



Is bank-debt maturity contingent on the financial system?

Bank-debt
maturity

Paolo Saona

*Business and Economics Department, Saint Louis University – Madrid Campus,
Madrid, Spain, and*

Eleuterio Vallelado

*Financial Economics and Accounting Department, Universidad de Valladolid,
Valladolid, Spain*

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Abstract

Purpose – The purpose of this paper is to determine whether bank debt-maturity decisions are conditioned by growth opportunities, the firms' ownership structure, or the institutional environment.

Design/methodology/approach – The empirical analysis is undertaken using an unbalanced panel data of Chilean and Spanish firms.

Findings – The results indicate that when banks are not allowed to become stockholders, managers use bank debt-maturity as a corporate governance mechanism. When banks can participate in the ownership of the firms that they finance, short-term bank debt can serve as a substitute for a governance mechanism.

Originality/value – The main contribution of this paper is the analysis of how differences in financial development among countries modify financial decisions by firms.

Keywords Ownership structure, Panel data, Banking regulation, Growth opportunities, Agency problems, Bank debt-maturity

Paper type Research paper

Introduction

In the presence of market imperfections, decisions about debt-maturity affect a firm's optimal investment policy. Theory indicates that in the presence of growth opportunities, managers may invest sub-optimally when problems of underinvestment and asset substitution appear (Myers, 1977; Barclay *et al.*, 1995; Morgado and Pindado, 2003; Douglas, 2009). One of the mechanisms to solve these agency problems of debt is the use of short-term bank debt.

Our objective is to determine whether bank debt-maturity decisions are conditioned by the existence of growth opportunities, the firm's ownership structure or the institutional environment in which they operate[1]. Thus, in the same vein as King and Levine (1993), one of our contributions is the analysis of how differences in financial development among countries modify financial decisions by firms. Regulations about banks owning controlling stakes in non-financial firms affect the way those companies use external funds to finance growth opportunities. Those bank-based countries with no restrictions on banks becoming internal shareholders favor financing growth

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opportunities with long-term funds. In contrast, the restriction on banks becoming internal shareholders leads to a more balanced distribution of banks' funds among all firms with growth opportunities. Therefore, bank regulation modifies the allocation of resources and influences which growth opportunities are financed.

The agency problems of debt relating to growth opportunities can be resolved by shortening the debt-maturity or by including lenders as controlling shareholders. Debt should mature prior to the exercise of the growth opportunities, if the investment is to generate value for the firm. Thus, on the one hand, short-term bank debt mitigates problems of underinvestment and asset substitution. On the other, those companies in which banks are internal shareholders do not need to shorten bank debt-maturity to reduce agency problems. Therefore, bank debt-maturity may be conditioned by the characteristics of the financial system (Alcock *et al.*, 2012; Beck and Levine, 2002; La Porta *et al.*, 1997).

To achieve our goal we compared the bank debt-maturity decisions of firms from Chile and Spain. These two countries have a common legal tradition with financial systems dominated by bank intermediaries. There is an important concentration in the banking sectors, and in the ownership structure of their firms. Moreover, the two countries have similar economic stability during the period of analysis in terms of GDP growth, inflation, and interest rates. However, they differ in the way their financial systems have evolved and in their banking regulation. Chilean banking law forbids bank ownership of non-financial firms, whereas in Spain, there are no limitations on bank ownership of non-financial firms.

The main findings of our research indicate that there are differences in the bank debt-maturity decisions between Spanish and Chilean firms seeking to finance their growth opportunities. In Chile, where banks cannot become internal stockholders, managers are forced to use bank debt-maturity to resolve their problems of underinvestment. In Spain, where banks are able to participate in the ownership of the firms, short-term bank debt loses much of its role as a mechanism of governance.

Thus, non-financial firms can be classified into two groups when they need debt to finance their growth opportunities. In one group are those firms with no shareholding ties with a bank; they need to use short-term bank debt to signal the quality of their projects. In the other group are those companies controlled by a financial institution, which avoid short-term debt due to their ownership ties with a bank.

This paper is organized in five sections. After the introduction, the second section describes our empirical hypotheses and a summary of the main theoretical contributions. The third section describes the sample, variables and methodology used in the empirical analysis. Section four presents the main results, and the final section summarizes the main conclusions.

Theory and empirical hypotheses

Underinvestment and asset substitution problems appear when a firm finances its new projects with debt. Underinvestment can be alleviated either by using secured debt, or by shortening the debt-maturity so that refinancing can occur before the investment option expires (Barclay and Smith, 1999; Cuñat, 1999; Johnson, 2003). Asset substitution can be mitigated by issuing preferred debt, or by shortening the debt-maturity (Smith and Warner, 1979). Moreover, Flannery (1986) argues that shortening the debt-maturity mitigates the asset substitution problem, since the value of short-term debt is less sensitive to any changes in the value of the firm's assets, and, hence, it will be less undervalued than long-term debt. In addition, these problems can be addressed by the choice of lender.

Banks are in a better position than arm's-length lenders to reduce managerial discretion because of debt ownership concentration (Denis and Mihov, 2003; Hadlock and James, 2002). However, one of the disadvantages of bank debt is that the lender may ultimately hold excessive control over the firm's decisions – the information monopoly problem (Rajan, 1992). Finally, a firm's financing decisions are affected by the institutional setting. The relevance of bank financing and the maturity choice could be the result of the relative weight that financial markets and intermediaries have in the financial system.

Firms with growth opportunities potentially present greater problems of asymmetric information (Goyal *et al.*, 2002; Myers and Majluf, 1984), greater agency problems between stockholders and lenders (De Andrés *et al.*, 2000), and higher bankruptcy costs (Shleifer and Vishny, 1992; Zou and Adams, 2009). Therefore, firms with growth opportunities should use internal funds for their financing (Hovakimian *et al.*, 2001). However, once their own resources are depleted, firms have to choose the most suitable source of external financing. Bank debt reduces the inefficient liquidation outcome (Zou and Adams, 2009). Short-term bank debt also deals with the undervaluation problem associated with asymmetric information; firms lacking growth opportunities are unable to imitate firms with profitable growth opportunities because of their greater risk of bankruptcy (Akerlof, 1970; Yosha, 1995).

However, the role of debt-maturity should be different when banks are allowed to be stockholders in the firms to which they lend, and to take a controlling stake. In bank-based financial systems banks are firms' main – and, at times, only – source of external financing. Banks usually establish relationships of mutual trust with firms, facilitating the provision of funds to firms with growth opportunities. In this case, the managers do not have to resort to shortening the debt-maturity to avoid underinvestment and asset substitution problems, since the banks can opt to lend money or provide the firm with capital (Demirgüç-Kunt and Maksimovic, 1999).

Based on the arguments above, our first hypothesis is:

- H1.* Firms with profitable growth opportunities will use short-term bank debt in bank-based countries where banks cannot become internal stockholders of the firms.

The problem of asymmetric information seems particularly significant in the case of firms with low cash flows. The problems of inefficient liquidation (liquidity risk), underinvestment, and undervaluation coincide in those firms with growth opportunities and external financing needs. In this scenario, shareholders may prefer to reduce the debt-maturity to overcome the problems generated by the existence of growth opportunities and the need for external funds at the same time. An exception can occur when banks act as internal shareholders because there is no need to increase bankruptcy costs. Consequently, our second hypothesis postulates that:

- H2.* Firms with growth opportunities that do not generate sufficient internal funds, and where the banks cannot become shareholders, will use short-term bank debt to mitigate problems of moral hazard.

The firm's agency problems vary depending on its ownership structure (Hart and Moore, 1995; Jensen and Meckling, 1976). When ownership is concentrated, managers have the incentive to choose the debt-maturity that maximizes the firm's value

(Bharadwaj and Shivdasani, 2003; Denis and Mihov, 2003). Short-term bank debt helps to improve the firm's corporate governance. Internal stockholders can signal the quality of their investment projects by shortening bank debt-maturity. However, when banks can participate in the ownership of firms, managers do not need to use short-term debt.

