks own equity stakes in firms together with outsider investors, since in our model debt and equity have the same role in corporate control.[6]

In next section we introduce the structure of the model, while in section 3 we analyze the conflict of interest stemming from the close-relationship and show how diversification may reduce this conflict. In section 4 we show that the main result of the paper is robust to the case where the banker owns several projects instead of one project alone. In section 5 we show the effect of having outside equity holders in the relationship, given that the entrepreneur keeps a controlling stake in the bank. Finally section 6 concludes and set the lines for future research.

[6] This point is discussed in more detail in the Conclusion, where we set the lines for further research.

## 2 The model

Let us assume that there are several entrepreneurial firms in the economy that seek financing. Each firm has a project, which returns $R$ in case of success, 0 otherwise. The probability of success of the project depends upon the behavior of the entrepreneur, who is essential to the project: when the entrepreneur "behaves" the probability of success, $p_H$, is larger than the probability of success if the entrepreneur is not behaving, $p_L$. Misbehavior renders to the entrepreneur a non-transferable private benefit $B$. While the expected return of the project when the entrepreneur is behaving, $p_H R$, is higher than the alternative return of the investment, $y$, we have that

**Assumption 1** $$p_L R + B < y.$$

Therefore from now on we refer to "behaving" as choosing the good project, while "misbehaving" as choosing the bad project. The choice of project is not observable to outsiders. Note that it follows that $\Delta p R > B$, where $\Delta p = p_H - p_L$ is the increment in the probability of success.

If the entrepreneur could finance his project with internal means, he would always choose the good project. However, the entrepreneur has no capital of his own and therefore must raise external funds. There are many investors, with alternative investment return $y$, that in principle can finance the entrepreneurs. However, since investors cannot observe the choice of the project, they will not finance the entrepreneur, as

**Assumption 2** $$p_H R - \frac{p_H}{\Delta p} B < y.$$

Assumption 2 means that the moral hazard problem in the choice of the project cannot be solved through a transfer from the creditor to the entrepreneur, i.e. that for all loan rates $r \geq \frac{y}{p_H}$ it follows that $\Delta p(R - r) < B$. The only way to induce the entrepreneur to choose the good project is by monitoring him. However, monitoring is costly, and thus due to free riding, each single investor does not have the incentive to monitor. In conclusion, there is no direct credit available to entrepreneurs. In alternative to investors, there are bankers, who have access to the monitoring technology. Monitoring allows to discover whether an entrepreneur has misbehaved and force him to choose the good project. Hence, at a cost $c$ per project, the banker can insure that the probability of success of any project is $p_H$.

We assume that monitoring is valuable in the sense that the increase in the expected return of the project outweighs the cost of monitoring, i.e. $\Delta pR > c$. Moreover, that the good project net of monitoring cost is still worth financing, i.e. $p_H R - c > y$. From this, together with Assumption 1, it follows that $\Delta pR > B + c$. We assume all along this paper that monitoring is contractible.[7]

If the banker was lending the entrepreneur money out of her own pocket, it would be enough if the banker's share of the project, denoted by $r$ and referred to as the loan rate, was large enough to cover the monitoring cost, that is[8]

**Assumption 3** $$p_H r - c > y.$$

This assumption insures that the return from the project to the banker, $r$, is enough to guarantee that the banker will monitor the project. Moreover, together with assumption 1 it implies that $\Delta pr - c > 0$.

In this set up, given that monitoring is observable to outsiders, intermediation through banks is the optimal way to finance entrepreneurs. However, given that monitoring is costly, we investigate whether there are other ways to finance projects at cheaper cost. The question we want to address is whether close-relationship between banks and firms reduce the costs of external finance, given that the bank is debt financed. In the next section we show that if the entrepreneur sets up a bank, by lending to many projects including his own project, he will indeed reduce the cost of external finance. We therefore conclude that close-relationship is valuable, given that the bank is sufficiently diversified and debt financed.

[7] Assuming that bank monitoring is observable is, on the one hand, hard on relationship, as relationship involves incentive costs, while monitoring does not. However, we cannot conclude that if relationship is beneficial when monitoring is contractible, it will also be so if monitoring is not contractible, as, on the other hand, the conflict of interest will worsen monitoring incentives. The value of relationship in case of unobservable monitoring efforts is left however to future research.

[8] Since projects either return 0 or $R$ we cannot distinguish between debt and equity as means to finance the entrepreneur, but we will refer to the contract between the bank and entrepreneur as a loan.

