BANKING RELATIONSHIP: EFFECTS ON DEBT TERMS FOR SMALL SPANISH FIRMS

Ginés Hernández-Cánovas[a,*] and Pedro Martínez-Solano[b]

[a] Technical University of Cartagena, Faculty of Business, Dpt. Finance and Accounting, Calle Real 3, 30201 Cartagena (SPAIN), tel: +34 968325761, email: gines.hernandez@upct.es

[b] University of Murcia, Faculty of Economics and Business, Dpt. Management and Finance, Campus Universitario de Espinardo, 30100-Murcia (SPAIN), tel: +34 868 883747, fax:+34 868 887537, email: pmsolano@um.es

[*]Corresponding author

ABSTRACT

This paper analyzes the effect of banking relationships on interest rates and the probability guarantees must be provided in a sample of small and medium-sized enterprises (SMEs). The results indicate that SMEs that work with fewer banks obtain debt at a lower cost. This seems to suggest that concentrated banking relationships reduce the uncertainty of lending to risky firms, which translates into lower interest rates. Reduction in risk could come from greater flexibility in negotiations, increased control over the investment, and mitigation of the free-rider problem. When the relationship is exclusive, which would represent the maximum concentration, a bank can take advantage of its monopoly position and require more guarantees from a firm. SMEs that have longer-term relationships with their bank are more likely to be required to provide guarantees. This result seems to suggest that SMEs involved in longer-term relationships are subject to the information monopoly of the lender.

Keywords: Small and medium-sized enterprises, banking relationships, interest rates, guarantees, asymmetric information.

***Acknowledgements*:** Financial support from *Fundación CajaMurcia* is gratefully acknowledged.

Post-print version

Hernández-Cánovas, G. and Martínez-Solano, P. 2006. Banking relationship: effects on debt terms for small Spanish firms, ***Journal of Small Business Management****, 44(3), 315-333(https://doi.org/10.1111/j.1540-627X.2006.00174.x)*

---

1. Introduction

The literature on financial intermediation customarily debated the advantages of banks in the context of highly asymmetric information; examples are Leland and Pyle (1977), Diamond (1984, 1991), Ramakrishnan and Thakor (1984), Fama (1985), Boyd and Prescott (1986) and Bhattacharya and Thakor (1993). Researches more recently have examined what happens when firms and banks go beyond a simple and anonymous economic transaction and establish relationships. According to Boot (2000), banking relationships entail the supply of financial services to a firm by a bank that invests in obtaining specific information about the firm and evaluates the chance of success of its investment through multiple interactions with the same client over a period of time or in the case of several products.

The advantages and disadvantages of banking relationships have been widely studied. Assuming asymmetric information, one advantage of establishing a link between a borrower and a bank is reduced inefficiencies a priori and a posteriori, the former through added flexibility in the negotiation of a loan (Boot and Thakor, 1994), and the later through supervision of the activities of the firm (Rajan, 1992). Then, if it is assumed that the establishment of a banking relationship reduces inefficiencies, firms whose loans are renewed will be seen as of good reputation (Diamond, 1991). Finally, Yosha (1995) predicts that borrowers with more valuable information will concentrate their relationships through bilateral negotiation with a bank in order to limit the information that must be conveyed to the market.

As for the disadvantages, the establishment of a bond between the company and one bank originates an asymmetric evolution of the information between that bank and the others lenders (Kane and Malkiel, 1965). Greenbaum et al. (1989) affirm that lenders can exploit their advantage to extract monopoly rents from the relationship. According to Sharpe (1990), the possibility of extracting these rents encourages banks to compete with one another and lend funds with little information about the quality of borrowers. If an inefficient allocation of resources reduces the benefits, D'Auria et al. (1999) and Lehmann and Neuberger (2001) argue that bank losses will be paid for by the clients who have maintained their relationships with a bank.

These advantages and disadvantages are reflected in the debt terms that a firm can negotiate with its bank. Our objective is to obtain empirical evidence of the net effect of banking relationships on the debt terms (interest rates and guarantees required) of a sample of Spanish small and medium-sized enterprises (SMEs). We measure the strength of the relationships in terms of the time a firm and a bank have worked together (duration) and the number of lenders the firm borrows from (concentration). In this sense, the banking relationship becomes closer as it is longer or as the firm reduces the number of banks it works with.

Our sample of small and medium-sized enterprises is well suited to our objectives, as such firms are most likely to suffer severe problems of asymmetric information owing to their size and background and the lack of formal credit rating measures for firms. Studies of bank relationships in Spain have focused so far only on large firms, using the bank ownership in the firm and/or whether the company belongs to a bank group as measures of the relationship's strength. See, for example, Berges and Sánchez del Villar (1991), Saá (1991), Hernando and Vallés (1992), Ochoa (1998), Sanchis et al. (1998), Zoido (1998) and García-Marco and Ocaña (1999).

An early contribution to the study of the effect of banking relationships on the debt of SMEs is Petersen and Rajan (1994). They study how connections between the borrower and its bank can affect the cost of credit for a sample of small companies in the United States.[1] A significant result is that companies with debt concentrated in fewer lenders pay lower interest rates. When the variable is the length of a relationship they don't find any effects on cost. Using the same sample, but focusing on credit lines, Berger and Udell (1995) find that companies with longer relationships with their banks pay lower interest rates and are less likely to have to provide collateral.

