ARE REGIONAL INSTITUTIONAL FACTORS DETERMINANTS OF THE CAPITAL STRUCTURE OF SMES?

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Abstract
This paper analyses the role that institutional factors play in explaining differences in the capital structure of small and medium-sized enterprises (SMEs) across regions belonging to a single country. Specifically, it studies the effect of the development of the financial sector and of the economic situation on leverage of firms. Furthermore, the standard firm-factor determinants of debt, such as firm size, asset structure, profitability, growth, business risk and age are also incorporated. For this empirical study, we use a sample of 638 SMEs representing every Spanish region for the period 1999-2007, and apply the panel data methodology. Our results suggest that the capital structure depends on the regional financial sector and the regional economic situation which implies that institutional factors at regional level help to better explain financing decisions of SMEs.

Introduction

The study of the determinants of capital structure of companies represents a major line of research in finance. According to this research, the capital structure is determined by a combination of factors related to the characteristics of the company and the environment within which the company does business.

Most empirical studies have focused on the relevance of firm factors in capital structure and were carried out using samples of single-country firms. More recently, studies analyse if the environment is a factor of influence in financing decisions, as Rajan and Zingales (1995) and La Porta et al. (1998) have pointed out. This approach is based on the idea that institutional factors affect capital structure choices. Therefore, the differences between financial capital systems, fiscal systems, investor protection or the degree of economic development in which the firms operate would explain the divergences in their debt. The prevalent research examines the effect of certain institutional factors on leverage by performing cross-country studies[1]. Among the studies based on samples of large and listed firms, those by Demirguç-Kunt and Maksimovic (1999), Booth et al. (2001), De Jong et al. (2008), López-Iturriaga and Rodríguez-Sanz (2008), González and González (2008), Fan et al. (2012) and Kirch and Terra (2012) deserve mention. From research performed on samples of SMEs, Giannetti (2003), Utrero-González (2007) and Hernández-Cánovas and Koëter-Kant (2011)[2] should be noted.

In a more innovative way, studies that analyse the relevance of institutional factors using samples of single-country firms are emerging. In this case, the idea is that within one country, institutional differences can exist that are notable when choosing the capital structure. The influence of local institutional factors is particularly significant for SMEs, since they usually have restrictions which limit them to operating within the local environment (Demirguç-Kunt and Maksimovic 1998, 1999). To our knowledge, the only study that tackles this issue is that of La Rocca et al. (2010), which investigates, in Italy, how certain local institutional differences, using regions as the unit of analysis, affect the leverage of SMEs.

Our paper provides new empirical evidence about the role of institutional factors at a regional level in SME debt. Specifically, we analyse the effect of the development of the financial sector and of the economic situation on the capital structure of firms. Moreover, we incorporate the standard firm-factor determinants of leverage which include firm size, asset structure, profitability, growth, business risk, and age of the firm. This study encompasses all regions of Spain and the sample comprises data from 638 Spanish SMEs over the period 1999-2007.

This study makes several contributions towards research on capital structure. First, it is one of the first studies worldwide to show the influence of regional institutional factors on capital structure decisions for small and medium-sized firms. Previous single-country studies have only considered firm factors, and have failed to consider institutional factors. There is only one study of this nature covering a European country (the work of La Rocca et al. 2010, in Italy, already cited). Our study, on the one hand, complements that of La Rocca et al. (2010) since empirical evidence concerning this aspect from more countries is needed in order to draw conclusions of a more general

nature. On the other hand, significant differences from the Italian study can be identified: Spain is the country studied; we incorporate macroeconomic factors in the analysis; we measure the regional financial sector development using other indicators such as Lerner index; and we use data that covers a 9-year horizon (and not only 1 year as La Rocca et al. 2010). This circumstance allows us to use the panel data methodology and to avoid limitations of cross-section studies.

Second, the choice of Spain as the country under study also adds value to this research in several ways. On the one hand, small and medium-sized enterprises (SMEs) are unquestionably the leading actors in Spanish business (over 99% of all companies in Spain are SMEs -DIRCE-). On the other hand, Spain exhibits certain regional heterogeneity. Its regions have a great capacity for self-government. Moreover, they present significant regional differences in the economic situation (Cuadrado-Roura 2010) and in the banking system (Carbó et al. 2003). For all these reasons, Spain is a very interesting case-study of regional aspects in SMEs. Furthermore, this work is the first study that attempts to analyse the effects of institutional factors in the debt of Spanish SMEs. Although, it is true that the study of Palacín-Sánchez et al. (2012) finds regional differences in Spanish SMEs between the level of debt and its firm-factor determinants, the institutional factors that may be the origin of these regional differences are not specifically examined. Our paper constitutes a continuation of this line of research.

The results of our paper suggest that the capital structure depends on the regional financial system and the regional economic situation. Hence, institutional factors at a regional level must be taken into account to explain the financing decisions of SMEs. These results are highly significant and should help policymakers understand the institutional origin of these differences and aid in their elimination. It makes no sense for these differences to persist within a single country when working at a European level towards the convergence of SMEs by improving, among other aspects, access to finance.

The rest of the article is organised as follows. Section 2 identifies the institutional factors that have a greater influence on corporate financing choices, in accordance with theoretical and empirical studies, and thereby formulates the hypotheses of our study. Section 3 presents the sample of firms, defines the variables to be studied, and shows descriptive statistics for all variables considered. Section 4 describes the model and the methodology to be used in our analysis, while Section 5 presents the empirical results. Finally, in Section 6, conclusions are drawn.