# 3 Close-relationship and con°ict of interest

Consider an entrepreneur that, in order to ¯nance his own project, sets up a bank. The close-relationship between the bank and the ¯rm, as the entrepreneur controls both of them, makes the interests of the parties in control of the bank and the ¯rm perfectly congruent. As a consequence, the bene¯t of close relationships is that the banker does not have to monitor her own ¯rm, and thus to reduce information costs. The cost is that, without monitoring, the entrepreneur may sometime choose the bad project, in which case the bank is making a bad loan. In this section we analyze the incentive of the entrepreneur to choose the bad project when ¯nancing it through his own bank. Will he choose the bad project as there is no external party interfering with his choice? We will show that this is not necessarily the case; it will depend on the ¯nancial structure of the bank, with which he has close-relation, and the degree of diversi¯cation of the bank portfolio.

The bank must ¯nance several projects for the following reason. Since the bank, with which the entrepreneur has a close-relation, has no initial capital, it must raise funds from investors. If the bank ¯nances only the banker's own project, the ability to raise external funds fully depends on the choice, not observable by outsiders, of the project for which the bank seeks ¯nance. Since the banker ¯nancing only his own project, alike any other entrepreneur, as follows from Assumption 2, chooses the bad project, when not monitored, the close-bank will not be able to raise money to ¯nance the project. Thus a close-bank that ¯nances only the banker's own project is not viable. What if the bank ¯nances many other projects in addition to the banker's own project? We will show that diversi¯cation of the close-bank reduces the con°ict of interest between the entrepreneur-banker and outside creditors of the bank, and thus induces the entrepreneur-banker to choose the good project, if the bank is debt ¯nanced.

## 3.1 How to reduce the con°ict of interest in relationship banking

Let us assume that the banker makes the choice of the project once $r$, the interest rate on loans, and $m$; the number of projects ¯nanced including his own project, are given, and that the choice is not observable to outsiders. Let us denote the project owned by the banker as the first project, while all other projects seeking finance are run by other entrepreneurs. Denote the probability that the entrepreneur-banker chooses a good project on his "home" project by $\beta$. When it comes to the other projects, the banker has to monitor them in order to get a sufficiently high return on the loans. Since monitoring is observable and is always profitable (from Assumption 3), the probabilities of success of the projects financed by the bank, are:

$$\begin{aligned} p_\beta &= p_L + \beta \Delta p; \\ p_i &= p_H; \qquad\qquad i = 2, \ldots m; \end{aligned}$$

where $p_\beta$ is the probability of success of the banker's own project. If $\beta = 1$, $p_\beta = p_H$, otherwise the probability of success is less than $p_H$, and if $\beta = 0$, $p_\beta = p_L$.

The banker has no capital of his own, but must raise funds from investors to finance the projects. We will assume that the banker issues debt contracts to investors.[9] The debt contract implies that the banker promises to pay investors the gross interest rate $r_D$ per unit of debt. Since investors are small without incentive to monitor, we will refer to them as depositors, and we refer to $r_D$ as the deposit rate. Because the bank portfolio is risky, the banker will not always be able to repay $r_D$, in which case the bank goes bankrupt. If we denote the overall portfolio return by $z$, the bank goes bankrupt whenever $z < mr_D$.

We can write the expected return of depositors as

$$mr_D - S_m.$$

If the bank fails to repay the face value of debt, $mr_D$, it goes bankrupt and whatever remains belongs to depositors. The difference between the face value of debt, $mr_D$; and the return $z$ is the shortfall, and $S_m$ are the expected shortfalls.

Depositors cannot observe the choice of the project of the banker, but by changing the expected shortfalls the choice affects the expected return of depositors. If the banker chooses more often the good project, i.e. an higher $\beta$, he decreases the probability of bank failure, but, since depositors cannot observe this, the deposit rate will not respond, and as a consequence depositors will get a higher expected return. Stated in more rigorous terms, we have that:

$$\frac{\partial S_m}{\partial \beta} < 0;$$

[9] In Cerasi and Daltung (1996) we discuss why debt financing is optimal.

