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## WHAT DO WE KNOW ABOUT THE FINANCIAL BEHAVIOUR OF THE SPANISH SME?: AN EMPIRICAL ANALYSIS\*

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### Abstract

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The main objective of this work is to analyze the capital structure of Spanish small and medium-sized enterprises from the point of view of the "*pecking order theory*". The Data base employed to test our hypotheses comes from the SABI (*Sistema de Análisis de Balances Ibéricos*). The contribution of this paper are basically: i) the database used in the empirical analysis of the Spanish financial companies behaviour and ii) the panel data allow us to control the possible existence of fixed effects associated to each company as well as the endogeneity problems through the use of instrumental variables models. By means of the so-called, "*pecking-order-theory*" we make a test of the capital structure againsts the size, age and activities within the sector.

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**Keywords:** SME capital structure, pecking-order theory.

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## 1.- INTRODUCTION

Within the main aspects undertaken by the corporate finance, it could be highlighted the study of the capital structure [CS] decided by the companies<sup>1</sup>. The search of an optimal CS has been one of the main concerns of the research done so far. Even though the studies have been based on the behaviour of big companies –because of the information gathered from the financial markets by means of the quotation of the shares and bond issued-, it might be thought that the study of the CS for Small and Medium Enterprises [SME's] is more actualised and recent because the study of the CS within this group of companies is more limited because of, i) the difficulty to get information since these companies go to the credit market rather than the capital market to get money to fund their projects, and ii) the difficulty to get funds from others, because of their credit constraints.

The CS of the companies have been explained by different theories, among them, the present article analyzes the evolution of the CS of the Spanish SME from the point of view of the “*pecking order theory*”. The reason why we decided to use this theory is because it is a reliable theory that has been empirically tested in most of the works done in Spain about SME by means of the negative correlation between the economic return of the SME and their leverage level. However, there are other variables such as: age, size and sector within which the company is running, that are key variables to study the behaviour and financial structure of the SME. Therefore, the *pecking-order-theory*, would be a useful and reliable tool to explain it.

The way of achieving the objective already mentioned is studying the impact of the variables specified before as well as other relevant factors found in the literature (growth opportunities, tangibles weight as a proxy to the real guarantees, the financial charges and other macro-variables) about CS in the SME from the point of view of general leverage level, lifetime of the total debt and proportion of bank debt. The last subject mentioned above is a new point of view with respect to other works related with the study of CS within the Spanish market. The reason to include this important aspect

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<sup>1</sup>It is used the term capital structure as a synonymous of financial structure, and defined as the fund composition (equity and liabilities) that allows the financing of the company investment projects. Sometimes (Sogorb, 2002), when it is talked about the financial structure (study of origin and resource application) make sense a distinction between the i) *capital structure* (combining equity and liabilities) and, ii) *investment structure* (application of the available funds).

in the analysis, is grounded on the fact that the Spanish financial system is mainly characterised by being a bank-oriented one.

After this introduction, section 2 has to do with the different theories that explain the CS of the companies in general, and the one of SME in particular. Then, section 3, presents the hypothesis to test. The section 4 presents the database and the methodology followed. Eventually, in section 5 the main results are presented, and finally section 6 conclude with the main findings and contributions of the paper.

## **2.- THEORIES EXPLAINING THE CAPITAL STRUCTURE**

There are many theories that have dealt with the behaviour of the companies in relation to their CS. Many of them are grounded on the basics of large companies. The different theories explain the financial behaviour of the companies, taking into account that their capital structure is the result of the different points of view to tackle different problems. In this sense, a brief revision of each theory is presented as well as an analysis of its application to the characteristics and environment of the SME.

i) "*Irrelevance Theory*" (Durand, 1952; Modigliani and Miller, 1958). According to this theory, the CS of the companies is irrelevant of the market value of the company. The authors depart from some propositions that are not strongly adjusted to reality. These propositions will be nullified by following articles such as those of Modigliani and Miller (1963) and Miller (1977) which assume that financial markets are not perfect, and assume that there are asymmetric information. Moreover, they assume that neither the companies nor the investors might get into debt at a riskless interest rate, and, that it cannot be forgotten the effect of taxes over the debt, which actually represents a save. Then, appear new explanatory factors about the leverage level, and as a consequence, the CS is not irrelevant any more.

Given this original focus, a new approach is being considered taking into account the effects of tax savings on both, the companies and the investors. The following theory deals with it.

ii) "*Static Equilibrium Theory or Trade off*" (Modigliani and Miller, 1963; Stiglitz, 1969; Baron, 1974; Fama, 1978, *inter alia*). Within the positive and negative effects

which come from a more debt, it is considered the effect that taxes have on the rents. Thus, given the save in taxes as a consequence of a more debt, Modigliani and Miller (1963) shows the positive effect of debt. Then, given this reasoning, there appear a new research area that analyses the negative effect of debt (bankruptcy costs). These costs could be offset the positive effects of the tax save coming from a more level of debt. The main results of this research were: i) the uncertainty about the tax save (DeAngelo and Mansulis, 1980); ii) The individual taxes as well as the rent taxes (Miller, 1977); and, iii) the existence of bankruptcy costs (Kraus and Litzemberger, 1973; Scott, 1976; Kim, 1978; Brennan and Schwartz, 1978).

After revising these theories, based on market imperfection, a new research approach has being born that deals with new issues that may affect the CS. We are talking about the agency problem, among which we may highlight:

iii) "*Agency Theory*" (Fama and Miller, 1972; Jensen and Meckling, 1976; Barnea, Haugen and Senbet, 1981; Stiglitz and Weiss, 1981; *inter alia*). This theory is grounded on the existence of asymmetric information (Petersen and Rajan, 1994; Berger y Udell, 1995 and 1998; Norton 1991, and Hellman and Stiglitz, 2000, *inter alia*) among the different agents. The theory analyses the CS of the company taking into account the agency costs, which are the costs of having a clash of interest between the different agents in the company, such as, i) The associated costs of capital (owner-manager), and ii) associated costs of debt (owner-creditor)<sup>2 3 4</sup>. Thus, the equity and the liabilities are chosen in such a way that minimize the agency costs.