Therefore, our third hypothesis is:

- H3.* In bank-based financial systems where the banks are forbidden to hold equity in companies, there is a negative relation between ownership concentration and bank debt-maturity. If the bank is simultaneously lender and internal stockholder, the ownership concentration of the firm reduces the agency problems between managers, owners and lenders. The firm does not need to use bank debt-maturity to signal the quality of its growth opportunities.

Sample, variables and methodology

Sample

We tested our hypotheses regarding the relationships between bank debt-maturity, growth opportunities, ownership structure and institutional environment using an unbalanced panel data of quoted firms from Chile and Spain. Both countries share legal systems based on the civil-law regime, show economic stability, and have developed their financial markets in a comparable way. However, whereas Spanish banks can become internal stockholders of non-financial firms, Chilean banks are forbidden such a practice (Bartholdy *et al.*, 1997).

We excluded financial firms, since the nature of their business would distort the results. We also excluded the years in which firms have no debt on the balance sheet, as this situation does not allow us to account for the asymmetric information and agency problems of debt.

Our source of information for Chilean firms was the FECU[2]. Our sample included 148 non-financial firms during the 1991-2001 period, accounting for a total of 1,154 observations. These 148 firms belonged to eight different industries: food, fisheries and agriculture (26); cement and building (ten); real estate properties (seven); transport and telecommunications (12); textile, paper and cellulose (15); utilities and energy (27); services (36); and mining (15).

We had 111 non-financial Spanish firms for the same period, with a total of 823 observations. Our source here was the information published by the Comisión Nacional del Mercado de Valores (National Stock Market Commission). As with the Chilean firms, the Spanish firms were classified according to the industry to which they belong: food, fisheries and agriculture (13); cement and building (22); real estate properties (ten); transport and telecommunications (eight); textile, paper and cellulose (11); utilities and energy (19); services (eight); and mining (20). We consider both samples representative of the Chilean and Spanish corporate sectors.

Variables

As a measure of bank debt-maturity (our dependent variable), we used the ratio of short-term bank debt to total bank debt (SBDBD) (Chen *et al.*, 1999; Demirgüç-Kunt and Maksimovic, 1999). Unfortunately, the available data do not allow another classification for bank debt-maturity. To control for the problem that short-term bank debt is often used to finance working capital, we used the ratio of short-term bank debt minus the variation of working capital to total bank debt as a dependent variable (SBDWBD)[3].

The following are our independent variables. As a measure of ownership concentration we used the percentage of stocks in the hands of the main stockholder (OWN1)[4]. We also used five dummy variables to account for the nature of the main stockholder: a family (FAMFM); an institutional investor – banks in Spain and mutual funds in Chile – (INSINV); a domestic firm (DOMFM); a multinational firm (MULFM); and a governmental entity (PUBFM). We proxied growth opportunities through the ratio of market value to book value (GO) (Cuñat, 1999; Johnson, 1997, 2003); and as a robustness check, we used the market to equity ratio (GO2) (Jara *et al.*, 2012) measured as the market capitalization over the equity capital at book value[5]. We calculated the need for external funds (DEF) to finance a firm's new investment (Shyam-Sunder and Myers, 1999; Sogorb and López, 2005). Shyam-Sunder and Myers (1999) define financing deficit (DEF) as:

$$DEF_{i,t} = DIV_{i,t} + I_{i,t} + \Delta WC_{i,t} + R_{i,t-1} - C_{i,t} = \Delta LTD_{i,t} + \Delta E_{i,t} \quad (1)$$

where $DIV_{i,t}$ is the cash dividend of firm i at time t ; $I_{i,t}$ is the net investment; $\Delta WC_{i,t}$ is the change in working capital; $R_{i,t-1}$ is the current portion of long-term debt at the start of the period; $C_{i,t}$ is the cash flow after interest and taxes; $\Delta LTD_{i,t}$ is the long-term debt issued; and $\Delta E_{i,t}$ is the net equity issued.

We included three interaction variables that relate: the ownership structure of the firm to the existence of growth opportunities ($OWN1 \times GOI$), the growth opportunities to the need for external funds ($GO \times DEFI$), and the growth opportunities when the main shareholder is a bank ($GO \times INSINV$). The variable $OWN1 \times GOI$ takes the value observed in $OWN1$ for all firms with growth opportunities ($GO > 1$), and 0 otherwise. $GO \times DEFI$ takes the value of growth opportunities for all firms with external fund needs ($DEF > 0$), and 0 otherwise; whilst $GO \times INSINV$ takes the value of growth opportunities for those firms where the main shareholder is a bank and 0 otherwise. This variable is not applicable to Chilean firms as bank ownership of non-financial firms is forbidden.

Size, return on assets (ROA), solvency, bankruptcy risk, term structure of interest rates, and growth rate of the GDP were our control variables (Antoniou *et al.*, 2008; Berger *et al.*, 2005; Chen *et al.*, 1999; Ozkan, 2002). We used the logarithmic transformation of firm assets as our measure of firm size (LNTAB). To measure profitability, we calculated the ROA. We measured the bankruptcy risk using two alternative proxies, the Altman's Z-Score (Z) (Altman, 1968) and the distance to bankruptcy (BKRISK)[6] (Laeven and Levine, 2009). Debt-to-equity ratio (TDEB) was our proxy for solvency. The term structure of interest rates (TINT) was estimated according to Vallelado and Saona (2011) as the difference between long- and short-term interest rates, and everything was divided by long-term interest rates; the growth of GDP (GGDP) was estimated as the annual growth rate in GDP. Table I offers a description of how the variables are measured.

Methodology

We performed a descriptive analysis and a variance analysis to identify similarities and dissimilarities in the use of bank debt between Chilean and Spanish firms. In a second stage, we ran a regression analysis applying panel data econometrics. This method was appropriate for our model:

$$Y_{i,t} = \beta_0 + \beta_1 Y_{i,t-1} + \beta_2 OWN1_{i,t} + \beta_3 (OWN1 \times GOI)_{i,t} + \beta_4 GO_{i,t} + \beta_5 (GO \times DEFI)_{i,t} \\ + \beta_6 TDEB_{i,t} + \beta_7 LNTAB_{i,t} + \beta_8 Z_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} TINT_{i,t} + \beta_{11} GGDP_{i,t} \\ + \beta_{12} DUMSEC + \beta_{13} DUMTEMP + \eta_i + \varepsilon_{i,t} \quad (2)$$

Variable name	Variable measure
Bank debt (1)	Bank debt/total assets
Bank debt (2)	Bank debt/total liabilities
Long-term bank debt	Long-term bank debt/bank debt
Bank debt maturity (1)	Short-term bank debt/bank debt
Bank debt maturity (2)	(Short-term bank debt – variation of working capital)/bank debt
Leverage	Total liabilities/equity at book value
Ownership structure	% of shares owned by main shareholder
Nature of main shareholder (1)	Dummy variable which takes value 1 when main shareholder is a family and 0 otherwise
Nature of main shareholder (2)	Dummy variable which takes value 1 when main shareholder is an institutional investor and 0 otherwise
Nature of main shareholder (3)	Dummy variable which takes value 1 when main shareholder is a domestic firm and 0 otherwise
Nature of main shareholder (4)	Dummy variable which takes value 1 when main shareholder is a multinational firm and 0 otherwise
Nature of main shareholder (5)	Dummy variable which takes value 1 when main shareholder is a governmental entity and 0 otherwise
Growth opportunities (1)	(Market capitalization + total liabilities)/total assets
Growth opportunities (2)	(Market capitalization)/total equity capital
Deficit of funds	(Cash dividend + net investment + change in working capital + current portion of long-term debt at the start of the period – cash flow after interest and taxes)/total assets
Company size	Ln(total assets)
Bankruptcy risk (1)	1.2 (working capital/total assets) + 1.4 (retained earnings/total assets) + 3.3 (EBIT/total assets) + 0.6 (equity capital at market value/total liabilities) + 1.0 (sales/total assets)
Bankruptcy risk (2)	Ln(ROA + (total equity capital/total assets)/standard deviation (ROA))
Profitability	EBIT/total assets
Term structure of interest rates	(Long-term interest rates – short-term interest rates)/long-term interest rates
Growth rate of gross domestic product	Growth rate of GDP per year

Table I.
Variables definition

where i stands for 1 to 148 for the sample of Chilean firms and 1 to 111 for the Spanish ones; t ranges from 1991 to 2001 for both samples. The η_i and ε_{it} correspond to the individual effect and the stochastic error term, respectively.

