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**Article**

## The effect of corporate governance on the financial structure of listed firms

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## The effect of corporate governance on the financial structure of listed firms

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### Abstract

The purpose of this study is to analyse the influence of corporate governance on the financial structure of listed firms. The analysis is founded on the capital structure and agency theories. Corporate governance literature indicates the existence of nonlinear relationships, and hence this research applies multiple linear regression to a sample of 100 firms listed on the London Stock Exchange, corresponding to a 3-year period. The results confirm the influence of corporate governance on the financial structure of listed firms, and in particular, the nonlinear effect of the percentage of executive members of the board.

**Keywords:** Corporate governance; financial structure; agency theory; listed firms.

### 1. Introduction

Corporate governance is associated with the financial structure through the type of financing used by firms (Jensen, 1989; Kaplan, 1989) and investment in assets (Mehran, 1995). It refers to the way investors control the board of directors and its portfolio (Kaplan and Stromberg, 2009). Within this framework, the agency theory is central to the study of the conflict of interests between owners and managers, with effects on the financial structure, particularly in terms of firm indebtedness. This agency conflict is also found among creditors and owners (Harris and Raviv, 1991).

Financial structure refers not only to the ways in which the firm is financed, but also to its investment structure (Axelson, Stromberg and Weisbach, 2009; Molly, Laverenand and Deloof, 2010; Sen, 2010). A financing structure that focuses primarily on increasing debt determines the firm's risk increase, and acts as an alarm signal to creditors, partners and the business itself, while managers focus on book



values when establishing financial structure (Graham and Harvey, 2001). In light of these reflections, this study poses the question “does corporate governance help to differentiate the financial structure of firms?”

The literature reveals that the financial structure strongly influences corporate performance; an influence that is linked to the interests and strategic options of shareholders and managers. The perspective of agency conflict is used to examine the relationship between the firm’s governance model and its financial structure to better understand the influence of this relationship on performance (Belsely, 1991; Berger, Ofek and Yearmack, 1997). Several authors note the need for further studies involving nonlinear relationships and the inclusion of more variables of governance. Other studies evaluate the relationship between different models of corporate governance in the financial structure but are generally not conclusive (Abor, 2007; Anderson, Mansi and Reeb, 2004; Fosberg, 2004).

This study focuses on the relationship between corporate governance and financial structure given its importance to business performance. The objective is to analyse the effect of corporate governance on investment structure, financial leverage, capital structure, long-term debt and short-term debt, and to examine the influence of sector, age, size, and growth opportunities on the financial structure.

The results make a clear contribution to the literature by demonstrating an inverted U-shaped relationship between the percentage of executive directors and financial leverage, which is also influenced by the existence of an executive committee. Another important contribution highlights the effect of size, age of business and growth opportunities in the financial structure.

Following this introduction, we present the literature review and hypotheses, as well as the conceptual model, variables and empirical agenda. The following section contains the analysis and results, and ensuing discussion, ending with the conclusions and recommendations for future research.

## **2. Literature review and hypotheses**

### **2.1- Corporate governance**

Several authors (e.g. Mangena, Taurigana and Chamisa, 2012; Ramdani and van Witteloostuijn, 2010) study the relationship between governance and corporate performance to understand how to mitigate the effects of agency and principal conflict. Black, Jang and Kim (2006) observe that firms with better corporate governance have better financial performance than firms with weaker governance, and that good corporate governance is fundamental in helping the owner to exert control over the firm’s activities. Fama and Jensen (1983), and Jensen and Meckling (1976) claim that good corporate governance helps owners to maintain greater control over the business and to access different types of financing. Assuming that a sound system of corporate governance is important for market rating, firms will most likely gain access to other kinds of financing, which are largely unavailable to organizations with weak corporate governance.

Agency theory suggests that large shareholders have the incentive and influence to ensure that managers operate in their interests (Daily, Dalton and Rajagopalan, 2003). In this context, firms face difficulties in obtaining financing because minority investors fear expropriation by managers and majority shareholders (Bruton et al., 2010). In this case, different governance mechanisms can replace or complement the concentration of power (Daily, Dalton and Rajagopalan, 2003; Hoskisson et al., 2002), for example, through independent directors and plainly separating the roles of the chairman and the CEO. Many agency problems arise due to a deficiency in governance mechanisms for complex ownership structures and a blurred separation between ownership and control (Harvey, Lins and Roper, 2004). For these authors, debt has been, in many cases, used more as a tool for the expropriation of minority shareholders than as an effective corporate governance instrument.

The main theories of capital structure sustain that firms that have access to capital markets and financial institutions work reasonably well, which justifies any effort to improve financing decisions and better knowledge of the capital structure (Myers, 2003). Corporate governance literature, mostly supported by agency theory (Filatotchev and Nakajima, 2010), helps to explain the behaviour of firms and their decisions, as well as investment decisions (Ruiz-Porras and Lopez-Mateo, 2011).

Board size and its internal arrangements play an important role in the study of corporate governance. Denis and McConnell (2003) consider that a smaller board is an important determinant of corporate governance, where members are more likely to agree with the proposed outcome. The separation of duties between the chairman and the CEO is posited as a central question with regard to the non-compatibility of supervision and decision duties (Davis and Kay, 1993). Fosberg (2004) considers that dual leadership structures lead to an increase in corporate debt.

