



High debt companies' leverage determinants in Spain: A quantile regression approach

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ABSTRACT

With a severe debt overhang problem in Spain, either public or private, the analysis of the factors that influence companies' leverage in this country reveals essential, in particular for the high-indebted firms. This study benefits from the quantile regression approach advantages over the OLS method to analyze the leverage determinants for a large sample of companies for the 2001–2011 period depending on their level of indebtedness. This method reveals that for the highly-leveraged companies many factors are no longer significant and that cash flow variable is crucial if the companies would like to decrease their debt levels.

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1. Introduction

The analysis of the level of debt held by companies and its determinants is crucial for economic policy. The corporate debt of Spanish firms has increased remarkably in recent years, reaching its height before the subprime crisis and the following credit crunch (Banco de España, 2008). Fig. 1 shows the mean debt ratio for companies in the sample used in the present study for the years 2002 to 2011. It can be seen that this sample of firms experienced the growth in debt mentioned above from 2002 until 2007, when an intense decrease was verified and a structural change seemed to happen. Since the start of this financial crisis leverage has declined considerably (Banco de España, 2008). Highly indebted companies are more likely to suffer from the credit crunch, which provokes a decrease in the funds that these firms can draw upon, and this critically constrains their capacity to grow or generate employment, casting severe doubts on their survival. Among quoted companies, for example, those most highly indebted have been the ones whose stock value has suffered most in this financial crisis, clear evidence that the burden of this high level of debt imposes is considered to have a sharp impact on their finance and investment policies. We will focus our study on nonquoted companies, and particularly on SMEs, which represent more than 91% of our sample. In Spain, SMEs constitute more than 99% of the companies and have been responsible for nearly 80% of the job creation for the 96–03 period (López García et al., 2009).

It is because of this that the study of the debt determinants is so important in this time of financial difficulty, especially for highly indebted companies, which have become the more vulnerable members of the economic and productive system in a context of a severe financial crisis and credit constraints.

With respect to the analysis of the determinants of debt, either for a full sample or a sample of low or high debt companies, most previous studies that have sought empirical evidence have been based on linear regression models and have therefore been based on the hypothesis that the relationship between leverage and the factors that determine it is linear. If the distribution of the dependent variable is highly heterogeneous, or if the factors that determine a firm's level of debt change their influence on this level of debt depending on the company's position in the distribution of the dependent variable, that is, depending on whether the company is highly indebted or not, then the linear regression estimates entail a loss of information, as this type of regression implies estimating the coefficients of the explanatory variables using conditional means of the sample variables.

There is a hint that relationships may be non-linear when contradictory results are found in different studies of capital structure that take into account different levels of indebtedness, even though they use similar variables and refer to the same country, when there are quadratic relationships for the explanatory variables or when conflicting results are found with respect to significance, value or even sign of the coefficients of these explanatory variables. Harris and Raviv (1991) argue that although numerous studies have identified a large number of potential determinants of capital structure, they have failed to establish which are important depending on the context. They conclude that what empirical studies should do is to

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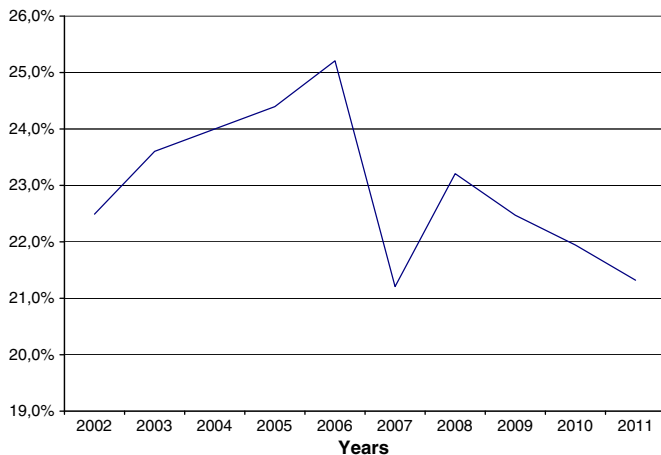


Fig. 1. Financial debt mean of the sample companies for 2002–2011. * Financial debt computed as long and short term financial debt/total assets.

test particular models to identify the most important determinants of capital structure in specific environments. As Myers (2003) points out “There is no universal theory of capital structure, and no reason to expect one. There are useful conditional theories, however Each factor could be dominant for some firms or in some circumstances, yet unimportant elsewhere”. Frank and Goyal (2009) analyze which are the factors that determine companies' leverage and that a proper complete theory about capital structure should account for, and admit that future research should allow for nonlinearities when studying these relations.