We also included time dummy variables (DUMMTEMP) for each of the years in this study, dummy variables for each of the eight industries (DUMMSEC), and dummy variables according to the nature of the main stockholder.

According to our first hypothesis, a positive value for the coefficient of β_4 for Chilean companies and a negative one for Spanish companies should be expected. The second hypothesis requires a positive value for the addition of coefficients β_4 and β_5 for Chilean companies; in the case of Spanish companies, the relationship should be negative. Finally, we used the estimations of β_2 and β_3 to test our third hypothesis.

Additionally, we run the following model only for Spanish companies:

$$\begin{aligned}
 Y_{i,t} = & \beta_0 + \beta_1 Y_{i,t} + \beta_2 OWN1_{i,t} + \beta_3 (OWN1 \times GOI)_{i,t} + \beta_4 GO_{i,t} + \beta_5 (GO \times DEF)_{i,t} \\
 & + \beta_6 (GO \times INSINV)_{i,t} + \beta_7 TDEB_{i,t} + \beta_8 LNTAB_{i,t} + \beta_9 Z_{i,t} + \beta_{10} ROA_{i,t} \\
 & + \beta_{11} TINT_{i,t} + \beta_{12} GGDP_{i,t} + \beta_{13} DUMSEC + \beta_{14} DUMTEMP + \eta_i + \varepsilon_{i,t}
 \end{aligned} \quad (3)$$

In Equation (3) we included the interaction variable that measures the existence of growth opportunities when the main owner is a bank ($GO \times INSINV$). The rest of the variables were the same as in Equation (2)[7]. Equation (3) enabled us to accept or reject our hypothesis that when banks act as insiders they provide an alternative corporate governance mechanism in place of short-term bank debt to solve the problems of underinvestment and asset substitution.

The main advantage of the panel data methodology is that it allows us to overcome the unobservable and constant heterogeneity of each firm –competitive advantages and strategies, management quality and style, etc. (Himmelberg *et al.*, 1999). Moreover, panel data contains higher informative contents, higher variability, less collinearity between the variables, and higher efficiency. Arellano and Bover (1990) argue that the panel data analysis allows the assessment of the dynamicity of the adjustments and is better in terms of the identification and measurement of those effects that are not observable either with the cross-sectional analysis or the time-series analysis. Nevertheless, we faced the common problem of simultaneity, given that some of the independent variables included in our integrated model – such as growth opportunities, the deficit of funds, ownership, profitability, or the probability of bankruptcy – could be determined simultaneously by the dependent variable.

When the unobserved effect is correlated to independent variables, pooled OLS regression produces estimations that are biased and inconsistent. We can overcome this econometric issue by using either the first differences or the fixed effects (within) estimators (Nickell, 1981). The general approach for estimating models that do not satisfy strict exogeneity is to use a transformation in order to eliminate the unobservable effects and instruments to deal with endogeneity (Wooldridge, 2002). Thus, we used the two-step system estimator (SE) (Blundell and Bond, 1998) with adjusted standard errors for potential heteroskedasticity as proposed by Blundell and Bond (1998). This econometric method considers the unobserved effect of transforming the variables into first differences, and uses the generalized method of moments (GMM) to deal with endogeneity problems. Those differences are reflected in the quality of the instruments involved (Levine *et al.*, 2000). The existence of weak instruments can lead to a poor asymptotic precision in finite samples (Alonso-Borrego and Arellano, 1999; Blundell and Bond, 1998). Therefore, in our model, it is also necessary to use an estimator that lessens this problem, substituting the specification in differences for the original regression in levels such as the SE (Blundell and Bond, 1998). Performing the model in this way, the SE involves two kinds of equations (simultaneous equations) with their own instruments. The first category of equations is in levels, and its instruments are the lagged differences in the dependent and the independent variables. The second category of equations consists of equations in first differences with the levels of the dependent variable and the independent variables as instruments (Bond, 2002; Wooldridge, 2002). For our case, by using the GMM method we were able to build instruments for those variables that were potentially endogenous (ownership structure, growth opportunities, deficit of funds, ownership, profitability, and bankruptcy).

To test the model specifications' validity, we used the Hansen/Sargan test of over-identification of restrictions. The first- and second-order serial correlation contrasts were also included in order to test that the differenced error term did not present second-order serial correlation. The Wald test of joint significance of all the independent variables was computed. In addition, we used the adjustment for small samples proposed by Windmeijer (2005) to avoid any potential downward bias in the estimated asymptotic standard errors.

Results*Descriptive analysis*

Our hypotheses imply that the use of short-term bank debt to alleviate underinvestment and asset substitution problems is contingent on the banking regulations governing banks that hold shares in firms. There are statistically significant differences between Chilean and Spanish firms in the volume of debt, the relative importance of bank debt, and in the mix between short- and long-term bank debt. Spanish firms were, in average terms, more leveraged than those in Chile (91 percent for Spanish firms compared to 45 percent for Chilean ones). Spanish firms presented a higher proportion of bank debt, both relative to assets (17 percent as opposed to 12 percent), and relative to total debt (54 percent compared to 41 percent) (see Table II, panel A). The same findings are observed when the median is considered (see Table II, panel B).

Both countries show a high ownership concentration. This fact is characteristic of civil-law bank-based countries. On average, the firm's main stockholder owns more than 40 percent of the stocks: 44.19 percent in Chilean firms and 40.93 percent in Spanish ones. Such a difference is statistically significant.

We observed that on average the proxy for growth opportunities exceeds 1 in both countries. It was higher in Chile than in Spain (1.34 and 1.23, respectively). Chilean firms presented superior ROA than Spanish firms, and higher Altman Z-Score values. Furthermore, Chilean firms achieve an average surplus of 11 percent in the generation of internal funds over total assets, while Spanish firms obtained only 8 percent, explaining why Spanish firms are more leveraged.

The figures in Table II reveal that in most Chilean firms, the main stockholder is either a domestic firm (46 percent) or a mutual fund (40 percent). These data evidence the pyramidal structure of ownership in Chile (Majluf *et al.*, 1998; Lefort and Walker, 1999-2000; Gallego and Loayza, 2000). In the case of Spain, there is no clear pattern in the nature of the main stockholder.

To gain a deeper insight into the descriptive analysis, we divided each of the firm samples, Chile and Spain, using the ratios long-term bank debt to bank debt (LBDBD) and SBDBD. Each sample was divided into three subsamples that contain, respectively: firms with low levels of long-term/short-term bank debt (N-tile 1); firms with medium levels of long-term/short-term bank debt (N-tile 2); and firms with high levels of long-term/short-term bank debt (N-tile 3). To reinforce the results of our variance we just compared the average values of the subsamples with low and high levels of long-term/short-term bank debt for each country (N-tiles 1 and 3) in Table II.