as $\Pr(z \le a)$ is decreasing in $\beta$ for all $a \in [0; \infty]$; where $\Pr(\cdot)$ is the probability function. As we will see, this gives the banker incentive to exploit depositors by sometimes choosing the bad project. However, rational investors will require a compensation for this so that in equilibrium

$$mr_D - S_m = my: \tag{1}$$

For simplicity we assume that per-project monitoring cost is constant, that is $cm$ is the cost of monitoring $m$ projects. Thus we can write the overall expected return of the banker, in the case of close-relationship, as:

$$\Pi = \Pi_F + \Pi_B^R + (1 - \beta)B - c(m - 1); \tag{2}$$

where $\Pi_F = p_\beta(R - r)$ are the expected profits of the banker as entrepreneur, $\Pi_B^R = p_\beta r + (m - 1)p_H r - (mr_D - S_m)$ are the expected profits of the bank with relationship, net of payments to depositors[10], $(1 - \beta)B$ is the forgiven private benefit, while $c(m - 1)$ is the cost of monitoring all other projects in the bank portfolio.

The banker chooses $\beta$ so as to maximize the expected return in equation (2), given that depositors cannot observe the choice of the project. The first order condition (FOC) is:

$$\Delta pR + \frac{\partial S_m}{\partial \beta} - B \ge 0: \tag{3}$$

As pointed out above, the derivative of the shortfall function is negative. This term captures the moral hazard problem of the entrepreneur-banker stemming from the unobservability of the project choice. Just as if he was financing the project by borrowing directly from investors, the entrepreneur-banker has incentive to choose the bad project, earning the private benefit, at the expenses of depositors which will get less often the promised rate $r_D$. However, the point is that the incentive problem is not the same when the project is financed through the bank, given that the bank also finances other projects and is debt financed.

By setting up a bank and financing his project through the bank, the banker moves the incentive problem from the firm to the bank; the banker has no incentive to fool

[10] We assume that the interest rate at which the close-firm gets finance from its own bank is equal to the interest rate on other loans $r$. This can be justified on the basis that, in many countries, banks are not allowed to give loans on favourable terms to persons who are closely related to the bank. This is the case for example in Swedish legislation.

the bank as he owns it, but he has incentive to exploit depositors. This would lead to lower incentive costs given that the expected shortfalls on bank debt are lower than the expected shortfalls on firm debt. This can be illustrated by a simple example.

Assume that the banker is financing only his own project. The expected shortfalls are $(1 - p_\beta)r'_D$, while the derivative of the expected shortfalls with respect to $\beta$ is equal to $-\Delta p r'_D$, where $r'_D$ is the equilibrium deposit rate. In this case the incentive problem is exactly the same as if the banker was financing his project by borrowing directly from investors, since the bank will go bankrupt whenever the project fails. Hence, in equilibrium we must have $r'_D = \frac{y}{p_L + \beta' \Delta p}$; where $\beta'$ is the equilibrium choice of $\beta$.[11] Assume instead that the bank finances two projects, one of which belongs to the banker. Moreover, let us assume that the success of one projects only is enough for the banker to be able to pay back depositors. In this case the expected shortfalls would be equal to $(1 - p_\beta)(1 - p_H)2r''_D$, and the derivative $-2(1 - p_H)\Delta p r''_D$; where now $r''_D$ is the equilibrium deposit rate. Because the expected shortfalls per unit of deposits are smaller in this second case, we have that $r''_D < r'_D$: Hence, if the other project is not too risky, say $p_H > \frac{1}{2}$, the effect of a change of $\beta$ on the expected shortfalls is smaller and therefore the incentive problem is smaller in the second case.

This example illustrates that by financing the project through his own bank, the banker manages to reduce his incentive problem.[12] Of course, it might not be the case that adding just one project reduces the impact on the shortfalls. In fact this impact might instead be increased, and even the probability of bank failure may be increased by adding just one or two projects to the bank portfolio. However, we will show that adding more and more projects will finally eliminate the incentive problem of the banker. We do this in two steps. First we show that the impact on the expected shortfalls of a change in $\beta$ as well as the expected shortfalls per unit of deposits approach zero as m goes to infinity, given that the expected return of each project is larger than the deposit rate, and then we will show that for a sufficiently diversified bank the expected return will indeed be larger than the deposit rate.[13]

[11] Here we ignore the fact that this is in contradiction with Assumption 2.

[12] In fact the same effect occurs whenever a single entrepreneur had access to several projects at the same time, and instead of financing each of them independently, he finances them jointly. This is equivalent to the case in which an entrepreneur sets up a conglomerate firm. As we pointed out in Cerasi and Daltung (1996), it suggests that there are benefits from financing conglomerates with debt as diversification improves incentives.

