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Research Paper

International rating agencies and corporate impact: A case study in Iberian companies

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Abstract. This study intended to analyse the impact of Rating Notation, from four of the major International Credit Rating Agencies, in Iberian private companies. Primary data was collected via SABI Database, with financial relevant data of Iberian private companies, in a time frame from 2003 to 2015. Results were determined by an empirical analysis, through a new econometric model, starting with correlations between leverage and variables Return on Assets, Return on Equity, Dimension, Tangibility, Sales Variation, Political Risk and Critical Political Risk. Critical Political Risk is a dummy variable on notations of the Credit Rating Agencies. Considering the impact of these international notations, we address the issue of how this notation impacts domestic Political Risk and affect companies' capital structure. Support evidence was found for our hypothesis: as Political Risk increases, Leverage tends to decrease. Further studies interest lays in research how CPR affects each company, measuring that risk by company, and analysing in detail the impact of Rating Notation in the decision of financing in private companies from Iberian Market.

Keywords: International credit rating agencies, financial crisis, corporate structure, leverage.

INTRODUCTION

This paper introduces a new approach on the decisions of private companies' management. There is no other study that we know of that applies a Political Risk (PR) Index with this methodology, incorporating the effects of Country's International Credit Rating Notation on private companies' decisions. Recent studies regarding European capital structure show that leverage (L) of European companies show considerable instability over time. But due to what special factor?

Companies' funding has always been crucial in corporate finance. So, the big issue still arises: How the countries' international credit rating notation can affect the capital structure and leverage (L) of private companies.

Our time frame, from 2003 to 2015, comprises two main international financial crises, namely, the sub-prime and the sovereign debt crisis. We select this period according to the PR index build with our methodology and based in Rating Notations from the 4 main credit rating agencies that the European Central Bank takes in consideration to realize open market operations, taking Iberian sovereign debt as guarantee. Our PR index, from 2000 to 2003, shows stability with low levels of PR. After 2003, the PR index starts to move slowly, and in 2008 the PR index shows huge annual increases. Between 2012 and 2013 we stated an equal high value of PR index. After 2013, the PR index starts a downwards tendency (Figure 1).

The main hypothesis was developed regarding recent literature review about European capital structure instability, and alternative measures of political uncertainty, and is in line with Cao *et al*. (2013), that

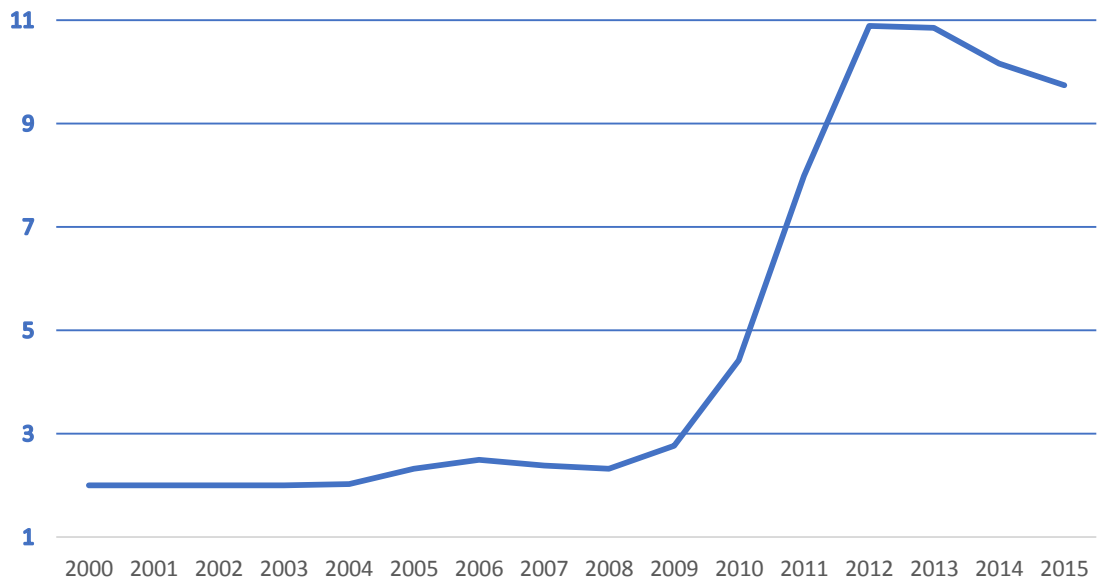

Figure 1. Political risk index evolution from 2000 to 2015.

verified that the level of political uncertainty in the US reduces the Leverage of listed companies, therefore stating that political uncertainty influences firms' structure of capital.