Doubts about the linearity of these relationships emerge not only when testing the different capital structure theories empirically, but also when analyzing the implications of some of those theories, as they give rise to nonlinear relationships between debt and its determinants. The tradeoff theory suggests that there is an optimal capital structure that pertains when firms trade off the costs and benefits of having debt, namely financial distress costs and the impact of debt on company and personal taxes respectively. Within this theory, the existence of potential non-linearities has been suggested, for example, in the situation where highly indebted companies want to apply for new loans (Castanias, 1983; Gilson, 1997). Highly leveraged companies therefore face higher expected costs for restructuring their debt. In addition, when companies are near to potential bankruptcy, creditors will ask for higher compensation because of the risks involved. In addition, many creditors will impose restrictive clauses in order to try to protect their interests, and this may result in very high costs for these companies. For this reason, the variables related to these costs may have a different influence on companies depending on the level of debt of the companies. Van Horne (1992) found that the probability of bankruptcy is often a non-linear function of the leverage ratio, and consequently the financing distress costs would have a non-linear effect on that leverage. In addition, Sibilkov (2009) found that the relation between asset liquidity and debt is curvilinear.

The other widely employed model of capital structure, the pecking order theory, could also imply non-linear relationships with respect to debt. This theory states that companies follow a financing hierarchy when they have to finance their investments. This hierarchy consists basically of a preference for internal financing, that is, retained earnings and depreciation. If the company has to apply for external funds, then it will prefer debt. When debt capacity is exhausted, the company will prefer convertible bonds and finally equity (Myers and Majluf, 1984).

As Chirinko and Singha (2000) point out, this financing behavior implies nonlinearity in the relationship between financing deficit

and the company's capital structure. Firms will only make use of debt when they have a financing deficit, that is, a need for external funds. Therefore, variables that form part of that financing deficit will only influence the absolute value of debt when that deficit is positive. As the need for external funds increases, these companies will only finance with debt until the company exceeds its debt capacity and the company then has to resort to equity issues. So, when the company reaches its limit for debt, these variables will again cease to influence the company's leverage and the decision will be whether to issue equity or not. As this decision usually implies all or nothing, many authors use discrete variable regression techniques (logit and probit¹) for analyzing this decision.

Benito and Whitley (2003) found evidence that the risk premium or undervaluing of the assets issued by a company has a non-linear relationship with the firm's leverage for a sample of British companies. This risk premium, which is the *raison d'être* for the Myers and Majluf (1984) pecking order model, is caused by the information asymmetry problem, which produces a lack of trust that will in turn affect the company's value as well as its investment projects and their correspondent financing by potential new investors. If this empirical evidence applied for the generality of enterprises, the most indebted companies could be obliged to implement a financial policy conditioned by an extreme hierarchy, in which they would rarely resort to equity issues to raise external investment or would only ever finance their growth from retained earnings, as all the external finance would be constrained.

When talking about the different capital structure theories, Myers (2001) argues that capital structure is relevant because of the consideration of taxes, financial distress costs, agency costs and information asymmetry problems. Myers says that the different capital structure theories emphasize concrete benefits and costs of the various financing policies, and due to the fact that these theories are not general, testing them for a large and heterogeneous group of enterprises may not be very informative. The researcher may find statistical results that are consistent with each theory, because each one may work for a specific subsample of companies. Therefore, he concludes that in order to test a hypothesis it is necessary to discriminate between subsamples. It is in this sense that Lemmon and Zender (2010) used the concept of a debt capacity limit, and found that when they split their sample into subsamples of above and below average, the financial behavior was different.

In the present study, the existence of that non-linear relationship will be tested through the use of quantile regressions procedure. This estimation is appropriate when analyzing heterogeneous behavior in the face of different levels of the dependent variable. This analysis is based on the LAD (least absolute deviations) estimation, in contrast with the usual OLS method, and allows the estimation for different levels or quantiles of the dependent variable.

Quantile estimation has already been used for studies about leverage for example by Fattouh et al. (2005, 2008) among others, for a sample of South Korean and British firms respectively, and, in both, evidence of non-linearity between debt and its determinants was found.

The aim of this work is to analyze whether the determinants of capital structure vary depending on the company's level of debt. Quantile regressions are used for a large sample of Spanish firms, and for different debt levels, using diverse variables and factors that are considered to be explanatory of a company's capital structure. The purpose of including variables from different theories is not to examine which theory explains Spanish companies' debt ratios, but to check whether they are determinant or not in a specific quantile of debt level. Besides, most of recent research has

¹ See Greene (1993) for a more detailed review of these studies.

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