[13] This result is not new, but a straightforward application of Cerasi and Daltung (1996), where

**Lemma 1** If the expected return on each loan in the bank portfolio is higher than the deposit rate, the derivative of the expected shortfalls with respect to $\beta$, and the average expected shortfalls approach zero as $m$ goes to infinity.

**Proof.** See the Appendix.

According to the Law of Large Numbers, as $m$ increases, the distribution of the average portfolio return becomes more and more concentrated around its mean. Since the mean is larger than the deposit rate, this implies that the probability that the average portfolio return is below the deposit rate becomes smaller and therefore the average expected shortfalls decreases as $m$ increases. Moreover, with the bankruptcy states being in the left tail which becomes thinner, the impact of an increase in the expected return on the expected shortfalls becomes smaller.

**Proposition 1** A sufficiently diversified banker will behave perfectly on the "home" project, that is, there is a $m$ for which $\beta = 1$.

**Proof.** We will assume that there is an equilibrium in which the average expected portfolio return is larger than the deposit rate, and then show that there is $m \geq \bar{m}$ for which there is a unique equilibrium in which this is true.
The equilibrium is given by the following system of equations:

$$\begin{aligned} \Delta pR + \frac{\partial S_m}{\partial \beta} - B &\geq 0; \\ r_D - \frac{1}{m} S_m &= y. \end{aligned} \tag{4}$$

From Lemma 1 it follows that $r_D$ approaches $y$, whenever $m$ approaches infinity. Moreover, the average expected portfolio return, $[\frac{m-1}{m} p_H + \frac{1}{m} p_-] r$ approaches $p_H r$ as $m$ approaches infinity. Since, according to Assumption 3, $p_H r > y$, there is a finite $\hat{m}$ for which the average expected portfolio return indeed is larger than the deposit rate. Then it follows, again from Lemma 1, that for $m \geq \hat{m}$, $\frac{\partial S_m}{\partial \beta}$ approaches zero as $m$ goes to infinity. Since, $\Delta pR - B > 0$, there is a finite $\bar{m}$ for which $\beta = 1$. ■

---

the result is stated in a more general framework. It shows that incentive problems in relationships can be treated in the same way as incentive problems in monitoring.

The intuition is that the cost of the bad project choice is carried by the banker in all states in which the bank does not fail. Since the probability of bank failure reduces with diversification, the project choice will have a smaller impact on the probability of bank failure and on the expected shortfalls, as the bank becomes more and more diversified. This means that a sufficiently diversified banker will internalize the full cost of the choice of a bad project, and therefore will always choose the good project.

The Proposition shows that, if it is possible to achieve sufficient portfolio diversification, then the banker can credibly commit to choose a good project in his own business. If this is the case, then relationship banking is good because it allows to save the monitoring cost on the "home" project, without affecting the incentives to choose the good project. A non-diversified banker has the incentive to exploit depositors. By choosing the bad project, he can appropriate the private benefit, and he will not bear the full cost of reducing the probability of success of the project, as he will not have to pay back the promised amount $mr_D$ to depositors, when the bank fails. Since the expected benefit when choosing the bad project is larger than the gain in the expected return from choosing the good project, he has an incentive to pass the losses to depositors. However as diversification increases, the expected losses of depositors go to zero, and thus the gain from choosing the bad project reduces, up to the point where there is no incentive to choose the bad project, since $\Delta pR > B$, as it follows from Assumption 1.

However, it is possible that sufficient diversification cannot be achieved because there is only a limited number of projects to finance. In this case relationship banking can become more of a concern, as the conflict of interest cannot be eliminated. Nevertheless, we show that relationship can be preferred to non-relationship, as savings in monitoring costs can be more important than the costs stemming from the conflict of interest.

## 3.2 Private incentives in relationship banking

In order to investigate whether there is scope for relationship banking we compare the relationship equilibrium with a non-relationship equilibrium. In the latter case the banker does not finance his own project through his own bank, but through another bank. His own bank replaces the loan to the banker's own project by a loan to another entrepreneur. In this way we avoid size effect on incentives as the number of projects financed by the bank is kept fixed.[14]