But the question is still there to be answered: what is the effect of a countries' Political Risk, determined by international credit rating notation, in private companies leverage?

Our main hypothesis is that as PR increases L tends to decrease. Our goal is to provide evidence that Critical PR (CPR) as we define it in the PR index, original from our methodology, can provide evidence that the hypothesis has positive evidence from data.

This paper is organised as follow. Next section presents Materials and Methodology, followed by Results and the Conclusion and Recommendations, supporting evidence for our hypothesis.

In order to maximize the value of investments and minimize the cost of opportunity, an optimal level of leverage (L) must be obtained. This subject of study was first addressed by Modigliani and Miller (1958) concluding, through a set of theoretical assumptions, that the value of a company is not affected by its capital structure but by investment decisions and the ability to generate future cash flows. Later on, Myers and Maluf (1984) analysed two main theories and suggested that L level can be explained essentially by two alternatives currents: The Pecking Order and the Trade-off Theories, associated with the preferences about debt management or internally generated resources to finance the firm. More recently, Ben-Nasr *et al*. (2010) show that in the absence of strong corporate governance the cost of capital tends to rise along with the systematic risk. In recent research about political influence, through political connected firms (PCF's), Boubakri, *et al*. (2012) support that the cost of equity varies systematically with political environment, and that the rate of return depends on the investor's perception of firm risk. This will affect investment decision, whether through debt or equity raising. Iyer *et al*. (2014) concluded that Portuguese banks capacity for financing were supported in the interbank market before the crisis and were reduced during the crisis, especially for smaller institutions.

In the United States (US), Gao and Qi (2012) verified that political uncertainty increases the risk premium of municipal bonds, and Cao *et al*. (2013) verified that political uncertainty in US listed companies reduces L ratio. In China, Zhang *et al*. (2015), following Leary and Roberts (2005), developed a study based on 2038 Chinese listed companies and found that as political uncertainty increases, companies tend to lower L ratios, due to degradation of the external financing environment. Matias *et al*. (2015) focused on 1448 Portuguese manufacturing companies, from 2004 till 2011 and suggest that the Pecking Order Theory and Trade-Off Theory are not mutually exclusive. The biggest Small and Medium companies (SMC) seem to use more debt and conclude that SMC are mainly financed by short-term debt and that it is positively correlated with the variables: size, profitability, growth opportunity and specificity, and negatively correlated with tangibility, age and a dummy crisis variable. The long-term debt is positively correlated with tangibility and crisis and negatively correlated with size, profitability, growth opportunities and age. The dummy crisis variable captures the effects of the crisis that began in 2008 (subprime) and presents a statistically positive relation. It was also observed in the sample that the global debt decreased with the crisis. This study is

also in line with Zhang *et al*. (2015), although they did not consider the period of higher sovereign debt crisis (2011 to 2014). That is the reason why our study comprises 2003 to 2015.

Pereira *et al*. (2015) studied the determinants of the capital structure of Portuguese SMC in the wine sector for the period of 2003 till 2012 and concluded that the companies' growth and age were not relevant in the level of debt, while profitability, tangibility, size, general liquidity, other tax benefits and risk are determining factors. Batten and Szilagyi (2012) studied the period of the global financial crisis and suggested that the balance of domestic companies will be more exposed to exchange rate movements, which will influence credit and interest rate risk. Therefore, we considered to be of the outmost importance to relate the impact of International Rating (influencing the perception of investors) on domestic companies finance decisions.