Other approach further these theories is based on the effects that asymmetric information may have over the CS. It could be highlighted:

iv) "*Preference Order Theory*" or "*pecking order theory*" (Donaldson, 1961; Myers, 1984; Myers and Majluf, 1984): The managerial risk aversion against the shareholders also affects their financial policy.

Following this theory, the managerial shows the following preference order to fund their projects: a) The managerial usually prefer equity, b) then, uses liability resources when

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<sup>2</sup> Scholtens (1999) studied the mechanisms of control that diminish the information asymmetry in order to confront efficient projects, distinguishes between: ownership, collateral and covenants, relationships and reputation.

<sup>3</sup> The works of Easterbrook (1984) related to the decision on borrowing as a mechanism to facilitate the supervision of the financial markets; and Jensen (1986) related to the decision on borrowing as a mechanism to reduce the funds of free availability.

<sup>4</sup> An extension to financial theory of the agency is the so called (*stakeholder theory*). This new approach, considers other clash of interest who belong to the company such as the workers, the customers and providers (Fama, 1980; Titman, 1984; Cornell and Shapiro, 1987; Willianson, 1988).

there exists profitable investment opportunities, and the internal financing are not enough. Under this second approach, the managerial would prefer the debt rather than issue new shares, because it is important to bear in mind, that those projects which are not so profitable provide negative signals to the market. In the case of SME's, the reason grounds on the fact that, the managerial (in most of the cases, the owners) usually does not want to lose the control of the company (Hamilton and Fox, 1998). In this type of companies, the preference order becomes even more important given the high costs of debt (Pettit and Singer, 1985), which according to Myers (1984), is the main consequence of the asymmetric information within the credit market (Michaelas, Chillenden and Poutziouris 1999). In fact, these companies may decide not to undertake good investment projects, if besides of the financial costs there exists a cost from the lose of control. Nevertheless, following Hall, Hutchinson and Michaelas (2000), these costs depend on the particular sector where the company is running, the leverage and the CS, etc.

v) “*Signalling Theory*” (Ross, 1977; Leland and Pyle, 1977; Heinkel, 1987 and Zingales, 2000, *inter alia*): This theory makes assumptions about the market value of the shares given the changes in the CS. The key point of this idea grounds on the fact that the market acts as a supervisor and a controller of the managerial function, evaluating the financial decision making as a signal of future cash flows and the company solvency.

In general, the agents who are more informed within the market know that their shares are giving signals, hence, sometimes, these signals may be manipulated to give favorable information. Therefore, it may be said, that the CS is a signal that is captured for the market, in such a way that investors realise the financial decision-making undertaken by the company.

Finally, a recent research develops a theory which considers the competence within the good markets in which SME runs.

vi) “*Corporate Strategy Theory*” (Brander and Lewis, 1986; Barton and Gordon, 1988; Chatterjee and Wernerfelt, 1991; Balakrishnan and Fox, 1993; Lowe, Naughton and Taylor, 1994; Robson, Gallagher and Daly, 1994; Jordan, Lowe and Taylor, 1998; and Kochhar and Hitt, 1998). In the case of SME, can be highlighted Robson, Gallagher and Daly (1994), and Jordan, Lowe and Taylor (1998). This theory, studies the effect that corporate strategies over the financing decision-making, basically over the CS. These

effects may be: i) strategies related with the commodity market, if there exists competence and, ii) strategies related to the commodity as well as the production factor.

These theories have explained basically the CS of big size companies, that is to say, of those companies with a market value such as gives information to the investors. These theories according to Barclay and Smith (1999) are complementary rather than independent. After the work of Harris and Raviv (1991), there have been different articles that besides of empirical test, also study the effects of different type of resources given different maturities, etc. (Michaelas, *et al.*, 1999, *inter alia*).

However, in the specific case of SME, the CS has been discussed by Keasey and Watson (1987); Storey, Watson and Wyncarczyk (1988); Ang (1991 and 1992); Reid (1993) and Storey (1994); Robson, *et al.*, (1994) and Jordan, *et al.*, (1998); *inter alia*. In Spain, Maroto (1996); Boedo and Calvo (1997); López and Aybar (2000); *inter alia*, have published outstanding studies in this field.

Since the environment in which SME runs is mainly characterised by: i) low disclosure of financial information, ii) lack of a valuation and iii) low possibility of being in the capital markets. We understood that those theories related with asymmetric information are the most accurate to explain the CS of SMEs. However, the no existence of a market gathering signals and information about the financial behaviour of the companies makes the test of the *signaling theory* applied to the SME more difficult

SMEs run in an environment characterised by scarce information given to external agents by means of their financial statements, because the majority of them are not obliged to present detailed financial statements but abbreviated with less information. Furthermore, the existence of risk rating rankings provides information about the capacity of SME to face their debts, as well as information about the risk of the debt itself. On the other hand, since SMEs do not have the capacity to go to the capital markets the information is even less. Because of it, there exists asymmetric information between the outsiders and the insiders at the SME. In sum, and as a consequence of the stated before, it is expected that the theories about the capital structure that would be better off to explain the behaviour of SMEs and their financing structure will be those

based on asymmetric information such as the *signalling theory* and the *pecking-order-theory*.

Concerning the *signalling theory*, it is assumed that companies choose the level of debt such that makes the external agents identifying the quality of the company (Cardone and Cazorla, 2001). However, for SMEs it is difficult to access the external markets to give signals about its quality, because of that the validity of this theory decreases. Therefore, it seems that the *pecking-order-theory* is the most accurate theory since it is able to adjust and explain the financial behaviour of the SMEs.

Previous works have empirically tested the *pecking-order-theory*, by means of the negative relationship between the level of debt and the return on assets of the companies. The present work tests, by means of this theory, the financial behaviour of the companies taking into account the leverage ratio and the maturity of other characteristics that define the SMEs. Besides the return on assets, it is also studied the relationship between the size, the age, the proportion of tangibles and the growth opportunities for each component of the CS, such as the leverage ratio, the duration of the debt, the proportion of fund from banks and its duration.