In the non-relationship equilibrium, the entrepreneur-banker will be perfectly monitored by the external bank and therefore he is never going to choose the bad project. Given this, we can write the utility of the banker, by simply setting the probability of success $p_H$ for all projects, included his own project[15]:

$$p_H(R - r) + mp_H r - (mr_D - S_m) - cm.$$

Since in equilibrium the individual rationality condition for depositors is binding, we have that the equilibrium utility level for the banker in the case of no relationship is:

$$U^N = p_H R + (m - 1)p_H r - my - cm.$$

In case of relationship, denoting by $\beta^R$ the solution to the FOC in equation (3), we have that the banker achieves the utility level:

$$U^R = (p_L + \beta^R \Delta p)R + (1 - \beta^R)B + (m - 1)(p_H r - c) - my.$$

For a given m, we can compute the difference in terms of utility for the banker in the relationship equilibrium and the non-relationship equilibrium:

$$U^R - U^N = c - (1 - \beta^R)(\Delta pR - B). \tag{5}$$

If the incentive problem is sufficiently severe, $\beta^R = 0$. In this case, the banker prefers not to have a relationship, since it follows from the assumptions that $\Delta pR > B + c$. On the other hand, when the bank is sufficiently diversified for $\beta^R = 1$, relationship is preferred by the banker, since it allows to save the cost of monitoring his own project without affecting the incentives to exploit depositors by choosing a bad project on her own business. Since in this case $U^R - U^N = c > 0$, there are $\beta^R < 1$ for which relationship is preferred although it gives rise to a conflict of interest. Thus, we have proved the following result:

[14] This could be the result of a more general model in which there was a given number of projects in the economy and a given number of banks. In a symmetric equilibrium each bank is financing the same number of projects. Our comparison would be equivalent to the comparison of two equilibria. In the relationship equilibrium each banker is financing his project through his own bank. In the non-relationship equilibrium none of the bankers is financing his project through his own bank, but instead through another bank.

[15] Let us assume that all the banks are charging the same interest rate on loans, r.

**Proposition 2** The banker will trade-off savings in monitoring costs against the costs arising from the conflict of interest. Since the monitoring cost is strictly positive, the banker will sometimes prefer close-relationship, although it leads to some degree of conflict of interest.

The Proposition states that there is scope for banking relationship although there is a potential conflict of interest arising from it. Moreover, close-relationship is socially valuable whenever the banker finds it beneficial. This is true, although the social planner is not able to contract upon the choice of $\beta$, because relationships allow to save socially costly monitoring costs.[16]

# 4 Several "home" projects

Let us discuss now the case in which a single entrepreneur who has access to several projects at the same time, wants to finance his projects by setting up a bank. Should the close bank be more of a concern now compared to the previous case? We claim that, provided that the bank portfolio is diversified enough, the main result of the paper still applies. The main result of the paper is robust to the case in which the same entrepreneur owns more than one "home" project, provided that the projects are not positively correlated. Suppose that a single entrepreneur has access to $N$ different projects with non correlated probabilities of success. The probability structure of the projects should be modified to the following:

$$\begin{aligned} p_{\beta_j} &= p_L + \beta_j \Delta p; & j &= 1; \ldots N \\ p_i &= p_H; & i &= N+1; \ldots m. \end{aligned}$$

The entrepreneur sets up a bank to finance his $N$ projects together with $(m - N)$ additional projects. His profits are defined as:

$$\Pi = \Pi_F + \Pi_B^R + \sum_{j=1}^{N} (1 - \beta_j) B - c(m - N); \tag{6}$$

where $\Pi_F = \sum_{j=1}^{N} p_{\beta_j} (R - r)$ are the expected profits of the banker as entrepreneur and $\Pi_B^R = \sum_{j=1}^{N} p_{\beta_j} r + (m - N) p_H r - (m r_D - S_m)$ are the expected profits of the bank net

[16]Notice, however, that there are no costs of bank failure in this model. If social costs of bank failure were higher than private costs of bank failure, relationship banking would become more of a social concern, as the conflict of interest raises the probability of bank failure.

of payments to depositors.[17]

The banker chooses $\beta_j$ so as to maximize the expected returns in equation (6), given that investors cannot observe the choice on each "home" project. Now the incentive problem of the entrepreneur is given by the following system of FOCs:

$$\Delta pR + \frac{\partial S_m}{\partial \beta_j} - B \geq 0; \qquad j = 1; ...N: \tag{7}$$

The incentive to choose a good project on each of his "home" projects is symmetric. Thus the entrepreneur will choose to behave on all his "home" projects if he has enough incentive to do so on each one of his own projects. We can conclude that Lemma 1 and Proposition 1 apply for a large enough $m$: Therefore if the bank is financing a sufficiently large number of non correlated projects, the overall benefit of close-relationship increases, since monitoring costs are lower and incentive costs can be eliminated. Notice that the main result of the paper requires that the overall number of projects in the bank portfolio $m$ to be large, for any number of "home" projects $N$:

shareholders of the bank.

