Ownership Structure, Banks, and Private Benefits of Control

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Abstract

What affects the number of banks a company chooses to borrow from? This paper provides evidence of a negative correlation across countries between shareholder protection and average number of banks used by firms, and proposes a simple explanation for this result. The intuition of the model is that setting up many bank relations reduces the rents that banks extract and, by doing so, limits the amount of private benefits extracted by the party in control (by decreasing his/her incentive to sell equity in the firm). Since the opportunity to enjoy private benefits of control is larger in countries with lower shareholder protection, the model predicts more bank relationships (and higher ownership concentration) in those countries. Consistent with the model’s predictions, within a country the number of bank relations that a firm maintains increases with its ownership concentration and with the size of the private benefits of control as measured by the voting premium.


Keywords: relationship financing, corporate governance, ownership structure, investor protection.

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1. Introduction

It has been suggested that banks may have a role as delegated monitors (Diamond, 1984) or as producers of information (Ramakrishna and Thakor, 1984; Allen, 1990). According to both interpretations, banks take advantage of economies of scale, and, therefore, single-bank relationships should be optimal. In fact, many banks create a duplication of costs (Diamond, 1984), originate “free-riding” in monitoring, or a “winner’s curse” problem in screening (Broecker, 1990). Alternatively, banks may have a crucial role as long-term investors, as suggested first by Gershenkron (1962), and, more recently, by Mayer (1988).¹ Also in this case, an exclusive relationship may be preferable to provide the bank with incentives to invest in the relationship with a company.²

At odds with the theories above, single-bank relationship is relatively uncommon around the world, especially among large companies. According to Ongena and Smith (2000), only 15 percent of German companies report a single-bank relation, 22.5 percent of UK companies, 4 percent of French, 3 percent of Italian, and zero percent of Greek companies.

Why do companies choose to have more than one bank despite the recognized costs of multiple banking?

Three groups of theories can be considered as possible explanations of the existence of multiple bank relationships. First, in the presence of a long-term relationship, the privileged information that banks learn enables them to accrue rents (Sharpe, 1990). These rents have negative effects on the entrepreneur's incentives to invest (Rajan, 1992) and on his decision to undertake long-term rather than short-term projects (Von Thadden, 1995). In this context, multiple banks and, therefore, interim competition among banks may be efficient.³ Second, according to Bolton and Scharfstein (1996) and Dewatripont and Maskin (1995), multiple creditors harden the budget constraint for managers increasing their incentive to behave according to investors’ interests. Finally, a company may choose many bank relationships in order to insure itself against the possibility that a liquidity crisis of one bank makes refinancing impossible and forces the firm to seek more costly funding from non-relationship banks (Detragiache, Garella and Guiso, 1999).

¹ I refer to Hellwig (1991) for a critical discussion about the difference between the two approaches.
² Accordingly, Petersen and Rajan (1994) find that credit availability decreases with multiple banks.
³ Hoshi, Kashyap and Scharfstein (1993) and Weinstein and Yafeh (1998) provide evidence of the costs of single-bank relationships.
As shown in Figure 1, in a sample of European countries the average number of banks used by firms is negatively (and significantly) correlated with an indicator of the degree of legal protection for shareholders. None of the theories described above can satisfactorily explain this relationship: in fact, why should shareholder protection matter when banks are concerned? In this paper, I propose an explanation for the evidence in Figure 1.

Through their lending relationship inside banks acquire preferred information which enables them to enjoy rents whenever the firm needs to raise capital. The rent that inside banks can extract decreases with the number of bank relationship and increases with the equity stake owned by the party in control. The former result is obtained because more banks increase the interim competition, the latter results is due to the fact that the surplus generated by relationship financing is net of the private benefits of control enjoyed by the party in control which decrease with his equity stake. In order to reduce the rents that banks extract, the entrepreneur faces the incentive to change his equity stake in the firm after bank relationships are setup even if this comes at the cost of larger extraction of private benefits of control. Because such an incentive is larger the fewer are the inside banks, the initial choice of the number of bank relationships solves a trade-off between the lower costs coming from fewer bank relationship and the lower expropriation of minority shareholders associated with more bank relationships. Since the opportunity to extract private benefits of control is larger in countries with lower shareholder protection, the model predicts more bank relationships (and higher ownership concentration) in countries with lower shareholder protection.

The finding in Figure 1 conflicts with the view that difficulties in raising external financing through arm’s-length contracts (a common feature in countries with low investor protection) may induce a firm to maintain few long-term relationships with investors who are willing to screen the firm’s investment opportunities and monitor its management (Rajan and Zingales, 1998). The model presented in this paper suggests that indeed in countries with low investor protection arm’s-length financing is reduced to a minimum (specifically, firms do not sell much equity on the market). However, the number of long-term relationships is higher than in countries with high investor protection because the potential for extraction of private benefits of control is stronger.

Among the contributions that link the nature of the financing relationship with the ownership structure, Gorton and Haubrich (1987) consider a model in which firms precommit to a level of
monitoring by borrowing from banks and then issue equity on the market. In this paper, rather than inducing more monitoring, fewer banks damage minority shareholders by inducing more expropriation. Mayer (1994) suggests that banking economies are characterized by long-term relations between banks and firms because of the high ownership concentration of companies. According to the author, a relationship requires a stability of control that is guaranteed only by high ownership concentration. Mahrt-Smith (1998) argues that companies with concentrated ownership should also have concentrated debt in order to create an efficient incentive structure for managers. These authors do not consider the incentives to change the ownership structure coming from concentrated bank debt.

The model in this paper is close to the literature on the optimal ownership structure of a firm and the decision of going public while differs from it because it links the choice of ownership structure to the nature of the bank-firm relation. In particular, the closest paper within this literature is Zingales (1995). As in his paper, going public is a strategic decision to strengthen the bargaining position of the entrepreneur. In Zingales (1995) the goal is to reduce the rent that a potential raider can enjoy, in this paper the goal is to reduce the rent that inside banks can extract.

The structure of the paper is as follows. The theoretical analysis is developed in Sections 2 and 3; the empirical analysis is in Sections 4 and 5; Section 6 concludes the paper.

Section 2 introduces the model and explains the assumptions behind it. Section 3 derives the solution of the model. Under general conditions the model predicts a negative relationship between investor protection and number of bank relationships. Section 4 contains cross-country evidence supporting the model. The main result is that shareholder protection and judicial efficiency explain most of the cross-section variability in the number of bank relationships. Section 5 presents within-country results on a sample of Italian firms. The number of bank relationships increases with the equity stake of the controlling shareholder and with the size of the private benefits of control, as measured by the voting premium.

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4 In the paper, I will use the terms “inside banks” and “relationship banks” interchangeably to identify banks that are linked to the firm by a long-term relationship. Similarly, I will use the terms “outside investors” and “arm’s-length investors” to identify all other investors.

2. Structure of the model

At \( t=0 \), an entrepreneur sets up a firm and chooses its ownership and capital structure. At this time, some capital is needed and the entrepreneur can choose whether (and how much) to raise it on the market or to borrow from banks. By borrowing from a bank, the entrepreneur establishes a relationship that provides the bank with preferred information.

At \( t=1 \), after the initial financing contracts are signed, the entrepreneur can choose to change his equity stake in the firm by trading on the market or going public. At \( t=2 \), with some probability the firm faces a positive NPV investment opportunity. Since only relationship investors know the profitability of the investment opportunity, they can extract a rent when the new financing contracts are negotiated.

At \( t=3 \), the entrepreneur can divert part of the cash flows produced by the investment opportunity as private benefits of control. Finally, at \( t=4 \), the output is distributed to shareholders and creditors according to their claims.

The following sections describe the assumptions in more details.

2.1 Firm’s setup

All participants to the economy are risk neutral. The gross rate of return on alternative investments is normalized to 1 and there is perfect competition in the capital market.

At \( t=0 \), an amount \( K \) of capital is needed and the entrepreneur has no personal wealth to finance it. The entrepreneur can raise the capital by selling equity on the stock market, by borrowing from banks, by issuing public debt or other forms of debt, or by choosing any combination of the above. A debt contract is defined by a pair \( \{F, P\} \), where \( F \) is the amount of funds borrowed, and \( P \) is the promised payment. The resource constraint can be written as follows: 

\[
(1 - \beta) V + F_I + F_o \geq K,
\]

where \( (1 - \beta) \) is the fraction of the equity sold to the market by the founder of the company, \( V \) is the value of equity for outside shareholders, \( F_I \) is the amount of resources provided by (inside) banks,
and \( F_o \) is the amount of resources provided through other forms of debt. \( F_o \) is left undetermined by the model and is allowed to be positive or negative in such a way to satisfy the resource constraint for given values of the other terms.