Tsui and Gul (2000) claim that non-executive or external directors play an important governance role in relation to the welfare of investors, especially non-controlling shareholders. In this context, the theory suggests that greater independence on the part of the board is considered good practice in corporate governance, as it brings greater diversity to the board and, in a context of shareholder dispersion, contributes to reducing the transfer of wealth from shareholders to managers, thereby alleviating the problem of collective action. The independent members of the board of directors are considered to contribute to provide an exempt evaluation of top manager activity (Matolcsy, Stokes and Wright, 2004; Peasnell, Pope and Young, 2006), enrich the board with added experience, and help to raise the quality of the board of directors (Bhojraj and Sengupta, 2003; Wood and Patrick, 2003).

According to several authors, an adequately drawn up remuneration plan (according to performance) will contribute to aligning managers' interests with those of shareholders, minimizing the agency problem (Becht, Bolton and Roell, 2003; Walkner, 2004). However, as pointed out by Anderson, Mansi and Reeb (2004), when ownership is highly concentrated the expropriation of minority shareholders may occur through overcompensation.

## **2.2- Financial structure**

The structure of financing comprises the shareholders' investments (equity capital), long-term loans (loan capital), short-term loans (i.e., overdrafts), and short-term liabilities (i.e., trade credit), explaining the acquisition of assets that make up the investment structure of the firm. Both the structure of financing and investment structure refer to the firm's financial structure (e.g., Axelson, Stromberg and Weisbach, 2009).

### ***Investment structure***

In firms with weak governance, there is a tendency towards the entrenchment of managers and the adoption of more conservative investment policies that can make them more secure (John, Litov and Yeung, 2008), which contradicts the general assumption that managers, when left free to act, seek to increase the size of the business using the logic of the creation of "empire". The argument presented by John, Litov and Yeung (2008) is in accordance with that of Gugler, Mueller and Yurtoglu (2003), who show that good governance practices appear to influence a higher level of investment in assets, regardless of the country's legal framework.

Grabowski and Mueller (1972) also suggest that the degree of separation between ownership and control explains investment decisions. Moreover, Gugler, Mueller and Yurtoglu (2007) report that ownership structures affect the investment decisions of the firm. Ruiz-Porrás and Lopez-Mateo (2011) state that the separation of ownership and control encourages investment. Consequently, we propose the following hypothesis:

*Hypothesis 1 – Corporate governance influences firm investment structure.*

### ***Financial leverage***

Anderson, Mansi and Reeb (2004) show that the cost of indebtedness is lower for boards with more members, because creditors tend to use more effective control mechanisms, but Berger, Ofek and Yermack (1997) show that larger boards, by adopting a more conservative view, use less financial leverage or debt ratio. In cases where firms are obliged to pay off debt, free cash flow is reduced, preventing managers from using available funds for non-ideal activities (Jensen, 1986). On the other hand, an increase in debt encourages managers to increase effort make and better investment decisions (Harris and Raviv, 1991). The empirical evidence suggests that there is a positive relationship between the structure of assets and firm debt (Hovakimian, Hovakimian and Tehranian, 2004; Rajan and Zingales, 1995; Shyam-Sunder and Myers, 1999).

Du and Dai (2005) find that controlling shareholders tend to resort to debt to avoid diluting the firm's control, while Harris and Raviv (1988) emphasize the efforts made by these shareholders to expand their

voting rights and diminish the risk of a takeover. However, they may choose to reduce the firm's financial leverage to conceal misappropriation, through the debt tunnelling effect.

The concentration of functions is positively related to the firm's indebtedness (Fosberg, 2004). Abor and Biekpe (2006) find that the debt ratio and the size of the board are negatively correlated. Bearing in mind that different perspectives exist, such as that of Fulghieri and Suominen (2008), who maintain that weak corporate governance may be accompanied by a higher leverage, we formulate the following working hypothesis:

*Hypothesis 2 – Corporate governance influences the financial leverage of firms.*

### **Capital structure**

The capital structure decision refers to the mix of debt and equity that a firm uses to finance its activity (Damodaran, 2001). As pointed out by Antoniou, Guney and Paudyal (2008), several theories have been developed in order to understand how firms choose their capital structure, with emphasis on tax issues, agency costs and information asymmetry. It is related to opportunities for maximizing the value of the firm by making choices with regard to capital structure. Kumar (2005) states that capital structure (debt ratio) has a non-linear relationship with corporate governance.

It has been found that compromised CEOs and directors prefer low leverage to reduce the performance pressures associated with higher debt, which is why a high fixed CEO salary can influence the reduction of financial risk and the effort to maintain that remuneration (Harris and Raviv, 1988; Stulz, 1988). Friend and Lang (1988) and Wen, Rwegasira and Bilderbeek (2002) find a negative relationship between fixed remuneration and financial leverage. According to Fosberg (2004), firms with dual leadership have higher debt ratios and are more likely to optimize the capital structure; a theory that is supported by Abor (2007).