Let us assume that the bank issues $w$ shares to outside equity holders, which entitle them to claim a proportion $\alpha$ of the bank profits, after repayment to depositors. The rest of the external finance of the bank is in the form of deposits, which promise to return $r_D$ for each unit of deposit provided that the $m$ projects of the bank return $z > (m - w)r_D$. Similarly to before, depositors expect to get $[r_D(m - w) - S_m(w)]$, where the expected shorfalls decreases with the amount of equity issued by the bank. To summarize, the equityholders of the bank are entitled to a proportion $\alpha$ of the return stream:

$$\Pi_B^R = (m - 1)p_H r + p_\beta r - [r_D(m - w) - S_m(w)]$$

We can therefore write the profits of the banker-entrepreneur as:

$$\Pi = \Pi_F + (1 - \alpha)\Pi_B^R + (1 - \beta)B - c(m - 1) \tag{8}$$

where $(1 - \alpha)\Pi_B^R$ is the proportion of profits to which the entrepreneur is entitled in the bank, while $\Pi_F = p_\beta(R - r)$ are, as before, the profits of the close firm.

To complete the picture, the rationality condition for depositors is modified into:

$$r_D(m - w) - S_m(w) \geq (m - w)y \tag{9}$$

while the rationality condition for equityholders is given by:

$$\alpha\Pi_B^R \geq wy \tag{10}$$

From the profits in equation (8), we can derive the FOC for the optimal choice on the "home" project, namely:

$$\Delta pR - \alpha\Delta pr + (1 - \alpha)\frac{\partial S_m(w)}{\partial\beta} - B \geq 0 \tag{11}$$

First of all, notice that for $\alpha = 0$; that is when the entrepreneur retains full ownership of the bank, we are back to the previous case. From the rationality condition for equityholders (10) it follows that $w = 0$; and thus the FOC coincides with the FOC in equation (4). In the other extreme case, $\alpha = 1$, we are back to the single entrepreneur who, given Assumption 2, is not able to get external finance because of the moral hazard in the project choice. In the middle, namely for $\alpha \in (0; 1)$, we get the interesting case in which, in addition to the incentive to exploit depositors, we have another incentive problem due to the fact that the return from choosing a good "home" project is going to partially benefit outside shareholders, while the cost of it, that is giving away the private benefit $B$; is fully on the entrepreneur. Outside equity finance therefore has two counteracting effects, on one hand it reduces the incentive to exploit depositors, on the other hand it increases the incentive to fool outside equity holders by passing on to them the losses from a bad "home" project choice.

As the bank becomes more diversified, the larger is $m$, the predominant effect will be the negative one, namely the incentive to fool the shareholders of the bank. Therefore we can say that, while issuing shares to outsiders has a positive impact on the incentive to exploit depositors, the more diversified is the bank the more negative is the effect of outside equity finance. We will show, however, that there still may be some room for issuing shares to outsiders.

Suppose that the bank is diversified enough, so that the term related to the incentive to exploit depositors in the FOC given by equation (11) is zero. If $\alpha = 0$, which is the case of a bank fully owned by the entrepreneur, from Assumption 1 we know that the entrepreneur is going to behave since he is residual claimant of the gains from choosing the good project. On the other hand, if $\alpha = 1$, that corresponds to the case of a bank fully owned by outside shareholders, from Assumption 2 it follows that the entrepreneur will not behave. Therefore we can derive the maximum level of $\alpha$ that can be pledged to outsiders, without violating the incentive constrain of the entrepreneur, that is:

$$\bar{\alpha} = \frac{1}{r}\left[R - \frac{B}{\Delta p}\right]$$

Yet this maximum amount of outside equity is positive. To conclude, even if outside equity has a negative impact on incentives, when the bank is diversified enough there may still be room for issuing equity shares in the bank without destroying the incentive of the entrepreneur to behave on the "home" project.

# 6 Conclusion and extensions

In this paper we have discussed the conflict of interest that arises between the banker and external investors of the bank, when the banker has a control stake both in the bank and in a firm to which the bank lends money. We have shown that there may be cases in which this close-relationship is actually bene¯cial, from the social point of view, as it allows to save on monitoring costs without giving rise to higher incentive costs. The con°ict of interest arises when the banker, acting in his own interest, may choose the wrong project on his own private business, shifting the risk of higher probability of bank failure on depositors shoulders. We have shown that, if the bank portfolio is diversi¯ed enough, the banker is less inclined to misbehave with relation to his own business.