As it was mentioned before, since the spanish financing system is focused on bank, then it will be interesting to analyse whether the causes of the debt are or are not relevant for the financing of the spanish SMEs.

### **3.- PECKING ORDER THEORY PREDICTIONS**

The *pecking-order-theory* considers that the greater is the asymmetric information between insiders and outsiders, then, greater will be the probability that the companies get internal funds, so that, the problem of subvaluating is reduced. Furthermore, as the asymmetries become greater, the companies will decide to go to debts that need softer requirements. Therefore, the greater the asymmetric information, the greater the preference of self-financing and greater the difficulties to get long run funds.

On the other hand, the greater the asymmetric information, the greater will be the constraint to get bank credits. Therefore, it is expected to find a smaller proportion of bank debt.

Figure 1 reports the predicted relationships between all the CS determinants and the level of asymmetric information. Doing so, we can construct the different hypotheses about their effects on the SMEs`CS, from the point of view of the *pecking-order theory*. Taking into account these results, we postulate that when a company gets greater growth opportunities, the uncertainty becomes larger as well as the asymmetric information. However, as the companies becomes more mature, and have more size, and greater proportion of tangibles, the asymmetries becomes smaller, because it is easier for external agents to get information from the company. When the environment becomes more uncertain, SMEs will be also affected and the asymmetries will be high in this case.

**Figure 1**  
**Expected effects on the asymmetric information**

Level of capital structure determinants	Asymmetric information
<i>Growth opportunities</i>	+
<i>Size</i>	-
<i>Tangible assets</i>	-
<i>Age</i>	-
<i>Macroeconomic effects (interest volatility, temporal structure of interest rates)</i>	+

The relationships between each factor determining the CS and the different components of the financing of the companies leads, according to the pecking-order-theory prediction, to the following hypotheses.

- The greater the size, the smaller the asymmetric information, and it is expected that:

H1a. The external financing becomes larger.

H1b: The long run debt becomes larger.

H1c: The proportion of bank debt becomes larger.



- The greater the age of the company, the smaller the asymmetric information, and it is expected that:

H2a: The external financing becomes larger.

H2b: The long run debt becomes larger.

H2c: The proportion of bank debt becomes larger.

- The greater the growth opportunities, the greater the asymmetric information, and it is expected that:

H3a: The external financing becomes smaller.

H3b: The long run debt becomes smaller.

H3c: The proportion of bank debt becomes smaller.

- The greater the proportion of tangibles assets, the smaller the asymmetric information, and it is expected that:

H4a: The external financing becomes larger.

H4b: The long run debt becomes larger.

H4c: The proportion of bank debt becomes larger.

- The greater the uncertainty caused by macroeconomic variables, the greater the asymmetric information, and it is expected that:

H5a: The external financing becomes smaller.

H5b: The long run debt becomes smaller.

H5c: The proportion of bank debt becomes smaller.

H6: The greater the return, the smaller the proportion of debt and smaller the bank debt.

Taking into account all the effects mentioned before, it is studied the relationships between the characteristics of the companies and the different components of the CS. To do so, the next section, first, makes a descriptive study of the sample and then, estimates several econometric models that allow us to test the hypotheses presented above.

## 4.- EMPIRICAL ANALYSIS

### 4.1. Sample description

The Database used to test the relevance of the *pecking-order theory* for the CS of Spanish SME comes from the SABI (*Sistema de Análisis de Balances Ibéricos*). The database surveys the balance sheets, income statements and others complementary financial information for 200,000 non-financial Spanish firms. Since there is no-full information for all of them, we will work only with those that have available detailed annual accounts. Although we can find more annual data, the period covered in this study is 1994-1998 because of lack of information for the very first years of the sample. Also, we consider only those SME presented in the sample taking into account the European Commission definition (Recommendation of the Commission, April, 3th, 1996 about the definition of small and medium enterprises 96/280/CE) for SME and some other filters that are reported in Appendix 1. The final sample is an unbalanced panel data composed of 13,266 SME with 42,258 observations. Table I reports the annual distribution of these observations per year.

**Table I**  
**Annual distribution of the observations**

	1994	1995	1996	1997	1998
Total number Of observations	6,080	8,520	9,215	9,486	8,957

In Spain, there exist more than 2,200,000 SME, therefore the database we are working with, represents approximately 0.6% of the whole Spanish entrepreneurial market, which let us to provide a representative idea of what is really happening. The size of the database used for this study supposes an additional contribution of this paper to the literature.

### 4.2. Variable description

In this section we describe the variables used to analyze the empirical relevance of the *pecking-order theory* to explain the CS of the Spanish SME. We consider two types of variables: i) those variables used to describe the composition of capital structure in Box

I, and ii) those variables influencing and explaining the SME's CS in Box II. Notice that the variable presented in both boxes will be used for the descriptive analysis and some for the econometric analysis.

### **Box I Capital Structure Variables**

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<b><i>Leverage ratio</i></b>	Amount of total liabilities respect to total level of assets.
<b><i>STDR</i></b>	Short-term debt ratio: Costly short debt over total costly debt.
<b><i>BD_CD</i></b>	Bank loans to costly debt ratio. It is the ratio of overall amount of bank credits to total costly debt.
<b><i>STBD_BD</i></b>	Short-term bank debt ratio: Short-term bank debt over total bank debt.
<b><i>BD_TA</i></b>	Total amount of bank credits respect to total amount of assets.
<b><i>STD_TA</i></b>	Short-term debt respect to total amount of assets.
<b><i>LTD_TA</i></b>	Long-term debt respect to total amount of assets.