The existence of independent members in the board results in lower debt levels, due to their conservative views meant to increase the value of the firm. Some literature shows no effect, which suggests the existence of nonlinear relationships between the variation in the number of independent members in the board and leverage. There is a direct relationship between a higher shareholder concentration and the indebtedness of firms (Fosberg, 2004). Mehran (1992) and Berger, Ofek, and Yermack (1997) found a positive relationship between management incentives and indebtedness, but Friend and Lang (1988), and Al-Fayoumi and Abuzayed (2009) found the relationship to be negative. Some studies have found a non-linear inverted U-shaped relationship between ownership and debt management (McConnell and Servaes, 1995). The following hypothesis is established:

*Hypothesis 3 – Corporate governance influences firm capital structure.*

### ***Long-term debt and short-term debt***

It is certainly not indifferent whether the firm uses debt in the medium and long term (Fama and French, 2002; Flannery and Rangan, 2006) or in the short-term (Sharpe, 1991). This type of funding may derive from the strategic decision to invest, exploiting business opportunities without recourse to partners or shareholders. It can be said that a greater concentration of voting rights reduces the agency problem and reinforces commitment to the creation of shareholder value by focusing on the growth of the business, resorting to indebtedness in the medium and long term as a way to respond to investment in assets. On the other hand, the attribution of incentive compensation to managers will strengthen the focus on business growth and short-term debt.

It appears that the separation of power takes effect at the level of debt in the medium and long term, which in many cases derives from investments in assets and from focusing on the value of the firm. In turn, the concentration of power favouring growth influences short-term debt at the prospect of creating greater value for the shareholder. It has been proven that there are several control mechanisms that relate to the leverage effect, which leads us to formulate the following hypotheses:

*Hypothesis 4 – Corporate governance influences the long-term debt to equity ratio.*

*Hypothesis 5 – Corporate governance influences the short-term debt to equity ratio.*

### **2.3- Characterization factors**

Different studies have identified factors affecting the financial structure of firms, such as activity, age, size and growth opportunities. In an industry cluster, firms tend to make similar choices on financing policy (Almazan et al., 2007; Hall, Hutchinson and Michaelas, 2004). Tam and Tan (2007) highlight the importance of the sector in their analysis of the impact of the investment structure on capital structure and observed differences between the activity sectors, further stating that debt levels significantly mediate the influence of the sector on the performance of firms.

The age of the firm may influence the financial structure through increased debt capacity due to accumulated reputation (Leland, 1994). At the same time, efforts to preserve the firm's reputation can prevent managers from adopting less conservative behaviour in terms of risk (Ellili and Farouk, 2011).

The literature confirms that, for firms listed on the stock exchange, while finding financing for their operations, large firms are more prone to debt, both in the long and the short term (Al-Sakran, 2001; Hovakimian, Hovakimian and Tehranian, 2004; Kim, Mauer and Sherman, 1998) because they are more diversified and show better tolerance to higher debt ratios (Castanias, 1983; Titman and Wessels, 1988; Wald, 1999). It can thus be deduced that size affects financial structure to the extent that the volume and type of debt, although dependent on policy, are not indifferent to the firm's ability to influence the market, especially in the case of providers of financial resources.

Growth opportunities associated with capital structure have been identified by various authors, as noted by Antoniou, Guney and Paudyal (2008). These authors point out reasons for this relationship based on trade-off theory and the existence of information asymmetries. Short-term debt is positively correlated with a firm's growth opportunities (Garcia-Terul and Martinez-Solano, 2007).

Tobin's Q ratio reflects the current market value of the firm's shares and assumes that capital markets know the correct value of a firm. It also reflects the growth opportunities of a firm, which arise, in part, due to industry conditions among other factors (Bozec, Dia and Bozec, 2010). McConnell and Servaes (1995) note that the positive and negative effects of debt with respect to investment opportunities are likely to be present in all firms, verifying the positive impact of debt in mitigating agency costs in firms with excess cash flows but with low growth opportunities, while the negative effect is likely to dominate in firms with high growth opportunities. The following hypothesis is thus formulated:

*Hypothesis 6 – Sector of activity, firm age, firm size, and growth opportunities influence the firm's financial structure.*

### **3. Conceptual model, variables and empirical agenda**

#### **3.1- The conceptual model**

The model relates corporate governance variables with the financial structure variables of listed firms (figure 1). It also considers the sector, age and size of the firms and growth opportunities as control variables.