Institutional factors: theory and evidence

The factors of the institutional environment in which the firm does business can affect its capital structure. Empirical evidence about the impact of institutional factors on the capital structure decisions requires the use of a sample of firms located in different geographical zones. The majority of these studies carry out cross-country comparisons. Certain studies use samples of listed firms. Demirgüç-Kunt and Maksimovic (1999) examine the capital structure in 30 developed and developing countries. They show that the differences in financing patterns are mostly due to the differences in the development of stock markets and banks, as well as the differences in the underlying legal infrastructure. Booth et al. (2001), in an analysis of 10 developing countries, find

that the debt ratios of firms located in these developing countries seem to be affected by the same firm factors as those of developed countries. However, differences are noted in the way in which debt is affected by country factors, such as GDP growth rates, inflation rates and the development of the capital market. López-Iturriaga and Rodríguez-Sanz (2008) analyse 10 developed countries, grouping the firms based on the legal system in force in its zone (common law, German civil law, and French civil law). They find that the legal and institutional system of each country not only affects the firm capital structure but also conditions how firm factors influence the capital structure. The work of De Jong et al. (2008) analyses the capital structure of firms located in 42 developed and developing countries. It observes that country factors, such as creditor protection, the degree of development of the public and private debt market and the GDP growth rate have a significant influence on corporate capital structure. González and González (2008) analyse the effect of bank market concentration and institutions on capital structure in 39 countries. They conclude that these institutional factors affect capital structure and firm-factor determinants of leverage. Fan et al. (2012) examine 39 developed and developing countries, and find that a country's legal and tax systems, corruption, and the preferences of capital suppliers explain a significant portion of the variation in leverage. Finally, Kirch and Terra (2012) test whether financial development and/or institutional quality have any effect on corporate debt maturity decisions on a sample of firms from 5 South American countries. While financial development remains an important determinant of debt maturity, institutional quality holds no influence.

Other studies use samples of SMEs. Giannetti (2003) compares small and large firms in 8 countries in the European Union and finds significant country differences between the debt level and the debt maturity. Moreover, these differences are especially relevant among non-listed firms. Certain country factors, such as the protection of lenders, the enforcement law and the degree of financial development can be considered as responsible for these differences. Similarly, Utrero-González (2007), on data of different-sized firms located in 11 developed countries, reaches the conclusion that the consideration of banking regulation and other institutional variables significantly improves the understanding of capital structure decisions. Moreover, it seems that SMEs are more subject to the legal environment of their countries than are large firms. Hernández-Cánovas and Koëter-Kant (2011), using a sample of SMEs from 19 European countries, show the influence of a country's legal and institutional environment on bank loan maturity.

The latest advances in the studies that analyse the effect of institutional factors on leverage have been to compare zones (regions) of a single country. This type of study is more suitable for SMEs, since individual country-level studies would offer a more useful way to understand financial contracting for SMEs, as Qian and Strahan (2007) point out. In this sense, capital structure of SMEs is likely to be influenced significantly by a set of regional institutional factors (Petersen and Rajan 1994; Demirguç-Kunt and Maksimovic 1998, 1999), and these are difficult to observe and control across a large number of countries. Moreover, this type of study, in contrast to the aforementioned cross-country studies, presents the basic advantage of a reduction of the difficulty in setting up the relation between the firms' financing decisions and the various institutional factors (Wald and Long 2007). This advantage arises since, when zones from a single-country are compared, the study sets out from a more homogeneous situation, given that many institutional factors are shared.

Among the very few regional studies carried out in the area of capital structure research in SMEs, that of La Rocca et al. (2010), performed in Italy, should be highlighted. These authors analyse whether the regional financial development and the efficiency of judicial enforcement have any effect on financing decisions. The results achieved support the starting hypothesis: capital structure is not only the result of firm factors but also of the influence of regional factors.

Our article follows this last line of research. Specifically, the role of regional factors is studied in order to explain the financing decisions in Spanish SMEs. In accordance with previous empirical evidence and within the Spanish context, the regional institutional factors that we consider in this study are: the development of the financial sector and the economic situation. We now present these factors and formulate a series of hypotheses linked to them.

Development of the Financial Sector

The development of the financial sector (banking sector) is one of the institutional factors that is considered in explaining the decisions on capital structure in the studies that carry out comparisons across countries: Demirguç-Kunt and Maksimovic (1999); Booth et al. (2001); Giannetti (2003); Utrero-González (2007); De Jong et al. (2008); González and González (2008) and Kirch and Terra (2012).

Most of these studies, following Diamond (1984), consider the significant role played by banks in the mitigation of problems arising from asymmetric information regarding credit risk, which particularly affect SMEs. Financial intermediaries enjoy economies of scale in the acquisition of information, and, thanks to the information collected, also have a greater incentive than that of individual investors to lend to borrowers. Following this line of argument, a more developed banking sector is expected to facilitate access to external finance, especially to SMEs which suffer more restrictions for credit. Other studies, according to Petersen and Rajan (1995), consider the effect of competition in the banking market on lending relationships. Lenders are more likely to finance credit-constrained firms when the banking market is not very competitive since it is easier for lenders to internalize the benefits of dealing with these firms. Along this line of reasoning, a concentrated banking sector is expected to facilitate credit access, especially to SMEs. Alternatively, a more competitive banking market would encourage lenders to build stronger relationships with clients in order to attain a distinctive competitive edge, thereby focusing more on relationship banking for the solution of problems of asymmetric information (Boot and Thakor 2000).

Within a country, differences in regional financial sectors also help explain differences in the capital structure of firm across regions. Studies such as those of Petersen and Rajan (1995), and La Rocca et al. (2010) confirm this idea. These divergences among the regional banking sector would become irrelevant in the case that firms had the possibility to access any financial market. However, for SMEs, their possibilities of access to financial markets (national or international) are inexistent. Moreover, they can also experience limitations in accessing financial companies that do business in other regions (Guiso et al. 2004).