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### **Box II Explanatory variables**

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<b>Size</b>	Considering the European Commission SME definition: Micro: number of employees < 10 Small: 10<= number of employees <50, sales below 7 million € and total asset under 5 million € Medium: 50<= number of employees <250, sales between 7 and 40 million €, total assets between 5 and 27 million €
<b>Age</b>	For the econometric analysis we only consider the number of employees. Mature: its age is higher than 10 years Young: its age is lower than 10 years
<b>Business Sector</b>	We consider CNAE93 Clasificaton elaborated by INE (Spanish Statistic National Institute). The number of groups of activities is 9.
<b>Forjur</b>	Dummy variable that takes the value of 1 if the company is "Corporation" and 0, otherwise. (Look at note 7 for an explanation).
<b>Findes</b>	Financial distress. Dummy variable that takes the value of 1 when the interest coverage ratio is higher or equal to 2, and 0 otherwise (Padilla y Requejo,1997).
<b>Tang</b>	Tangibility assets. Ratio of tangible assets respect to total assets.
<b>GO</b>	Grow opportunities: it is the ratio computed by the proportion of intangible assets divided by total assets.
<b>ROA</b>	Return on assets as a proxy of economic performance. It is the ratio of EBIT on total assets
<b>TSIT</b>	It is the temporal structure of interest rates.
<b>Volat</b>	Volatility of the interest rate. It is measured as an annual mean of MIBOR 3 months.

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### 4.3. Descriptive Analysis

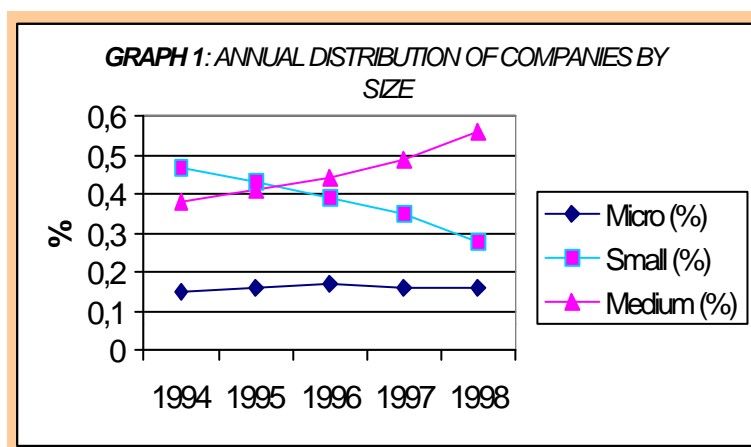
We conduct the empirical analysis in two parts. The first, this section, involves mean tests and descriptive analysis of the SME included in the study according to their different size, age, business sector, legal form and the financial distress situation respect to the different CS ratios defined above. The second, the following section, involves an econometric study to test the main factors explaining SME` CS.

Most of the studies about the CS have been concerned with establishing a comparison between the CS of big size companies and the CS of SME. This paper focuses on the CS of SME and answers the following question. What do we know about the Spanish SME` capital structure?. To do that, the SME sample is divided in three categories (micro, small and medium),. Table II reports the percentage of the different types of SME for the period considered.

**Table II**  
**Annual percentage of firms and size (considering European Commission definition)**

Year	1994	1995	1996	1997	1998
Micro (%)	15	16	17	16	16
Small (%)	47	43	39	35	28
Medium (%)	38	41	44	49	56

From Table II (and also in Graph I) we can see the distribution of the SME and how the percentage of micro business is smooth all the period but the proportion of medium type companies is increasing all the period against the reduction in the proportion of small



type<sup>5</sup>.

<sup>5</sup> If we consider the definition of size according to the number of employees, the results indicate the increase in the number of medium type companies, and the stability of the micro type firms. So, both

It is also a goal of this paper to analyze SMEs`capital structure taking into account the different business sector where each company belongs. Following the CNAE93 classification of the Spanish Instituto Nacional de Estadística (INE) for the business activities we consider nine groups of activity and their relative importance in the whole sample is reported in Table III.

**Table III**  
**Distribution of SME according to their business sector (%)**

<b>CNAE93</b>	<b>Activity description</b>	<b>Relative importance (%)</b>
1	Agriculture, forestry and mining	1.54
2	Manufacturing	38.52
3	Construction	6.24
4	Wholesale and retail trade	35.71
5	Restaurants and hotels	2.32
6	Transports and communications	5.01
7	Business services	7.78
8	Education	0.88
9	Others	2.04

As it can be seen in Table III, the main business sector where SME in the sample work are: 2 (manufacturing), and 4 (Wholesale and retail trade). After that, Services (7) and Construction (3) are the most important. Furthermore, we will center in the first two sectors to analyze the different financial behaviour of those companies according to their industrial activity.

The company`s age is another variable used to study SME and we find a 29.29% of Spanish SME in the sample are younger than 10 years old, and a 70.71% are older than 10 years old. This fact reflects the consolidated character of the SME in the case of Spain and it supposes the high degree of surviving.

Although we have dropped all those observations with bankruptcy problems (those with negative shareholders`equity), we consider the different behaviour of SME according to their possible financial distress. The way of doing so is constructing a new dummy variable which takes the value of 1 when the interest coverage ratio (defined as

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types of measures are consistent, although the variability is lower in this case.

Gross Margin/Interest expenses) is bigger than 2, what supposes that the company affords the interest payment, and 0 if this ratio is lower than 2 meaning the company can start to have financial distress problems. Considering this characteristic along the period, Table IV reports a decreasing trend in the percentage of SME with more possibilities of getting a financial distress for the period 1.994-1.998, but we must take into account that they are not in a bankruptcy situation. One of the possible explanation could be the decrease in the interest level for the period considered (Appendix 2) what helped SME to have a better financial health.

**Table IV**  
**Annual percentage of firms and possible problems of financial distress (high & low)**

<b>Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
HIGH(%)	45	43	41	35	28
LOW(%)	55	57	59	65	72

Considering the legal form of the companies, Table V shows, how independently to the size type of SME considered (micro, small or medium), a higher proportion of “corporation” can be found instead of “non corporation”<sup>6</sup>. Although the expenses that a company has to afford to constitute a society with the legal structure as a Business Corporation are higher, this expenditure can be compensated by a reduction in the tax ratio up to 30%. In fact, this possibility is more affordable for bigger companies, as can be seen in Table V.