Although we believe that the model presented in the paper is general enough to discuss di®erent types of con°icts of interest in relationships between banks and ¯rms, we think that there is still research to be done in order to have a broader picture of costs and bene¯ts of close-relationships between banks and ¯rms.

In particular we are not addressing at all the question on how equity and debt di®er as means of corporate control. In this paper in fact we cannot distinguish between di®erent ways of ¯nancing projects by a bank, in particular between equity or debt ¯nancing. This depends on the binary structure of the project outcomes we have chosen. If we complicate the structure, for example by having three outcomes for each project, then debt and equity ¯nance could be compared. In particular it is the case that equity ¯nance of a project gives more incentives to monitor to the monitoring bank, than debt ¯nance. Equity ¯nance would make the bank residual claimant also in the good states, and since monitoring insures that those states are more often achieved, it reinforces the incentives to monitor. Only in this context we could have something to say about universal banking.

When depositors of the bank cannot observe neither the choice of the "home" project nor the monitoring e®ort on all other projects, there is an additional incentive problem for the banker, who has incentive to shift some of the losses arising from lower monitoring on the shoulders of depositors. The con°ict of interest, which arises because of the close relationship between the bank and the banker's own ¯rm, is very similar to the moral hazard problem of the banker in monitoring borrowers. Therefore the analysis can be extended to the case of non observable monitoring e®orts to discuss this interdependency among incentives, namely the impact of a bad choice on the home project on the incentives to monitor all other projects in the bank portfolio.

Further, we have assumed that the banker cannot discriminate in terms of interest rate between his own ¯rm and other ¯rms. If we relax this assumption, depending on whether the internal interest rate is observable to outsiders, it could happen that the banker is willing to lend to his own ¯rm at very favorable terms, that is, to make cheap loans to his own ¯rm, which then may worsen monitoring incentives.

Finally, we leave for future research to relax the assumption about all the projects being of the same size, in particular between the close-¯rm project and all the other projects in the bank portfolio. This would allow us to discuss what type of ¯rms would bene¯t most from having a close-relationship with a bank.

# References


[1] Aoki M.& Patrick H. (1994). The Japanese Main Banking System: Its relevancy for developing and transforming economies. Oxford: Oxford University Press.

[2] Benston G.J. (1994). Universal Banking. Journal of Economic Perspectives, 8(3), Summer, 121-143.

[3] Bröker G. (1989). Competition in banking. Paris: OECD.

[4] Cerasi V.& Daltung S. (1996). The Optimal Size of a Bank: Costs and Benefits of Diversification. FMG Discussion Paper 231, London School of Economics.

[5] Daltung S. (1997). Optimal Structure of the Financial Intermediation Industry. Sveriges Riksbank Working Paper 36, Stockholm.

[6] Edwards J.& Fischer K. (1994). Banks, Finance and Investment in Germany. Cambridge: Cambridge University Press.

[7] Gorton G.& Schmid F.A. (1996). Universal Banking and the Performance of German Firms. Mimeo. University of Pennsylvania.

[8] Hoshi T., Kashyap A.& Scharfstein D. (1990). Bank Monitoring and Investment: Evidence from the Changing Structure of Japanese Corporate Banking Relationships. In R. Glenn Hubbard, Ed. Asymmetric Information, Corporate Finance, and Investment. Chicago: University of Chicago Press, 105-126.

[9] Kroszner R.& Rajan R. (1994). Is the Glass-Steagall Act Justified? A Study of the US Experience with Universal Banking before 1933. American Economic Review, 84(4), 810-832.

[10] OECD (1992). Banks under stress. Paris: OECD.

[11] Porta A. (1990), Ed. The Separation of Industry and Finance and the Specialization of Financial Institutions. Milan: EGEA.

[12] Rajan R.G. (1991). A Theory of the Costs and Benefits of Universal Banking. Mimeo. Graduate School of Business, University of Chicago.

[13] Saunders A. (1994). Banking and Commerce: An Overview of the Public Policy Issues. Journal of Banking and Finance, 18(2), 231-254.

[14] Saunders A.& Walter I. (1994). Universal Banking in the United States: What could we gain? What could we lose? Oxford: Oxford University Press.

# Appendix

Proof of Lemma 1 We have to show that both $\frac{1}{m}S_m$ and $\frac{\partial S_m}{\partial \beta}$ approach zero as the number of projects increases, whenever the expected return on each loan is higher than $r_D$.