Angelini et al. (1998) find that small Italian companies with longer and more concentrated relationships are subject to a higher cost of debt. Harhoff and Körting (1998) find that small and medium-sized German companies that work with fewer banks or maintain longer relationships are less likely to have to provide collateral. Machauer and Weber (1998) find contrary results; German SMEs that work with fewer lenders provide

[1] The Petersen and Rajan (1994) data are from the National Survey of Small Business Finance (NSSBF). They come from a survey carried out in 1988 and 1989 under the supervision of the Board of Governors of the Federal Reserve System.

more collateral. In Belgium, Degryse and Van Cayseele (2000) verify added costs and reduced collateral for small borrowers who have long lasting links with their bank.

We find that SMEs that deal with fewer banks can obtain debt at a lower cost. This seems to suggest that concentrating banking relationships reduces the uncertainty of lending to risky firms and that this translates into better interest rates. A reduction in risk could come from added flexibility in bank negotiations, increased control of the investment, and mitigation of the free-rider problem. When the relationship is exclusive, however, which would be the maximum concentration, the bank takes advantage of its monopoly position, and it asks for more guarantees from the firm. The analysis reveals that SMEs that maintain longer-term relationships with their banks are more likely to be required to provide loan guarantees. This result seems to suggest that SMEs involved in longer-term relationships are subject to the information monopoly of the bank.

The rest of the paper is organized as follows. We present the sample of small and medium-sized enterprises and the variables in the next section. The analysis of the effect of banking relationships on interest rates and the probability guarantees must be provided are in the third section. In the fourth section we carry out a deeper analysis on the results obtained in the previous section. Lastly, the main conclusions are discussed in the fifth section.

2. Data and methodology

We start with an initial sample of the 530 non-financial companies that responded to a personal survey directed to the principal manager, and distributed by the Economic Observatory of the SME of the Region of Murcia.[2] We select from these the 322 firms whose accounting information for the years 1999 and 2000 is available in the database SABE.[3] After eliminating cases with errors in the financial statements, missing variables, and incomplete information about banking relationships, the final sample constitutes 184 small and medium-sized enterprises.

[2] This survey, carried out in the first half of 2001, provides the number of years a company has worked with its longest-term bank and the use of guarantees.

[3] We need accounting information for both years in order to obtain average values of some variables. The SABE database is operated by *Informa, S.A.*, and includes information on companies in the Mercantile Register of the Region of Murcia.

Table I presents the mean value of different magnitudes by age of the firm (Panel A) and its size (Panel B). Both panels include the p-values of an analysis of variance (ANOVA) where the variables are continuous, and p-values of a non-parametric Kruskal-Wallis test for independent samples, when they are ordinal. Note that the oldest and the largest companies are required to provide fewer guarantees, while costs are lower only for the larger borrowers. These results indicate that the better-known firms can obtain more favorable terms for their debt. Note also the lower financial leverage of the oldest firms. This could be due to the availability of alternative sources of funds as a firm establishes its reputation.

The relationship variables indicate that older and larger firms work with more lenders and maintain longer relationships. It would seem logical that the complexities deriving from size may encourage larger companies to divide their business across several banks. Also, lenders likely want to maintain their connections with larger firms because these are the more profitable, and they can be overseen more easily. Finally, only the oldest companies have been able to develop longer backgrounds in their relationships with banks.

To analyze the determinants of the debt terms (interest rates and guarantees) obtained by the SMEs in this sample, we express a model as follows:

$$Y_i = \alpha + \sum_{j=1}^{J} \beta_j X_{ij} + \sum_{k=1}^{7} \gamma_k \text{ Industry}_{ik} + \mu_i$$

where X_{ij} stands for the J factors considered for each firm i, Industry_{ik} denotes the K dummy variables that indicate whether the firm is in a particular sector, and μ_i represents the random error. The dependent variables are the ratio of interest expense to total liabilities (*Cost*) in the case of the cost of debt and a dummy variable in the case of the probability of securing the loan.[4]

The binary variable is defined using information from questionnaires distributed by the Economic Observatory of the SME of the Region of Murcia. Managers indicate their degree of agreement with this statement raging from one (completely disagree) to five

[4] Table II describes the variables used, and Table III displays their correlations and descriptive statistics. The interest expense includes neither the exchange difference nor provisions for financial investment.

(completely agree): “Banks grant loans and credit on the basis of personal guarantees”. Following this scale, variable *Guarantees* takes the value of one when the answer is above the median and zero otherwise. This variable enables us to differentiate companies according to the probability that they must provide guarantees.

To examine the effect of banking relationships on interest rates and the guarantees required for a bank loan, we use three variables common in the empirical literature. The first one is *Duration*, which is measured by the natural logarithm of the number of years the firm and the lender have worked together. The banking relationship will be strengthened, the longer the firm and the bank maintain their association.

The connection between the lender and the company can also be defined in terms of the concentration of indebtedness, which we can look at from two perspectives: (1) the choice of one or multiple banks, and (2) the choice of the number of banking relationships. In the first case, this is defined as the *Exclusivity* variable, which takes the value of one if the firm works with one lender and zero otherwise. The *Dispersion* variable equals the natural logarithm of one plus the number of banking relationships that the company maintains. The connection is closer for lower values of Dispersion or when the dummy Exclusivity takes the value of one.

There is both private information supplied to the bank in the relationship and public information that enables the market to evaluate the quality of the firm. According to Berger and Udell (1995), Harhoff and Körting (1998), and Degryse and Van Cayseele (2000), the age of the firm reflects the reputation that is openly transmitted to the market; it plays a different role from the information the bank acquires privately through its relationship with the firm. The variable *Age* is defined as the number of years since the firm was established. Another source of public information about the firm comes from its balance sheets. The financial statements can provide information by which we can assess the risk of a company, such as its size, capacity for generating internal funds, and financial leverage. We use the natural logarithm of net turnover to proxy for the size of the firm (*Size*). Berger et al. (2001) consider that the size of the borrower to be an inverse measure of its information opaqueness, as smaller companies are likely to be in poorer financial condition and have less experience and less public information available to the public. The capacity to generate internal funds is measured by the ratio of cash flow to total assets (*Solvency*), and financial

leverage is proxied by the ratio of total liabilities to total assets (*Indebtedness*). Finally, we define industry dummies that take the value of one when the firm is in an industry and zero otherwise.