We focus our study on SMEs within Spain. Spain has a financial system with a bank-based structure; therefore SMEs depend highly on banks to obtain loans. There are three banking groups in Spain: the commercial banks, the savings banks, and the cooperative banks in rural areas. While the big commercial banks and saving banks have a national action area, the small and medium-sized saving banks and some small and medium-sized commercial banks are regionally oriented. If the financial intermediaries present in each region differ, it makes sense that the regional banking sector could vary across regions. In this sense, Carbó et al. (2003) find that the degree of development of the regional financial system in Spain is not homogeneous and also identify that there are significant differences in terms of concentration, prices, and other competition indicators. Moreover, these differences in the regional financial sectors seem to affect SMEs (Carbó et al. 2009 for the Spanish case and Lehmann et al. 2004 for the German case, where banks of a similar nature to those in Spain coexist).

Consequently, according to the aforementioned empirical research, it is to be expected that the development of the regional financial sector has an effect on leverage; however the sign of this relation is ambiguous. Therefore, we state our first hypothesis as follows:

> H1. Development of the financial sector significantly affects firm leverage.

The Economic Situation

In general, the conditions of the economy are normally taken as institutional factors in order to explain the capital structure of firms when carrying out cross-country comparisons (Demirguç-Kunt and Maksimovic 1999; Booth et al. 2001; De Jong et al. 2008; Fan et al. 2012). We believe that the study of the effect of the economic situation on the financial structure of companies around the world can also be applied across Spanish regions. According to Cuadrado-Roura (2010), Spanish regions show significant differences in their economic situations and it is expected that these differences affect SMEs. These economic differences between regions are due to a variety of historical reasons and to the differences in the economic policies developed in each region thanks to the fact that each region is self-governing.

One of most important factors that illustrates the economic situation is the economic growth.This factor affects financing decisions since the growth of the economy is an indicator of the firms' financing needs. If investment opportunities and the economy are correlated, then the more an economy grows, the more resources companies need. Moreover, the empirical evidence above has verified a positive impact of economic growth on debt. It seems that in zones (countries) with relatively higher economic growth, firms use higher levels of debt to finance new investment. Therefore, we set out the second of our hypotheses:

> H2. The economic growth has a positive effect on firm leverage.

Another indicator of the economic situation is the inflation rate. This rate provides, on the one hand, an indicator of the economic administration of the government, and, on the other hand, indicates if the local currency provides a stable measure to be used in long-term contracts. Empirical evidence has almost always verified a negative relation between inflation and the debt ratio (Demirguç-Kunt and Maksimovic 1999; Booth et

al. 2001 and Hernández-Cánovas and Koëter-Kant 2011). According to these studies, high and/or variable rates of inflation render it costly for investors and firms to take out loans. In this sense, despite the fact that inflation increases the monetary value of the firm's assets, the higher interest rate and monetary risk caused by inflation causes the debt ratio to fall. Although it is true that Fan et al. (2012) obtain non-significant results, we formulate the third of our hypotheses as follows:

> H3. Inflation has a negative effect on firm leverage.

Data collection, variables, and descriptive statistics

Data

We need firm-level data and region-level data to carry out the empirical study. The firms of our sample are obtained from the SABI (*Sistema de Análisis de Balances Ibéricos*) database constructed by Bureau Van Dijk. This database is the largest source of financial information on non-financial Spanish SMEs. The sample period covers the years 1999 to 2007. The firms selected are within the European Commission definition (2003)[3] of SMEs for every year under consideration. Moreover, we require that the firms of our sample possess: a) positive equity and positive financial year results in every period; and b) data available for the study period. The final sample consists of 638 firms which cover the 17 Spanish regions; hence we have balanced panel data with 5742 firm-year observations.

On the other hand, region-level data is obtained from various sources, mainly from the Bank of Spain, and the Spanish Statistical Office. Further regional variables are taken from previous empirical studies.

Firm Variables

Leverage. The first firm-variable is the leverage. This is the dependent variable in our study. Following, among others, Van der Wijst and Thurik (1993), Michaelas et al. (1999), Giannetti (2003), Sogorb-Mira (2005), Utrero-González (2007), La Rocca et al. (2010), and Degryse et al. (2012), we use the total debt ratio (DEBT) to reflect the capital structure of the firm, and estimate it as the quotient between total debt and total assets. This ratio is based on book values since the firms of the sample are unlisted. The average total debt ratio is 59.24% for the total sample of Spanish SMEs, i.e. more than half of the resources used by SMEs to finance their investments are liabilities. These high levels of debt are relatively usual in European SMEs (Giannetti 2003, Hall et al. 2004, and Psillaki and Daskilakis 2009).

In a first approach, we can assess geographical differences in financing decisions by comparing region by region the level of debt for firms in our sample. Figure 1 presents the average ratio of total debt for each of the 17 regions; we also add the value for the total sample of Spanish companies. La Rioja has the lowest total-debt ratio, whereas Castile-La Mancha has the highest. Moreover, if the regions are ordered according to their level of debt (Figure 2), we can observe two groups of regions. The first group (10 regions) has debt ratios very close or slightly lower than the average debt ratio of all Spanish SMEs (Spain is denoted by the bold line in Figure 2). The second group (7 regions) has a debt ratio higher than that of the total sample. Not only do these results

suggest that there are regional differences in the capital structure of SMEs across regions, but these differences are also statistically significant according to the analysis of variance (ANOVA) performed[4].

Another aspect worth mentioning is that those regions with lower leverage are also the regions that have higher GDP per capita, (in 7 of these 10 regions, GDP was higher than 100% of the 1999-2007 average for the EU-27[5] (these regions are denoted by clearer lines in Figure 2)), while those regions with a higher leverage are also regions with lower GDP per capita, (in 6 of these 7 regions GDP was less than 100% of the 1999-2007 average for the EU-27 (these regions are denoted by darker lines in Figure 2)). Furthermore, the regions with highest GDP per capita and lowest total debt ratio are located for the most part in northeastern Spain. These results suggest that SMEs in less developed regions are more in debt. These differences seem to be related to institutional factors, since it is possible to consider that GDP per capita is a proxy of a set of institutional factors that have operated over the years in the various geographical areas (Demirguç-Kunt and Maksimovic 1998 and Fan et al. 2012).