MATERIALS AND METHODS

Description of the study area

For this study, the Iberian System Balance Sheet Analysis (SABI) was used, a database that captures and handles Iberian private company information in relevant financial reports. In this database, were selected 383 Iberian companies that between 2003 and 2015 (including two main financial crisis) presented the necessary data. Only companies with positive sales and a minimum of 20% of equity were considered. These totals an annual number of companies between 163 in 2003-2008, and 220 in 2009-2015.

Data collection methods

For this study, determined by an empirical analysis and through a defined model, for each year were calculated the average on leverage (AL), return-on-assets (ROA), return-on-equity (ROE), dimension (D), tangibility (T), sales variation (SV) political risk (PR) and a dummy variable critical political risk (CPR), running continue progressive regressions between (AL) and seven variables considered, (ROA), (ROE), (D), (T), (SV), (PR), and (CPR).

Our goal was to analyse, through an international environment, the impact of PR change in L of the Iberian firms from 2003 to 2015.

Our hypothesis was that as PR increases, L tends to decrease.

To define the basic political risk index for each year, were considered four main international rating agencies, Standard & Poor's, Fitch, Moody's and DBRS. We analysed the ratings on a scale between 0 and 21 (0 for AAA and 21 for C) and according to the variation of the rating, the year average was calculated taking into account the number of months that each rating had. The "negative watch" had an annual weight in the period in which they were active of +1, the "negative" of +0.5, the "positive watch" of -1, and the "positive" of - 0.5. This methodology was applied considering the percentage of the year with these indicators, to identify changes in PR due to expectations induced by the rating agencies, combining the PR index with the rating noted for that period. These results are stated in Figure 1, and are in line with the study of Matias *et al*. (2015) where it is stated that the dummy crisis variable captures the effect of the crisis that begun in 2008. They observed in the sample that the global debt decreased within crisis period. This study is also in line with Zhang *et al*. (2015), although they did not consider the period of high sovereign debt (2012 to 2014).

After calculating each year's PR index, we then calculated an average of the PR with the four agencies each year. This notation served to amplify the risk associated with funding, measured by international investors. The introduction of the dummy CPR took value 1 if PR is equal or above 4 and value 0 if it's below.

Empirical analysis started with correlations between L and variables ROA, ROE, D, T, SV, PR and CPR. Progressive regressions were run on L with ROA e ROE, D, T, SV, PR and CPR, to verify classic relations of capital structure, considering our main hypothesis that increasing PR will decrease L and will have increasing explanatory power of capital structure. Our variables regarding profitability, such as ROA and ROA are traditional variables used in Pecking Order and Trade-off Theories of capital structure. Other variables, T, D, SV, are defined as log of tangible assets, log of total assets and the average of sales variation rate.

Our goal was to increase adjusted R^2 as we added the variables, taking care of multicollinearity problems that lead to Spurious Regressions. We continued with progressive regressions, adding variables in order to test their additional explanatory power. We eliminated variables with multicollinearity problems, considering only the variables that increased adjusted R^2. In the last regression, we included CPR as explanatory variable of L.

The regression model used was defined as follows:

$$L_t = a + b_1 X_{1,t} + b_2 X_{2,t} + b_3 X_{3,t} + b_4 X_{4,t} + b_5 X_{5,t} + b_6 X_{6,t} + b_7 X_{7,t} + e_t$$

L_t = *average leverage of total companies in year "t", being leverage defined as the debt-to-equity ratio.*

Regarding independent variables we used:

$X_{1,t}$ - *ROA, defined as year "t" sample average of ratio Return on Assets, as net profit divided by total assets*

Table 1. Pearson Correlation Matrix between explanatory variables and leverage.

	Leverage (L)	ROA	RO	Dimension (D)
Leverage (L)	1.000			
ROA	-0.325	1.000		
ROE	-0.277	0.968***	1.000	
Dimension (D)	-0.379	0.142	0.237	1.000

***, ** - Significantly different from zero at the 1%, 5% level

	Leverage (L)	Tangibility (T)	Sales variation (SV)	Political risk (PR)	Critical political risk (CPR)
Tangibility (T)	-0.203	1.000			
Sales Variation (SV)	0.157	-0.372	1.000		
Political Risk (PC)	-0.534	0.114	0.054	1.000	
Critical Political Risk (CPR)	-0.568**	0.128	-0.020	0.906***	1.000

***, ** - Significantly different from zero at the 1%, 5% level

Table 2. Progressive regressions of profitability ratios with leverage.