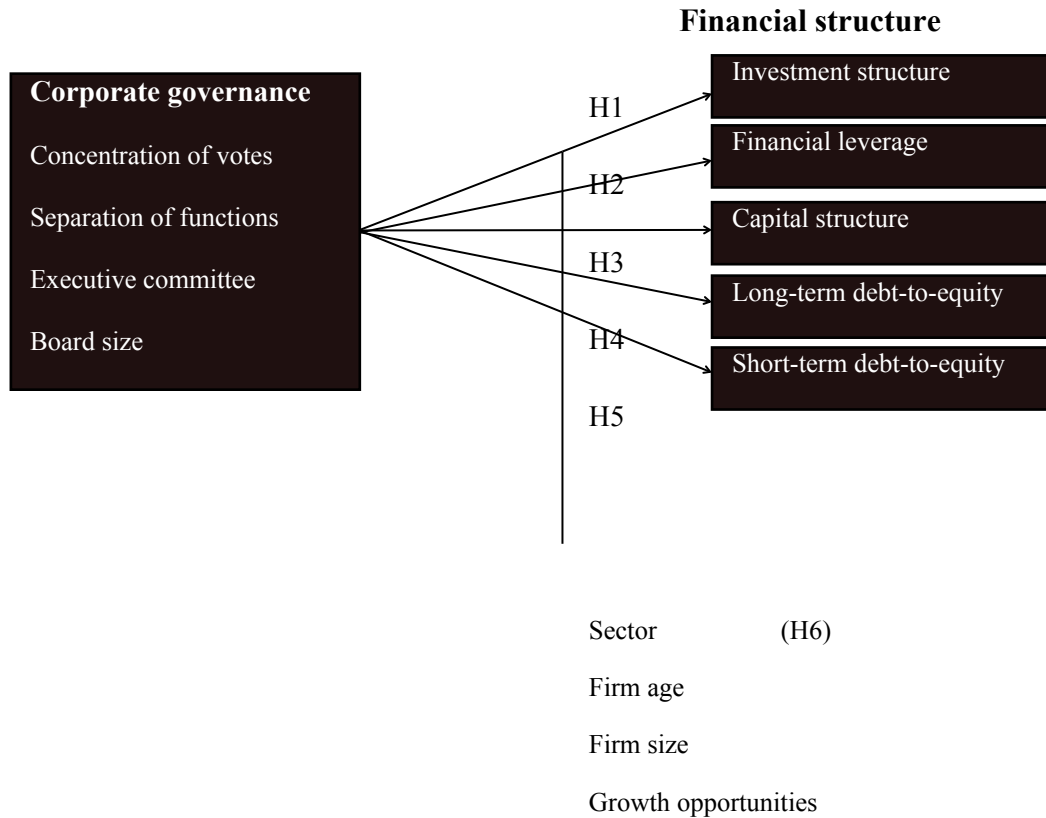


Figure 1 – Conceptual model and hypotheses

### 3.2- Variables

In this study, corporate governance is represented by seven variables: concentration of voting rights (CVR), separation of functions between CEO and Chairman (SCC), existence of an executive committee (EEC), board size (SBD), percentage of independent directors (PID), percentage of executive directors (PED) and percentage of variable remuneration of the executive board members (PVR). The financial structure contains five variables: investment structure (IS), debt ratio or financial leverage (DR), debt-to-equity ratio or capital structure (DER), long term debt-to-equity ratio (LTD) and current liabilities-to-equity ratio or short term debt-to-equity ratio (CLE). The four control variables are: sector of activity, age of firms, firm size and growth opportunities (represented by Tobin’s Q) (Table 1).

Table 1 - Detailed information about the variables

	<b>Variables</b>	<b>Description</b>	<b>Detail</b>
Corporate governance	CVR	Concentration of voting rights	This variable consists of the average (3 years) of the sum of the voting rights of the 3 major shareholders. Information about the major shareholding was gathered from the annual reports, given the mandatory disclosure of major holdings (more than 2%). Some firms have no shareholders with 2% or more of the voting rights and, in these cases, it was assumed that the 3 largest shareholders total at least 2%.
	SCC	Separation between CEO and Chairman	The separation of duties between the Chairman and the CEO was classified as a dummy variable with 0 standing for duties concentration and 1 for duties separation.
	EEC	Existence of an executive committee	This is a dummy variable in which 1 represents the existence of the executive committee and 0 represents its absence.
	SBD	Size of the board of directors	Average number (3 years) of members of the board of directors.
	PID	Percentage of independent directors	This variable reflects the percentage of independent directors (as identified by the firm in the annual report) in the board.
	PED	Percentage of executive directors	This variable reflects the number of directors appointed as executive directors in the total number of firm directors.
	PVR	Percentage of variable remuneration	This variable was calculated with the disclosed information concerning the yearly remuneration of executive members of the board. It reflects the weight of the variable component in the total remuneration of executive directors. It is based on firm reports and considers only the cash (not taking into account stock options and other forms of remuneration of executive directors).
Financial structure	IS	Investment structure	This variable was calculated as the ratio of fixed assets to total assets.
	DR	Debt ratio	This variable is the ratio of the debt capital (DC) (including the stable debt capital (SDC), referring to the medium or long term loans, whatever its type or other operations of a stable nature for the firm, current liabilities (CL) comprising loans and related to the activity and financial liabilities (FL) comprising the short-term loans obtained to support the activity from any source) over total assets.
	DER	Debt-to-equity ratio	This variable is the ratio of debt capital (DC) over equity.
	LTD	Long term debt-to-equity ratio	This variable refers to the ratio between stable debt capital (SDC) and equity (E).
	CLE	Current liabilities-to-equity ratio	This variable is the ratio of current liabilities to equity. The value of current liabilities is an approximation given by short-term debt.
Control	Sector	Sector of activity	3 sectors have been considered, grouped into financial firms, industrial firms and others (mainly service firms).
	Age	Age of the firms	Number of years since the establishment of the firm.
	Size	Size of the firms	The size of the firms was proxied by sales.
	Q	Tobin's Q	This variable, according to La Porta et al. (2002), is calculated as the ratio of (book value of assets – book value of common equity – deferred taxes + market value of common equity) over the book value of assets.



### 3.3- Empirical agenda and statistical methods

#### **Data**

The research focuses on firms listed on the London Stock Exchange. The sample consists of 100 firms, from a population of 1,294, listed on the London Stock Exchange (LSE) on 31st October 2006, over a 3-year period (2005, 2006 and 2007) resulting in 300 firm-year observations. The random sample replicates the activity sectors of the 1,294 listed firms. All data was gathered in person from the firms' financial statements.