Bearing all these reasons in mind, this study is fully justified. In the remainder of the article, we strive to identify which regional factors are relevant and how they affect the financing decisions of SMEs.

Figure1. Total debt ratio across regions
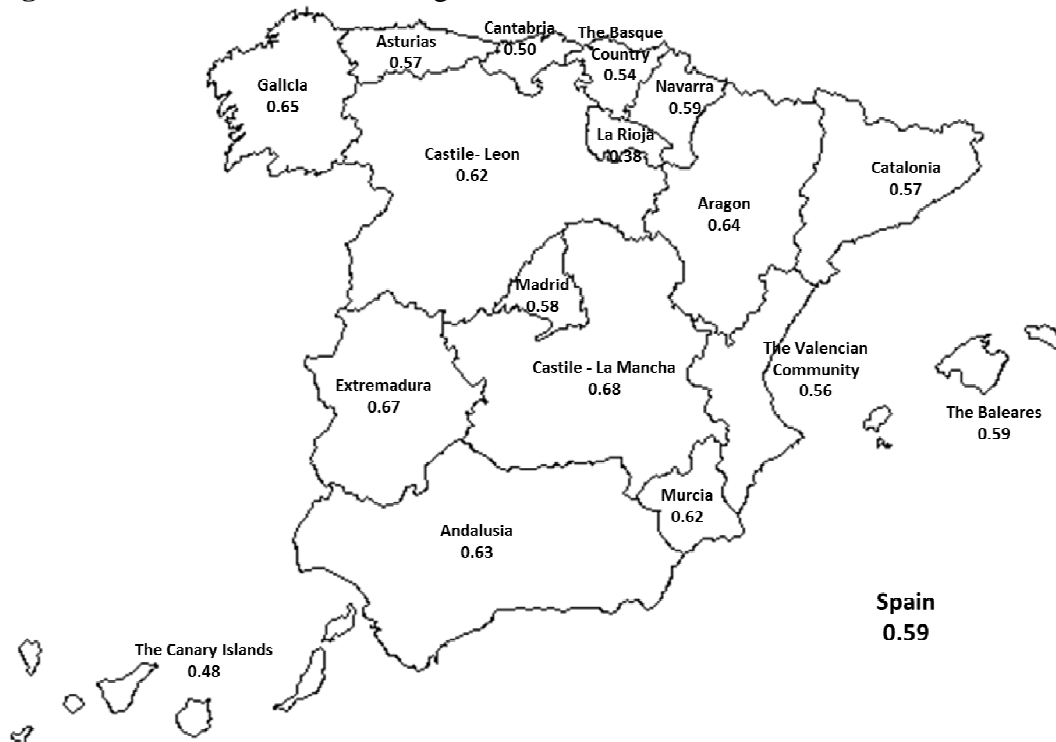
Note: the figure presents the ratio of the average total debt to total assets for firms in each region for the period 1999-2007.

Figure 2. Total debt ratio across regions in ascending order
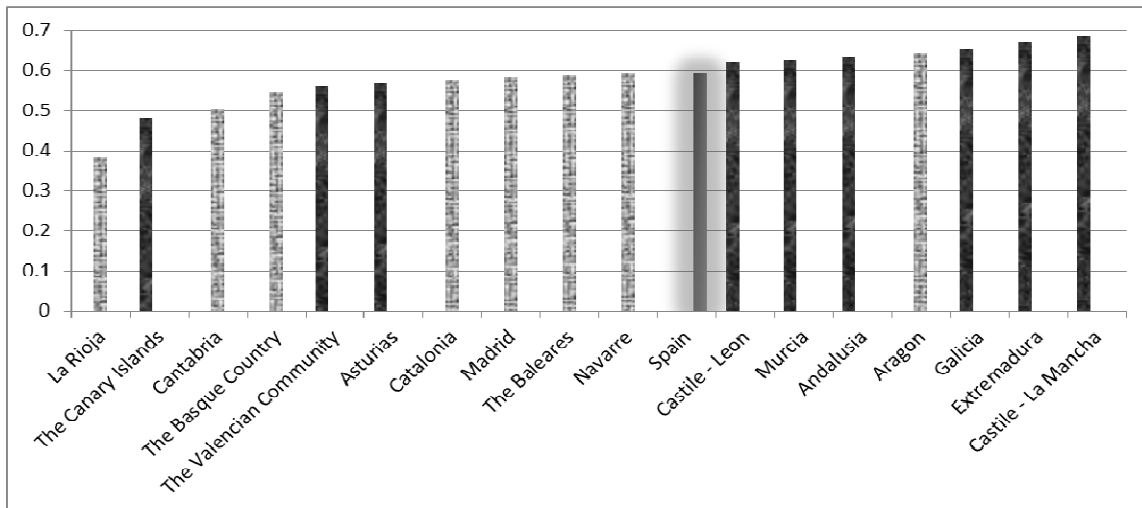
Notes: the regions are ordered by their level of leverage. The darker lines correspond to regions with a GDP per capita less than 100% of the 1999–2007 average for the EU-27. Spain is denoted by the bold line.