3. Effect of the banking relationship on interest rates and guarantees

Analysis of the influence of banking relationships on the cost of debt and the use of guarantees for a sample of small and medium-sized enterprises indicates, first, that the coefficient of the Duration variable is significant and positive in both regressions in Table IV. This indicates that firms that maintain long-lasting relationships with their bank pay higher interest rates and have a higher probability of securing loans. An increment of ten years in the length of the relationship [from 10 years (the 25th percentile) to 20 years (the 75th percentile)] raises the cost by almost 56 basic points (3.73% to 4.29%) and increases the possibility that the bank will require guarantees from 37.84% to 45.9%.

The coefficient of Dispersion is significant in the first regression in Table IV. The positive sign indicates that companies that borrow from fewer banks have cheaper debt. That is, the SMEs that work with 3 lenders (75th percentile) pay an interest rate 120 basic points higher than those that maintain a single relationship (25th percentile). The coefficient of the Exclusivity variable has a positive sign in regression (2). This shows that borrowers that work with a single bank must provide guarantees more often (59.19% against 31.26% of those that work with more than one bank).

Among the public information regressors, the coefficient of the variable Size has a negative sign in column (1) in Table IV. This indicates that larger borrowers can secure loans at a lower rate. Regression (2) indicates that younger, smaller, more indebted, and less solvent firms have higher probabilities of securing loans. These results suggest that banks require more guarantees from companies presumed to be of higher risk because of their relative youth, smaller size, greater indebtedness, and reduced solvency.

Our analysis of the public information variables seems to indicate that banks draw up the terms of a loan contract (cost and guarantees) to adjust for the borrower's risk. The private information variables also may describe the risk of the firm, which can explain why they affect on debt terms. The first step in confirming this association is to analyze whether the nature of the banking relationship differs according to the risk of the company. This

requires examination of the correlation between the private and the public information variables. Table III indicates that the variables Size and Age are positively correlated with Duration and Dispersion, while Indebtedness is negatively correlated with Duration. This indicates that riskier companies have shorter-term banking relationships and work with more lenders. The dummy variable Exclusivity has a negative correlation with the variable Size, which confirms that firms that work with a bank are riskier.

Results of this analysis would show how banking relationships are structured differently depending on the risk of the firm. That is, riskier companies might establish longer and more concentrated relationships. This might explain the effect of the private information variables on debt terms. To control for this effect, the estimations should use groups of firms with more homogeneous risk. We accordingly use the public information to classify the firms in the sample into two groups of risk. The SMEs whose size, age, or solvency are above the sample median and whose financial leverage is below the sample median are considered less risky. Tables V and VI provide the results obtained for each group in the case of interest rates and guarantees. Panel A of each table shows the results of the four estimations for the riskier firms (smaller, 1; younger, 2; more indebted, 3; and less solvent, 4). Panel B provides results calculated for the less risky companies.

The analysis of the cost of debt in Table V shows that the variable Duration becomes insignificant. The coefficient of Dispersion is significant in the four equations of Panel A. Its positive sign indicates that riskier SMEs pay less for their loans if they borrow from fewer lenders. This result seems to suggest that concentrating banking relationships reduces the uncertainty of a loan, and this is translated into lower interest rates. The reduced risk comes from the added flexibility in negotiations, increased control of the investment, and mitigation of the free-rider problem.[5]

Table VI shows results for the use of guarantees. Note that the coefficient of the variable Duration is significant in columns (3) and (4) of Panel A and in column (2) of Panel B. Its positive sign indicates that the probability a firm must provide guarantees increases with the duration of the connection. One explanation is that the lender gains more knowledge about the guarantees that the SME has, which reduces the cost of including

[5] The less banks overlap, the more they will recover in any eventual liquidation of the firm. This fact increases the prospective yield of the bank, which might result in a lower interest rate.

them in a loan contract, making the use of guarantees more frequent. An alternative explanation is that companies stay longer with their lenders because they are financed with debt of longer maturity. As loans with later expiration dates are riskier, this would explain a bank's request for guarantees. Finally, the last explanation relates to the nature of SMEs. A typical management practice is appropriation of firm assets as perquisites. This would diminish the capacity of the firm to secure a loan on the basis of company assets. Consequently, the lender demands more personal guarantees, the longer the relationship, and as it has more private information about the firm and its owners.

The probability of securing a loan is also higher among firms that work with only one bank (see equations (1) and (4) of Panel A and equation (2) of Panel B in Table VI). Degryse and Van Cayseele (2000) similarly indicate that firms that maintain broader relationships have a higher likelihood to provide collateral. They attribute this result to the information monopoly exercised by the lender. Degryse and Van Cayseele (2000) define the broader connections in terms of the financial services that the borrower needs from the bank. In this sense, our variable Exclusivity can describe the scope of the banking relationship since the companies that work with a single lender receive all their financial services from the same one. This would justify the harmful effect of the variable Exclusivity on the personal guarantees requirement. Another possible interpretation is that the firms that maintain an exclusive relationship are smaller and therefore riskier, which justify the necessity of securing the loan[6].

