

## **Corporate Governance and Capital Structure Interactions in New Technology-Based Firms. The Effects of Ownership Structure and Board of Directors on Firm's Leverage<sup>1</sup>**

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### **Abstract**

*The paper aims to explore the effect of some corporate governance features on the capital structure of NTBFs in term of firm's leverage. It was hypothesized that different ownership and board of directors structures can negatively affect the debt-financing choices of this type of firm. Based on a sample of 303 Italian firms' observations over the period 2004-2013, the results suggest that NTBFs with a concentrated ownership denote a reduction of firm's leverage. In addition, also manager shareholders prefer to reduce the level of firms' debt. Nevertheless, the board size seems to have no effects on the capital structure of NTBF's, as well as the presence of independent directors in the board does. The paper offers some contributions on literature and extends the understanding of corporate governance effects on capital structure in NTBFs.*

**Keywords:** New Technology-Based Firms (NTBFs); Capital structure; Corporate governance; Ownership structure; Board of Directors; firm's leverage.

### **1. Introduction**

Literature and practice consider New Technology-Based Firms (henceforth NTBFs) as a business model of prime relevance for creating and developing innovation and competitiveness in the current economic context (Acs and Muller, 2008; Audretsch, 1995; Cassar, 2004); but also for being a catalyst for new technologies (Storey and Tether, 1998). Due to their basic nature of small size and high-risk firms (Hogan and Hutson, 2005), NTBFs show restrictive features related to their management and organization, due to the rapidity of their life cycle growth (Aaboen et al., 2006). Indeed, NTBFs are typically characterized by a limited availability of resources, and, simultaneously, they are constantly in search of new sources (Minola and Giorgino, 2011). They require a high stock of resources, primarily related to investments in R&D, marketing and technology development (Giudici and Paleari, 2000); all those appear to be elements of essential importance when starting a business and also in order to develop it in a sustainable way over the time (Minola et al., 2013). For those reasons, financial challenges play a special role in in this type of firms, with both theoretical and practical substantial effects (Carpenter and Petersen, 2002).

The availability of financial resources is one of the basic prerogatives when starting a business (Giudici and Paleari, 2000), as well as its management and organizational composition are (Cassar, 2004). In the NTBFs, financial and capital rising is known to be limited by problems of suitability of the internal sources and by the difficulty for the entrepreneur to access to the external ones (either formal or informal) (Minola et al., 2013; Atherton, 2009).

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The choices linked to the financial structure adopted by NTBFs assume, consequently, theoretical and practical significance (Minola et al., 2013; Hoganand Hutson, 2005; Cassia and Minola, 2011). In this regard, and in accordance with the managerial perspective, the change in capital structure (Barton and Gordon, 1988; Bergeretal., 1997) depends, in a non-exclusive manner, on internal and external factors influencing the concerns of firm-related risks and control, but also on the choices and strategic decisions of the management (Brailsford et al., 2002). In fact, Demsetz (1983), Shleifer and Vishny (1986), Agrawal and Mandelker (1990) noted that the adverse and opportunistic decisions related to a firm's financing are influenced by both the ownership structure and the associated features of governance. Therefore, for a proper understanding of a firm's financial structure, the characteristics and the effects of corporate governance must be seriously considered. In this regard, as pointed by Jensen (1986), and Kochhar and Hitt (1998), both structure and choices of corporate governance are influenced by the capital structure. In turn, however, the corporate governance affects decisively the strategies of a firm; among the latter, especially the composition choices of the financial structure are affected.

In addition, and in relation to this assumption, Kochhar and Hitt (1998) observed that the capital structure is affected by the amount and the characteristics of the resources available for the firm. In view of the crucial part played by the corporate governance in the acquisition and in the composition of the key resources of the firm (Aguilera et al., 2008), it becomes logical to recognize its significant activity in the strategic decisions concerning the capital structure of the NTBFs. Although this study focuses on the mechanisms of corporate governance on a firm's capital structure, it has already been explored in literature, that there are few empirical relevancies involving the NTBFs. Considering its relevance in the understanding of the firm's capital structure, and also in view of the role played by the corporate governance on the same (Minola et al., 2013) –as well as its effects on performance and development (Aaboen et al., 2006; Minola and Giorgino, 2011) –, the paper aims to investigate all these aspects, studying whether and how the characteristics of corporate governance affect the capital structure of NTBFs in term of firm's leverage. For this purpose, an analysis was performed on a sample of 200 Italian firms covering the years from 2004 to 2013. The remainder of this paper is organized as follows. Section 2 reviews theories and evidences relating corporate governance to capital structure. Section 3 describes the sample, the variables employed and the analytical approach. Section 4 provides summary statistics and an estimation of the regression model developed. Section 5 discusses the results and exposes the conclusions.