	Regression1	Regression2
Constant	1.795 (0.000)	1.760 (0.000)
ROA	-1.713 (0.279)	-4.698 (0.464)
ROE	-	1.542 (0.628)
R^2	0.106	0.127
Adjusted R^2	0.024	0.047
DW	1.951	1.818

(…) significance level of the explanatory variable

$X_{2,t}$ *- ROE, defined as year "t" sample average of ratio Return on Equity, as net profit divided by total equity*

$X_{3,t}$ *- D, as dimension, defined as year "t" sample average of log of total assets*

$X_{4,t}$ *- T, as tangibility, defined as year "t" sample average of log of tangible assets*

$X_{5,t}$ *- SV, as sales variation, defined as year "t" sample average of sales variation rate*

$X_{6,t}$ *- PR, as political risk, defined as year "t" sample average of the four rating agencies index.*

$X_{7,t}$ *- CPR, as critical political risk defined as dummy variable with value 1 when PR is equal or above 4 and value 0 with PR below this levels.*

ε_t - As the regression error as white noise variable.

RESULTS

Table 1 confirms our hypothesis that as PR increases L tends to decrease, although the correlation is not statistically significant. The negative correlation of profitability ratios with leverage gives support of the Pecking Order Theory. Correlations between profitability ratios and PR, with L, are not statistically significant, and the only variable with significant correlation with L is CPR and negative as expected. Those results are in line with Cao *et al*. (2013) stating that in US companies the increase of political uncertainty reduces the level of leverage. Zang *et al*. (2015) also stated that L is negative correlated with profitability ratios. Regarding this result, it is important to run progressive regressions of the several explanatory variables regarding L in order to verify if there is some statistic explanatory power of the variables in study, to analyse the progressive regression explanatory power of those variables. We then can compare these results with the regression of L with CPR, since this variable alone has higher regression R^2 than together.

The results in Table 2 confirm some statistical explanatory power of the Regression1. In Regression2, R^2 shows that ROA has in fact negative impact on L. This is in line with Zang *et al*. (2015) for part of our time frame and regarding profitability ratio RAO. In Regression2, R^2 shows ROE with positive signal with L, what is not

Table 3. Progressive regressions of ROA and independent variables dimension, tangibility and sales variation with leverage.

	Regression3	Regression4	Regression5
Constant	2.153 (0.000)	2.503(0.000)	2.110 (0.000)
ROA	-1.458 (0.350)	-0.722 (0.678)	-1.576 (0.354)
Dimension (D)	-0.032 (0.257)	-0.098 (0.222)	-0.028 (0.381)
Tangibility (T)	-	0.042 (0.367)	-
Sales Variation (SV)	-	-	0.099 (0.776)
R^2	0.219	0.290	0.266
Adjusted R^2	0.062	0.053	0.071
DW	2.267	2.513	2.242

(…) significance level of the explanatory variable.

Table 4. Progressive regressions of ROA and independent variables dimension and political risk with leverage.

	Regression 1	Regression 3	Regression 6
Constant	1.795 (0.000)	2.153 (0.000)	1.977 (0.000)
ROA	-1.713 (0.279)	-1.458 (0.350)	-1.464 (0.319)
Dimension (D)	-	-0.032 (0.257)	-0.014 (0.629)
Political Risk (PR)	-	-	-0.007 (0.148)
R^2	0.106	0.219	0.388
Adjusted R^2	0.024	0.062	0.184
DW	1.951	2.267	2.599

(…) significance level of the explanatory variable.

expected, as shown in Table 1, providing evidence of multicollinearity. As a result, we will maintain in the next regression ROA and remove ROE. The Regressing1, having an adjusted R^2 of 0.024, shows that ROA has statistical power, even low.