Chilean firms with less short-term bank debt use less bank debt overall, have a higher proportion of long-term bank debt, fewer growth opportunities, and a reduced capacity to generate funds internally, than firms that use a higher proportion of short-term bank debt. In contrast, the Chilean firms that use the most long-term bank debt are more highly leveraged, have a greater proportion of bank debt, fewer growth opportunities, less capacity to generate funds internally, are larger, and less profitable than those that use less long-term bank debt (Table II).

Spanish firms with a lower proportion of short-term bank debt use more bank debt as a whole, have a higher proportion of long-term bank debt, more growth opportunities, generate less funds internally, are larger and more profitable than firms that use more short-term bank debt (Table II). The results of the variance analysis indicate that the Chilean firms that use more short-term and less long-term bank debt present the best growth opportunities. However, among Spanish firms, it is those that least use short-term bank debt that present the best growth opportunities. This finding

Variable name	Chile						Spain							
	N-riles 1 and 3 by long-term bank debt			N-riles 1 and 3 by short-term bank debt			N-riles 1 and 3 by long-term bank debt			N-riles 1 and 3 by short-term bank debt				
	Sig. bilateral	Mean diff.	Sig. bilateral	Mean diff.	Sig. bilateral	Mean diff.	Sig. bilateral	Mean diff.	Sig. bilateral	Mean diff.	Sig. bilateral	Mean diff.		
<i>Panel A: mean difference test</i>														
Bank debt over total assets	0.000	0.116	0.052	0.000	0.024	0.178	0.090	0.090	0.086	0.211	0.000	0.174	0.120	0.054
Bank debt over total debt	0.000	0.544	0.406	0.138	0.000	0.165	0.286	0.286	0.363	0.654	-0.290	0.064	0.530	0.473
Long-term bank debt	0.001	0.414	0.361	0.053	0.000	0.000	0.825	0.000	0.470	0.036	0.433	0.000	0.704	0.051
Bank debt maturity	0.009	0.520	0.474	0.046	0.000	0.589	0.175	0.000	0.036	0.964	-0.928	0.000	0.069	0.949
Leverage	0.000	0.913	0.450	0.463	0.000	0.313	0.554	0.000	0.408	0.431	-0.023	0.050	0.985	0.717
Ownership structure	0.005	0.409	0.442	-0.033	0.135	0.419	0.445	-0.026	0.321	43.365	45.233	-1.868	0.031	38.739
Growth opportunities (1)	0.027	1.229	1.338	-0.110	0.016	1.433	1.260	0.172	0.000	1.294	1.549	-0.315	0.139	1.378
Growth opportunities (2)	0.012	0.957	1.044	-0.087	0.021	1.090	0.950	0.140	0.007	1.017	0.962	0.055	0.000	1.077
Deficit of funds	0.000	-0.080	-0.113	0.032	0.000	-0.131	-0.077	-0.054	0.038	-0.104	-0.133	0.030	0.011	-0.094
Company size	0.000	10.664	11.238	-0.573	0.000	11.008	11.607	-0.599	0.637	11.271	11.215	0.056	0.000	10.138
Bankruptcy risk (1)	0.000	2.866	7.532	-4.665	0.000	13.240	3.557	9.683	0.071	10.386	8.558	1.828	0.000	4.682
Bankruptcy risk (2)	0.005	0.053	0.040	0.013	0.000	0.081	0.010	0.071	0.000	0.072	0.020	0.052	0.000	0.044
Return on assets	0.000	0.024	0.087	-0.062	0.000	0.114	0.072	0.041	0.154	0.098	0.088	0.010	0.691	0.035
Term structure of interest rates	0.000	0.107	0.180	-0.073	0.000	0.142	0.175	-0.033	0.000	0.070	0.088	-0.018	0.000	0.140
Growth of GDP	0.040	0.071	0.075	-0.004	0.000	0.062	0.070	-0.008	0.000	0.079	0.081	-0.002	0.120	0.062
Nature of main shareholder family firm	0.000	0.280	0.058	0.202	0.764	0.065	0.070	-0.005	0.019	0.086	0.044	0.042	0.022	0.255
Nature of main shareholder instit. investor	0.000	0.179	0.399	-0.220	0.128	0.407	0.356	0.051	0.049	0.352	0.421	-0.069	0.391	0.212
Nature of main shareholder domestic firm	0.000	0.255	0.458	-0.203	0.036	0.426	0.499	-0.072	0.234	0.471	0.429	0.043	0.384	0.248
Nature of main shareholder multinational firm	0.000	0.188	0.062	0.127	0.006	0.078	0.034	0.044	0.002	0.042	0.099	-0.057	0.014	0.245
Nature of main shareholder governmental entity	0.000	0.118	0.023	0.094	0.143	0.024	0.042	-0.018	0.001	0.049	0.008	0.042	0.000	0.040
<i>Panel B: median difference test</i>														
Bank debt	0.000	0.172	0.122	0.050	0.000	0.120	0.189	-0.069	0.028	0.132	0.087	0.045	0.000	0.141
Bank debt	0.000	0.567	0.341	0.226	0.000	0.135	0.477	-0.342	0.000	0.180	0.440	-0.260	0.000	0.187
Long-term Bank debt	0.000	0.421	0.325	0.096	0.000	0.000	0.768	-0.768	0.000	0.561	0.049	0.512	0.000	0.034
Bank debt maturity	0.000	0.542	0.440	0.102	0.000	0.624	0.199	0.425	0.000	0.055	0.894	-0.749	0.000	0.608

(continued)

Table II. Tests of mean differences and medians differences among the variables for Chilean and Spanish samples

	Chile			Spain																
	Combined sample	N-tiles 1 and 3 by long-term bank debt	N-tiles 1 and 3 by short-term bank debt	N-tiles 1 and 3 by long-term bank debt	N-tiles 1 and 3 by short-term bank debt	N-tiles 1 and 3 by short-term bank debt														
Solvency	0.000	0.880	0.559	0.301	0.455	-0.154	0.000	0.928	0.530	0.398	0.067	0.854	0.618	0.236						
Ownership structure	0.047	0.357	0.385	-0.028	0.064	0.388	0.417	-0.029	0.158	0.390	0.416	-0.026	0.004	0.347	0.077	0.088	0.418	0.372	0.046	
Growth opportunities	0.078	1.950	1.605	0.345	0.022	1.680	1.070	0.610	0.095	1.507	1.150	0.357	0.015	1.620	0.365	0.156	1.770	1.120	0.650	
Growth opportunities	0.000	1.320	0.860	0.460	0.034	1.110	0.925	0.185	0.082	1.400	1.111	0.289	0.084	0.904	0.044	0.092	1.180	1.471	-0.291	
Deficit of funds	0.000	-0.065	-0.140	0.075	0.000	-0.178	-0.096	-0.082	0.000	-0.167	-0.088	-0.069	0.070	-0.140	-0.081	0.177	-0.088	-0.140	0.052	
Company size	0.000	9.580	14.841	-5.281	0.000	10.080	12.770	-2.690	0.210	12.040	11.860	0.180	0.280	11.730	10.080	1.650	0.013	13.580	11.630	1.950
Bankruptcy risk	0.000	4.220	8.950	-4.730	0.000	6.890	7.880	-0.990	0.000	18.400	6.520	11.880	0.000	8.500	3.940	4.560	0.000	6.540	4.085	2.455
Bankruptcy risk	0.008	0.049	0.038	0.011	0.000	0.110	0.042	0.068	0.045	0.080	0.044	0.036	0.000	0.084	0.042	0.042	0.091	0.097	0.031	0.066
Return on assets	0.000	0.030	0.067	-0.037	0.040	0.071	0.062	0.008	0.127	0.065	0.071	-0.006	0.280	0.029	0.030	-0.001	0.272	0.048	0.031	0.017
Term structure of interest rates	0.003	0.095	0.170	-0.075	0.000	0.150	0.185	-0.035	0.000	0.120	0.057	0.063	0.348	0.155	0.148	0.007	0.000	0.128	0.085	0.043
Growth rate of gross domestic product	0.065	0.069	0.078	-0.009	0.125	0.071	0.072	-0.001	0.071	0.076	0.086	-0.010	0.899	0.060	0.061	-0.001	0.066	0.043	0.077	-0.035
	1,977				769								548							

Notes: Panel A (panel B) of this table shows the mean (median) differences test performed first by comparing the mean (median) differences for the combined sample categorized by country. Then, a similar analysis is performed with the samples of Chilean and Spanish firms categorized by both, first, long-term bank debt to total bank debt considering superior and inferior thirds (N-tiles 1 and 3, respectively); and then by short-term bank debt to total bank debt considering the superior and inferior thirds. The null hypothesis in panel A (panel B) is that equal means (medians) exists among the variables for each category. Particularly, for the median difference contrast, we used the Wilcoxon-Mann-Whitney test, under the assumption that the variables are not normally distributed. All variables are defined in Table I

is important evidence of the different role that bank debt-maturity plays in Spain and Chile in the financing of growth opportunities.