4. Extensions of results

We have found that the use of guarantees is associated with riskier firms. Here it is important to point out the difference between borrower risk and loan risk. According to Berger and Udell (1995), loans granted to the riskier firms need not necessarily be higher risk. The effect of guarantees can reduce the risk of a loan so that these loans can be sometimes less risky than non-guaranteed loans made to companies of lower risk. To test whether secured loans are less risky, Berger and Udell (1995) analyze the cost of debt as a function of the use of guarantees. They interpret a negative relationship as an indication of the lower risk of guaranteed loans. In a similar way, we include in column (1) of Table VII

[6] Note in Table III the existence of a negative correlation between the variable Size and Exclusivity.

the dummy variable Guarantees as an explanatory factor of the interest rate. Its lack of statistical significance does not permit us to confirm any relationship between the use of guarantees and the risk of the loan.

Specification of Equation (1) in Table VII assumes single direction causality from the regressors toward the dependent variable. Elsas and Krahnen (1998) point out that this is not completely correct for certain types of variables, such as the interest rate and the guarantees. According to them, a bank can use both elements to adjust a loan for borrower risk, so the variables become interdependent, and an ordinary least squares estimate is not consistent. One way to solve the problem of simultaneity is to use methods of instrumental variables such as two stages least squares (2SLS) (see Green, 1999). In this case, the problem consists of finding appropriate instruments for the endogenous variable.

To apply 2SLS and to test the robustness of the results, we use three instrumental variables. The first one is obtained from the answers managers provided to this statement [from one (completely disagree) to five (completely agree)]: "Banks grant loans and credit on the basis of analysis of the financial condition of the borrower". [7] We use this scale to define the variable *Accounting*, which is equal to one when the answer is above the median and zero otherwise. Therefore, a value of one indicates that accounting information is taken into account by the bank in granting the credit. It is presumed that the use of accounting data mitigates the asymmetric information problem and enables the bank to reduce the requirement of guarantees.

The second instrument is the variable *Maturity*. This is defined as the ratio of short-term liabilities to total liabilities. Assuming asymmetric information, loans of shorter terms are considered less risky. The third instrumental variable is the ratio of current assets minus short-term liabilities over total assets (*Working Capital*). In principle, more working capital increases the stability of a firm over business cycles and reduces the risk of investments. Banks would be expected to require fewer guarantees from firms with shorter-maturity debt or with more working capital.

The results of the 2SLS estimates are shown in column (2) of Table VII. The coefficient of the variable Guarantees maintains its positive sign, but is still statistically insignificant. For an alternative approach that controls for the presence of

[7] These answers are obtained from the Economic Observatory of the SMEs of the Region of Murcia.

heteroskedasticity, we recalculate this specification using the generalized method of moments (see Green, 1999). This estimation, provided in column (3) of Table VII, does not differ from the previous one.

To test for the severity of the endogeneity problem, we apply a version of the Hausman test proposed by Davidson and MacKinnon (1989; 1993). First, the endogenous variable (Guarantees) must be estimated on all the exogenous variables and instruments, and the residuals are calculated. Then, the cost of debt is estimated including the residuals from the first regression as an explanatory variable. If the variable Guarantees is not endogenous, the coefficient of the residuals in the second regression would not be significantly different from zero. The results of this estimation appear in column (4) of Table VII. Note that the coefficient of the residuals is not statistically significant, which suggests that endogeneity is not a problem. Since the results of the Davidson and MacKinnon test depend on the validity of the instruments, it is not possible to clearly differentiate the OLS or the 2SLS estimates. Nevertheless, the conclusion that either one supports is the same. The use of guarantees does no seem to reduce the risk of the loans.

Another methodological consideration is problems that result from the presence of collinearity in the estimates. According to Damodar (1997), collinearity can arise when the correlation between two variables is higher than 0.8. Analysis of Table III shows that none of the correlations is above that value; the maximum correlation is between the variable Dispersion and Exclusivity (-0.798). To test for the importance of collinearity problems, we carry out the test of Belsley et al. (1980). The result of Belsley test indicates that collinearity is not a problem.

5. Conclusions

We have analyzed the effect of banking relationships on the cost of debt and the use of guarantees for a sample of small and medium-sized enterprises in their indebtedness. While this topic is widely debated in the international literature on financial intermediation, it has been examined very little in Spain. Studies so far have focused mainly on large firms, using as a measurement of the strength of the relationship a banks ownership in the firm and/or whether the company belongs to a bank group. We use instead the duration and

concentration of the banking relationships with the aim of analyzing their influence on the cost of debt and the probability of securing a loan.

Our results indicate that SMEs that work with fewer banks obtain debt at a lower cost. After controlling for the risk of the firm, we find only the riskier firms benefit from reduced interest rates as they borrow from fewer banks. This seems to suggest that concentrating banking relationships reduces the uncertainty of lending to the riskier firms, and this it is translated into lower interest rates. The reduction in risk is presumed to come from greater flexibility in loan negotiation, increased control over the investment, and mitigation of the free-rider problem. When the banking relationship is exclusive, however, which is the case of maximum concentration, the bank takes advantage of its monopoly position, and actually requires more guarantees.

Analysis of the variable Duration reveals that SMEs that maintain longer relationships with their bank have more expensive debt. The relation, however, becomes insignificant when the estimation is carried out controlling for the risk of the firm. The variable Duration does affect the use of guarantees in a significant way, even after controlling for the risk of the company. Overall, the probability of securing a loan increases with the length of the banking relationships. These results seem to suggest that SMEs involved in longer relationships are subject to an information monopoly on the part of the lender.

Less favorable debt terms for companies as their banking relationships become closer are commonly found for many samples of European firms. The research related to North American companies finds a contrary result: reduced interest rates and fewer guarantees required as the banking relationship is strengthened. The answer for the contrary results may lie in the degree of disintermediation of the economies and therefore in companies' access to alternative sources of financing. To put this another way, it could be that most small and medium-sized companies in Spain, Italy, Germany, and Belgium have only bank financing to meet their needs. The bank uses its position as a monopoly lender to increase its profits through the interest rate or guarantees required in the loan contract.