**Table V**  
**Percentage of SME firms with different legal structure**

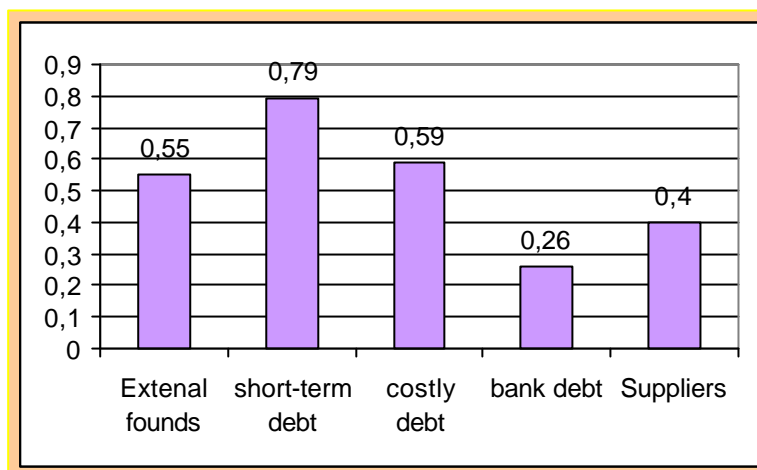
	<b>Micro</b>	<b>Small</b>	<b>Medium</b>
Non –corporation (%)	30	18	9
Corporation (%)	70	82	91

Lately, and as a part of this first descriptive analysis, it is presented the average of the variables which define the CS of the SMEs. Graph 2, shows that the average level of the external funds used by the SMEs analysed is 55%. Also, it can be seen that most of the external financing (80%) is short run fund, which once again comes to show the constraints faced by this group of companies. Graph 2 also shows that, in average, the 60% of the external financing of SMEs has a cost, and a 40% comes from suppliers.

<sup>6</sup> In our case corporations are referring to Joint Stock Companies (in the case of Spanish classification we are referring to Sociedad Anónima”), and non-corporations includes the rest of legal forms like Limited

Finally, just the 26% of the external financing, and half of the financing with costs are bank debt. Later, it is analysed the main variables which affects that bank debt and its duration.

**Graph 2**



Once we have described the characteristics and distribution of our sample, now we are going to study the CS respect to all these characteristics. As we told before, we consider different levels of CS: leverage (LEV), maturity debt (STDR), bank indebtness (BD\_CD) and maturity of bank debt (STBD\_BD). The reason why we study the behaviour respect to the bank indebtness, is because the Spanish financial system belongs to the bank-oriented one, what justifies the importance of this financial instrument as we tested above.

Respect to the size, Table A3.1 (Appendix 3) reports how higher companies have more short-term debt, higher level of indebtness, more bank debt, but the level of long-term debt respect total assets is lower for this type.

It may be said that since the medium size companies are funded with short run debt, then, they are able to improve the agreement conditions of long run debt. These results are similar to those obtained in other papers which use the same database (Sogorb, 2002).

Table A3.2 (Appendix 3) reports the mean test by maturity of the company respect to all the CS ratios. From this first statistical approach, we can conclude that mature firms are less indebted, use more bank debt and use less long-term debt respect to total assets. But respect to the level of short-term debt, although there is a significant difference in STDR, this loses its significance in the case we consider the level of short-term-debt respect to level of assets. So we will analyse it with more detail in the econometric analysis.

Financial distressed associated to the different CS ratios is studied in Table A3.3 (Appendix 3). We can conclude that those companies with higher probability of financial distress count with higher level of indebtedness, more bank debt, more long and short-term debt respect to the assets. But if we consider the short-term debt ratio it results lower.

Table A3.4 (Appendix 3) reports the different CS ratios for all activity sectors. The sectors with more debt are: building (3); wholesale and retail trade (4), transport and communication (6). Those industries which use more banking debt are wholesale and retail trade (4), manufacturing (2) and Others (9). Concerning the lifetime of the debt with costs, we find out that those sectors which are mainly short run financed are wholesale and retail trade (4), manufacturing (2), building (3) and Others (9).

To analyse whether the differences are statistically significant, we focus on two sectors [manufacturing (2) and wholesale and retail trade (4)] which are the most important in our sample where the SMEs are working (see Table 3.4 in Appendix 3). By comparing these two sectors, it may be said that the manufacturing sector has more banking debt than the commercial sector. The reason could be grounded on the existence of tangible assets as guarantees to financial intermediaries. From the point of view of the short run debt, the commercial sector has more debt than the manufacturing one. The reason could be based on the fact that this sector uses more short run financing than long run, because of a lower availability to use tangible assets as guarantees.



As it can be seen in Tabla A3.5 in Appendix 3, Corporations are usually less indebted but present more short run debt (from the point of view of the total debt and from the point of view of the total assets).

#### 4.4. Econometric Analysis

The empirical specification to analyze the behaviour of the CS is given by:

$$CS_{it} = \mathbf{a}_0 + \mathbf{b}_1 SIZE_{it} + \mathbf{b}_2 AGE_{it} + \mathbf{b}_3 FINDES_{it} + \mathbf{b}_4 GO_{it} + \mathbf{b}_5 TANG_{it} + \mathbf{b}_6 DSEC_{it} + \mathbf{b}_7 ROA_{it} + \mathbf{b}_8 VOLAT_{it} + \mathbf{b}_9 TSIR_{it} + \mathbf{h}_i + \mathbf{e}_{it}$$

where  $\mathbf{e}_{it}$  denotes error coefficient, which is normally distributed with zero mean and  $\sigma^2$  variance and  $\mathbf{h}_i$  represents the fixed effects associated to each firm. CS represents the different ratios that describe the capital structure for every case according to general level of indebtedness (LEV), bank indebtedness (BD\_CD), debt maturity (STDR) and bank debt maturity (STBD\_BD). The explanatory variables used are: SIZE, measured by the number of employees and a proxy of the size of the company; AGE, as a proxy of the age of the company; GO which measures the growth opportunities; TANG, which is the proportion of tangible assets and a proxy of the guarantees that may be presented by the firm as a collateral; and ROA which measures the economic performance. We introduce some control variables like FINDES, as a proxy of the possibilities of financial distress DSEC, which is a dummy variable that captures the industrial effects according to the dependent variable<sup>7</sup>. Furthermore, two more variables have been added, one that captures the economic cycle (TSTI) and another one, which captures the volatility of interest rates (VOLAT).