Firm-factor determinants of leverage. The other variables considered for the firm include the characteristics of its determinants of debt. We cannot forget that the capital structure is determined by a combination of factors: firm factors and institutional factors. Therefore, not only do we have to consider institutional factors in our empirical study but also firm factors. These are independent variables in this study. According to previous theoretical and empirical studies, six characteristics of firms are used: size, asset structure, profitability, growth, risk, and age, and are defined as follows. Size of firm (SIZE) is measured as the logarithm of total assets (Sogorb-Mira 2005 Degryse et al. 2012, and La Rocca et al. 2010). Asset structure (AS) is estimated as the net fixed assets divided by the total assets of the firm (Rajan and Zingales 1995, Booth et al. 2001, Giannetti 2003, Sogorb-Mira 2005, De Jong et al. 2008, and La Rocca et al. 2010). Profitability (PROF) is defined as the ratio between earnings before interest, taxes, amortization and depreciation and the total assets (Rajan and Zingales 1995, Sogorb-Mira 2005, De Jong et al. 2008 and La Rocca et al. 2010). Growth (GROWTH) is measured as the growth of the assets, calculated as the annual change of the total assets of the firm (Degryse et al. 2012). Business risk (RISK) is defined as the standard deviation of earnings before interest and taxes during the sample period over the book value of total assets (Booth et al. 2001, De Jong et al. 2008, and Psillaki and Daskalakis 2009). Finally, the age of the firm (AGE) is measured as the logarithm of the number of years that the firm has been operating (La Rocca et al. 2010).

According to previous literature on capital structure in SMEs, there is a relative consensus that leverage of firms has a positive relationship with firm size, asset structure and growth, and a negative relationship with profitability, business risk and age.

Regional Variables

The regional variables are related with the institutional factors considered in this study. These are the development of the financial sector and the economic situation. These are independent variables in our empirical analysis and are defined below.

We show the degree of development of the Spanish regional banking sector with three variables. The first is the ratio of regional bank deposits to the Gross Domestic Product (GDP) which Demirguç-Kunt and Maksimovic (1999), La Rocca et al. (2010) and Fan et al. (2012) use as a proxy of development of the financial intermediaries. The original idea is that regions with higher deposits have more funds available for the financing of the investment of SMEs. However empirical evidence is mixed: this variable is not significant in Demirguç-Kunt and Maksimovic (1999), it has a positive relation in La Rocca et al. (2010), and a negative relation in Fan et al. (2012).

The second variable is the number of regional bank branches per 10,000 inhabitants (La Rocca et al. 2010). Following Petersen and Rajan (2002) and La Rocca et al. (2010), more branches that a certain bank maintains within a zone, the closer their relationship with SMEs becomes, and the easier it is to finance these SMEs. Most studies find a positive relationship. Both indicators of the bank system come from the Bank of Spain

The third variable is the Lerner index. This is an indicator of competition in the banking sector. The Lerner index has been successfully employed in banking research by Berger et al. (2009) and Jiménez et al. (2010), and this indicator was employed for the first time in the literature of firm financing constraints by Carbó et al. (2009). The use of this variable in capital structure research is novel. The Lerner index is measured as the difference between the output prices and the marginal costs divided by output prices, and is obtained from the study of Carbó et al. (2009)[6]. This index varies between 0 and 1, where 0 means high competition in the banking sector while 1 signifies the existence of market power.

We reflect the economic situation with two variables. First, we measure the economic growth with the average annual growth rate in GDP per capita. Second, the inflation rate is measured as the yearly change in consumer prices. These variables come from the Spanish Statistical Office.

Moreover, a developed economy indicator, GDP per capita, is included since it may capture certain institutional factors that are not shown by the other regional variables already considered (Demirguç-Kunt and Maksimovic 1998, and Fan et al. 2012). This variable also comes from the Spanish Statistical Office.

Descriptive statistics

Table 1. Descriptive statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
DEBT	5742	0.592	0.216	0.033	0.988
SIZE	5742	8.588	0.725	6.202	10.660
AS	5742	0.331	0.214	0.000	0.989
PROF	5742	0.129	0.089	-0.302	0.904
GROWTH	5742	0.146	0.304	-0.824	9.375
RISK	5742	0.053	0.068	0.003	1.168
AGE	5742	2.896	0.530	0.405	4.691
Deposits/GDP	5742	0.841	0.214	0.449	1.602
Nº bank branches	5742	10.007	1.711	5.858	16.088
Lerner index	5742	0.094	0.045	0.011	0.211
GDP Growth	5742	0.061	0.013	0.021	0.094

Inflation rate	5742	0.033	0.005	0.017	0.041
GDP per capita (€)	5742	19,947.35	4857.61	9202	30,562

Table 1 shows descriptive statistics for all the variables of the study. Specifically, it presents the mean, standard deviation, maximum and minimum values of debt, firm-factors, and regional institutional factors. These values are estimated as the average of the 17 regions taken into account over the period 1999-2007, and hence each region has one single observation. Differences are noted between institutional factors across regions. It remains to be ascertained whether these regional institutional differences impose any statistically significant effect on the financing decisions of SMEs.

Table 2 shows the correlations between all the variables of the study. Debt has a significant relation with all factors, both company and institutional, with the exception of the variables representing the number of regional bank branches per 10,000 inhabitants and that of the inflation rate. Moreover, the relationships between factors related to the development of the banking sector, factors related to economic conditions, and factors related to the firm all remain low, thereby showing that multi-collinearity is not a concern.