Banking regulation about controlling stakes in non-financial firms influences the way non-financial firms use external funds to finance growth opportunities. Those companies internally controlled by a bank suffer less financial constraints and liquidity risk than those companies with no ownership ties with a bank.

Table III describes the correlation coefficients among the variables included in the empirical analysis. For the sample as a whole, short-term bank debt is negatively correlated with the ownership structure, the deficit of funds, the term structure of interest rates, and the growth rate of the GDP. Growth opportunities, company size, and the two proxies of bankruptcy risk are positively correlated with the proportion of short-term bank debt (see Table III).

Regression analysis

We ran a regression analysis for each country[8]. Tables IV and V show the results corresponding to the hypotheses that relate growth opportunities and ownership structure to bank debt-maturity in each institutional environment. The Wald tests to determine the significance of both the model and the dummies are statistically significant[9]. The Hansen/Sargan test allows us to accept the null hypothesis that the model is correctly identified.

When the financial system is bank-based, the relationship between bank-debt maturity and growth opportunities depends on the role that banks play within the system. If banks are simultaneously internal stockholders and lenders, bank-debt maturity loses its value as a signal of the quality of the growth opportunities and its power to discipline the managers. Instead, banks can control firm management through their stockholdings.

Our results revealed differences between the behavior of Chilean and Spanish firms[10]. Chilean firms showed a negative relation between a firm's growth opportunities and bank debt-maturity; the relation is even stronger when the firm needs external funds. Chilean firms that need external funds to finance their growth opportunities use short-term bank debt. In contrast, in the Spanish firms, we observed a positive relation between the existence of growth opportunities and bank debt-maturity. All those companies controlled by a financial institution use bank funds to finance their growth opportunities with longer maturities. This result (Table IV) confirms the exploratory results of the variance analysis and supports our *H1* and *H2*.

In Spain, banks' ability to become internal stockholders makes it unnecessary for firms under bank control to use bank debt-maturity to reduce their underinvestment problems. However, in Chile, where banks cannot become internal stockholders, managers use bank debt-maturity to resolve their underinvestment problems. Chilean firms use short-term bank debt as a sign that they have profitable growth opportunities. In these firms, the greater the agency problems caused by the growth opportunities and the need for external finance ($GO + GO \times DEFI$), the greater the recourse to short-term bank debt as a corporate governance mechanism. In contrast, the managers of Spanish firms under the control of a bank do not need to issue short-term bank debt to solve this type of agency problem. Spanish firms can use their greater ownership concentration and the participation of the lending banks in their equity as alternative governance mechanisms. Therefore, it appears that the institutional environment of each country does affect firms' willingness to finance their growth opportunities with bank debt.

Table III.
Correlation matrix

Variables	Bank debt (1)	Bank debt (2)	Long-term bank debt	Bank debt maturity (1)	Bank debt maturity (2)	Leverage	Ownership structure	Growth opportunities (1)	Growth opportunities (2)	Deficit of funds	Company size	Bankruptcy risk (1)	Bankruptcy risk (2)	Profitability	Term structure of interest rates
Bank debt (2)	0.728 (0.000)	1.000													
Long-term bank debt	0.511 (0.000)	0.605 (0.000)	1.000												
Bank debt maturity (1)	0.051 (0.006)	0.178 (0.000)	-0.343 (0.000)	1.000											
Bank debt maturity (2)	0.391 (0.000)	0.663 (0.000)	-0.079 (0.000)	0.618 (0.000)	1.000										
Leverage	0.346 (0.000)	0.087 (0.000)	0.180 (0.000)	-0.029 (0.126)	-0.006 (0.747)	1.000									
Ownership structure	0.082 (0.000)	0.008 (0.058)	0.037 (0.052)	-0.035 (0.067)	-0.070 (0.084)	0.100 (0.000)	1.000								
Growth opportunities (1)	0.086 (0.000)	0.009 (0.648)	-0.008 (0.685)	0.153 (0.000)	0.044 (0.019)	0.038 (0.042)	-0.031 (0.103)	1.000							
Growth opportunities (2)	0.020 (0.281)	0.027 (0.146)	0.022 (0.247)	0.026 (0.064)	0.020 (0.099)	0.010 (0.585)	-0.039 (0.036)	0.029 (0.123)	1.000						
Deficit of funds	0.024 (0.198)	0.026 (0.168)	-0.017 (0.368)	-0.009 (0.094)	-0.035 (0.064)	0.010 (0.610)	0.041 (0.028)	-0.044 (0.020)	0.002 (0.915)	1.000					
Company size	-0.026 (0.169)	0.012 (0.527)	0.082 (0.000)	0.106 (0.000)	0.043 (0.023)	-0.039 (0.038)	0.014 (0.474)	0.077 (0.000)	-0.007 (0.706)	-0.162 (0.000)	1.000				
Bankruptcy risk (1)	0.249 (0.000)	0.226 (0.000)	-0.188 (0.000)	0.104 (0.463)	0.138 (0.000)	-0.127 (0.000)	-0.160 (0.000)	0.227 (0.000)	-0.018 (0.335)	-0.028 (0.143)	0.023 (0.230)	1.000			
Bankruptcy risk (2)	0.023 (0.222)	0.031 (0.105)	-0.024 (0.196)	0.027 (0.147)	0.022 (0.249)	-0.012 (0.535)	0.035 (0.060)	-0.029 (0.124)	0.092 (0.000)	0.002 (0.932)	0.007 (0.717)	-0.002 (0.929)	1.000		
Profitability	-0.187 (0.000)	-0.083 (0.000)	-0.025 (0.191)	0.039 (0.041)	-0.063 (0.001)	-0.089 (0.000)	-0.136 (0.000)	0.114 (0.000)	0.015 (0.438)	-0.054 (0.004)	0.143 (0.000)	0.278 (0.000)	0.057 (0.002)	1.000	
Term structure of interest rates	-0.091 (0.000)	0.021 (0.262)	0.024 (0.210)	-0.110 (0.000)	-0.017 (0.362)	-0.044 (0.021)	-0.113 (0.000)	-0.025 (0.189)	0.040 (0.035)	0.001 (0.979)	0.033 (0.086)	0.055 (0.004)	0.000 (0.997)	-0.002 (0.911)	1.000
Growth rate of gross domestic product	-0.015 (0.015)	-0.056 (0.003)	-0.003 (0.065)	-0.074 (0.064)	-0.007 (0.000)	-0.007 (0.721)	-0.114 (0.000)	0.080 (0.000)	-0.011 (0.576)	-0.164 (0.000)	0.518 (0.000)	-0.037 (0.052)	-0.010 (0.602)	0.027 (0.151)	-0.100 (0.000)