During the exploratory stage of the research, we used Pearson correlations and ANOVA in the case of dummy independent variables. For multivariate analysis, we used multiple linear regression.

#### **Specification of multiple linear regression model**

Multiple regression analysis is often used in management to analyse the relationship between one dependent variable and several independent variables (Hair et al., 2010). The general multiple regression model can be represented as:

$$[1] \quad y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_k X_{ki} + \varepsilon_i$$

In accordance with the literature review, the existence of nonlinear relationships is assumed. In the case of dependent variables IS, DER, LTD and CLE, we used logarithms and the independent variable size corresponds to a sales logarithm. In addition, as part of the independent variables, in the case of variables CVR, SBD, PID and PED, theory points to the existence of quadratic nonlinear relationships that are incorporated into the model assuming the squared variable. Hair et al. (2010) state the need for added interaction terms in order to fully represent the multivariate effect, which is discussed in detail by Ganzach (1997), highlighting the effects of non-inclusion of the interaction terms if there is high multicollinearity between independent variables. In this context, we tested the introduction of terms of interaction between the variables with the highest correlation and found that there were no significant variations in the adjusted R<sup>2</sup>, or in the interpretation of the models and previously identified statistically significant coefficients. Thus, based on the literature, we assumed the following generic model:

$$[2] \quad Y_i = \beta_0 + \beta_1 CVR_i + \beta_2 CVR_i^2 + \beta_3 SCC_i + \beta_4 EEC_i + \beta_5 SBD_i + \beta_6 SBD_i^2 + \beta_7 PID_i + \beta_8 PID_i^2 + \beta_9 PED_i + \beta_{10} PED_i^2 + \beta_{11} PVR_i + \beta_{12} Financial_i + \beta_{13} Industrial_i + \beta_{14} Size_i + \beta_{15} Age_i + \beta_{16} Q_i + e_i$$

In interpreting the curvilinear effects included in the model, Hair et al. (2010) emphasize that multicollinearity can create problems in assessing the statistical significance of individual coefficients,

which is why the focus should be on testing the significance of the increase in the  $R^2$  value justified by the addition of the polynomial term.

### ***Validation of linear regression model***

The generic model identified by the equation [2] was assumed. The Breusch-Pagan heteroskedasticity test (Wooldridge, 2002) was performed, in which the null hypothesis confirms the presence of homoscedasticity. Wooldridge (2002) suggests the use of robust standard errors if the presence of heteroskedasticity is confirmed.

We also applied the Ramsey regression specification error test (RESET) to find if there was a general form misspecification of the model, by creating an expanded regression (Wooldridge, 2002). Not rejecting the null hypothesis confirms that the original model is correctly specified.

### ***Analysis of the multiple linear regression model***

The F ratio was used to evaluate the significance of each regression and the  $R^2$  (coefficient of determination) for prediction accuracy. The significance of the estimated coefficients was also evaluated and the null hypothesis was that the coefficients are not significantly different from 0 (Hair et al., 2010). We also performed a significance test based on the F statistics to the sub-set of parameters of the corporate governance variables.

## **4. Analysis and results**

### **4.1- Descriptive analysis**

The sample includes firms with different profiles (table 2). In terms of concentration of voting rights, the average sum of the three largest shareholders is 23.75%, which allows them to exercise effective control over the organization. As there are variations in the sample (reaching 76.95%), the problem of collective action and expropriation of minority shareholders can exist cumulatively. The size of the board, with an average of 7.8 members, ranges from a minimum of 3 and a maximum of 37.6. On average, 55% are considered independent members and about 30% have executive functions. Remuneration is represented, on average, by a variable component which represents 22.7% of the total, ranging between 0% and 67%.

Table 2 – Descriptive statistics and Pearson correlations

	Mean	Std. Dev.	CVR	SBD	PID	PED	PVR	Size	Age	Q	IS	DR	DER	LTD	STD
CVR	0.238	0.148	1.000												
SBD	7.867	3.984	-0.050 (0.619)	1.000											
PID	0.554	0.212	-0.069 (0.493)	-0.217 (0.030)	1.000										
PED	0.296	0.195	0.216 (0.031)	0.201 (0.045)	-0.735 (0.000)	1.000									
PVR	0.227	0.189	0.202 (0.043)	0.408 (0.000)	-0.443 (0.000)	0.521 (0.000)	1.000								
Size*	1,163	3,643	-0.080 (0.428)	0.566 (0.000)	-0.301 (0.002)	0.412 (0.000)	0.520 (0.000)	1.000							
Age	55.11	59.54	-0.086 (0.398)	0.403 (0.000)	-0.122 (0.226)	0.140 (0.164)	0.248 (0.013)	0.373 (0.000)	1.000						
Q	1.178	0.995	0.307 (0.002)	0.033 (0.742)	-0.165 (0.100)	0.153 (0.129)	0.033 (0.742)	-0.077 (0.448)	-0.044 (0.662)	1.000					
IS	0.162	0.226	0.105 (0.297)	0.090 (0.375)	-0.335 (0.001)	0.389 (0.000)	0.090 (0.371)	0.241 (0.016)	0.192 (0.055)	-0.002 (0.982)	1.000				
DR	0.417	0.293	0.170 (0.091)	0.193 (0.054)	-0.363 (0.000)	0.470 (0.000)	0.425 (0.000)	0.525 (0.000)	0.199 (0.047)	0.284 (0.004)	0.353 (0.000)	1.000			
DER	2.139	5.511	0.007 (0.942)	0.234 (0.019)	-0.129 (0.203)	0.164 (0.102)	0.194 (0.053)	0.239 (0.017)	-0.062 (0.543)	0.251 (0.012)	-0.079 (0.438)	0.425 (0.000)	1.000		
LTD	0.724	2.143	-0.015 (0.886)	0.277 (0.005)	-0.096 (0.344)	0.065 (0.522)	0.282 (0.005)	0.363 (0.000)	0.025 (0.807)	0.051 (0.611)	0.040 (0.692)	0.360 (0.000)	0.638 (0.000)	1.000	
CLE	0.882	2.354	-0.076 (0.454)	0.231 (0.020)	-0.128 (0.204)	0.144 (0.154)	0.192 (0.056)	0.215 (0.031)	-0.008 (0.941)	0.195 (0.052)	-0.091 (0.369)	0.292 (0.003)	0.765 (0.000)	0.605 (0.000)	1.000