The results in Table 3 confirm some statistical explanatory power of ROA and D regarding L. Regression3 has a negative coefficient of D regarding L, even not statistically significant. This shows that, in the period, as D increases, L tends to decrease. This is in line with Matias *et al*. (2014), where they stated that, considering the short and the long term debt, there is statistically evidence that long term debt is negatively correlated to size, profitability among other variables. The explanatory power of Regression3 measured by adjusted R^2 is higher than Regression1, where just ROA is considered. So, the variable D is retained in follow regressions. Regression4 shows T with positive signal with L, what is not expected, as stated in Matias *et al*. (2015) for long term debt and as shown in Table 1, providing evidence of multicollinearity. The adjusted R^2 decreased when Regression3 is considered. So, the variable T is eliminated in follow regressions. Regression5 shows that when including SV, the explanatory power is null. Matias *et al*. (2015) regarding long term debt, stated that grow opportunities as a proxy for SV are negative correlated. So, the variable SV is eliminated in follow regressions.

Table 4 shows the selected regressions of Tables 2 and 3 (Regression1 and Regression3) and a new and important Regression6 inserting PR as an additional variable. Results show that PR has no multicollinearity problems with the retained two variables (ROA and D) and the explanatory power of this Regression6 increases from Regression3, with adjusted R^2 increasing from 0.062 to 0.184. These results provide evidence that in this period of high variance of PR, mainly due to the sovereign debt crisis, L tends to adjust according to our hypothesis, that is, as PR increase L tends to decrease. These results show also that the higher ROA e ROE, the lower L tend to present. These results are according to Vieira (2013), Zhang *et al*. (2015) and Matias *et al*. (2015), although the last one did not consider the period of high sovereign debt crisis (2011 to 2014). When considering the variable CPR together with the others the explanatory power decreases, since they are not statistically significant. In Regression7 just L against CPR show statistical power, telling us that in high CPR years L tends to decrease, providing evidence to our hypothesis.

Table 5 shows Regression7 with the dummy variable, where L is explained by CPR, show an adjusted R^2 of 26.1 per cent. The variable dummy CPR is significant since the significance level is below 0.05. The DW value is somewhat above 2.2 showing some positive

Table 5. Progressive regression of dummy critical political risk with leverage.

	Regression 7
Constant	1.715 (0.000)
Dummy CPR	-0.568 (0.043)
R^2	0.323
Adjusted R^2	0.261
DW	2.475

(…) significance level of the explanatory variable

autocorrelation of the variable. This regression provides evidence that the high increase of PR leads to lower L, during the periods of sub-prime and sovereign debt crisis, on Iberian Private Companies, providing strong evidence to the hypothesis that increase of PR tends to decrease L.

DISCUSSION

Historically, academicians have largely studied the capital structure of companies, and internal and external factors of impact.

Our time frame includes two main financial crises, the sub-prime and sovereign debt crisis, from 2003 till 2015, and the results obtained support evidence for our hypothesis, that is: as PR increases, L tends to decrease. We avoid the main limitation of not getting statistically significant correlations in general, by introducing a dummy variable Critical Political Risk.

CONCLUSION AND RECOMMENDATIONS

Since the work of Modigliani and Miller (1958), two main theories have emerged, the Pecking Order Theory and the Trade-Off theory, being actual references.

PR measured by rating notations in European countries has been disregarded until the sovereign debt crisis. Internationally political risk has been recently discussed by Iyer *et al*. (2014). They state the difficulty of banks capacity for financing, in the interbank market, leading to a reduced supply of credit. Zhang *et al*. (2015) also show that as political uncertainty increases, companies tend to lower leverage ratios.

Our time frame includes sub-prime and sovereign debt crisis, from 2003 till 2015.

The results obtained support evidence for our hypothesis, that is: as PR increases, L tends to decrease. The CPR associated with the crisis period, from 2010 to 2015, show strong statistical negative correlation with L and the regression of this variable alone for explaining L variation, explains 26% of the variation around the mean. These results support our hypothesis that high increase in PR tends to decrease L of companies.

The main limitation is that we could not get statistically significant correlations other than with PR that provides evidence for our hypothesis. We recommend that future interest research lays in showing how PR affects each company, measuring that risk by company, and verifying how the evolution of PR change L, on average.

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