Notes: This table shows the correlation among the variables. All variables are defined in Table I. Numbers in parenthesis are the statistical significance

	Chile	Spain	Chile	Spain
Intercept	0.2720*** (0.0000)	-0.6220* (0.0501)	0.2810*** (0.0000)	-0.7730*** (0.0790)
One-period lagged dependent variable	0.7550*** (0.0000)	0.6620*** (0.0000)	0.7785*** (0.0000)	0.6044*** (0.0000)
Ownership structure	0.0007*** (0.0000)	-0.0038*** (0.0060)	0.0045** (0.0422)	-0.0090*** (0.0018)
Own. struct. interacted with growth opportunities	-0.0050*** (0.0000)	0.0013** (0.0300)	-0.0095** (0.0240)	0.006* (0.0866)
Own. struct. + own. struct. interacted with growth opportunities	-0.0043*** (0.0000)	-0.0025*** (0.0056)	-0.0050* (0.0690)	-0.0030** (0.0463)
Growth opportunities	0.0067*** (0.0000)	-0.0280* (0.0852)	0.0346* (0.0800)	-0.0329 (0.4090)
Grow. opp. interacted with deficit of funds	0.0412** (0.0440)	-0.0529* (0.0520)	0.0208* (0.0850)	-0.054*** (0.0057)
Grow. opp. + grow. opp. interacted with deficit of funds	0.0479*** (0.0000)	-0.0809*** (0.0000)	0.0554** (0.0350)	-0.0869* (0.0682)
Firm leverage	0.2066*** (0.0000)	0.0035 (0.6100)	0.1508** (0.0200)	-0.0111 (0.2688)
Firm size	-0.0905 (0.1205)	0.2440*** (0.0000)	0.0030** (0.0229)	0.1512*** (0.0000)
Bankruptcy risk	0.0046*** (0.0060)	0.0049 (0.2200)	0.0058** (0.0207)	0.0157*** (0.0003)
Profitability	0.2088*** (0.0000)	-0.3255** (0.0440)	-0.0630*** (0.0000)	-0.9705 (0.6500)
Term structure of interest rates	0.0055* (0.0970)	0.0081* (0.0668)	0.0400 (0.2440)	0.0166 (0.1407)
Growth rate of gross domestic product	-0.0448** (0.0192)	-0.0202* (0.0883)	-0.0445** (0.0150)	-0.0388* (0.0512)
Nature of main shareholder (dummy variables)	Yes	Yes	Yes	Yes
Dummy time variables	Yes	Yes	Yes	Yes
Dummy industrial sector variables	Yes	Yes	Yes	Yes

(continued)

Table IV.
Determinants of bank debt maturity for samples of Chilean and Spanish firms

Table IV.

	Chile	Spain	Chile	Spain
Test for first-order serial correlation	-14.1530*** (0.0000)	-14.2250*** (0.0000)	-12.4090*** (0.0000)	-12.5000*** (0.0000)
Test for second-order serial correlation	-8.5320 (0.4260)	-5.2780 (0.1800)	-6.4570 (0.8500)	-7.9870 (0.9100)
Hansen/Sargan test	112.8400 (0.1380)	66.2440 (0.6810)	118.2540 (0.8600)	69.5580 (0.1348)
Wald test	10,124.7*** (0.000)	1,907.84*** (0.000)	8,138.53*** (0.000)	5,038.07*** (0.000)
Observations	1,154	823	1,154	823

Notes: This table shows the regression results for the samples by country. For the first two regressions the dependent variable is short-term bank debt to bank debt, whilst for the second two regressions the dependent variable is short-term bank debt minus the variation in working capital to bank debt. All variables are defined in Table I. The regressions also include the coefficients for the interacted variables such as the interaction between the ownership concentration and growth opportunities; and the interaction between the fund deficit for financing the firm's portfolio of projects and growth opportunities. Non-linear restriction test was estimated for the joint significance of the interacted variables. The ownership structure, growth opportunities, deficit of funds, profitability and bankruptcy have been considered as endogenous variables and have been instrumented by the generalized method of moments using the two-step system estimator which considers both the equations in first-difference and in levels. First- and second-order serial correlation contrasts have been tested. The Sargan and Hansen contrasts represent the test of over-identifying restrictions, asymptotically distributed as a χ^2 . In all cases, the Wald test reveals that the models are statistically significant. Numbers in parentheses are z-statistics and ***, **, *, statistical significance at 1, 5, and 10 percent levels, respectively

	(1)	(2)
Intercept	-0.9880*** (0.0000)	-0.8008*** (0.0000)
One-period lagged dependent variable	0.8160*** (0.0020)	0.7580*** (0.0000)
Ownership structure	-0.0040*** (0.0000)	-0.0877 (0.1150)
Own. struct. interacted with growth opportunities	0.0025 (0.2790)	-0.0047 (0.1454)
Own. struct. + own. struct. interacted with growth opportunities	-0.0015*** (0.0020)	-0.0924*** (0.0000)
Growth opportunities	-0.0770 (0.5210)	-0.0545 (0.4040)
Grow. opp. interacted with deficit of funds	-0.0655*** (0.0000)	-0.0710*** (0.0000)
Grow. opp. + grow. opp. interacted with deficit of funds	-0.1425*** (0.0000)	-0.1255*** (0.0000)
Grow. opp. interacted with dummy variable for institutional investor	0.0160 (0.1800)	-0.0430*** (0.0004)
Firm leverage	0.0846 (0.1090)	-0.0533 (0.7050)
Firm size	0.4550*** (0.0060)	0.1890*** (0.0000)
Bankruptcy risk	0.0770 (0.2318)	0.0651*** (0.0000)
Profitability	-0.4780* (0.0880)	-0.2890*** (0.0044)
Term structure of interest rates	0.0145** (0.0440)	0.1900 (0.1330)
Growth rate of gross domestic product	-0.0680*** (0.0000)	-0.11547*** (0.0000)
Nature of main shareholder (dummy variables)	Yes	Yes

(continued)

Table V.
Determinants of bank debt maturity for Spanish non-financial firms when the main shareholder is a bank

Table V.

	(1)	(2)
Dummy time variables	Yes	Yes
Dummy industrial sector variables	Yes	Yes
Test for first-order serial correlation	-6.4100*** (0.0000)	-6.0800*** (0.0000)
Test for second-order serial correlation	-3.1590 (0.6840)	-0.3020 (0.7500)
Hansen/Sargan test	120.1800 (0.4860)	177.3880 (0.2670)
Wald test	6,972.35*** (0.000)	4,419.94*** (0.000)
Observations	823	823

Notes: This table shows the regression results for the samples of Spanish firms. In the first regression (1), the dependent variable is short-term bank debt to bank debt, whilst for the second regression (2) the dependent variable is short-term bank debt minus the variation in working capital to bank debt. All variables are defined in Table I. The regressions also include the coefficients for the interacted variables such as the interaction between the ownership concentration and growth opportunities; the interaction between the fund deficit for financing the firm's portfolio of projects and growth opportunities; and the interaction of growth opportunities with the dummy variable when the main shareholder is an institutional investor. Non-linear restriction test was estimated for the joint significance of the interacted variables. The ownership structure, growth opportunities, deficit of funds, profitability and bankruptcy have been considered as endogenous variables and have been instrumented by the generalized method of moments using the two-step system estimator which considers both the equations in first-difference and in levels. First- and second-order serial correlation contrasts have been tested. The Sargan and Hansen contrasts represent the test of over-identifying restrictions, asymptotically distributed as a χ^2 . In all cases, the Wald test reveals that the models are statistically significant. Numbers in parentheses are z-statistics and ***, **, * statistical significance at 1, 5, and 10 percent levels, respectively

According to previous research, between 1990 and 1999, the Chilean financial system underwent various structural modifications where firms with good ratings were allowed to issue ADRs and to hold external financial assets in their portfolios (Gallego and Loayza, 2000). Consequently, the freedom of capital movements in Chile during the 1990s, along with the banking regulation that forbids Chilean banks to own shares in non-financial firms, help to explain our results.