\* unit: millions of pounds

Note: Values in parentheses are the p-values (2-tailed)

The size of the firm presents sizeable differences between smaller and larger companies. Firm age is also diverse, averaging 55 years, and ranges between 2 and 309 years. On average, firms generate growth opportunities resulting in incentive to invest (Tobin's Q ratio above 1, according to Brealey and Meyers, 1998), although this is not true for all of the firms.

The dependent variables, on average, show a ratio of debt to total assets of 41.7%, rising to 213.9% in the case of equity. We observed a greater importance endowed to short-term debt (88%) compared to long-term debt (72%). Investment in fixed assets is about 16% of total assets, with differences among the firms in the sample.

The dummy variables show that the roles of the CEO and PCA are not separate in only 11% of the firms and a formal executive committee exists only in 22%. It should be noted that 45% of firms are in the financial sector, 23% are industrial firms and the others are from a variety of sectors.

Table 3 – Frequencies

Variable		Freq.	Percent	Cum.
SCC	0	11	11	11
	1	89	89	100
EEC	0	78	78	78
	1	22	22	100
Sector_Fin	0	55	55	55
	1	45	45	100
Sector_Ind	0	77	77	77
	1	23	23	100

Statistically significant correlations are identified between variables (table 2). The strongest show a negative relationship between the percentage of independent directors and the percentage of executive directors, which is considered natural given the conditions of independence. Firm size appears to be positively correlated with the size of the board, which is also to be expected, and the percentage of variable compensation. Firm size is also positively correlated with DR. There is a positive relationship between the percentage of variable compensation and the percentage of executive directors. When limiting the analysis to the financial structure variables, positive relationships exist between variables DER, LTD and CLE (all percentage of equity).

We used ANOVA to study the relationship between the variables SCC, ECC and sector with the financial structure variables. It appears that the variable EEC has statistically significant implications for the variables DR, LTD and CLE (Table 4). The sector of activity influences the variables IS and DR. The separation of functions does not provide statistically significant results.

Table 4 – One way ANOVA (p-values)

	IS	DR	DER	LTD	CLE
SCC	0.086	0.317	0.339	0.529	0.382
EEC	0.225	0.007	0.097	0.001	0.047
Sector	0.000	0.003	0.894	0.968	0.954

In sum, focusing on the variables of CG, we do not identify statistically significant correlations between CVR and financial structure variables. The variable SBD shows positive correlations with the variables of the financial structure DER, LTD and CLE (ratios where the denominator is equity). The variable PID has a negative correlation with the variables IS and DR. The negative correlations support the conservatism of independent directors in terms of the financial structure (this situation holds true even when the

correlations are not significant in the cases of DER, LTD and CLE variables). Conversely, the variable PED is positively correlated with the same variables IS and DR. The variable PVR correlates positively with DR and LTD. Finally, the ANOVA results indicate that the variable SCC in this context is not relevant in determining financial structure, while EEC is particularly relevant in its relation with the variables DR, LTD and CLE.

#### **4.2- Multivariate analysis**

The linear regression model used assumes the existence of nonlinear relationships and proved to be appropriate, revealing coefficients of determination ( $R^2$ ) greater than 45%. The analysis of the F statistic proves significant (table 5). The Breusch-Pagan test shows the presence of heteroskedasticity in one regression, which was addressed calculating the robust standard deviations. The RESET test supports the correct specification of the model.