References

Angelini, P., R. di Salvo and G. Ferri (1998). "Availability and cost of credit form small businesses: Customer relationships and credit cooperatives," *Journal of Banking and Finance* 22, 925-954.

Belsley, D., E. Kuh, and R. Welsch (1980). *Regression diagnostics: Identifying influential data and sources of collinearity*. New York: Wiley and Sons.

Berger, A., L. Klapper, and G. Udell (2001). "The ability of banks to lend to informationally opaque small businesses," *Journal of Banking and Finance* 25, 2127-2167.

Berger, A., and G. Udell (1995). "Relationship lending and lines of credit in small firm finance," *Journal of Business* 68(3), 351-381.

Bergés, A., and E. Sánchez del Villar (1991). "Las participaciones bursátiles de la Banca en España," *Papeles de Economía Española, Suplementos sobre el Sistema Financiero* 24, 72-86.

Bhattacharya, S., and A. Thakor (1993). "Contemporary banking theory," *Journal of Financial Intermediation* 3, 2-50.

Boot, A. (2000). "Relationship banking: What do we know?" *Journal of Financial Intermediation* 9, 7-25.

Boot, A., and A. Thakor (1994). "Moral hazard and secured lending in an infinitely repeated credit market game," *International Economic Review* 35(4), 899-920.

Boyd, J., and E. Prescott (1986). "Financial intermediary-coalitions," *Journal of Economic Theory* 38, 211-232.

Damodar, G. (1997). *Econometría.* Santafé de Bogotá: McGraw-Hill.

D'auria, C., A. Foglia, and P. Marullo (1999). "Bank interest rates and credit relationships in Italy," *Journal of Banking and Finance* 23, 1067-1093.

Davidson, R., and J. Mackinnon (1989). "Testing for consistency using artificial regressions," *Econometric Theory* 5, 363-384.

Davidson, R., and J. Mackinnon (1993). *Estimation and inference in econometrics.* Oxford: Oxford University Press.

Degryse, H., and P. Van Cayseele (2000). "Relationship lending within a bank-based system: Evidence from European small business data," *Journal of Financial Intermediation* 9, 90-109.

Diamond, D. (1984). "Financial intermediation and delegated monitoring," *Review of Economic Studies* 51, 393-414.

Diamond, D. (1991). "Monitoring and reputation: The choice between bank loans and directly placed debt," *Journal of Political Economy* 99, 689-721.

Elsas, R., and J. Krahnen (1998). "Is relationship lending special? Evidence from credit-file data in Germany," *Journal of Banking and Finance* 22, 1283-1316.

Fama, E. (1985). "What's different about banks?" *Journal of Monetary Economics* 15, 29-39.

García-Marco, T., and C. Ocaña (1999). "The effect of bank monitoring on the investment behavior of Spanish firms," *Journal of Banking and Finance* 22, 1579-1603.

Green, W. (1999). *Análisis Econométrico*. Madrid: Pearson Educación.

Greenbaum, S., G. Kanatas, and I. Venezia (1989). "Equilibrium loan pricing under the bank-client relationship," *Journal of Banking and Finance* 13, 221-235.

Harhoff, D., and T. Körting (1998). "Lending relationships in Germany – Empirical evidence from survey data," *Journal of Banking and Finance* 22, 1317-1353.

Hernando, I., and J. Vallés (1992). "Inversión y restricciones financieras: Evidencia en las empresas manufactureras españolas," *Moneda y Crédito* 195, 185-222.

Kane, E., and B. Malkiel (1965). "Bank portfolio allocation, deposit variability, and the availability doctrine," *Quarterly Journal of Economics* 79, 113-134.

Lehmann, E., and D. Neuberger (2001). "Do lending relationships matter? Evidence from bank survey data in Germany," *Journal of Economic Behavior and Organization* 45, 339-359.

Leland, H., and D. Pyle (1977). "Informational asymmetries, financial structure, and financial intermediation," *Journal of Finance* 32, 371-387.

Machauer, A., and M. Weber (1998). "Bank behavior based on internal credit ratings of borrowers," *Journal of Banking and Finance* 20, 1355-1383.

Ochoa, J. (1998). "Efectos de la participación bancaria en la propiedad de las empresas no financieras sobre la trayectoria de estas últimas," *Estudios Empresariales* 97, 4-7.

Petersen, M., and R. Rajan (1994). “The benefits of lending relationships: Evidence from small business data,” *Journal of Finance* 49(1), 3-37.

Rajan, R (1992). “Insiders and outsiders: The choice between informed and arm’s-length debt,” *Journal of Finance* 47, 1367-1400.

Ramakrishnan, R., and A. Thakor (1984). “Information reliability and a theory of financial intermediation,” *Review of Economic Studies* 51, 415-432.

Saá, J. (1991). “Los determinantes de las decisiones sobre fuentes de financiación de las empresas Españolas,” *Moneda y Crédito* 193, 147-178.

Sanchis, J., F. Puig, and J. Soriano (1998). “Las relaciones banca-industria en España. Un estudio empírico sobre las participaciones de las entidades de crédito en el capital de las empresas no financieras,” *Perspectivas del sistema financiero* 63-64, 83-102.

Sharpe, S. (1990). “Asymmetric information, bank lending, and implicit contracts: A stylized model of customer relationships,” *Journal of Finance* 55, 1069-1087.

Yosha, O. (1995). “Information disclosure costs and the choice of financing source,” *Journal of Financial Intermediation* 49, 3-20.

Zoido, M. (1998). “Un estudio de las participaciones accionariales de los bancos en las empresas españolas,” *Investigaciones Económicas* 22(3), 427-467.