Table 2. Correlation Matrix

	TDR	SIZE	AS	PROF	GROWTH	RISK	AGE	Deposits/ GDP	N° bank branches	Lerner index	GDP Growth	GDP per capita	Inflation rate
DEBT	1												
SIZE	-0.1377*	1											
AS	-0.0969*	0.0066	1										
PROF	-0.3045*	-0.1448*	0.1926*	1									
GROWTH	0.1986*	0.0251*	-0.0590*	0.0371*	1								
RISK	-0.1999*	-0.2492*	-0.0755*	0.4544*	0.0745*	1							
AGE	-0.3180*	0.2892*	-0,0106	-0.0940*	-0.1580*	-0.2513*	1						
Deposits/GDP	-0.0289*	0.0997*	-0.0861*	0.0013	-0.0598*	-0.0306*	0.1267*	1					
N° bank branches	-0.0035	0.0109	-0.0189	0.0099	-0.0122	-0.0844*	0.0703*	0.0684*	1				
Lerner index	-0.0605*	0.1929*	-0.021	-0.0988*	-0.0277*	-0.1759*	0.1880*	0.2823*	-0.1174*	1			
GDP Growth	0.1006*	-0.1611*	0.0174	0.0338*	0.0827*	0.1124*	-0.1439*	-0.1389*	-0.0383*	-0.0889*	1		
GDP per capita	-0.1550*	0.1708*	-0.1187*	-0.0279*	-0.1030*	-0.1255*	0.2614*	0.5885*	0.2086*	0.4032*	-0.3919*	1	
Inflation rate	-0.0141	-0.0158	-0.0503*	0.0321*	-0.0285*	0.0343*	0.0260*	0.1342*	0.0542*	-0.0992*	0.1012*	0.2443*	1

Note: *Statistically significant at 90%.

Model and analysis methodology

In this section, the equation model and the econometric methodology used to test our hypotheses are presented. The determinants of the total debt ratio according to previous empirical and theoretical studies are included in the following equation model. The model, in addition to firm variables, includes variables that represent regional institutional factors such as: the Deposits/GDP ratio, N° regional bank branches, Lerner index, GDP Growth, Inflation rate, and GDP per capita:

$$DEBT_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 AS_{it} + \beta_3 PROF_{it} + \beta_4 GROWTH_{it} + \beta_5 AGE_{it} + \beta_6 RISK_{it} + \beta_7 \text{Deposits/GDP}_{jt} + \beta_8 \text{N° regional bank branches}_{jt} + \beta_9 LERNER_{jt} + \beta_{10} \text{GDP Growth}_{jt} + \beta_{11} \text{Inflation Rate}_{jt} + \beta_{12} \text{GDP per capita}_{jt} + u_i + \epsilon_{it}$$

where i is the firm, j is the region, and t is the time period.

In this work, panel data is used. In our opinion, this methodology constitutes the best option to explore our hypotheses, since it considers individual unobservable heterogeneity, gives more information, yields fewer collinearity problems, incorporates more degrees of freedom, and is more efficient.

For the specification of the econometric model, it is necessary to make statistical assumptions about the unobservable components. The term, ϵ_{it}, indicates the traditional stochastic error of the classic linear regression model for which it is assumed that the mean is equal to zero and the variance is constant. The term, u_i, represents the individual effects that define the unobservable heterogeneity of the model. These two terms together represent our "ignorance". When individual effects exist, it is not possible to use classic ordinary least-squared estimation (OLS) since it produces bias and incorrect values. In our case, individual effects are highly probable, and hence the within-group estimator is used which is a consistent estimator that makes individual effects disappear. To confirm the existence of individual effects, the F test is carried out. Moreover, to ascertain whether the individual effects are fixed or random, the Hausman test is also performed. In our analysis, the first test confirms that a within model is a better option than a classic OLS estimation and the second test confirms that the fixed-effect model is better than the random-effect model.

Results

In this section, regressions are presented that estimate the influence of regional factors upon leverage, and consider firm characteristics (Table 3). The regressions are estimated with within fixed-effect approach. While Column 1, in Table 3, shows the results of the first model which uses only firm variables, Column 2 presents the results of a second model estimated with firm and regional variables. The first and the second regression have an adjusted R^2 of 0.239 and 0.277, respectively. These results suggest that it is convenient to consider the regional factors to better explain the capital structure of SMEs. Moreover, in previous studies, where panel analysis on samples of Spanish SMEs is used and regional factors are not considered (Sogorb-Mira 2005, and Giannetti 2003), their R^2 remain much lower than ours[7].

Table 3. Determinants of total debt ratio (within fixed-effect estimation)

Variables	1	2
Intercept	0.325***	-0.145***
	(-0.0376)	(-0.0543)
SIZE	0.108***	0.129***
	(0.005)	(-0.0054)
AS	0.023***	0.0168
	(0.012)	(-0.0114)
PROF	-0.162**	-0.164***
	(0.018)	(-0.0180)
GROWTH	0.037***	0.033***
	(0.003)	(-0.0035)
RISK	0.476***	0.531***
	(0.038)	(0.0374)
AGE	-0.234***	-0.126***
	(0.008)	(0.0107)
Deposits/GDP		-0.075***
		(0.0144)
Nº bank branches		0.015***
		(0.0036)
Lerner index		-0.095***
		(0.0285)
GDP Growth		0.433***

		(0.1051)
Inflation rate		0.0139
		(0.2319)
GDP per capita		-0.000006***
		(0.000)
Adjusted R square	0.239	0.277
F test	267.32***	162.82***
F test that all u_i=0	56.67***	58.25***
Hausman test	280.94***	574.99***
Num. of observations	5742	5742

Notes: t-statistics in parentheses. *Statistically significant at 90%; ** statistically significant at 95%; *** statistically significant at 99%.

The top half of Table 3 provides the coefficients of firm factors considered in our study. On the one hand, these firm factors are significant in explaining the total debt ratio. Moreover, when the regional factors in the regression are introduced (Model 2 of Table 3), all firm variables are still relevant; with the exception of asset structure, which loses its influence. On the other hand, the sign of the relationships between leverage and firm factors is positive for size, asset structure, and risk; and negative with profit, and age. These results coincide with those expected according to previous empirical studies (for SMEs: Michaelas et al. 1999, Hall et al. 2004, Sogorb-Mira 2005, and Degryse et al. 2012). The only firm variable that has a sign opposite to that expected is that of business risk; however this also occurred in earlier empirical evidence (Booth et al. 2001, De Jong et al. 2008, and Psillaki and Daskalakis 2009).