Table 5 – Synthesis of multiple linear regressions

	<b>LnIS</b>	<b>DR</b>	<b>LnDER</b>	<b>LnLTD</b>	<b>LnCLE</b>
CVR	7.085 (1.75)	0.370 (0.82)	-3.932 (-1.20)	-9.295 (-1.82)	-2.402 (-0.74)
CVR <sup>2</sup>	-5.141 (-0.88)	-0.438 (-0.66)	3.893 (0.82)	10.925 (1.83)	2.596 (0.55)
SCC	-.4326 (-0.57)	0.114 (1.35)	0.844 (1.37)	0.189 (0.28)	0.866 (1.43)
EEC	.366 (0.60)	-0.020 (-0.30)	1.079 ** (2.16)	1.202 (1.55)	1.286 ** (2.63)
SBD	-.002 (-0.01)	0.004 (0.18)	-0.0298 (-0.19)	0.094 (0.46)	-0.078 (-0.52)
SBD <sup>2</sup>	.001 (0.22)	-0.001 (-1.03)	-0.000 (-0.06)	-0.003 (-0.68)	0.001 (0.32)
PID	2.085 (0.35)	0.607 (0.91)	1.604 (0.33)	-4.973 (-0.64)	4.628 (0.98)
PID <sup>2</sup>	-2.939 (-0.62)	-0.532 (-1.00)	-1.530 (-0.40)	4.593 (0.66)	-4.767 (-1.26)
PED	15.644 ** (3.13)	1.118 * (2.00)	8.596 ** (2.12)	22.728 ** (3.12)	2.341 (0.59)
PED <sup>2</sup>	-17.080 * (-2.35)	-1.171 (-1.44)	-8.601 (-1.46)	-28.727 *** (-3.28)	-0.2978 (-0.05)
PVR	-2.814 (-1.80)	-0.081 (-0.46)	0.245 (0.19)	1.063 (0.54)	0.065 (0.05)
Dummy Financial	-1.815 ** (-3.08)	0.050 (0.76)	-0.270 (-0.56)	-1.009 (-1.22)	-0.535 (-1.14)
Dummy Industrial	1.055 (1.90)	-0.003 (-0.04)	-0.163 (-0.36)	0.036 (0.07)	-0.016 (-0.04)
Size	.180 (1.20)	0.063 *** (3.79)	0.091 (0.75)	0.145 (0.69)	0.107 (0.90)
Age	.009 * (2.31)	0.000 (0.08)	-0.002 (-0.66)	-0.002 (-0.32)	-0.001 (-0.46)
Q	-.013 (-0.06)	0.067 ** (2.62)	0.387 ** (2.08)	0.066 (0.26)	0.512 ** (2.80)
Constant	-9.513 *** (-3.64)	-0.898 ** (-3.06)	-3.846 (-1.81)	-5.361 (-1.47)	-4.772 * (-2.29)
R <sup>2</sup>	0.734	0.541	0.460	0.495	0.490
Adjusted R <sup>2</sup>	0.682	0.452	0.356	0.398	0.392
F-statistic (p-value)	14.28 (0.000)	6.11 (0.000)	4.42 (0.000)	2.67 (0.000)	1.54 (0.000)
Breusch-Pagan (p-value)	0.196	0.108	0.960	0.001	0.880
RESET (p-value)	0.173	0.159	0.928	na.	0.850

(\*), (\*\*) and (\*\*\*) indicate significance at levels 0.05, 0.01 and 0.001 (2-tailed). Using the invt function of the Stata software we also obtained the 5% critical value for the 1-tailed test = 1,663. For the variable LnLTD, considering the heteroskedacity, the robust standard-deviations were

calculated. For the same reason, the Ramsey test was not performed. The t statistic values are presented in parentheses below the regression coefficients. For multivariate analysis the variables DER, LTD and CLE were winsorized (Cox, 1998) at 5%.

### ***Investment structure***

The regression for the ratio of fixed assets to total assets (IS) is statistically significant, explaining 73% of the variability ( $R^2$ ). The percentage of executive directors has an inverted U-shaped relationship with IS, reaching a maximum when the PED is about 46%. When the majority of the board is made up of non-executives, the adoption of a conservative investment approach does not prevail.

Although the shareholder concentration was not statistically significant for the 2-tailed test, the results present some indications of the importance of the agency problem between owners and managers, contributing the higher concentration of shareholders in favour of increased investment in fixed assets. Similarly, the variable compensation negatively influences investment in fixed assets, which reflects an effort to maximize short-term gains and sacrifice return in the medium to long term. Based on these results and the test of the sub-set of corporate governance parameters, the hypothesis regarding the influence of corporate governance in the investment structure can be accepted (H1).

### ***Financial leverage***

The results show that the regression explains 54% of the variability in DR, highlighting the importance of the percentage of executive directors that positively influences this financial structure ratio. It confirms the influence of corporate governance on financial leverage, thus verifying hypothesis (H2).

### ***Capital structure***

In a model that explains 46% of the variability of DER, the results show the contribution of the executive committee and the percentage of executive directors in increasing the DER. The data supports hypothesis 3 (H3) on the influence of corporate governance on capital structure.

### ***Long-term debt and short-term debt***

The research distinguishes between long-term debt and short-term debt. Regressions are statistically significant and explain 49.5% and 49% of the variability ( $R^2$ ) respectively. According to the results, the executive committee is influential in the short term, while the percentage of executive directors influences the long-term debt.

Focusing on long-term debt, there is an inverted U-shaped relationship, reaching a peak in the percentage of executive directors at around 40% of the total membership of the board. Above this value, an increase in the number of independent directors translates into a percentage reduction in the ratio of long-term debt. Still in terms of long-term debt, using a 1-tailed test, the results indicate a U-shaped relationship between shareholder concentration and long-term debt. With a low level of shareholder concentration, an increase leads to a decrease in long-term debt and the opposite for high levels of shareholder concentration.

Long-term debt and short-term debt are influenced by corporate governance, thus supporting hypotheses 4 and 5 (H4 and H5).