The initial investment produces a cash flow \( Y > K \) at \( t=4 \) and generates a new investment opportunity at \( t=2 \). While the cost of this new investment opportunity is known (it requires capital \( I \) to be undertaken), its profitability is not. With exogenous probability \( \alpha \), the new investment opportunity has a positive net-present-value, i.e. yields cash flows \( X > I \). Otherwise, the project has a negative net-present-value, that is, yields cash flows \( X < I \). The quality of the project becomes known at \( t=2 \) only to the entrepreneur and the inside banks.

I assume that financial contracts are incomplete. In particular, the cash flows produced by the investment project available at \( t=2 \) are non-verifiable. As usual, the justification is that the complex nature of the uncertainty regarding the project makes it very costly to describe them in a contract that can be verified by a court. Hence, as discussed in more details in section 2.3, at \( t=3 \) the party in control can appropriate some of the cash flow produced by the project.\(^6\) The size of the diversion will depend on his equity stake in the company and on the legal protection existing in the economy. In order to simplify the analysis, I assume that the firm is an investment with positive net present value even with maximum diversion by the party in control, i.e. \( V \geq 0 \).

In order not to deal with changes in control, I assume that the founder’s entrepreneurial skills are essential to the firm. The founder is therefore entrenched in power either as the top executive (when the firm is widely held), or as the controlling shareholder (when the firm is closely held). In either case, the founder is the one in charge of all executive decisions concerning the firm.

This assumption implies that the only relevant decision variable when the ownership structure is chosen is the share of equity that the founder retains.\(^7\) It will be shown that the founder faces the incentives to alter his equity stake at \( t=1 \), i.e. after the bank relationships’ setup. In fact, by doing so, he can affect the rent that inside banks can extract. Hence, I allow the entrepreneur to alter his new equity stake to \( b \) at \( t=1 \).

\(^6\) He can do so only in the good state of the world in which he keeps control of the company.

\(^7\) For simplicity there is no deviation from the law of one-share-one-vote. If there is a difference between income and voting rights, the relevant indicator is the share of income rights owned by the controlling shareholder because the income rights affect his utility.
2.2 Bank relationships

I assume that setting up a bank relationship costs \( k > 0 \). This cost represents a compensation for the screening costs that a bank has to sustain in order to become informed. An informed bank learns the quality of the new investment opportunity at \( t = 2 \). This information is “soft” and cannot be sold: i.e. all and only the banks that sustain the investment \( k \) become informed about the firm’s investment possibilities.\(^8\)

At \( t = 2 \), the entrepreneur needs to raise external resources \( I \) to undertake the new investment opportunity. I model the capital market in this interim phase as follows: each potential financier decides whether to offer resources to the entrepreneur and at what interest rate. The entrepreneur chooses among the different offers.

I will be focusing on the set of parameters over which the entrepreneur wants to invest into the new project independently of the project’s quality. I will show that this is the case if the following condition is satisfied:

\[
B(x, \lambda) > Y - K
\]  
(A1)

Under this assumption, uninformed investors face an adverse selection problem since they cannot distinguish between good and bad projects. More specifically, I will simplify the analysis by assuming that the adverse selection problem is so severe that uninformed investors choose not to provide financing at \( t = 2 \). This is the case if the following condition is satisfied:

\[
\alpha X + Y < I + K
\]  
(A2)

A2 states that the firm cannot be financed with a long-term contract in which all needed capital is provided at \( t = 0 \). This assumption implies that uninformed investors with subordinated claims do not provide capital at \( t = 2 \). However, the assumption also implies that the interim investors cannot be assigned senior claims because otherwise no capital will be provided at \( t = 0 \).

Given that uninformed investors are not willing to provide resources, in the interim phase the capital market is restricted to informed banks and therefore it is not necessarily competitive. The inside banks can strategically interact and set the interest rate as in an oligopolistic market. Instead

\(^8\) For simplicity, I abstract from the issue of whether banks have the incentive to invest in screening. Since informed banks extract rents, a bank has the incentive to acquire information as long as the rent that it extracts is at least as large as the information costs. The only change to the model would be to add an incentive constraint for banks.
than imposing a specific interaction game, I assume that the fraction \( R(N) \) of the surplus that \( N \) inside banks extract decreases with \( N \), i.e. \( 0 < R(N) < 1 \) is decreasing and convex \( (R' < 0 \text{ and } R'' > 0) \).\(^9\)

One example of bargaining procedure that satisfies the conditions above is bargaining according to the Shapley value. In such case, given that the entrepreneur can finance the project by selecting just one of the inside banks, the fraction of the surplus that banks obtain is \( R(N) = 1/N \).\(^{10}\)

An alternative interpretation is that the competition among banks is \textit{a la Bertrand}, but inside bank \( i \) learns the state of the world with probability \( \pi < 1 \), where the event of bank \( i \) becoming informed is independent of (and identically distributed to) bank \( j \) becoming informed. In such a case, inside banks extract a rent with probability \( R(N) = N\pi(1-\pi)^{N-1} \) and \( R(N) \) is strictly decreasing in \( N \) as long as \( \pi > 1-1/e \).

### 2.3 Private benefits extraction

At \( t=3 \), the entrepreneur can extract private benefits of control from the proceeds of the investment opportunity undertaken at \( t=2 \). I consider a cash equivalent representation similar to the one in Burkart, Gromb and Panunzi (1997). If \( D \) is the amount of cash-flow that is diverted, \( B(D, \lambda) \) is the cash flows that the entrepreneur obtains, where \( \lambda \) is a measure of the investor protection in the firm. Diversion is inefficient, i.e. \( D \geq B(D, \lambda) \) for all \( D \). The function \( B(.) \) is assumed to be continuous and differentiable, increasing and concave in \( D \) (\( B_D > 0 \) and \( B_{DD} < 0 \)), since more diversion increases the private benefits and extracting private benefits may be more expensive the larger is the amount diverted. As in Wolfenzon (1999), investor protection reduces the efficiency of the production of private benefits of control: in particular, \( B_{\lambda} < 0 \) and \( B_{D\lambda} < 0 \).

An example of diversion technology that satisfies all the above conditions is the linear quadratic function: \( B(D, \lambda) = D - \frac{\lambda D^2}{2} \).

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\(^9\) In order to avoid dealing with the integer problem, I assume that \( N \geq 1 \) is a continuous variable.

\(^{10}\) This is a simple application of the Shapley value in an incomplete-contract framework in which I assume that the entrepreneur is essential to the relationship and one bank is enough to finance the investment. I refer to Bakos and Brynjolfsson (1993) for a discussion of this approach and an application to the choice of the optimal number of suppliers.
3. Equilibrium

In this section I will describe the sub-game perfect equilibria of the model. Proceeding backwards, I will start from $t=3$ when the decision to extract private benefits of control is taken. Then, I will move to the investment opportunity at $t=2$. Hence, I will consider the incentive to change the equity stake at $t=1$. Finally, I will derive the number of bank relationships and the initial ownership structure.

3.1 Extraction of private benefits

By assumption, private benefits of control can be extracted only if the investment opportunity available at $t=2$ has been undertaken. Two subgames must be considered: (i) the subgame in which the project undertaken at $t=2$ is bad; (ii) the subgame in which the project is good.

In subgame (i), the entrepreneur knows that the firm will default at $t=4$ since $x+Y<\lambda+K$. Hence, he chooses to appropriate as much cash flow as possible: the diversion is maximal, i.e. $D=x$, and the private benefits are equal to $B(x,\lambda)$.