We observed that, as the ownership concentration of Chilean firms increases, they use more short-term bank debt (Table IV). This result is dissimilar to that obtained for Spanish firms and confirms our third hypothesis; the differences we observe are a consequence of the different bank regulations, specifically regarding ownership of non-financial firms by banks.

Table V shows the results when we introduce the interacted variable $GO \times INSINV$ to consider the presence of banks as main shareholders of non-financial firms. If the bank can simultaneously act as lender and internal stockholder (as in Spanish firms), we observe that firms with growth opportunities reduce their use of short-term bank debt. Bank ownership and short-term bank debt become an alternative governance mechanism to mitigate the agency problems.

Robustness checks

Additionally, we reran the regressions for Tables IV and V but this time with the alternative proxy for growth opportunities measured as the firm's market capitalization over the equity capital. The findings are both robust and consistent to this alternative measure. In the same vein, no matter which variable for bank debt-maturity was used (SBDBD or SBDWBD), the results were also consistent. For instance, the robustness checks reveal that the public Chilean firms with growth opportunities use short-term bank debt as a corporate governance mechanism, whilst Spanish firms use less short-term bank debt. Additionally, we observed that whenever firms in Chile account with a funds deficit, as well as future growth opportunities, the bank debt maturity decreases in order to mitigate the moral hazard problems. This finding is the opposite for the sample of Spanish firms. We also observe that when banks are forbidden to hold equity stakes in companies, there is a negative relationship between ownership concentration and bank debt maturity. All these findings support our research hypotheses (see Table VI). For the particular case of Spanish firms where banks can hold equity stakes in those firms financed by the bank, we observed that when the company has growth opportunities and a concentrated ownership structure, the short-term bank debt decreases. The same relationship is observed when the firm presents growth opportunities and the financing bank is already a shareholder. In other words, the findings are consistent in supporting the idea that when the bank is a shareholder, it can exercise tight control over the firm through its voting rights; and therefore, the firm can substitute the short-term bank debt for debt with longer maturities (see Table VII).

Conclusions

We focussed our efforts on testing whether firms' bank debt-maturity decisions are related to the existence of growth opportunities, the ownership structure, or the characteristics of the legal and institutional environment where firms operate. In particular, we analyzed to what extent the participation of banks as internal stockholders of non-financial firms modifies the role of bank debt-maturity in solving asymmetric information and agency problems.

Table VI.
Determinants of bank debt
maturity for samples of
Chilean and Spanish firms

	Chile	Spain	Chile	Spain
Intercept	0.3090*** (0.0000)	0.4080*** (0.0066)	0.1850*** (0.0000)	0.4533*** (0.0047)
One-period lagged dependent variable	0.8070*** (0.0000)	0.7010** (0.0106)	0.8230*** (0.0000)	0.7440*** (0.0000)
Ownership structure	0.0019*** (0.0030)	-0.0082* (0.0780)	0.0010* (0.0330)	-0.0135* (0.0650)
Own. struct. interacted with growth opportunities	-0.0170** (0.0250)	0.0004** (0.0309)	-0.0037* (0.0833)	0.0032* (0.0880)
Own. struct + own. struct. interacted with growth opportunities	-0.0151* (0.0740)	-0.0078*** (0.0001)	-0.0027** (0.0405)	-0.0103*** (0.0090)
Growth opportunities	0.0388* (0.0633)	-0.0203*** (0.0066)	0.0415** (0.0350)	-0.0740 (0.2207)
Grow. opp. interacted with deficit of funds	0.0209** (0.0160)	-0.097** (0.0471)	0.0309 (0.6620)	-0.455* (0.0708)
Grow. opp. + grow. opp. interacted with deficit of funds	0.0597*** (0.0044)	-0.1173*** (0.0000)	0.0724* (0.0604)	-0.5290** (0.0404)
Firm leverage	0.0170 (0.2500)	0.0105 (0.3090)	0.1508** (0.0200)	-0.0200 (0.6150)
Firm size	0.6480 (0.3300)	0.7860*** (0.0000)	0.0030 (0.1190)	0.5050*** (0.0000)
Bankruptcy risk	0.0741** (0.0480)	0.0101*** (0.0045)	0.0540 (0.3705)	0.041* (0.0888)
Profitability	0.377*** (0.0000)	-0.0988 (0.1661)	-0.0448*** (0.0000)	-0.1550 (0.3250)
Term structure of interest rates	0.0099* (0.0801)	0.0500*** (0.0080)	0.0377* (0.0802)	0.0481 (0.6000)
Growth rate of gross domestic product	-0.007*** (0.0000)	-0.0466 (0.7020)	-0.0670*** (0.0000)	0.0410 (0.7750)
Nature of main shareholder (dummy variables)	Yes	Yes	Yes	Yes
Dummy time variables	Yes	Yes	Yes	Yes
Dummy industrial sector variables	Yes	Yes	Yes	Yes

(continued)

	Chile	Spain	Chile	Spain
Test for first-order serial correlation	-26.8700*** (0.0000)	-24.3310*** (0.0000)	-29.4700*** (0.0000)	-22.4800*** (0.0000)
Test for second-order serial correlation	-6.1701 (0.3440)	-5.5010 (0.3780)	-7.8010 (0.7120)	-4.8912 (0.6055)
Sargan test	97.2200 (0.1755)	119.3050 (0.7100)	92.4099 (0.6145)	115.2700 (0.5900)
Wald test	7,968.59*** (0.000)	5,042.51*** (0.000)	125,694.66*** (0.000)	305,729.55*** (0.000)
Observations	1,154	823	1,154	823

Notes: Robustness check. This table shows the robustness checks for the samples by country. This table replicates the results of Table III using the alternative proxy for growth opportunities measured as the market capitalization over total equity capital. For the first two regressions the dependent variable is short-term bank debt to bank debt, whilst for the second two regressions the dependent variable is short-term bank debt minus the variation in working capital to bank debt. All variables are defined in Table I. The regressions also include the coefficients for the interacted variables such as the interaction between the ownership concentration and growth opportunities; and the interaction between the fund deficit for financing the firm's portfolio of projects and growth opportunities. Non-linear restriction test was estimated for the joint significance of the interacted variables. The ownership structure, growth opportunities, deficit of funds, profitability and bankruptcy have been considered as endogenous variables and have been instrumented by the generalized method of moments using the two-step system estimator which considers both the equations in first-difference and in levels. First- and second-order serial correlation contrasts have been tested. The Sargan and Hansen contrasts represent the test of over-identifying restrictions, asymptotically distributed as a χ^2 . In all cases, the Wald test reveals that the models are statistically significant. Numbers in parentheses are *z*-statistics and ***, **, *, statistical significance at 1, 5, and 10 percent levels, respectively

Table VI.