### ***Characterization factors***

In line with expectations, it was found that sector, size, age and growth opportunities are significant in different regressions, thereby confirming hypothesis 6 (H6).

The size of the firm and the existence of growth opportunities contribute positively to financial leverage. There is a positive influence of growth opportunities (Q) in the capital structure. Short-term debt is positively influenced by the existence of growth opportunities (Q) and firm age positively influences the investment structure.

## **5. Discussion**

This research extends the discussion on the effect of various CG factors on the financial structure of organizations. It highlights the existence of nonlinear relationships between CG and financial structure variables, which is a relevant contribution to the literature.

The results show the importance of the composition of the board, including the balance between executive and non-executives in determining the financial structure of listed firms. From the perspective of agency theory, the highest percentage of executive members indicates a greater agency problem, as numerous contributions sustain the monitoring role of the board through the contribution of non-executives, and in particular the independent board members. The results highlight the importance of executive directors in safeguarding the long-term interests of shareholders through an adequate financial structure to support the firm's development and, consequently, the return for shareholders and other stakeholders.

The executive committee and the percentage of executive directors positively influence all the variables of financial structure. In the case of the variables IS and LTD, we observe that the relationship assumes an inverted U-shaped, so that, from a certain percentage of executives, there is a decrease; a finding that is in line with the results obtained by John, Litov and Yeung (2008). This nonlinear behaviour



suggests that, when the board is mostly made up of the executive members, they assume an entrenchment position, opting for decisions that reduce pressure on their performance.

### ***Investment structure***

Corporate governance influences increased investment in assets. We find that the investment practices of more conservative managers influence the investment structure (IS) (John, Litov and Yeung, 2008). Other authors argue that in the face of a lack of governance mechanisms, managers tend to adopt the logic of "empire" building. The results obtained, by demonstrating the nonlinear relationship exerted by the constitution of the board, reconcile the different existing theoretical perspectives on the influence of corporate governance in the investment structure.

### ***Financial leverage***

The theory states that managers prefer low debt levels to reduce performance pressures and that higher debt contributes to managers putting in greater effort and making better investment decisions (Harris and Raviv, 1991).

From the perspective of corporate governance, the results indicate that, in boards dominated by executive members (lower level of separation between the executive and monitoring functions), characterized as "weak governance", there is an increase in indebtedness. However, as stated by Harris and Raviv (1991), the increase in debt contributes to managers making better investment decisions, though it is not possible, without further investigation, to know the effects on performance. The results obtained indicate that the increased power of the executive members contributes to an increase in debt, but it is unclear as to whether this is the result of lower monitoring of non-executives or less conservatism on the part of the executive members.

### ***Capital structure***

According to previous studies (Harris and Raviv, 1988; Stulz, 1988), there are some arguments that support manager preference for low debt. From the conservative perspective, the independent members of the board advocate low indebtedness. The results contradict the preference of managers for low debt because the existence of an executive committee and the percentage of executive members contribute to increasing the ratio of debt to equity.

### ***Long-term debt and short-term debt***

The executive board members influence the indebtedness decision. It is assumed that the delegation of functions to the executive committee facilitates obtaining short-term financing and, if this committee does not exist, the role of non-executive members becomes important in opting for more stable sources of funding, probably more oriented towards the organization's medium/long term results.

### ***Characterization factors***

The firms in the financial sector have a lower ratio of IS, while the industrial sector contributes to increasing the ratio in line with the findings of Almazan et al. (2007). Firm age positively contributes to IS, which indicates that firms over time tend to accumulate fixed assets. In line with Castanias (1983), Titman and Wessels (1988) and Wald (1999), the results obtained also support the idea that larger firms sustain higher leverage ratios. Investment opportunities, as derived from the literature, positively influence debt.

## **6. Conclusions**

This study presents an important contribution to the literature by confirming the existence of nonlinear relationships between factors of corporate governance and financial structure. It becomes easier to understand why different studies report that positive or negative relationships exist regarding the existence of the executive committee and the proportion of executive directors over the financial structure. It is shown that the size, age and growth opportunities of firms affect the financial structure and are relevant contributions to the theory.

The main finding indicates that different corporate governance factors influence the financial structure and show either positive or negative nonlinear relationships. The study of nonlinear relationships helps to explain divergences regarding the influence of corporate governance on different variables.

Few studies have evaluated the executive as opposed to independent directors or non-executive directors, proving that these take on more conservative behaviour towards risk by avoiding the recourse to indebtedness.

It is found that the percentage of executive members on the board and the existence of an executive committee have different effects on financial structure. In addition to the executive members, the results reveal the possible influence of the concentration of voting rights in the financial structure options.

## **Recommendations**

Differences still exist concerning the effect of each variable of corporate governance in the financial structure, which is another contribution of this research that indicates the need for further investigation.

Analysis of the level of shareholder concentration in the firms in the sample allows us to assume the presence of two types of agency problem. In future studies, it would be appropriate to narrow down the agency problem and verify resultant differences in interpretations using the same set of variables.

It was assumed that all regression models would be the same regardless of the dependent variable. In future research, it may be possible to introduce details that differentiate the models depending on the dependent variables.

Based on the knowledge of the influence of CG on financial structure, it is important to test whether the financial structure has a moderating effect on the relationship between CG and performance in order to contribute further to knowledge of the relationship, and thereby to better understand the direction and magnitude of its influence.

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