In subgame (ii), the firm will not default. Hence, the problem faced by the entrepreneur is:

$$\max_{D\leq x} - BD + B(D,\lambda) \tag{1}$$

The following result is derived:

**Lemma 1.** $D=D(\beta,\lambda)$, decreasing in both $\beta$, and $\lambda$.

**Proof:** The first order condition of (1) is

$$- \beta + B_D(D,\lambda) = 0$$

Since $B_D<0$, $D$ is decreasing in $\beta$. Since $B_{\lambda}<0$, $D$ is decreasing in $\lambda$.\footnote{The second order condition for a maximum is satisfied since $B_{DD}<0$.}

It is convenient to compute the shareholders’ loss from the extraction of private benefits, that is, $L(\beta,\lambda)=D(\beta,\lambda)-B(D(\beta,\lambda),\lambda)$. Notice that $L(\cdot)$ is decreasing in $\beta$ since $L_\beta=(1-B_D)D_\beta=(1-\beta)D_\beta<0$.\footnote{The second order condition for a maximum is satisfied since $B_{DD}<0$.}
3.2 Interim investment decision

At \( t=2 \), the entrepreneur needs to raise external capital \( I \) to undertake the investment opportunity. Because of assumption (A1), the entrepreneur will try to invest even if the project has negative net present value. In fact, investing in the bad project yields a payoff to the entrepreneur equal to \( B(x, \lambda) \); while the payoff from not investing is instead equal to \( \beta(Y-K) \).

Assumption (A2) implies that no financier will provide funds without knowing whether the entrepreneur is investing in the positive net present value project. The consequences are that only good projects are undertaken, and, informed investors are needed to invest in the good project. These results imply that the surplus that inside banks allow to generate is equal to the value of the good investment opportunity, i.e. \( (X-I) \). However, the entrepreneur extracts private benefits of control. Hence, the surplus from the investment that banks can appropriate is net of the diversion by the entrepreneur. Combining these results with the assumption that inside banks compete in some oligopolistic way, the rent that \( N \) banks extract is given by

\[
R(N)(X - I - D(\beta, \lambda))
\]

(2)

It is important to notice that the rent is decreasing in \( N \) and increasing in \( \beta \). The first result follows from the assumption that \( R(.) \) is a decreasing function of \( N \); the second result follows from Lemma 1.

3.3 Retrading

Since \( \beta \) has an effect on the rent that banks extract, at \( t=1 \) the entrepreneur faces the incentive to alter his equity stake in the firms. In particular, the entrepreneur chooses \( \beta \) in such a way to maximize his interim utility:

\[
\max_{\beta} \alpha \left\{ \beta (1 - R)[X - I - D(\beta, \lambda)] + B(D(\beta, \lambda), \lambda) \right\}
\]

(3)

The following result is derived:

Lemma 2. \( \beta = \hat{\beta}(1 - R(N)) \).

Proof: The first order condition of (3) is
Since from Lemma 1 \(B_D = \beta\), \(\beta = \hat{\beta}(1 - R(N))\).\(^{12}\) ■

Notice that Lemma 2 establishes a positive relationship between \(\beta\) and \(N\), for given initial ownership \(\hat{\beta}\). The intuition for the result in Lemma 2 is similar to Zingales (1995): going public is a strategic decision to strengthen the bargaining position of the entrepreneur. In Zingales (1995) the goal is to reduce the rent that a potential raider can enjoy, in this case the goal is to reduce the rent that inside banks can extract. The entrepreneur is willing to reduce his equity stake even if this comes at the cost of more extraction of private benefits because the banks share part of the cost of the diversion.

3.4 Choice of the number of bank relationships

In choosing the initial ownership and capital structure, the entrepreneur faces a trade-off between setting up fewer bank relationships to save on the costs of these relationships and many relationships to reduce the extraction of private benefits of control. Given ex-ante competition the rents that banks extract are returned ex-ante in the form of lower interest rates. Hence, the entrepreneur solves the following problem:

\[
\max_{N, \hat{\beta}} \quad Y - K + \alpha(X - I) - kN - L\left(\hat{\beta}(1 - R(N)), \lambda\right)
\]

Proposition 1. The optimal initial ownership structure is \(\hat{\beta} = 1\) and the number of inside banks chosen, \(N\), solves the following condition

\[
-k + L_{\hat{\beta}}(1 - R(N), \lambda)R'(N) = 0.
\]

Proof: Since \(L_{\hat{\beta}} < 0\), the objective function is strictly increasing in \(\hat{\beta}\). Hence, it is efficient to have \(\hat{\beta} = 1\). \(N\) is determined by the first order condition with \(\hat{\beta} = 1\), i.e. by equation (5).\(^{13}\) ■

\(^{12}\) The second order condition is locally satisfied since \(-\hat{\beta}(1 - R)D_{\hat{\beta}} + D_{\hat{\beta}} + B_D D_{\hat{\beta}} = D_{\hat{\beta}} < 0\).
From equation (5), one can study the relationship between $N$ and $\lambda$.

**Corollary 1.** The optimal number of bank relationships is decreasing in $\lambda$, as long as $D_{\beta \lambda} > 0$.

**Proof:** Since problem (4) is locally concave (see footnote 13), one can apply the implicit function theorem to find:

$$\frac{dN}{d\lambda} = -\frac{L_{\mu \lambda} R'}{L_{\mu} R'' - L_{\mu \mu} (R')^2}.$$ 

From the second order condition, the denominator is negative. Since $R' < 0$ by assumption, 

$$\text{sign}\left(\frac{dN}{d\lambda}\right) = -\text{sign}\left(L_{\mu \lambda}\right).$$ 

The corollary follows after noticing that $L_{\mu \lambda} = (1-\beta) D_{\mu \lambda}$. ■

Corollary 1 states that there is a negative relationship between investor protection and number of banks under one condition on the second mixed derivative of $D(.)$. The condition is very reasonable and simply requires that decreasing the equity stake of the party in control induces more diversion in countries with lower investor protection. The linear-quadratic benefit function studied in the coming section satisfies this condition.

### 3.5 An example

In this example, I am assuming that $R(N) = 1/N$, as in the case in which the outcome of the bargaining between the firm and the inside banks is according to each parties’ Shapley value. I am also assuming that the benefit function is linear-quadratic, i.e. $B(D, \lambda) = D - \frac{\lambda D^2}{2}$.

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13 The second order condition is satisfied if $-L_{\mu \mu} (R')^2 + L_{\mu} R'' < 0$. I assume that such condition is satisfied. The conditions under which this happens are very general. In fact, the second term is negative because $L_{\mu} < 0$ and $R'' > 0$. While the sign of the first term is unknown, it is likely that the overall sign of the second order condition is negative because $L_{\mu \mu} = (1-\beta)D_{\mu \mu} - D_{\mu}$. Again, the second term in this expression is positive by Lemma 1, while the sign of the first term is undetermined. The case of linear-quadratic benefit function that is examined in section 3.5 is an example that satisfy the second order conditions.
Notice that \( R(N) = 1/N \) satisfies the requirements that \( R < 0 \) and \( R'' > 0 \). In fact, \( R'(N) = -\frac{1}{N^2} \).

\[
R''(N) = \frac{2}{N^3}.
\]

Similarly, \( B(D, \lambda) = D - \frac{\lambda D^2}{2} \) satisfies the requirement that \( B_D > 0 \), \( B_{DD} < 0 \), \( B_\lambda < 0 \) and \( B_{D\lambda} < 0 \). In fact, \( B_D = 1 - \lambda D \), \( B_{DD} = -\lambda \), \( B_\lambda = -\frac{D^2}{2} \), and \( B_{D\lambda} = -D \).

As a solution to problem (1), it is easy to obtain \( D(\beta, \lambda) = \frac{1 - \beta}{\lambda} \). Consistent with Lemma 1,

\[
D_\beta = \frac{1}{\lambda} < 0, \quad D_\lambda = -\frac{1 - \beta}{\lambda^2} < 0.
\]

It follows that \( L(\beta, \lambda) = \frac{(1 - \beta)^2}{2\lambda} \).

The first order condition (5) becomes \( -k + \frac{1}{\lambda N^3} = 0 \). Hence, \( N = \frac{1}{\sqrt{3 \lambda k}} \) and, using Lemma 2,

\[
\beta = 1 - \frac{\sqrt{3}}{\sqrt{\lambda k}}.
\]

It is immediate to notice that, as in Corollary 1, there is a negative relationship between \( N \) and \( \lambda \).\(^{14}\)

### 3.6 Empirical predictions

Two testable predictions derive from Corollary 1:

**Prediction 1**: Across countries, the number of bank relationships is a decreasing function of investor and, in particular, shareholder protection.

In Section 4, I will show that this prediction is consistent with the cross-country evidence: I find there that both the index of shareholder rights and the index of judicial efficiency are negatively correlated with the number of bank relationships.