Table VII.
Determinants of bank
debt maturity for
Spanish non-financial
firms when the main
shareholder is a bank

	(1)	(2)
Intercept	0.1260*** (0.0000)	0.2280*** (0.0000)
One-period lagged dependent variable	0.7041*** (0.0000)	0.6120*** (0.0000)
Ownership structure	-0.0127* (0.0800)	-0.0466 (0.2704)
Own. struct. interacted with growth opportunities	0.0037 (0.1120)	-0.0104** (0.0470)
Own. struct. + own. struct. interacted with growth opportunities	-0.0090** (0.0228)	-0.0570** (0.0140)
Growth opportunities	-0.0124 (0.8022)	-0.4400 (0.2100)
Grow. opp. interacted with deficit of funds	-0.0056*** (0.0000)	-0.1040* (0.0590)
Grow. opp. + grow. opp. interacted with deficit of funds	-0.0180*** (0.0000)	-0.5440* (0.0598)
Grow. opp. interacted with dummy variable for institutional investor	0.0133 (0.4500)	-0.0336*** (0.0000)
Firm leverage	0.0667 (0.2920)	-0.6800 (0.8150)
Firm size	0.3740*** (0.0000)	0.1640* (0.0780)
Bankruptcy risk	0.0006 (0.4880)	0.0507*** (0.0000)
Profitability	-0.2300 (0.6650)	-0.4700* (0.0488)
Term structure of interest rates	0.0207*** (0.0054)	0.1137 (0.4055)
Growth rate of gross domestic product	-0.0540* (0.0780)	-0.2170*** (0.0000)
Nature of main shareholder (dummy variables)	Yes	Yes
Dummy time variables	Yes	Yes

(continued)

	(1)	(2)
Dummy industrial sector variables		
Test for first-order serial correlation	Yes -8.5550*** (0.0000)	Yes -9.7800*** (0.0000)
Test for second-order serial correlation	-4.8700 (0.1700)	-0.5540 (0.6008)
Hansen/Sargan test	145.8400 (0.2390)	132.1400 (0.3990)
Wald test	7,769.52*** (0.0000)	4,560.75*** (0.0000)
Observations	823	823

Notes: Robustness check. This table shows the robustness checks for the samples by country. This table replicates the results of Table IV using the alternative proxy for growth opportunities measured as the market capitalization over total equity capital. In the first regression (1), the dependent variable is short-term bank debt to bank debt, whilst for the second regression (2) the dependent variable is short-term bank debt minus the variation in working capital to bank debt. All variables are defined in Table I. The regressions also include the coefficients for the interacted variables such as the interaction between the ownership concentration and growth opportunities; the interaction between the fund deficit for financing the firm's portfolio of projects and growth opportunities; and the interaction of growth opportunities with the dummy variable when the main shareholder is an institutional investor. Non-linear restriction test was estimated for the joint significance of the interacted variables. The ownership structure, growth opportunities, deficit of funds, profitability and bankruptcy have been considered as endogenous variables and have been instrumented by the generalized method of moments using the two-step system estimator which considers both the equations in first-difference and in levels. First- and second-order serial correlation contrasts have been tested. The Sargan and Hansen contrasts represent the test of over-identifying restrictions, asymptotically distributed as a χ^2 . In all cases, the Wald test reveals that the models are statistically significant. Numbers in parentheses are z-statistics and ***, **, *, statistical significance at 1, 5, and 10 percent levels, respectively

Table VII.

For this purpose, we used a sample of Chilean and Spanish firms. Regression analysis shows that Spanish firms with growth opportunities do not appear to resolve their underinvestment problems by shortening bank debt-maturity. The banks' participation in the ownership of the firms acts as a substitute for short-term bank debt as a governance mechanism for resolving information asymmetry problems. In Chilean firms, in contrast, where banks cannot be internal stockholders, managers are forced to use bank debt-maturity to resolve their underinvestment problems. This problem is more severe the greater the need for external funds. Thus, whereas Chilean firms with deficit and growth opportunities resort to short-term bank debt, in Spain, the opposite takes place. In Spain, the combination of a high ownership concentration and the banks' participation in the equity of the firms to which they lend are the elements acting as efficient governance mechanisms, whereas in Chile, it is the combination of high ownership concentration and bank debt.

In sum, we have seen that bank debt decisions are dependent on the characteristics of the institutional environment in which firms operate, and that these environments evolve differently depending on the decisions adopted by the regulators. The role of debt-maturity to solve underinvestment and asset substitution problems is contingent on bank regulation. On the other hand, in those countries where banks have limitations on their control of non-financial firms, firms will use shorter bank debt-maturities to finance their growth opportunities.

Our recommendation for policy makers is that banks should reduce their controlling stakes in non-financial firms to avoid risk concentration and conflict of interest when they are simultaneously internal shareholders and the main lenders of a non-financial company. Thus, banks should decide on financing based on the quality of firms' growth opportunities. Such behavior would improve firms' access to external funds independently of their banking ownership ties. As policy makers introduce higher degrees of competition in the capital markets, the companies with the best investment projects will benefit from higher availability of funds at a lower cost.

The particular evolutionary process of the financial system in each country may lead to market imperfections – such as information asymmetries and agency costs – to have a distinct influence on both firms' investments and in the use of bank debt-maturity for managers' control and supervision.

Notes

1. The introduction of the institutional setting in the analysis is what Stulz (2006) calls the twin agency problem.
2. The FECU is the “Ficha Estadística Codificada Uniforme” published by the “Superintendencia de Valores and Seguros” in Chile.
3. We appreciate the comments of an anonymous referee on this point.
4. Other measures of ownership concentration calculated were the percentage of stocks in the hands of the two main stockholders as well as in hands of the five main stockholders.
5. Additionally, as an alternative measure for growth opportunities, we used the investment in assets in time $t + 1$ but this measure was insignificant in our regression outputs. We consider that the two proxies (Q and Q2) used are suitable in this study. These measures are also supported by a number of other works developed with samples of firms from Chile and Spain such as Azofra *et al.* (2004, 2007), Saona and Vallelado (2010), Saona (2010), and Jara *et al.* (2012), among others.
6. We are grateful for the comments of an anonymous referee in including an alternative variable to measure the bankruptcy risk. Nevertheless, after the regression outputs, we

decided to use the Altman Z-Score because the proxy used according to Laeven and Levine (2009) was insignificant. Additionally, the Altman Z-Score has been used successfully in both the Chilean and the Spanish contexts in previous research (Azofra *et al.*, 2004, 2007; Jara *et al.*, 2012; Saona, 2010; Saona and Vallelado, 2010).

7. As a robustness check, we have run alternative regressions using long-term bank debt to bank debt as the dependent variable. The presence of serial correlation invalidates the results.
8. Moreover, we ran a regression analysis for a sample that includes both countries' companies with a dummy variable that takes the value of one for Chilean companies and zero for Spanish companies. The results confirm that there are differences between Chilean and Spanish companies in bank debt-maturity decisions.
9. In order to simplify, we have omitted the values of these tests in the corresponding tables. We have only included those models that are statistically significant. The tests performed and the values obtained are available from the authors on request. The Wald test has been performed to check the combined significance of parameters; the significance of temporary dummy variables; the significance of industry variables; and the significance both of temporary dummy variables and of industry.
10. We only report GMM system estimators because they are consistent and the most efficient. Our results with GMM first difference estimators are qualitatively similar.

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About the authors

Dr Paolo Saona is an Assistant Professor of Finance at the Saint Louis University's Madrid Campus in Spain. He received his PhD at Universidad de Valladolid, Spain, and his MBA and BSc in Business at the Austral University of Chile. He is an Active Researcher and has published his works in several national and international academic journals such as the *Applied Economics*, the *Spanish Journal of Finance and Accounting*, *ABANTE* and *Research Management*, among others. His research fields are corporate finance (basically, capital structure decisions), corporate governance, and financial systems. He has also served as a Reviewer for international journals. Dr Paolo Saona is the corresponding author and can be contacted at: psaonaho@slu.edu

Eleuterio Vallelado is a Professor of Finance at the Universidad de Valladolid. He obtained his Bachelor's Degree in Economics and Business and his PhD from the Universidad de Valladolid, Spain and MBA from Stern School of Business, New York University, USA. He has published widely in corporate finance, banking and behavioral finance areas. Author of several books, his articles can be found in *Journal of Banking and Finance*, *Applied Economics*, *Financial Review*, *ABANTE*, *Spanish Review of Finance and Accounting*, *Universia Business Review*, *Cuadernos de Economía y Dirección de Empresas*, among others. His research interests include: corporate finance, corporate governance in banks, and behavioral finance.