## **2. Theoretical background and hypothesis developed**

### **2.1. Overview to the Corporate Governance in NTBFs**

Corporate Governance consists of the system and mechanisms through which firms are directed and controlled (Broni and Velentzas, 2012; Daily et al., 2003; Dalwai et al., 2015). It involves relationships among the firm management, board of directors, owners, and further stakeholders (Aoki, 2000; Huse, 2005). Furthermore, it focuses on the monitoring of the deployment and management of firms' resources (O'Sullivan, 2000), and influences the strategic plans and decision when agendas of a firm are made (Forbes and Milliken, 1999).

In particular, the governance of NTBFs generally assumes the features characterizing the SME (Aaboen et al., 2006). Indeed, the small dimensional scale and the peculiarity of the ownership structures lead to a combination of roles, chiefly those of owner (principal) and manager (agent) (Karami et al., 2008). Specifically, in smaller and independently owned firms, the NTBFs governance is characterized by very close ownership and control, with a consequent impact on the goals and strategic guidelines of this type of company (Aaboen et al., 2006). Additionally, it is interesting to note that, although possessing the key technological and innovative resources, NTBFs often lack of financial, commercial and management skills, thus obstaculating their growth opportunities (Colombo and Grilli, 2005; Minola and Giorgino, 2011). Such an issue could be limited by adopting an external opened corporate structure, such as to increase the chances of attracting investments and strategic funding, as well as the key resources in terms of skills and management capability. (Kaplan and Strömberg, 2004; Hsu 2006; Colombo et al. 2006; Colombo et al., 2009).

The above-delineated processes can also lead to a dynamic governance and knowledge involvement with outside shareholders, such as venture capitalists (Cassia and Minola, 2012; Colombo and Grilli, 2005). Nevertheless, the negative effects that may arise are related to agency costs and caused by the separation between ownership and control (Colombo et al., 2009; Carpenter and Petersen, 2002). This circumstances lead to a non-alignment of interests between principal and agent, due to different preferences and risk-attitudes, as stated by the agency theory (Jensen and Meckling, 1976; Eisenhardt, 1989).

## 2.2. Relationship between Ownership Structure and Capital Structure in NTBFs

In literature, some scholars have proposed to study the firm's capital structure choices on the basis of the agency theory assumptions (Jensen and Meckling, 1976; Agrawal and Mandelker, 1990; Morellec, 2004); emphasizing how agency costs can have an impact on the capital structure in line with the corporate governance characteristics. As a support of these observations, several scholars emphasize the effects of a firm's ownership structure on the capital one. In this view, Kasbi (2009) suggests that firms with a concentrated ownership structure adjust their leverage at a slower rate, because large blockholders show a greater propensity to avoid control-diluting equity issuances. Furthermore, firms with a higher degree of ownership concentration suffer the negative consequences of adverse selection (Leary and Roberts, 2005) and a lower liquidity level of stocks (Dyck and Zingales, 2004). Therefore, the raise of ownership concentration has subsequent effects on the growth of the costs of external finance. This partly occurs because an increasing of the firms' debt level also implies an increase in the firm's risk (Kasbi, 2009). This assertion assumes particular significance because large blockholders usually have undiversified portfolio, which decrease the choices to rise firm's leverage (Anderson and Reeb, 2003; Ødegaard, 2009). Therefore, in consideration of these observations it can be stated as follows:

*Hypothesis 1: Ownership concentration has a negative effect on the leverage level of NTBFs.*

Second, the managerial share ownership, as a mechanism to reduce agency conflicts through the alignment of interests between management and shareholders, becomes an assumption more complex about the relation between managerial share ownership and corporate debt (Brailsford et al., 2002). Indeed, high levels of managerial ownership lead to a management entrenchment with high alignments of interests between managers and shareholders. This limits the positive impact of the agency-related advantages, due to the increase of corporate debt; and creates a non-linear inverted U-shaped relationship between managerial ownership and debt (Short and Keasey, 1999; McConnell and Servaes, 1995, 1990; Morck et al., 1988). Similarly, other scholars (Friend and Hasbrouck, 1988; Firth, 1995; Berger et al., 1997; Al-Fayoumi and Abuzayed, 2009) emphasize how shareholder managers tend to reduce corporates' debt levels because of the additional bankruptcy risk. In contrast to these assumptions, few scholars noted a positive relationship between managerial ownership and firm's debt (Mehran, 1992); while in the SME context, the results are mixed (Kuo et al., 2012). Nonetheless, in light of the major findings in the literature it is proper to state the following:

*Hypothesis 2: Managerial ownership has a negative effect on the leverage level of NTBFs.*

## 2.3. Relationship between Board of Directors Structure and Capital Structure in NTBFs

In addition to the above-mentioned considerations, it has been observed that also the board of directors structure has a significant influential impact on firms' capital structure (Pfeffer and Salancick, 2003; Lipton and Lorsch 1992; Rose, 2006; Kuo et al., 2012). The cause lies on the board itself, which is the core of corporate governance structure, and forms the safe guarding mechanism of share holders' interests from any opportunistic behaviour of the managers (Daily et al., 2003). Simultaneously, the actions of the board allow to limit the expectations gap between the firms' stakeholders and them (Brennan, 2006). They also play a significant role either in configuring decisions or in achieving incremental performance (Zahra and Pearce, 1989). On this regard, previous studies (Marsh, 1982; Jensen, 1986; Berger et al., 1997; Friend and Lang, 1988; Wen et al., 2002; Abor, 2007) pointed out a positive association between the size of the board of directors and the capital structure. These findings are mainly related to three factors.