The prediction above holds within a country, that is, after controlling for the degree of shareholder protection, as long as there are other sources of variability in the expropriation opportunities aside from legal rules. These may be personal characteristics of the owner or industry characteristics of the sector in which the firm operates. If so,

\[\text{\textsuperscript{14}} \text{ Notice that the second order condition of problem (4) is satisfied since } L_{\beta\beta} = \frac{1}{\lambda} > 0. \text{ Moreover, the condition in Corollary 1 is satisfied since } D_{D\lambda} = \frac{1}{\lambda} > 0.\]
**Prediction 2:** At a firm level and for given investor protection, the number of bank relationships is an increasing function of the opportunity for extraction of private benefits of control.

This prediction is tested in Section 5 on a sample of Italian firms, where the potential for extraction of private benefits is proxied by the voting premium, as defined in Zingales (1994). The results are consistent with the prediction.

From Lemma 2, a third testable prediction can be derived:

**Prediction 3:** At a firm level, the equity stake of the party in control should be positively correlated with the number of bank relationships.

This prediction is also tested in Section 5 on a sample of Italian firms with results consistent with the above prediction.

It is important to notice that the combination of Predictions 1 and 3 implies a negative cross-country relationship between ownership concentration and shareholder protection. This prediction is consistent with evidence in La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998) and La Porta, Lopez-de-Silanes, and Shleifer (1999).

### 3.7 Extensions

The model assumes the simplest setup as possible, in which banks are not involved in monitoring and setting up a bank relation entails a fixed positive cost \( k \). It is immediate to analyze the extension in which banks must engage in monitoring in order, for instance, to increase the liquidation value of the firm in a bad state of the world. As will be discussed in this section, such extension offers interesting predictions on the emergence of a main bank.

#### 3.7.1 Bank monitoring and debt concentration

If bank monitoring is beneficial, the only change to the model will be that in problem (4) the cost of setting up \( N \) bank relations, \( C(N) \), is a more complex (possibly non-linear) function of \( N \) than \( C(N) = kN \) (as in the basic version of the model). However, since monitoring is, to some extent, like
providing a public good, \( C(N) \) will continue to be an increasing function of \( N \). Hence, the nature of the trade-off in problem (4) will not change and Proposition 1 and Corollary 1 will follow substantially unchanged.

What changes in this case is that a new decision variable will affect the cost function \( C(N) \), namely the concentration of bank debt among inside banks. In this setting, it would be efficient to concentrate as much of the liabilities within one bank relation subject to the constraint that the other banks (who are there to minimize the rent extracted by banks) have enough exposure to invest in screening.

This extension suggests that in countries with low shareholder protection main- but not single-bank relationship should emerge. The statement above is consistent with recent evidence on Italian firms contained in D'Auria, Foglia and Marullo-Reedtz (1999). Their paper indicates that the interest rate charged to firm \( j \) by a bank \( i \) decreases with the size of the lines of credit granted by the bank (normalized by the total lines of credit granted by the banking system). At the same time, the interest rate decreases with the number of banks lending to the firm. The authors show that, when the two forces are combined the relationship between the interest rate and a measure of debt concentration (given by the debt from bank \( i \) to firm \( j \) over the total bank debt of firm \( j \)) is U-shaped. If it is true that interest rate decreases as firm \( j \) borrows more from a main bank \( i \), there exists a maximum level of debt concentration beyond which firm \( j \) starts decreasing the number of bank relationships causing the interest rate to increase again. The model presented in this section is able to explain this U-shaped curve.

An alternative way to maximize the amount of monitoring provided by banks, is to structure the seniority of bank claims in such a way to have one bank (the main bank) as the only residual claimant in the bad state of the world (when monitoring is needed most). In that case, the main bank has the incentive to choose the optimal investment in monitoring because it fully internalizes the benefits of monitoring. This is consistent with evidence on Japan provided by Hoshi, Kashyap, and Scharfstein (1990) according to which main banks organize bailouts and assume responsibilities for bad debts when client firms become financially distressed.

The feasibility of such a solution depends on the amount of information available when the capital structure is chosen. Given that the liquidation value of the firm is uncertain at the beginning, the undermonitoring problem is unlikely to be solved by creating a main bank as junior claimant. Moreover, this solution would rely on a bankruptcy procedure that preserves the absolute priority
rule. Evidence in Weiss (1990) suggests large violations from the absolute priority rule in the United States, a country with good investor protection. If so, playing with relative seniority may in the best case only alleviate the undermonitoring problem.

3.7.2 Bank ownership

A further extension is to allow the banks to own equity stakes in the firm. In such case

4. Cross-country empirical analysis

In this section, I use aggregate data on a set of 16 European countries to test the cross-country implications of the model, and to compare the alternative explanations that have been proposed in the literature.

The source of data on the average number of banks maintained by companies in European countries is Birks (1998). This book presents the main results of a survey of European companies called GlobalCash-Europe96, in which cash managers and treasurers from 5800 among the largest companies in Europe were asked to complete a detailed questionnaire on their company’s cash management practices. The number of questionnaires completed and returned was 1129. One of the requested information, was the number of banks used for domestic cash management. I use the within-country average of that number as the number of bank relationships per country. In doing so, I follow the approach of Ongena and Smith (2000). These authors study the determinants of the number of bank relationships using the firm-level data from GlobalCash-Europe96. Many are the differences in the variables used and in the interpretation of the results of this paper with respect to the study by Ongena and Smith (2000). Most importantly, the two authors do not evaluate the effects of shareholder protection and ownership structure on the number of bank relationships as suggested by the model presented in this paper.

4.1 Competing theories

There are three main explanations of the determinants of the number of bank relationships: (1) hardening the budget constraints as in Bolton and Scharfstein (1996) and Dewatripont and Maskin (1995); (2) providing insurance against banks’ liquidity crises as in Detragiache, Garella and Guiso (2000); (3) shaping the incentives of banks and entrepreneurs as in Rajan (1992) and Von Thadden (1995).
Bolton and Scharfstein (1996) argue that many creditors reduce the likelihood of a successful debt restructuring and increase the chance of liquidation. Thus, maintaining many banks has a disciplining effect on the entrepreneurs by preventing strategic defaults. On the other hand, many banks increase the chance of liquidation in case of a liquidity crisis. The number of banks within a company derives from the solution of the trade-off between incentive and efficiency. By applying this theory to a cross-country setting, it would be reasonable to assume that investor protection decreases the potential for strategic default. If so, Bolton and Scharfstein (1996) would predict a larger number of banks in countries with lower creditor protection.

Detragiache, Garella and Guiso (2000) suggest that the choice of many bank relations operates as an insurance against the possibility that a bank suffers a liquidity crisis that prevents the firm’s refinancing. One of the main prediction of their model is that the number of bank relationships should be higher in countries with more fragile banks. A second prediction of their model is that the number of bank relationships should increase with the efficiency of the judicial system.\footnote{More specifically, as described in section 5.5, the authors suggest a non-monotonic relationship between the number of bank relationships and both judicial efficiency and bank fragility.}

Even if the purpose of their papers was not to determine the number of bank relationships Rajan (1992) and Von Thadden (1995) suggest that increasing the number of inside banks has the effect of reducing the banks’ incentive to monitor and the effect of increasing the incentive of entrepreneurs to invest. One possible cross-country prediction of this theory, consistent with the interpretation in Mayer (1994) and Rajan and Zingales (1998), is that one should observe large investors in countries with low investor protection, because more monitoring is needed in those countries. Therefore, one may expect that the number of banks is positively correlated with investor protection.

Papers that do not directly address the choice of the number of bank relationships may provide additional predictions. Boot and Thakor (2000) analyze a bank’s decision to specialize in either relationship or transaction lending. While they provide a model of the structure of the banking industry, rather than a model of the relations between banks and firms, they suggest that many bank relations may be a substitute for underdeveloped public debt and equity market. If so, one could expect the number of bank relationships to be negatively correlated with the size of the private bond market. Shleifer and Vishny (1997) suggest that large creditors may be more likely in countries with low creditor rights because large investors need less legal protection. If so, one should expect fewer bank relations in countries with lower creditor legal protection.
Finally, the empirical predictions of the model presented in this paper have been described in section 3.6.

4.2 Data description

Table 1 contains a description of the variables that are used in the cross-country analysis. The availability of data on the number of bank relationships constrains the sample to only 16 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

Data on the nature of the relationship between banks and firms are combined with indicators of the legal protection existing in one country, measures of the development of the equity and private bond market, characteristics of the banking industry, and finally with information about the ownership structure of firms.