Model 2, in Table 3, also shows the coefficients of the regional institutional factors under consideration in our study. On the one hand, the three proxies used of the development of the regional financial sector are statistically significant in explaining debt. Therefore, hypothesis *H1. Development of the financial sector significantly affects firm leverage* is verified. In order to understand the nature of this relationship, each of the three regional financial variables needs to be analysed individually.

The first regional financial variable, the ratio of regional bank deposits to GDP, negatively influences the level of debt. This result coincides with that found in a study by Fan et al. (2012). It seems that the debt ratio is higher in regions with relatively smaller bank deposits. However, the mixed empirical results of this variable in previous studies questions the goodness of this variable as a proxy of the degree of financial development, as La Rocca et al. (2010), and Fan et al. (2012) also point out. In fact, deposits constitute only a minority of the resources available to financial institutions, and hence their connection with debt may be less tenuous. The lender has access to a lot of resources by means of financial markets or other financial institutions. It is also possible that this ratio is representative of other variables. For example, the ratio of regional bank deposits may reflect the savings rate. In this sense, if saving rates rise in a region, then this is possibly correlated with the highest availability in the system of internal resources rather than with external resources, such as credits, to fund investments, which could explain this negative connection between the ratio of deposits/GDP to debt.

The second regional financial variable, the number of regional bank branches per 10,000 inhabitants, has a positive relation with debt. This result suggests that in Spain, as in Italy (La Rocca et al. 2010), the presence of many bank branches favours bank

financing in SMEs; however in the Italian study this variable remains either insignificant or weakly significant. The reason may lie in one of the characteristics of the Spanish banking system: the high number of bank branches. While in Italy the number of bank branches per 10,000 population is an average of 5.45, according to the study of La Rocca et al. (2010), in Spain there is an average of 10^8. Therefore, the closer proximity of financial institutions to SMEs, expressed as the number of bank branches, implies a greater possibility to obtain resources to finance investments.

The third regional financial variable, the Lerner index, negatively influences debt. This index is an indicator of competition in the banking sector; therefore our result suggests that the more competitive the regional banking sector, the higher the level of debt. This finding is in accordance with Boot and Thakor (2000), who proposed that a more competitive banking market could encourage lenders to build a lending relationship in order to obtain a competitive advantage and to resolve the problems of asymmetric information. It is possible that such a high number of bank branches in Spain promotes competitiveness in the banking sector.

On the other hand, we use two indicators of the regional economic situation. The first variable is the annual growth rate in GDP per capita. This is significant and has a positive impact on debt, thus confirming hypothesis H2. Our findings are in line with previous studies such as Booth et al. (2001), and De Jong et al. (2008). It seems that companies are more prone to use debt to finance their investments in regions with greater growth.

The second regional economic variable, the inflation rate, is unrelated to debt. This is also shown in a study by Fan et al. (2012). Therefore, hypothesis H3 is rejected. It is reasonable that this variable at regional level has a low effect since financial intermediaries consider the inflation rate of the whole country when fixing credit conditions. Nevertheless, differences in inflation rates affect the firms that do business in each region, and hence an analysis of its effect is justified.

The regional GDP per capita is the last institutional variable considered here. This factor is significant in explaining the debt of SMEs. Regarding the sign of the relationship, this variable negatively influences the leverage. This result suggests that the debt ratio of SMEs is higher in less developed Spanish regions. In the descriptive analysis, it was pointed out that the regions with lower leverage are also those regions that have higher GDP per capita. A possible explanation is that less developed regions have fewer resources of their own to invest, and therefore must rely on debt. Moreover, in these regions, the local government has probably pressured financial institutions, especially the savings banks that do business in their area, to grant external financing (credits) to new investment projects and thereby to further the economic development. The study by Fan et al. (2012) also obtained a negative relationship between economic development and level of debt; however its unit of analysis is that of country and not region.

In order to check the robustness of our results, we run a set of additional analyses. On the one hand, there are indications that the model can be affected by problems of endogeneity due to the simultaneity among DEBT, SIZE, AS, PROF, and GROWTH, and a biased result can be implied. To handle this problem, the two-stage least square within estimator is applied by using the first lag of DEBT, SIZE, AS, PROF and GROWTH as instrumental variables. Column 1, in Table 4, presents the results of

regression that are estimated with instrumental variables (2SLS-IV). The Sargan test, whose result is given at the bottom of Column 1, confirms the validity of instrumental variables because the null hypothesis of a lack of correlation between instrumental variables and the residuals is not rejected, and therefore they remain acceptable according to this criterion. In general, the results using instruments are similar to those shown earlier (Column 2, in Table 3); the only exception being that inflation negatively affects debt, which confirms our hypothesis H3. However this relation still remains insignificant.