Because of the panel structure of data, the methodology used is grounded on panel data techniques. The advantage of using this methodology is that it will allow to manage the unobservable firm's heterogeneity (such as the ability of managers to get a balanced

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<sup>7</sup> This dummy variable is measured as the difference between the mean of leverage by year and business sector minus the mean of leverage for every year. Depending on the dependent variable that we are explaining, DSEC takes different features. For LEV, we call this variable ENDSEC which takes the difference between the sectors and years for the leverage level. For bank indebtedness, we consider BDSEC

management) as well as its possible correlation with explanatory variables (fixed effects)<sup>8</sup>. If this is the case, the estimations will be biased, and the within group estimator should be used. Once we apply the Hausman test<sup>9</sup> to all the specifications, the existence of the previous correlation is confirmed, and the within group estimation is the only consistent one for all the models.

Apart from the problem associated to the correlation between the individual effects and the explanatory problems, we can also find endogeneity problems related to the economic performance and capital structure variables (leverage and maturity), in the sense that capital structure can determine the economic performance at the same time. Moreover, we introduce control variable for industry which can also cause endogeneity problems. So, we test this possibility through the use of Sargan test<sup>10</sup>. Because the models are estimated by fixed effects, we compare the model in first differences with the instrumental variable model where the instrument used is the second lag of ROA and the second lag of the industry variable. After applying Sargan test we reject the similarity of the models in the case of leverage and maturity, but we can not reject the null hypothesis in the case of bank debt and bank debt maturity. As a result of that, the final models for total debt and maturity debt are estimated by instrumental variables (Hsiao, 1986) (columns 1 and 2) and those for bank debt and bank debt maturity are estimated by fixed effects (columns 3 and 4) in Tabla VI. It reports also the Hausman test, Sargan test and Goodness of fit for each model.

Table VI shows estimations of the total SME sample, and captures the effects of the explanatory variables specified before about different levels in which the CS has been

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and for maturity debt, we use MDSEC.

<sup>8</sup> If the unobserved heterogeneity is correlated with the explanatory variables, then it will be needed conditional inference on the effects of the sample (it is known as estimation by fixed effects) If the effects are not correlated with the explanatory variables, then the conditional inference is applied as in the method of compound errors (random effects) [Arellano y Bover, 1990].

<sup>9</sup> Hausman Test allows to check the resemblance of the coefficients of the intragroups estimations as well as the estimation by random effects. The null hypothesis says that the coefficients of models are similar. If the null hypothesis is rejected, then the intragroups estimation will be the only consistent estimation.

<sup>10</sup> The null hypothesis of the Sargan test is that models of instrumental variables and the mean squared ordinary are similar, therefore, there are not endogeneity problems. However, if the null hypothesis is rejected, then, the coefficients of both models differ, which indicates the existence of endogeneity problems.

divided<sup>11</sup>. As it was said at the beginning, the article analysis the effect of each explanatory variable on the different components of the CS. In contrast to other works, it is also analysed the effects on the related components with the bank debt, since the Spanish financial system is characterised by being oriented to the bank. To analyse possible problems of multicollinearity, Table A3.6 (Appendix 3) reports the correlation matrix of the variables, and it can be observed that there are not any correlation above 0,5, which proves no multicollinearity problems.

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<sup>11</sup> The estimations done in the general case, are also done for subsamples of two sectors (manufacturing and comercial), however, there are not significative differences among the explanatory variables used in the general model, when they are analysed by sectors.

**Table VI**  
**SME capital structure determinants**

	(1) Leverage (Inst. variab)	(2) Debt Maturity (Inst. variab)	(3) Bank debt (Fixed effects)	(4) Bank debt maturity (Fixed effects)
<b>ROA</b>	-0.209* (0.061)	-0.072 (0.639)	-0.221*** (0.000)	-0.131*** (0.000)
<b>DSEC</b>	0.91*** (0.000)	0.578** (0.024)	0.252*** (0.000)	-0.0264 (0.120)
<b>GO</b>	0.171*** (0.001)	-0.617*** (0.000)	0.270*** (0.000)	-0.648*** (0.000)
<b>TANG</b>	-0.073** (0.013)	-0.334*** (0.000)	0.0879*** (0.000)	-0.443*** (0.000)
<b>SIZE</b>	0.092*** (0.000)	0.078*** (0.000)	0.013** (0.013)	0.02*** (0.001)
<b>AGE</b>	-0.003 (0.748)	0.0002 (0.985)	-0.0011 (0.715)	-0.0015 (0.698)
<b>TSIR</b>	-0.022*** (0.000)	-0.0137** (0.033)	0.0392*** (0.000)	-0.023*** (0.001)
<b>VOLAT</b>	0.0159** (0.022)	0.0316*** (0.000)	-0.0249*** (0.002)	0.031*** (0.002)
<b>FINDES</b>	-0.0158** (0.017)	0.0081 (0.350)	-0.023*** (0.000)	0.0052 (0.297)
<b>CONSTANT</b>	-0.0045 (0.632)	-0.0018 (0.877)	0.350*** (0.000)	-0.479*** (0.000)
<b>Hausman test<sup>1</sup></b>	612.69 (0.00)	222.38 (0.00)	2315.16 (0.00)	373.65 (0.00)
<b>Sargan test<sup>2</sup></b>	48.58 (0.00)	26.32 (0.0018)	1.11 (0.99)	14.02 (0.12)
<b>Goodness of fit<sup>3</sup></b>	42.80 (0.00)	40.52 (0.00)	97.56 (0.00)	41.46 (0.00)

In brackets p-values: \*\*\*p-value 0.01, \*\* p-value 0.05, p-value 0.10

T-Statistics are in brackets: \*\*\*p-value< 0.01, \*\* p-value<0.05, p-value< 0.10

<sup>1</sup>  $\chi^2$  – Statistics and Hausman test p-value: equality test between fixed and random effects models.

<sup>2</sup>  $\chi^2$  –Statistics and Sargan endogeneity test p-value: equality test between ordinary least squares and instrumental variable models. Because the fixed-effect model is the resulting one, we apply Sargan test to the model with first differences.