Table 2 shows the pair-wise correlations among some of these variables. The first important result is that the number of bank relationships is not significantly correlated with creditor protection and the size of the bond market.

Therefore, the idea that many banks may be used as a substitute for an underdeveloped public debt market is not supported. However, many bank relationships may be a substitute for an underdeveloped equity market, as suggested by the negative and significant correlation for equity market. This second correlation may actually be the indirect result of the positive correlation between equity market, and shareholder protection and judicial efficiency, where the latter are negatively correlated to the number of banks. Moreover, since creditor protection is not correlated with the number of bank relations and judicial efficiency is negatively correlated with the number of bank relationships, the prediction of Shleifer and Vishny (1997) and Mayer (1994) and Rajan and Zingales (1998) are contradicted. The negative and significant coefficient for judicial efficiency is in favor of both Bolton and Scharfstein (1996) and this paper. However, Bolton and Scharfstein (1996) cannot explain why the correlation with ownership concentration is positive, and the one for shareholder protection is negative, nor why the measure of creditor rights is not significantly correlated with the number of bank relations.

As regards the other correlations, the degree of concentration in the banking industry is negatively correlated with the number of bank-firm relations. This can be interpreted as a supply factor. Ownership concentration is negatively correlated with shareholder protection and judicial efficiency,
and the size of the equity market is positively correlated with the two indicators, suggesting that fewer companies are traded in countries with lower shareholder protection and judicial efficiency. The latter results are consistent with La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998).

To summarize table 2, judicial efficiency, shareholder protection and banking industry concentration seem to be the most important determinants of the number of bank relationships. On the other hand, creditor protection is not significant. As a robustness check (not reported here), I have distinguished between rights for secured and unsecured creditors.\textsuperscript{16} None of the two indexes is significantly correlated with the number of banks, and, surprisingly, the index for unsecured creditors is not correlated with the size of the bond market, while the index for secured creditors is, as shown in table 2.

\textbf{4.3 Cross-country results}

According to Prediction 1, shareholder rights and judicial efficiency should explain the cross-sectional variation in the number of bank relationships. Table 3 addresses directly this prediction.

Regression (1), (2) and (3) consider only shareholder protection and judicial efficiency, alone and together. The $R^2$ of 77 percent suggests that the two variables, both strongly significant, explain a large portion of the variability in the number of banks. Judicial efficiency explains more than half of the variability, but shareholder protection alone still explains 30 percent.

Regression (4) confirms that creditor protection is not a significant determinant of the number of bank relationships. Regression (5) controls for the concentration of the banking industry, the supply factor, and shows that the significance of judicial efficiency and shareholder protection do not change.

The methodology in Ongena and Smith (2000) differs from the one used in the previous section in one important detail. The authors start with the panel from GlobalCash-Europe96 and run a first regression in which they introduce industry dummies, firm’s characteristics, and country dummies. In a second step, they use the values of the country dummies as a substitute for the average number of banks per country. Their approach allows to control for differences in the firms’ characteristics across countries. As a control check I run the same regressions in table 3 with the country dummies

\textsuperscript{16} Secured creditors enjoy all rights reported in the aggregate index of creditor protection, while unsecured creditors enjoy only two of these rights.
used by Ongena and Smith (2000). Since there are no changes in the results, I do not report those regressions.

4.4 Robustness checks

The data on the number of banks used in the previous analysis is the number of banks engaged in short-term financing and cash-managing, not the overall number of banks. The absence of banks providing long-term financing and the inclusion of banks involved in cash-managing may generate a bias.

First, differences in the relative importance of short- versus long-term borrowing across countries may bias the number of banks reported by the data-set. For example, it is possible that short-term borrowing is relatively more common in Italy than in UK, and that, as a consequence, the data on the number of banks for Italy is larger than the number for UK, simply because of institutional differences between the two countries. This is particularly true if banks specialize in either short- or long-term lending or are required by law to do so.

Secondly, concerning banks engaged in cash-managing, differences across countries in the branching regulation may bias the number of banks reported by the data-set. In fact, in a country where banks are not allowed to open branches outside their own region, a large company that operates in different geographical regions needs to deal with many banks simply because it needs to pay workers in different regions. On the other hand, the same company in a country with less branching regulation needs fewer banks as cash-managers. In this respect, the intense deregulation in the banking industry across Europe has reduced the differences.

In order to address the first issue, I have computed the ratio between short- and long-term liabilities in 1994 using the OECD aggregate balance-sheet data on non-financial enterprises. This data is available for only 12 of the 16 countries because Greece, Ireland, Portugal, and Switzerland are not included in the OECD statistics. To address the second potential bias, I have computed the average number of bank branches from data in Barth, Nolle, and Rice (1997). This data is not available for Norway.

Table 4, part (A), presents simple correlations between the two new variables, the number of bank relationships and the three independent variables found significant in table 3. None of the new
variables is correlated with the number of banks. In part (B), the regressions proposed in table 3 are augmented by the two new controlling variables: the results are substantially unchanged.  

### 4.5 Addressing alternative explanations

The results in tables 2 and 3 present evidence in favor of the model proposed in this paper and against some of the competing explanations. However, further tests are needed in order to address the explanation elaborated in Detragiache, Garella, and Guiso (1999).

Detragiache, Garella, and Guiso (1999) suggest two sets of prediction reported in their Proposition 3 and 4, respectively. First, the probability that a firm chooses single-bank relationship should be increasing in both the likelihood of liquidity crisis for banks and in judicial efficiency. Second, for companies with multiple banks, the number of bank relationships should be increasing in the likelihood of the bank liquidity crisis and in the judicial efficiency.

In this section, I test both sets of predictions. To obtains $M_i$, the average number of banks just for companies with multiple banks, I use the percentage of firms with single-bank relationship, $x_i$, and the average number banks, $N_i$, to compute $M_i = (N_i - x_i)(1 - x_i)$. I call $M_i$ the conditional number of banks in country $i$ because it is the average number of banks conditional on firms with multiple banks.

As a proxy for the likelihood of a liquidity crisis in banks (bank fragility) I use the average credit ratings of the banks reported by *Credit ratings international* (Financial Times).

Table 5 presents a set of correlations and the regression analysis. Notice that the fraction of single-bank firms is correlated only with judicial efficiency and not with bank fragility, while the conditional number of banks is not correlated with bank fragility and it is negatively (rather than positively) correlated with judicial efficiency.

The regressions in part (B) address Detragiache, Garella and Guiso (2000) directly. First, in regression (2), consistent with the authors’ Proposition 3, the percentage of single-bank firms is higher the higher is judicial efficiency. Bank fragility has the expected sign, but is not significant. On the other hand, in regression (4) the result is against Detragiache, Garella, and Guiso (1999). At odds with their Proposition 4, higher judicial efficiency implies a lower number of banks. Again, bank

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17 Notice that since short-term liabilities is negatively correlated with banking concentration, the latter is excluded from the regressions.
fragility is not significant. Finally, regressions (1) and (3) show that judicial efficiency and shareholder protection continues to be significant in the way predicted by the model presented in this paper.

5. Within-country analysis: Italian firms

As the country with the largest number of bank relationships among those considered in Section 4, Italy is a case that deserves further investigation. In this Section, I will consider two predictions of the proposed model: the number of bank relationships should increase with the equity stake owned by the controlling shareholder (Prediction 3), and the number of bank relationships should increase with measures of the opportunity to extract private benefits of control (Prediction 2).

5.1 Institutional details

In Italy, the relationship between banks and firms has been historically characterized as “a paradox where firms depend almost exclusively on bank financing and, still, banks are weak with respect to firms” (Padoa-Schioppa, 1995). Multiple-banking relationship and intense regulation are widely considered the main cause of the weakness and contradictions of the Italian banking system. The banking industry has been intensely regulated till recently. Until 1990, for example, banks required a special authorization to open a branch outside a region, but the banking reform in 1993 changed the industry considerably. The reform allowed the creation of universal banking and deregulated long-term financing. At the same time, it triggered an intense merging and consolidation activity within the banking industry (Sapienza, 1998). Finally, the bankruptcy law is unfavorable to creditors, especially when large companies are involved. In fact, since 1979, large companies have access to a special procedure known as amministrazione straordinaria or Prodi’s Act that gives full priority to the protection of employment and substantially weakens creditors’ claims (Penati and Zingales, 1998).