Table I. Distribution of sample by age and size.

The results in this table are shown by firm age (Panel A) and size (Panel B). In both cases the 33th and 66th percentiles are used to obtain the three classifications. Y*ears of relationship* is the number of years the SME has worked with its bank. *Number of banks* is the number of lenders the firm works with. *Solvency* is the ratio of cash flow over the total assets. *Indebtedness* is the ratio of total liabilities to total assets. *Personal guarantees* is a scale that takes values of between one and five, depending on whether the firm receives loans based on personal guarantees less often (one) or more often (five). *Cost* is the ratio of financial expense to total liabilities. Both panels include the p-value of an ANOVA, when the variables are continuous, and the p-value of the non-parametric test for independent samples of Kruskal-Wallis, when they are ordinal in order to test whether the means are different.

	Years of relationship	Number of banks	Solvency	Indebtedness	Personal guarantees	Cost
Panel A. Distribution of sample by age						
Under 11 years	10.186	2.475	0.078	0.806	2.797	0.042
From 11 to 17 years	16.763	2.186	0.081	0.662	2.712	0.039
Over 17 years	22.864	2.939	0.084	0.607	1.97	0.039
p-value	0	0.046	0.833	0	0.006	0.829
Panel B. Distribution of sample by size						
Under 3300000€	15.259	1.776	0.077	0.675	3	0.049
From 3300000 to 6100000€	16.266	2.266	0.075	0.709	2.562	0.037
Over 6100000€	18.919	3.564	0.091	0.68	1.887	0.035
p-value	0.087	0	0.159	0.589	0	0.019

Table II. Definition of variables.

Variable	Definition
Cost	$\frac{\text{Interest expense}}{\text{Total liabilities}}$
Guarantees	Dummy variable that takes value of one if the firm receives loans and credit on the basis of personal guarantees
Duration	Ln (Number of years the firm and the bank have worked together)
Exclusivity	Dummy that takes value of one if the firm works with one lender and zero otherwise
Dispersion	Ln (1+Number of banking relationships that the company maintains)
Age	Ln (Number of years since the firm was established)
Size	Ln (Net turnover)
Solvency	$\frac{\text{Cash flow}}{\text{Total assets}}$
Indebtedness	$\frac{\text{Total liabilities}}{\text{Total assets}}$
Industry_k	Dummy that takes the value of one if the company is in sector k and zero otherwise
Accounting	Dummy variable that takes value of one if the bank grant loans on the basis of analysis of the financial condition of the firm
Maturity	$\frac{\text{Short - term liabilities}}{\text{Total liabilities}}$
Working Capital	$\frac{\text{Current assets - Short - term liabilities}}{\text{Total assets}}$

Table III. Correlation and descriptive statistics of variables.

Panel A. Correlation

	Cost	Guarantees	Duration	Dispersion	Exclusivity	Size	Age	Indebtedness	Solvency	Accounting	Maturity	Working Capital
Cost												
Guarantees	0.107											
Duration	0.064	-0.074										
Dispersion	0.029	[1]-0.199	0.121									
Exclusivity	-0.006	[1]0.211	-0.093	[1]-0.798								
Size	[1]-0.203	[1]-0.308	[3]0.125	[1]0.507	[1]-0.282							
Age	-0.073	[1]-0.249	[1]0.69	[2]0.16	-0.094	[1]0.299						
Indebtedness	0.029	[1]0.299	[1]-0.3	-0.046	0.074	-0.105	[1]-0.445					
Solvency	0	[1]-0.261	0.033	0.015	-0.072	[2]0.181	0.056	[1]-0.391				
Accounting	-0.105	[3]-0.123	0.072	-0.097	0.041	-0.077	0.022	-0.035	0.073			
Maturity	-0.062	-0.068	-0.016	0.081	-0.101	[3]0.122	0.022	-0.014	-0.049	-0.062		
Working Capital	-0.118	[1]-0.201	[1]0.244	0.062	-0.057	[2]0.163	[1]0.305	[1]-0.603	0.101	0.081	0.019	

Panel B. Descriptive Statistics

	Cost	Guarantees	Duration [a]	Dispersion [b]	Exclusivity	Size [c]	Age [d]	Indebtedness	Solvency	Accounting	Maturity	Working Capital
Mean	0.0403	0.4348	16.84	2.549	0.3478	11.25	15.71	0.6884	0.0811	0.5815	0.8564	0.0896
Standard deviation	0.0294	0.4971	9.451	1.723	0.4776	29.45	8.43	0.1973	0.0526	0.4945	0.1458	0.1896
Minimum	0	0	3	1	0	0.5114	2.5	0.06	-0.05	0	0.1296	-0.3184
Maximum	0.21	1	50	10	1	314	49.1	0.98	0.31	1	1	0.8799
Percentile 25	0.0215	0	10	1	0	2.855	10.25	0.5614	0.0434	0	0.7869	-0.0395
Median	0.0349	0	15	2	0	4.711	14.1	0.728	0.0694	1	0.9016	0.076
Percentile 75	0.0533	1	20	3	1	8.332	20.48	0.8518	0.1101	1	0.9752	0.203
Observations	184	184	184	184	184	184	184	184	184	184	184	184

a. Number of years firm has worked with the oldest bank.
b. Number of lenders the firm works with.
c. Net turnover of the firm (millions of euros).
d. Number of years since firm was started.
[1] Significant at 1%, [2] significant at 5%, and [3] significant at 10%.

Table IV. Effect of banking relationship on debt terms.