<sup>3</sup> Statistics and p-values of the goodness-of-fit model. In the fixed effects case corresponds to *F-statistics*.

## 5. RESULTS

Table VI captures the results from the estimations of the different variables of the CS of the Spanish SMEs. Columns (1) and (2) refers to the composition of total debt while columns (3) and (4) are referred to bank debt.

Concerning the debt and its duration, the results achieved shows that SMEs prefer to self-finance their investments so that they are able to generate enough internal funds. This follows the pecking order theory (it is accepted Hypothesis 6). It is also shown that small companies use more internal funds (it is accepted Hypothesis H1a); the companies with greater growth opportunities get more external funds and the companies with greater proportion of tangible assets prefer to self-finance their investment (it is rejected hypothesis 3a and 4a, respectively)<sup>12</sup>. On the other hand, when interest rate raises, greater are the cost faced by SMEs, therefore SMEs tend to use their own funds (it is accepted Hypothesis 5a).

Concerning the effects on the duration, it could be noted that the return is not a consequence of the maturity of the debt of the SMEs. Therefore, it could be highlighted that big companies get more funds at short run (it is rejected hypothesis 1b), the companies with greater growth opportunities get more long run funds (it is rejected hypothesis 3b). On the other hand, the existence of tangible assets allow a greater long run financing, which follows the pecking-order theory (it is accepted hypothesis 4b). From a macroeconomic point of view, the uncertainty caused by more volatility of the interest rate, makes that SMEs be short run financed, as the theory predict (it is accepted hypothesis 5b).

Column (3) and (4) of Table VI capture the effects achieved for bank debt and its duration. It is shown that more profitable companies prefer other type of fund different to the bank debt (it is accepted hypothesis 6). However, companies with greater growth opportunities, with greater proportion of tangible assets and greater size have more access to bank funds (it is rejected hypothesis 3c and it is accepted hypothesis 4c and 1c, respectively). Concerning the macroeconomic effects, it is achieved that the environments associated to greater levels of uncertainty, makes the access of SME more difficult to the bank credit, as the pecking-order theory predicts (it is accepted hypothesis 5c).

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<sup>12</sup> If we define growth opportunities based on sales increase, leverage is negatively correlated with them, and the rest of measures are not affected by it. So, a study of these measure quality is needed, and it can be further research.

The results presented at column (4) related to the duration of the bank debt do not differ from those of the duration of the global debt, except in the case of return, where it is relevant to the duration of the bank debt. The more profitable companies prefer the self-financing, however if they ask for bank funds, they get a greater duration than those companies which are less profitable.

Boxes III-VI sum up the main results obtained for all the capital structure components and the agreement or disagreement with the pecking-order theory.

### **Box III**

#### **Main results associated to Leverage determinants and its match with pecking-order theory**

ROA (-) SMEs prefers to self-finance their investments if they generate retained earnings	YES
GO (+) SMEs with higher growth opportunities get more external funds	NO
TANG (-) SMEs prefers self-finance their fixed investment	NO
SIZE (+) Smaller SMEs use more internal resources than the larger SMEs	YES
TSIR (-) Higher debt costs makes SMEs use their own resources	YES

### **Box IV**

#### **Main results associated to debt maturity determinants and its match with *pecking-order theory***

ROA does not help to determine the general debt maturity	-
GO (-) SMEs with higher growth opportunities prefer finance them with long-term debt	NO
TANG (-) Higher level of tangible assets helps SMEs to get more long-term debt	YES
SIZE (+) Larger SMEs prefer to get more short-term external funds	NO
VOLAT (+) Higher uncertainty makes SME to get more short-term debt	YES

### Box V

#### Main results associated to bank debt determinants and its match with pecking-order theory

ROA (-) More profitable SMEs use less bank debt to finance their investments	YES
GO (+) SMEs with higher growth opportunities prefer bank debt to finance them	NO
TANG (+) SMEs get more bank debt to finance their fixed assets	YES
SIZE (+) Larger SMEs get more bank debt than the smaller SMEs	YES
VOLAT (-) Higher uncertainty makes more difficult to get bank debt	YES

### Box VI

#### Main results associated to bank debt maturity determinants and its match with pecking-order theory

ROA (-) Higher profitable SMEs prefer long-term bank debt in case they use external funds	-
GO (-) SMEs with higher opportunities growth get more long-term bank debt	NO
TANG (-) SME prefer to finance their fixed asset with long-term bank debt	YES
SIZE (+) Larger SMEs prefer short-term bank debt	NO
VOLAT (+) Higher uncertainty makes SMEs use more short-term bank debt	YES

Looking at the p-values associated to the constants of each model, it could be proved the significativity of them in the case of the models related to the bank components, but not in the case of the global components of debt. This result is explained by the fact that the bank debt and the maturity of it are determined by other factors such as those associated to the relationships between the companies and the banks. These relationships may affect the CS. This is an issue of future research.

## 6. CONCLUSIONS

In this work it has been studied the variables that affect the CS of Spanish SMEs from the point of view of the *pecking-order theory*. Traditionally, the empirical test used by this theory is based on an inverse relationship between the return of the companies and their leverage. However, in this work, it is checked the empirical validity of the

predictions done by the pecking-order theory in relation to other affecting variables of the CS of the companies, such as: the size, age, the presence of the tangible assets, the presence of growth opportunities and the macoeconomics factors.

Besides, in contrast to other works, it is analysed the influence of the described factors over the final composition of the CS, taking into account four dimensions (total debt, and its duration, bank debt and its duration). The reason why it has been studied separately the bank debt is because of the importance that this debt has on the financing of Spanish companies, given the fact that these companies are oriented to the bank.

Within a context of high asymmetries associated to SMEs, the theories grounded on asymmetric information are especially important. However, since it is difficult to access to the market to give signals that shows the type of the company, the pecking-order-theory seems to be the most relevant theory to make test under this scenario.

To test the hypothesys of the study it is used a subsample from the database SABE during the period 1994-1998. The sample is made of an incomplete panel of 13,266 companies and 42,258 observatioins. An additional contribution to the work is that besides of the database used, it can be apply the data panel methodology taking into account the existence of individual effects. Furthermore, the panel allow us to solve endogeneity problems by means of the lags used in the model of instrumental variables.