5.2 Ownership structure and number of banks

The data-set I use contains traded and non-traded companies and covers the period 1993-1998. The source is “Ricerche e Studi” (R&S), an annual publication edited by Mediobanca. This publication covers the largest companies operating in Italy and provides consolidated balances,
information about ownership and capital structure (with details on the medium- and long-term debt structure), and the history and organizational structure of their group.\textsuperscript{18} The selection of the companies is made every year by Mediobanca on the basis of performance, size and relative importance in the country. In 1998, 179 were the groups included, covering a total of 9400 firms and more than one third of manufacturing, retailing, banking and insurance industries.\textsuperscript{19} The focus on large and well-known companies ensures that all companies in the sample (traded or not) enjoy similar visibility on the debt market and therefore face similar asymmetric information problems. In fact, Pagano, Panetta and Zingales (1998) suggest that the number of bank relationships increases when a company goes public because of an increase in the company’s visibility. With the sample choice I control for this effect.

Once banks, insurance companies, and companies controlled by the state or by foreign parties are excluded, the data-set left contains 560 observations from 121 companies. The companies are controlled by 80 ultimate owners and are classified into 11 industries. Half of the companies are not traded. In the following analysis the number of bank relationships corresponds to the number of financial institutions providing medium- and long-term credit to a firm and its subsidiaries in one year. The data-set allows to compute the share of income and control rights owned by the controlling shareholder. When a group is not traded, the share of income rights is assumed to be 100 percent.\textsuperscript{20}

Table 6 describes the variables used in the analysis, while table 7(A) provides basic summary statistics.

It is important to notice that the average number of banks in this sample is 8.84, much smaller than the 15.2 used in section 5. The main reason for this difference is that 8.84 corresponds to the number of financial institutions engaged in medium- and long-term lending to the firm: the banks providing only short term financing, as well as the commercial banks used only for cash managing, are not included.

Table 7(B) analyzes the relationship between ownership concentration and number of banks following the suggestions above. Two measures of ownership structure are used: the share of income rights owned by the party in control and a dummy variable for non-traded companies. As control

\textsuperscript{18} The number of companies varies between 150 and 180 depending on the year.

\textsuperscript{19} I will use the terms “group” and “company” interchangeably when referring to the companies included in the sample because these companies are holding companies at the head of large groups of firms.

\textsuperscript{20} Even if also in non-traded companies there may be more shareholders, the agency problem between controlling and minority shareholders is likely to be very small.
variables I use sales, as a measure of size, and the ratio of medium- and long-term debt over total
debt, to correct for the nature of the dependent variable. Industry effects are introduced in
regressions (2) and (5); Year effects are introduced in regressions (3) and (6). The results show that
indeed ownership concentration is positively correlated with the number of banks. The relationship is
stronger for the no-trade dummy.

As a robustness check (not reported), I run the regressions in table 7(B) for the sub-sample
1996-1998 in order to control for the effects of the 1993 reform of the banking industry by allowing
possible lags in the reaction to the deregulation of long-term financing: the results do not change.

5.3 Voting premium and number of bank relationship

The model predicts that the number of bank relationships should be increasing in the opportunities
for extraction of the private benefits of control. It is legitimate to explore this relationship at firm level
and within a country because there can be variability in the potential for extraction of private benefits
even within a country, i.e. even after controlling for the characteristics of legal and judicial system.
For example, we expect the ability of the controlling shareholder to engage in transfer pricing to
depend on the business in which the firm operates as well as on the nature of the other activities that
the controlling shareholder manages.

In order to find a measure of the opportunity for the extraction of private benefits of control, I
follow Zingales (1994). According to this author, the voting premium (as measured by the
percentage difference in trading price between a voting and a nonvoting share of a given company) is
a good proxy for the size of private benefits of control in a company. This proxy is expected to be
proportional to the private benefits of control because the price of voting shares reflects the value of
control as a consequence of their pivotal role in a possible future fight for the control of the company.

Following Zingales (1994), the total value of a firm is given by the verifiable value $V$ plus the value
of the private benefits of control $B$.

The non-voting shares do not obtain private benefits of control because they have no voting rights.
Therefore, $V=P_{nv} N$, that is the verifiable value is equal to the total number of shares times the price
of the non-voting shares. If the benefit is distributed equally to all voting shares, $B=(P_v-P_{nv}) N_v$, i.e.
the value of the private benefits of control is equal to the difference in price between voting and non-
voting shares times the number of voting shares. Therefore, $B/V=[(P_v-P_{nv})/P_{nv}] [N_v / N_{nv}]$. If $\beta$ is the
firm’s private benefits of control expressed as a fraction of the value \( V \) of the firm, and \( \pi \) is the fraction of the voting shares over the total outstanding shares, one obtains that the voting premium is equal to

\[
(P_v - P_{nv})/P_{nv} = \beta / \pi - e
\]

where \( e \) is the correction for the preferred dividends that non-voting shares receive.

Zingales (1994) uses the specification (6) as the starting point to study the determinants of the voting premium in Italy. Taking into explicit consideration the ownership structure, he estimates equation (6) and finds a sample estimate for the private benefits \( \beta \). Instead than doing so, I take (6) as the true model and I use (6) to obtain a proxy of the private benefits of control at a firm level. Thus, for a generic firm \( i \), a proxy of the private benefits of control is given by

\[
\beta_i = \pi_i \left[ \frac{(P_v - P_{nv})}{P_{nv}} \right]_i + e_i
\]

Finally, the relationship I estimate is:

\[
N_i = \alpha_0 + \alpha_1 \beta_i + \alpha_2 X_i + \eta_i
\]

where \( N_i \) is the number of bank relationships and \( X_i \) is a set of control variables.

As in the previous section, I use the number of banks engaged in medium- and long-term lending to firm \( i \) as a proxy for the number of bank relationships of that firm. Table 8(A) describes the variables used in the analysis. All variables are evaluated at the end of each year. The number of companies (39) is lower than the total number of companies with traded voting and nonvoting shares (70). The loss of observations is due to lack of data on the number of bank relationships.

One interesting observation in part (A) is that the average voting premium (49.9 percent) is lower than the 80 percent found by Zingales (1994). It is possible that the lower voting premium is actually the consequence of lower private benefits of control produced by recent legal reforms that have improved shareholder protection. As a matter of fact, the sample used by Zingales covers the period 1987-1990; after that time, several legislative acts came to enhance shareholder legal protection.\(^{21}\)

The first regression in table 8(B) shows that indeed the number of banks is positively correlated with the measure of private benefits of control. As shown by regression (2) and (3), the result continues to hold after controlling for size of the firm measured alternatively as market capitalization at the end of the year or as consolidated sales. Moreover, since the data on the number of banks

\(^{21}\) In 1991 disclosure requirement were introduced and the power of the Italian stock exchange commission (CONSOB) was increased; in 1992 a law on takeover went into effect.
refer to banks providing medium- and long-term financing, the ratio of medium- and long-term debt over total debt is included as control variable.

As in section 5.2, I repeat the analysis (not reported) for the sub-sample 1996-1998 in order to control for the effects of the 1993 reform of the banking industry and I find no change in the results.

6. Conclusion

This paper provides evidence of a negative relationship between the number of banks maintained by firms and the degree of shareholder legal protection. A theoretical model explains the finding. Through their lending relationship inside banks acquire preferred information which enables them to enjoy rents whenever the firm needs to raise capital. The rent that inside banks can extract decreases with the number of bank relationship because more banks increase the interim competition and increases with the equity stake owned by the party in control because the surplus generated by relationship financing is net of the private benefits of control enjoyed by the party in control which decrease with his equity stake. After bank relationships are setup, the entrepreneur faces the incentive to change his equity stake in the firm to reduce the rents that banks extract, even if this comes at the cost of larger extraction of private benefits of control. Since such an incentive is larger the fewer are the inside banks, the initial choice of the number of bank relationships solves a trade-off between the lower costs coming from fewer bank relationship and the lower expropriation of minority shareholders associated with more bank relationships. Finally, the model predicts more bank relationships (and higher ownership concentration) in countries with lower shareholder protection, because the opportunity to extract private benefits of control is larger in countries with lower shareholder protection.