This table analyzes the effect of banking relationships on (1) the interest rate charged in the loan, and (2) the guarantees requested. The dependent variables are: (1) the Cost ratio (Interest expense/Total liabilities) and (2) the dummy variable Guarantees. The variables are defined in Table II. Equation (1) is calculated using ordinary least squares. Estimation of the probit regression (2) uses maximum likelihood. All the equations include industry dummies. *Observations* is the number of cases included in each estimation. *Chi*^{2} is the p-value of the test of global significance of the probit estimation. *Pseudo* R^2 measures the quality of the adjustment of the probit model. *F* is the p-value of the test of global significance of the linear estimation. R^2 is the coefficient of determination (measuring the quality of the adjustment in the linear model). *White* is the p-value of a White test whose null hypothesis is the absence of heteroskedasticity. Rejection of this hypothesis indicates robust estimations. Standard errors appear in parentheses.

	Cost OLS (1)	**Guarantees Probit (2)**
Constant	***0.0984	***6.2088
	(0.0351)	(2.1158)
Private Information Variables:		
Duration	*0.0081	*0.4123
	(0.0048)	(0.2504)
Dispersion	*0.0175	0.5334
	(0.0089)	(0.4605)
Exclusivity	0.0085	*0.721
	(0.0072)	(0.3726)
Public Information Variables:		
Size	***-0.0071	***-0.4665
	(0.0024)	(0.1484)
Age	-0.0076	*-0.5349
	(0.0056)	(0.2843)
Indebtedness	0.0139	*1.2223
	(0.0128)	(0.6722)
Solvency	0.0433	*-4.7736
	(0.0427)	(2.4855)
Observations	184	184
Chi^2		0
Pseudo R^2		0.2007
F	0	
R^2	0.1739	
White	0.1305	

*** Significant at 1%, ** significant at 5%, and * significant at 10%.

Table V. Effect of banking relationships on interest rates depending on risk of the firm.

The dependent variable is the Cost ratio (Interest expense/Total liabilities) and the estimations use ordinary least squares. Panel A includes the riskier companies, and Panel B the lower risk companies. The variables are defined in Table II. All equations include industry dummies. *Observations* is the number of cases included in each estimation. *F* is the p-value of the test of global significance. R^2 is the coefficient of determination. *White* is the p-value of a White test whose null hypothesis is the absence of heteroskedasticity. Rejection of this hypothesis indicates robust estimations. Standard errors appear in parentheses.

Sorted by	**Size**	**Age**	**Indebtedness**	**Solvency**
	Cost OLS (1)	**Cost OLS (2)**	**Cost OLS (3)**	**Cost OLS (4)**
Panel A. Riskier firms				
Constant	0.125	*0.1028	*0.126	***0.1826
	(0.1036)	(0.0573)	(0.0721)	(0.0535)
Private Information Variables:				
Duration	0.0156	0.0053	0.0059	0.0045
	(0.0116)	(0.0073)	(0.0066)	(0.0057)
Dispersion	*0.0516	*0.0214	*0.0208	*0.022
	(0.0294)	(0.0128)	(0.011)	(0.0111)
Exclusivity	0.0215	0.0118	0.0097	0.0108
	(0.0149)	(0.0103)	(0.0089)	(0.0094)
Public Information Variables:				
Size	*-0.0128	**-0.008	**-0.0088	***-0.0116
	(0.0075)	(0.0039)	(0.0037)	(0.0038)
Age	-0.0082	-0.0073	-0.0076	-0.0076
	(0.0075)	(0.01)	(0.0066)	(0.0067)
Indebtedness	0.0096	0.0254	0.0163	-0.0017
	(0.0199)	(0.0236)	(0.0424)	(0.0187)
Solvency	0.0502	0.0407	0.0074	0.081
	(0.0631)	(0.0704)	(0.0836)	(0.1481)
Observations	92	92	92	92
F	0.0036	0.0016	0.0009	0.001
R^2	0.2494	0.2675	0.2821	0.2792
White	0.0378	0.8443	0.8771	0.3103
Panel B. Less risky firms				
Constant	-0.0064	0.1363	0.0783	0.0395
	(0.0526)	(0.057)	(0.0499)	(0.0507)
Private Information Variables:				
Duration	0.0027	0.0087	0.0102	0.0111
	(0.0056)	(0.0072)	(0.0075)	(0.0085)
Dispersion	0.0102	0.0163	0.0154	0.021
	(0.0084)	(0.0132)	(0.0153)	(0.0151)
Exclusivity	0.0095	0.0051	0.0091	0.011
	(0.0084)	(0.0108)	(0.0121)	(0.0116)
Public Information Variables:				
Size	0	**-0.0081	*-0.0067	-0.0056
	(0.0031)	(0.0036)	(.0037)	(0.0035)
Age	-0.0028	-0.0147	-0.0063	-0.003
	(0.0062)	(0.0118)	(0.0106)	(0.0104)
Indebtedness	0.021	0.0109	0.0266	0.0317
	(0.0163)	(0.0168)	(0.0228)	(0.0196)
Solvency	0.004	0.0496	0.0458	0.0336
	(0.044)	(0.0597)	(0.0615)	(0.0742)
Observations	92	92	92	92
F	0.0311	0.0372	0.0476	0.0188
R^2	0.1935	0.1884	0.1812	0.2075
White	0.5851	0.2143	0.3264	0.2413

*** Significant at 1%, ** significant at 5%, and * significant at 10%.

Table VI. Effect of banking relationships on probabilities firm is required to provide guarantees depending on risk of the firm.

The dependent variable is the dummy Guarantees and the estimations use maximum likelihood. Panel A includes the riskier companies, and Panel B the lower risk companies. The variables are defined in Table II. All equations include industry dummies. *Observations* is the number of cases included in each estimation. *Chi*^{2} is the p-value of the test of global significance. *Pseudo* R^2 measures the quality of the adjustment. Standard errors appear in parentheses.