The results achieved shows the importance of the pecking-order theory in the determination of the CS of the Spanish SMEs, although it is also needed other useful theories to explain the behaviour of the companies.

On the other hand, it could be highlighted that the bank debt is easier to get for the SMEs with more growth opportunities. Besides, the more profitable the companies are, the greater is the long run funds obtained.

The *pecking order theory* has been broadly checked in the literature by means of the return (measured by the ROE). Therefore, since the present article considers other variables such as the age, and the size, it is not so clear that the results fulfill this theory. So, it is observed that capital structure theories are complementarities rather than



independent, then, a possible extension would be to check other theories presented at section 2.

## APPENDIX 1

We drop all those observations with one of the following characteristics:

1. Industrial activity code not available.
2. Number of employees greater than 250
3. Amount of sales higher than 40 million €
4. Total assets greater than 27 million €
5. Abbreviate Financial Statements
6. Amount of short-term bank loans  $< 0$
7. Amount of long-term bank loans  $< 0$
8. Sales  $< 0$
9. Shareholders' equity  $< 0$
10. All those observations with negative values in supposed positive accounts.

## APPENDIX 2

Evolution of Temporal structure of Interest rates and Interest rate volatility for the period 1.994-1.998 for Spain.

<b>Year</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
TSIR	1.26	1.49	0.18	-0.1	-0.17
VOLAT:	0.12	0.088	0.58	0.115	0.126

## APPENDIX 3

**Table A3.1**  
**SME' Capital Structure according to the European Comission definition**

	<b>Leverage</b>	<b>STDR</b>	<b>BDCD</b>	<b>STD_TA</b>	<b>LTD_TA</b>
Micro	0.48	0.62	0.34	0.17	0.09
Small	0.49	0.66	0.39	0.19	0.082
Medium	0.58	0.77	0.48	0.25	0.086
p-value 1-2	*	***	***	***	***
p-value 1-3	***	***	***	***	**
p-value 2-3	***	***	***	***	**

\*\*\*, \*\*, \* diferencias significativas al 99%, 95% y 90%

**Table A3.2**  
**SME' Capital Structure by maturity**

	<b>Leverage</b>	<b>STDR</b>	<b>BDCD</b>	<b>STD_TA</b>	<b>LTD_TA</b>
Young	0.56	0.67	0.39	0.219	0.10
Mature	0.546	0.74	0.46	0.22	0.08
p-value 1-2	***	***	***	0.1434	***

\*\*\*, \*\*, \* diferencias significativas al 99%, 95% y 90%

**Table A3.3**  
**SME' Capital Structure by its financial distress situation**

	<b>Leverage</b>	<b>STDR</b>	<b>BDCD</b>	<b>STD_TA</b>	<b>LTD_TA</b>
Yes findes	0.61	0.68	0.51	0.26	0.12
No findes	0.51	0.75	0.39	0.20	0.07
p-value 1-2	***	***	***	***	***

\*\*\*, \*\*, \* diferencias significativas al 99%, 95% y 90%

**Table A3.4**  
**SME' Capital Structure by industry**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Lev	0.46	0.53	0.62	0.58	0.49	0.54	0.50	0.53	0.47
STDR	0.60	0.73	0.71	0.76	0.55	0.66	0.65	0.57	0.71
Stb_ta	0.16	0.23	0.21	0.24	0.16	0.19	0.19	0.18	0.23
Ltd_ta	0.13	0.09	0.075	0.066	0.205	0.114	0.105	0.187	0.09
Bd_cd	0.42	0.47	0.45	0.46	0.39	0.37	0.29	0.38	0.26

**Table A3.4a**  
**SME' Capital Structure by industry**

	<b>Leverage</b>	<b>STDR</b>	<b>BDCD</b>	<b>STD_TA</b>	<b>LTD_TA</b>
Manufacture	0.53	0.73	0.47	0.23	0.091
Trade	0.58	0.76	0.458	0.24	0.066
p-value 1-2	***	***	***	***	***

\*\*\*, \*\*, \* mean difference test 99%, 95% y 90%

**Table A3.5**  
**SME' Capital Structure by its legal form**

	<b>Leverage</b>	<b>STDR</b>	<b>BDCD</b>	<b>STD_TA</b>	<b>LTD_TA</b>
Corporations	0.55	0.74	0.44	0.23	0.086
Non-corporations	0.56	0.65	0.435	0.20	0.098
p-value 1-2	**	***	0.26	***	***

\*\*\*, \*\*, \* mean difference test 99%, 95% y 90%

**Table A3.6**  
**Correlation matrix of the explanatory variables.**

	Size	Age	Forjur	Findes	TSIR	Volat	GO	Tang	Endsec	Mdsec	Dbsec
Size	1										
Age	<b>0.2101</b>	1									
Forjur	0.0898	<b>0.1371</b>	1								
Findes	<b>0.0098</b>	-0.008	0.008	1							
TSIR	<b>-0.015</b>	<b>-0.049</b>	<b>0.0358</b>	<b>-0.09</b>	1						
Volat	-0.005	-0.005	-0.004	<b>-0.032</b>	<b>-0.265</b>	1					
GO	-0.002	0.0042	0.0019	<b>-0.009</b>	<b>0.0135</b>	-0.005	1				
Tang	<b>0.2025</b>	<b>0.0682</b>	-0.007	0.0024	0.0015	<b>0.0124</b>	<b>0.0187</b>	1			
Endsec	<b>-0.054</b>	<b>-0.073</b>	-0.032	<b>-0.081</b>	0.0000	0.000	-0.000	<b>-0.189</b>	1		
Mdsec	<b>-0.033</b>	<b>0.0364</b>	<b>0.0562</b>	<b>0.023</b>	0.0009	0.000	-0.009	<b>-0.27</b>	<b>0.1881</b>	1	
Dbsec	-0.054	0.056	-0.007	<b>-0.086</b>	0.000	0.000	-0.003	-0.002	<b>0.3891</b>	<b>0.0966</b>	1

\* Bold coefficients represents a significance level of 5% or better.

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