Consistent with the prediction of model, the degree of shareholder protection is negatively correlated with the number of bank relationships per company. When combined with judicial efficiency, the index of shareholder rights is not only robust to controlling variables suggested by the literature, but explains 80 percent of the cross-country variability. Further support to the model comes from the analysis of a sample of Italian firms. For these companies, the number of bank relationships is positively correlated with the share of income rights owned by the controlling shareholder and with the size of private benefits of control as measured by the voting premium.
References


Table 1 - Description of the variables used in cross-country analysis

<table>
<thead>
<tr>
<th>Nature of bank-firm relationship</th>
<th>Nature of bank-firm relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of banks</strong></td>
<td>Average number of bank relationships per country. Birks (1998), Figure 3.2.</td>
</tr>
<tr>
<td><strong>Single-bank firms</strong></td>
<td>Fraction of firms in each country with a single-bank relation. Ongena and Smith (2000), Table 1.</td>
</tr>
<tr>
<td><strong>Legal Protection</strong></td>
<td>Index of the degree of legal protection for minority shareholders equal to the product of anti-director rights and rule of law divided by 10, as defined in La Porta et al. (1998).</td>
</tr>
<tr>
<td><strong>Shareholder protection</strong></td>
<td>Index of the degree of legal protection for creditors equal to the product of creditor rights and rule of law divided by 10, as defined in La Porta et al. (1998).</td>
</tr>
<tr>
<td><strong>Creditor protection</strong></td>
<td>Index of the quality of the legal environment as it affects business. La Porta et al. (1998), Table 5.</td>
</tr>
<tr>
<td><strong>Judicial efficiency</strong></td>
<td>Index of the quality of the legal environment as it affects business. La Porta et al. (1998), Table 5.</td>
</tr>
<tr>
<td><strong>Capital markets</strong></td>
<td>Index of the quality of the legal environment as it affects business. La Porta et al. (1998), Table 5.</td>
</tr>
<tr>
<td><strong>Banking industry concentration</strong></td>
<td>Percentage of the assets held by the three largest banks in 1993 over the total assets owned by the banking system. Barth, et al. (1997), Table 3, and Nordal and Naerland (1995) (Norway).</td>
</tr>
<tr>
<td><strong>Bank fragility</strong></td>
<td>Average credit rating of tracked banks within a country, where the scaling is inverted so that higher score indicates higher risk. FT Financial Publishing, <em>Credit ratings international</em>.</td>
</tr>
<tr>
<td><strong>Branching</strong></td>
<td>Average number of branches per commercial bank. Barth, Nolle and Rice (1997), Table 3.</td>
</tr>
<tr>
<td><strong>Firm characteristics</strong></td>
<td>Average percentage of common shares owned by the three largest shareholders in the 10 largest non-financial, non-state owned traded firms. La Porta et al. (1998), Table 7.</td>
</tr>
</tbody>
</table>
Table 2 - Pair-wise correlations in the cross-country analysis

For all correlations the number of observations is 16. The p-values are reported in parenthesis. The variables are defined in table 1. * indicates coefficients that are significant at a 10 percent level, ** significance at 5 percent, and ***, significance at 1 percent level.

<table>
<thead>
<tr>
<th>Number of banks</th>
<th>Shareholder protection</th>
<th>Creditor protection</th>
<th>Judicial efficiency</th>
<th>Banking concentration</th>
<th>Equity market</th>
<th>Bond market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholder protection</td>
<td>-.549*** (.027)</td>
<td>- .315 (.234)</td>
<td>- .764*** (.001)</td>
<td>- .480* (.059)</td>
<td>(.951)</td>
<td>(.231)</td>
</tr>
<tr>
<td>Creditor protection</td>
<td>.014 (.957)</td>
<td>(.234)</td>
<td>.162 (.549)</td>
<td>.017 (.951)</td>
<td>(.231)</td>
<td>(.270)</td>
</tr>
<tr>
<td>Judicial efficiency</td>
<td>.475* (.234)</td>
<td>(.234)</td>
<td>.014 (.957)</td>
<td>(.957)</td>
<td>(.234)</td>
<td>(.270)</td>
</tr>
<tr>
<td>Banking concentration</td>
<td>- .317 (.957)</td>
<td>(.234)</td>
<td>.293 (.549)</td>
<td>(.234)</td>
<td>(.270)</td>
<td>(.270)</td>
</tr>
<tr>
<td>n</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 3 - Cross-country regression analysis

The dependent variable in all five regressions is the number of bank relationships. Robust standard errors are in parenthesis. * indicates coefficients that are significant at a 10 percent level, ** significance at 5 percent, and ***, significance at 1 percent level. A constant is included but not reported.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholder protection</td>
<td>-1.939*** (.561)</td>
<td>-1.542*** (.480)</td>
<td>-1.575*** (.285)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Judicial efficiency</td>
<td>-2.009*** (.410)</td>
<td>-1.824*** (.300)</td>
<td>-1.592*** (.481)</td>
<td>-1.592*** (.281)</td>
<td></td>
</tr>
<tr>
<td>Creditor protection</td>
<td>.257 (.736)</td>
<td>.257 (.736)</td>
<td>.257 (.736)</td>
<td>.257 (.736)</td>
<td></td>
</tr>
<tr>
<td>Banking concentration</td>
<td>- .053*** (1.017)</td>
<td>- .053*** (1.017)</td>
<td>- .053*** (1.017)</td>
<td>- .053*** (1.017)</td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.301</td>
<td>0.585</td>
<td>0.770</td>
<td>0.587</td>
<td>0.850</td>
</tr>
<tr>
<td>N.obs.</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>
Table 4 - Robustness checks for cross-country analysis

A) Correlations.
The number of branches is not available for Norway; the ratio of short-term over long-term liabilities is not available for Greece, Ireland, Portugal and Switzerland. The p-values are reported in parenthesis. * indicates coefficients that are significant at a 10 percent level, ** significance at 5 percent, and ***, significance at 1 percent level.

<table>
<thead>
<tr>
<th></th>
<th>Number of banks</th>
<th>Shareholder protection</th>
<th>Judicial efficiency</th>
<th>Banking concentration</th>
<th>Branching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholder protection</td>
<td>-.549**</td>
<td>(.027)</td>
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</tr>
<tr>
<td>Judicial efficiency</td>
<td>-.764***</td>
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<td>(.549)</td>
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<tr>
<td>Banking concentration</td>
<td>-.480*</td>
<td>.017</td>
<td>.293</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Branching</td>
<td>.057</td>
<td>.212</td>
<td>-.186</td>
<td>.017</td>
<td></td>
</tr>
<tr>
<td>Short-term liabilities</td>
<td>-.182</td>
<td>.260</td>
<td>.169</td>
<td>-.530*</td>
<td>-.326</td>
</tr>
</tbody>
</table>

B) Regression analysis.
The dependent variable is the number of bank relationships. Robust standard errors are in parenthesis. A constant is included but not reported.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholder protection</td>
<td>-1.623**</td>
<td>-1.653***</td>
<td>-1.703*</td>
</tr>
<tr>
<td>(.)</td>
<td>(.630)</td>
<td>(.442)</td>
<td>(.761)</td>
</tr>
<tr>
<td>Judicial efficiency</td>
<td>-1.833***</td>
<td>-2.331***</td>
<td>-2.401***</td>
</tr>
<tr>
<td>(.346)</td>
<td>(.484)</td>
<td>(.474)</td>
<td></td>
</tr>
<tr>
<td>Branching</td>
<td>.002</td>
<td>-.006</td>
<td></td>
</tr>
<tr>
<td>(.)</td>
<td>(.011)</td>
<td>(.017)</td>
<td></td>
</tr>
<tr>
<td>Short-term liabilities</td>
<td>-.182</td>
<td>.150</td>
<td>.165</td>
</tr>
<tr>
<td>(.)</td>
<td>(.201)</td>
<td>(.428)</td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>.754</td>
<td>.879</td>
<td>.875</td>
</tr>
<tr>
<td>N.obs.</td>
<td>15</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>
Table 5 - Multiple banks as insurance: Detragiache, Garella and Guiso (2000)

A) Correlations.
The significance level is reported in parenthesis.