Sorted by	**Size**	**Age**	**Indebtedness**	**Solvency**
	Guarantees Probit (1)	**Guarantees Probit (2)**	**Guarantees Probit (3)**	**Guarantees Probit (4)**
Panel A. Riskier firms				
Constant	4.6968	4.1324	2.8987	4.8316
	(0.46879)	(3.0898)	(4.0984)	(2.9623)
Private Information Variables:				
Duration	0.5375	0.1539	*0.6534	*0.64
	(0.3937)	(0.3695)	(0.3875)	(0.3382)
Dispersion	1.1069	0.4226	0.2843	0.4738
	(1.1298)	(0.6391)	(0.6089)	(0.599)
Exclusivity	**1.3413	0.4917	0.573	*0.8727
	(0.6794)	(0.5197)	(0.5048)	(0.5202)
Public Information Variables:				
Size	*-0.6038	*-0.3949	-0.3218	*-0.364
	(0.3311)	(0.2071)	(0.2128)	(0.2109)
Age	-0.0799	-0.2407	*-0.7484	**-0.7569
	(0.4572)	0.4993	(0.3883)	(0.3828)
Indebtedness	***2.4783	**2.493	2.4552	0.5992
	(.9162)	(1.2335)	(2.3672)	(1.0361)
Solvency	-2.6932	-2.2109	-3.0191	-3.9059
	(3.5258)	(3.574)	(4.7805)	(8.0937)
Observations	92	92	92	92
Chi^2	0.0007	0.0244	0.0677	0.0201
Pseudo R^2	0.2291	0.1502	0.1287	0.1544
Panel B. Less risky firms				
Constant	*8.1719	***12.449	**7.4497	***10.4602
	(4.8645)	(4.6351)	(3.0997)	(3.8606)
Private Information Variables:				
Duration	0.117	**0.9364	0.3007	0.1172
	(0.3933)	(0.4401)	(0.3562)	(0.4253)
Dispersion	0.0567	0.9254	0.8198	0.8574
	(0.5946)	(0.7347)	(0.7466)	(0.7792)
Exclusivity	-0.1856	*1.0798	0.9466	0.7448
	(0.6031)	(0.5846)	(0.5936)	(0.5882)
Public Information Variables:				
Size	-0.3438	***-0.8592	**-0.5928	***-0.7212
	(0.2872)	(0.3035)	(0.2367)	(0.2477)
Age	-0.7441	*-1.2146	-0.1783	-0.229
	(0.4644)	(0.6638)	(0.4897)	(0.5206)
Indebtedness	-0.4315	1.0202	0.6381	**2.2101
	(1.195)	(0.8917)	(1.1231)	(1.0321)
Solvency	**-9.8807	*-7.5147	-3.8109	**-13.7472
	(4.6995)	(4.342)	(3.2043)	(5.7467)
Observations	92	92	92	92
Chi^2	0.0038	0.0002	0.0137	0.0001
Pseudo R^2	0.2122	0.2718	0.1786	0.2911

*** Significant at 1%, ** significant at 5%, and * significant at 10%.

Table VII. Effect of guarantees on the cost of debt. An analysis of endogeneity.

The dependent variable is the Cost ratio (Interest expense/Total liabilities). Equations (1) and (4) are calculated using ordinary least squares. Estimation of regression (2) uses two stages least squares. Estimation of equation (3) uses generalized method of moments and the dummy Guarantees is instrumented by the variables Accounting, Maturity, and Working Capital. The variables are defined in Table II. All the equations include industry dummies. *Observations* is the number of cases included in each estimation. *F* is the p-value of the test of global significance. R^2 is the coefficient of determination. *White* is the p-value of a White test whose null hypothesis is the absence of heteroskedasticity. Rejection of this hypothesis indicates robust estimations. Sargan is the p-value of the Sargan test of overidentification. J is the p-value of the J-Hansen test of overidentification, which is robust to the existence of heteroskedasticity. Standard errors appear in parentheses.

	Cost OLS (1)	**Cost 2SLS (2)**	**Cost GMM (3)**	**Cost OLS (4)**
Constant	**0.0878	0.0154	0.0169	***0.0984
	(0.0362)	(0.0717)	(0.0672)	(0.0351)
Guarantees	0.0054	0.0429	0.0394	
	(0.0045)	(0.0307)	(0.0287)	
Residual				0.0044
				(0.0046)
Private Information Variables:				
Duration	0.0073	0.002	0.0006	*0.0081
	(0.0048)	(0.007)	(0.0065)	(0.0048)
Dispersion	*0.0168	0.01222	0.012	0.0175*
	(0.0089)	(0.0108)	(0.01)	(0.0089)
Exclusivity	0.0073	-0.0006	0.0008	0.0085
	(0.0073)	(0.0105)	(0.0107)	(0.0072)
Public Information Variables:				
Size	***-0.0065	-0.0024	-0.0023	***-0.0071
	(0.0025)	(0.0044)	(0.0041)	(0.0024)
Age	-0.0067	.0001	0.0003	-0.0076
	(0.0056)	(.0085)	(0.0076)	(0.0056)
Indebtedness	0.012	-0.0017	0.0018	0.014
	(0.0128)	(0.0184)	(0.0164)	(0.0128)
Solvency	0.0505	0.0998	0.0987	0.0433
	(0.0431)	(0.0635)	(0.0522)	(0.0428)
Observations	184	184	184	184
F	0	0.0002		.0
R^2	0.2211			0.2186
White	0.253			0.2363
J		0.6813		
Hansen			0.7874	

*** Significant at 1%, ** significant at 5%, and * significant at 10%.