Table 4. Determinants of Total Debt Ratio (2SLS-IV Estimation)

Variables	All regions	Omitting Madrid	Omitting Catalonia
	1	2	3
Intercept	-0.135***	-0.100***	-0.217***
	(0.058)	(0.062)	(0.066)
SIZE	0.128***	0.122***	0.133***
	(0.006)	(0.006)	(0.007)
AS	0.016	0.017	0.0155
	(0.012)	0.0127	(0.014)
PROF	-0.171***	-0.183***	-0.188***
	(0.019)	(0.021)	(0.024)
GROWTH	0.033***	0.032***	0.0365***
	(0.004)	(0.004)	(0.0045)
RISK	0.504***	0.465***	0.540***
	(0.040)	(0.048)	(0.050)
AGE	-0.125***	-0.130***	-0.114***
	(0.012)	(0.012)	(0.0131)
Deposits/GDP	-0.074***	-0.051**	-0.076***
	(0.015)	(0.026)	(0.016)
Nº bank branches	0.015***	0.014***	0.018***
	(0.003)	(0.004)	(0.004)
Lerner index	-0.095***	-0.133***	-0.138***
	(0.030)	(0.032)	(0.034)
GDP Growth	0.409***	0.461***	0.483***
	(0.112)	(0.117)	(0.121)
Inflation rate	-0.053	-0.269	-0.026
	(0.247)	(0.270)	(0.267)
GDP per capita	-0.000006***	-0.000005***	-0.000007***
	(0.0000008)	(0.0000008)	(0.0000009)
Adjusted R square	0.274	0.259	0.28.8
Wald test	375182.46***	341721.77***	286460***
F test that all $u_i=0$	52.78***	57.42***	52.89***
Hausman test	466.65***	315.03***	257.85***
Sargan test	134.27	137.15	139.33
Num. of observations	5104	4240	3880

Notes: t-statistics in parentheses. *Statistically significant at 90%; ** statistically significant at 95%; *** statistically significant at 99%.

On the other hand, those regions of the sample with the most firms are omitted from the regressions in order to ascertain if any of them has a disproportionate influence on the results. These regions are Madrid and Catalonia, with 108 and 153 firms, respectively. The results of the two-stage least square within estimator for the whole sample whilst omitting only the region of Madrid (Column 2, in Table 4)) and omitting only the region

of Catalonia (Column 3, in Table 4) are very similar to our earlier findings, not only in size and sign of the coefficients, but also in the levels of significance.

Conclusions

This paper studies the role of institutional factors in the debt of SMEs from a regional perspective. Specifically, it analyses the effect of the development of the financial sector and of the economic situation on leverage of firms, using a sample of 638 SMEs from 17 Spanish regions.

Overall, our results suggest that is crucial to consider the regional factors to explain the capital structure of SMEs. The empirical model that includes not only firm factors (firm size, asset structure, profitability, growth, business risk and age) but also regional institutional factors, better explains the debt of SMEs.

One of the institutional factors considered, the development of the regional financial sector, affects the capital structure of SMEs. In this sense, the three proxies used for this institutional factor are statistically significant variables for leverage. The first regional financial variable, the ratio of regional bank deposits to GDP, negatively influences the level of debt. It seems that the debt ratio is higher in regions with relatively smaller bank deposits. The second regional financial variable, the number of regional bank branches per 10,000 inhabitants, has a positive relation with debt. This result suggests that in Spain the presence of many bank branches favours external financing in SMEs. Therefore, the closer proximity of financial institutions to SMEs, expressed as the number of bank branches, implies a greater possibility to find credit to finance investments. The third regional financial variable, the Lerner index, negatively influences debt. This index is a proxy of competition in the banking sector, therefore this result suggests that the more competitive the regional banking sector becomes, the higher the level of debt there is.

Furthermore, we find a certain influence of the regional economic situation on the capital structure of SMEs. First, the annual growth rate in GDP per capita is significant and has a positive impact on debt. It seems that companies use more debt to finance their investments in regions with greater growth. Second, the inflation rate is found to be unrelated to debt.

Finally, the regional GDP per capita is significant in explaining the debt of SMEs. Regarding the sign of the relationship, this variable negatively influences the leverage. This result suggests that the debt ratio of SMEs is higher in less developed Spanish regions. A possible explanation is that less developed regions have fewer resources of their own to invest, and therefore must rely on debt.

To sum up, the evidence of this paper is in line with previous empirical studies that confirm that the institutional factors influence how the firms are financed (Demirgüç-Kunt and Maksimovic 1999, Booth et al. 2001, Giannetti 2003, De Jong et al. 2008, González and González 2008, Hernández-Cánovas and Koëter-Kant 2011, and Fan et al. 2012 cross-country comparisons, and La Rocca et al. 2010 cross-region comparisons). Our findings should help the policymaker to understand the origin of regional differences in the financing of SMEs and to succeed in reducing said differences. This support is highly relevant, since one of the reasons why regional economic development

remains without converging after so many years of democracy is based on the regional divergences in financing SMEs.

For future research along these lines of research, we propose: a) finding and analysing other institutional factors that affect the capital structure of SMEs; b) comparing the regional results of Spain with those of other countries; c) employing more indicators for the measurement of the development of the financial system; d) ascertaining the relevant unit of analysis.

Acknowledgements

Note

[1] Other studies only compare the leverage and its firm-factor determinants in companies belonging to different geographical areas. Among these studies we highlight Rajan and Zingales (1995), Hall et al. (2004), Psillaki and Daskalakis (2009) and Palacín-Sánchez et al. (2012).

[2] The first two papers also include large and listed companies.

[3] The SMEs are defined by three indicators: (i) the number of employees is equal to or greater than 10 and less than 250; (ii) operating incomes are of over two million euros and less than fifty million euros; (iii) total assets are of over two million euros and less than forty-three million euros.

[4] One-way ANOVA *F statistic* is equal to 18.44. This is statistically significant at 99%.

[5] Eurostat Regional Yearbooks (1999-2007).

[6] According to Carbó et al. (2009), the price of total assets is directly computed from the bank-level auxiliary data as the average ratio of "bank revenue/total assets" for the banks operating in a given region using the distribution of branches of banks in the different regions as the weighting factor. Marginal costs are estimated from a translog cost function with a single output (total assets) and three inputs (deposits, labour costs and physical capital) by using two-stage least squares and fixed bank effects.

[7] The adjusted R-squares in Sogorb-Mira (2005) and in Giannetti (2003) are 0.083 and 0.19, respectively.

[8] In Spain this variable is the largest in the European Union (Gallego et al. 2002).

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