<table>
<thead>
<tr>
<th></th>
<th>Single-bank firms</th>
<th>Conditional # of banks</th>
<th>Shareholder protection</th>
<th>Creditor protection</th>
<th>Judicial efficiency</th>
<th>Banking concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditional # of banks</td>
<td>-.599**</td>
<td>(.014)</td>
<td>-.560**</td>
<td>.024</td>
<td>.957</td>
<td></td>
</tr>
<tr>
<td>Shareholder protection</td>
<td>.394</td>
<td>(.131)</td>
<td>-.301</td>
<td>.014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creditor protection</td>
<td>.267</td>
<td>(.318)</td>
<td>(.256)</td>
<td>(.957)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Judicial efficiency</td>
<td>.574**</td>
<td>(.020)</td>
<td>-.750***</td>
<td>.162</td>
<td>.475</td>
<td></td>
</tr>
<tr>
<td>Banking concentration</td>
<td>.225</td>
<td>(.401)</td>
<td>(.064)</td>
<td>(.950)</td>
<td>(.231)</td>
<td>(.270)</td>
</tr>
<tr>
<td>Bank fragility</td>
<td>.390</td>
<td>(.134)</td>
<td>-.064</td>
<td>.069</td>
<td>.520**</td>
<td>.356</td>
</tr>
</tbody>
</table>

B) Regression analysis.
In the first two regression single-bank firms is the dependent variable. In the regressions (3) and (4) the dependent variable is conditional number of banks. Robust standard errors are in parenthesis. * indicates coefficients that are significant at a 10 percent, ** significance at 5 percent, and *** significance at 1 percent level. A constant is included but not reported.

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Single-bank firms</th>
<th>Conditional # of banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shareholder protection</td>
<td>.031*</td>
<td>-1.598***</td>
</tr>
<tr>
<td>Judicial efficiency</td>
<td>.039**</td>
<td>.037**</td>
</tr>
<tr>
<td>Banks fragility</td>
<td>.015</td>
<td>(.016)</td>
</tr>
<tr>
<td>Banking concentration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.423</td>
<td>0.369</td>
</tr>
<tr>
<td>N.obs.</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>
**Table 6 - Description of the variables used in within-country analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of banks</td>
<td>Number of financial institutions providing medium- and long-term financing to a firm in one year. Source: R&amp;S (Mediobanca edited by) 1993-1998.</td>
<td></td>
</tr>
<tr>
<td>Owner income rights</td>
<td>Fraction of income rights owned by the controlling shareholder. Computed on the basis of the ownership structure of the firm and the group to which it belongs. Source: R&amp;S 1993-1998.</td>
<td></td>
</tr>
<tr>
<td>No-trade dummy</td>
<td>Indicator for companies that are not traded. Source: R&amp;S 1993-1998.</td>
<td></td>
</tr>
<tr>
<td>Voting premium</td>
<td>Percentage difference between price of voting and non-voting shares (saving shares) at the end of each year. Source: Sole 24 Ore.</td>
<td></td>
</tr>
<tr>
<td>Fraction voting shares</td>
<td>Fraction of voting shares over the total number of shares outstanding. Source: Indice e Dati (Mediobanca) 1993-1998.</td>
<td></td>
</tr>
</tbody>
</table>
Table 7 - Number of bank relationships and ownership structure

A) Summary statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of banks</td>
<td>560</td>
<td>8.84</td>
<td>7</td>
<td>7.01</td>
<td>0</td>
<td>51</td>
</tr>
<tr>
<td>Owner income rights (%)</td>
<td>560</td>
<td>72.6</td>
<td>99.6</td>
<td>31.5</td>
<td>2.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Sales (Bln Liras)</td>
<td>560</td>
<td>3313.8</td>
<td>1112.3</td>
<td>8887.1</td>
<td>75.6</td>
<td>85666</td>
</tr>
<tr>
<td>No-trade dummy</td>
<td>560</td>
<td>.493</td>
<td>0</td>
<td>.500</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ML-term debt ratio</td>
<td>560</td>
<td>.218</td>
<td>.192</td>
<td>.149</td>
<td>0</td>
<td>.916</td>
</tr>
</tbody>
</table>

B) Regression analysis.
Dependent variable is the number of banks providing medium- and long-term credit to a company. Robust standard errors are in parenthesis. * indicates coefficients that are significant at a 10 percent level, ** significance at 5 percent, and *** significance at 1 percent level. A constant is included but not reported.

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner income rights</td>
<td>.021***</td>
<td>.018**</td>
<td>.022***</td>
<td>.024***</td>
<td>1.56***</td>
</tr>
<tr>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(0.009)</td>
<td>(.565)</td>
<td>(.581)</td>
</tr>
<tr>
<td>No-trade dummy</td>
<td>.0002***</td>
<td>.0002***</td>
<td>.0002***</td>
<td>.0002***</td>
<td>.0003***</td>
</tr>
<tr>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(0.0000)</td>
<td>(.0000)</td>
<td>(.0000)</td>
</tr>
<tr>
<td>Sales</td>
<td>14.2***</td>
<td>14.6***</td>
<td>14.0***</td>
<td>14.8***</td>
<td>15.0***</td>
</tr>
<tr>
<td>(2.11)</td>
<td>(2.51)</td>
<td>(2.14)</td>
<td>(2.07)</td>
<td>(2.49)</td>
<td>(2.09)</td>
</tr>
<tr>
<td>ML-term debt ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed effects</td>
<td>NO</td>
<td>Industry</td>
<td>Year</td>
<td>NO</td>
<td>Industry</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.163</td>
<td>0.190</td>
<td>0.158</td>
<td>0.180</td>
<td>0.203</td>
</tr>
<tr>
<td>N. obs</td>
<td>560</td>
<td>560</td>
<td>560</td>
<td>560</td>
<td>560</td>
</tr>
</tbody>
</table>
**Table 8 - Voting premium and number of bank-relationships**

A) Summary statistics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Dev.</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voting premium (%)</td>
<td>174</td>
<td>49.9</td>
<td>35.3</td>
<td>66.0</td>
<td>-83.7</td>
<td>383.5</td>
</tr>
<tr>
<td>Differential dividend (%)</td>
<td>174</td>
<td>3.3</td>
<td>2.0</td>
<td>3.1</td>
<td>2.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Fraction voting shares</td>
<td>174</td>
<td>.857</td>
<td>.897</td>
<td>.144</td>
<td>.500</td>
<td>.998</td>
</tr>
<tr>
<td>Implied private benefit (%)</td>
<td>174</td>
<td>40.9</td>
<td>32.6</td>
<td>50.6</td>
<td>-63.7</td>
<td>289.4</td>
</tr>
<tr>
<td>Number of banks</td>
<td>174</td>
<td>9.26</td>
<td>8</td>
<td>5.88</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Market cap. (Bln Liras)</td>
<td>174</td>
<td>2003.0</td>
<td>721.3</td>
<td>4647.5</td>
<td>36.3</td>
<td>37141.4</td>
</tr>
<tr>
<td>Sales (Bln Liras)</td>
<td>174</td>
<td>5316.5</td>
<td>1559.9</td>
<td>11461.8</td>
<td>75.6</td>
<td>71033.0</td>
</tr>
<tr>
<td>ML-term debt ratio</td>
<td>174</td>
<td>.168</td>
<td>.144</td>
<td>.108</td>
<td>0</td>
<td>.546</td>
</tr>
</tbody>
</table>

B) Regression analysis.

Dependent variable is the number of banks providing medium- and long-term credit to a company. Robust standard errors are in parenthesis. * indicates coefficients that are significant at a 10 percent level, ** significance at 5 percent, and *** significance at 1 percent level. A constant is included but not reported.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private benefits</td>
<td>2.272***</td>
<td>1.733***</td>
<td>1.772**</td>
</tr>
<tr>
<td></td>
<td>(.723)</td>
<td>(.653)</td>
<td>(.707)</td>
</tr>
<tr>
<td>Market cap.</td>
<td></td>
<td>.0006***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.0001)</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td></td>
<td></td>
<td>.0003***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.0003)</td>
</tr>
<tr>
<td>ML-term debt</td>
<td></td>
<td>1.530</td>
<td>-1.880</td>
</tr>
<tr>
<td>ratio</td>
<td></td>
<td>(3.751)</td>
<td>(3.348)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.038</td>
<td>0.300</td>
<td>0.318</td>
</tr>
<tr>
<td>N. obs.</td>
<td>174</td>
<td>174</td>
<td>174</td>
</tr>
</tbody>
</table>
Figure 1 - Number of banks and legal protection

The source of the average number of bank relationships is Birks (1998). Overall shareholder protection is defined as the sum of shareholder protection (equal to the product of shareholder rights and rule of law divided by 10) and judicial efficiency, where all indexes are taken from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998).