Let $z = \frac{1}{m}\sum_{i=1}^{m} z_i$, be the average return on the bank portfolio. According to the Central Limit Theorem the distribution of the standardization of z tends to the standard normal as m goes to infinity. Thus, for a given m, sufficiently large, the expected shortfalls are approximately

$$m\int_0^{r_D}(r_D - z)\phi\left(\frac{z - E(z)}{\sqrt{\sigma^2}}\right)\frac{1}{\sqrt{\sigma^2}}dz; \tag{12}$$

where $E(z) = \frac{1}{m}(p_\beta + (m-1)p_H)r$ is the expected return of z, $\sigma^2 = \frac{1}{m^2}(p_\beta(1-p_\beta) + (m-1)p_H(1-p_H))r^2$ is the variance, and $\phi(.)$ is the density function of a standard normal variable. By subtracting and adding $\frac{E(z)}{\sqrt{\sigma^2}}$ the integral in (12) can be rewritten as

$$(r_D - E(z))\int_0^{r_D}\phi\left(\frac{z - E(z)}{\sqrt{\sigma^2}}\right)\frac{1}{\sqrt{\sigma^2}}dz - \int_0^{r_D}\frac{z - E(z)}{\sqrt{\sigma^2}}\phi\left(\frac{z - E(z)}{\sqrt{\sigma^2}}\right)dz. \tag{13}$$

Since $\frac{d}{dx}\phi(x) = -x\phi(x)$, (13) is equal to

$$(r_D - E(z))\left[\Phi\left(\frac{r_D - E(z)}{\sqrt{\sigma^2}}\right) - \Phi\left(\frac{-E(z)}{\sqrt{\sigma^2}}\right)\right] + \sqrt{\sigma^2}\left[\phi\left(\frac{r_D - E(z)}{\sqrt{\sigma^2}}\right) - \phi\left(\frac{-E(z)}{\sqrt{\sigma^2}}\right)\right]; \tag{14}$$

where $\Phi$ is the c.d.f. of a standard normal variable.

First we will show that $\lim_{m\to\infty}\frac{1}{m}S_m = 0$. We have that $\lim_{m\to\infty}\frac{1}{m}S_m$ is equal to the limit of the expression in (14) as $m \to \infty$. We will show that this limit is equal to zero, whenever $p_\beta r > r_D$. First, $\lim_{m\to\infty}\sigma^2 = 0$. Secondly, when $p_\beta r > r_D$, then not only $\frac{-E(z)}{\sqrt{\sigma^2}}$, but also $\frac{r_D - E(z)}{\sqrt{\sigma^2}}$ approaches $-\infty$ as $m \to \infty$, and we have that $\lim_{x\to-\infty}\Phi(x) = 0$ and $\lim_{x\to-\infty}\phi(x) = 0$.

Secondly, we will show that $\frac{\partial S_m}{\partial \beta} \to 0$ as $m \to \infty$. For m, sufficiently large, the partial derivative of the expected shortfalls w.r.t. $\beta$ is approximately equal to m times the partial derivative of expression (14) w.r.t. $\beta$, which is:

$$-\cdot pr\left[\Phi\left(\frac{r_D - E(z)}{\sqrt{\sigma^2}}\right) - \Phi\left(-\frac{E(z)}{\sqrt{\sigma^2}}\right)\right] - \frac{1}{2\sqrt{\sigma^2}m}(1-2p_\beta)\cdot pr^2\left[\phi\left(\frac{r_D - E(z)}{\sqrt{\sigma^2}}\right) - \phi\left(-\frac{E(z)}{\sqrt{\sigma^2}}\right)\right]$$

$$+ r_D\phi\left(-\frac{E(z)}{\sqrt{\sigma^2}}\right)\frac{1}{\sqrt{\sigma^2}}\left[\cdot pr - \frac{E(z)}{2\sigma^2 m}(1-2p_\beta)\cdot pr^2\right]. \tag{15}$$

Whenever $p_\beta r > r_D$ for all i, the limit of the first two terms in (15) as $m \to \infty$ is equal to zero for the same reasons as before. We also have that the limit of the last term is zero, since $\lim_{m\to\infty}\phi\left(-\frac{E(z)}{\sqrt{\sigma^2}}\right)\frac{1}{\sqrt{\sigma^2}} = 0$, and the term within the square brackets is a finite number. $\square$