First, large boards of directors are characterized by a major entrenchment that leads to an increase of the firm value, caused by the pursuit of a higher leverage (Berger et al., 1997). Second, a larger board membership leads to a decrease of corporate governance performance, and causes a high leverage, because of the growing conflicts in decision-making processes (Core et al., 1999; Yermack, 1996). Third, firms with a larger board can benefit of a lower cost of debt, due to the positive perceptions of creditors, when a more effective control of the corporate financial activities (Anderson et al. 2004) occurs. In contrast to these considerations, Berger et al. (1997), Abor and Biepkke (2006), found a positive relationship between the size of the board of directors and the capital structure in the context of SMEs. These findings suggest that firms characterized by a large board membership are less inclined to use debt, and opt for equity – preferably external equity -, as a major pressure of the board on managers reduces the debt ratio in the capital structure, which eventually improves both firm value and performance (Abor and Biepkke, 2006; Berger et al. 1997). In light of these observations, the relation between size of board of directors and capital structure is quite mixed.

Nevertheless, as the major findings on this topic regard large firms, the only one study involving the SMEs is that of Abor and Biepe (2006); hence, it is reasonable to refer to this last theoretical background of studies in order to state the following:

*Hypothesis 3: A large board size has a negative effect on the leverage level of NTBFs.*

Some scholars (Pettigrew and McNulty, 1995; Abor and Adjasi, 2007) claim that independent directors significantly affect the corporate strategy, as they lead superior strategic decisions, and cause a decrease of the uncertainties affecting the firm. These aspects and mechanisms also improve the ability of the firm to gain resources, especially financial ones (Pfeffer and Salancick, 2003). In addition, Brennan and McDermott (2004), Matolcsy et al. (2004) and Peasnell et al. (2006) point out how independent directors can have a more effective control on company managers, thus reducing the agency costs and consequently any agency problems arising from the divergence between managers and shareholders (Brickley et al., 1994). In literature, significant evidences were found about the relationship between independent directors and capital structure; however, as it has been observed for board size evidences, findings are mixed. Abor and Biepe (2005), Abor (2007), Jensen (1986) and Berger *et al.* (1997) assume that independent directors have a positive impact on debt ratio; on the contrary, a negative relationship between debt ratio and independent directors was found by other researchers (Wen et al., 2002; Brennan and McDermott, 2004; Matolcsy et al., 2004; Peasnell et al., 2006). These studies suggest that independent directors tend to effectively control the management and force it to reduce the financial leverage, in order to increase the value of the firm, with benefits in terms of lower agency costs. Also with regard to SME, the study of Kuo et al. (2012) reveals that independent directors are incline to decrease the firm's debt level.

In light of these considerations, it can be stated as follows:

*Hypothesis 4: Independent directors have a negative effect on the leverage level of NTBFs.*

### **3. Methods**

#### *3.1. Sample*

The sample employed in this study is drawn from AIDA - Bureau van Dijk database, which containing financial statements, corporate governance information, as well as biographical and merchandise data of about 700,000 Italian active firms. In order to select and extract our sample, we primarily used a sectoral approach based on the STI working paper of the OECD classification (Hatzichronoglou, 1997) for high-tech firms. As the AIDA database is based on ATECO 2007 industrial sector classification - while OECD classification is based on ISIC Rev. 2 - SITC Rev. 3 - we took into account the OECD classification to select the following industrial sectors: Manufacture of basic pharmaceutical products and pharmaceutical preparations, Computer programming, consultancy and related activities, Telecommunications, Scientific research and development of Computers and electronics-communications, software/information technology, technology consultants, office machinery - basically related to the following technology consultants: Computers and office machinery, Electronics-communications and Pharmaceuticals.

On the base of AIDA system classification, we extracted only the small and medium firms from the selected high technology industrial sectors. In order to assure a high level of alignment with the theory on the topic, we checked the selected firms following the elements taken in consideration by Aaboen et al. (2006), Monck et al. (1988) and Little (1979) to define a NTBF. Basically, it deals with: new knowledge-based and R&D intensive industry, independent firm – those not subsidiary of an established company. Finally, a random sample of a panel nature for of the period 2004–2013 was analysed, and as a result, financial data vary over time while corporate governance data are time-invariant. The initial collection includes firms producing 2 000 observations. After the elimination of the missing values, the sample size decreases to 303 observations.

#### *3.2. Variables*

##### *3.2.1. Dependent variable*

The dependent variable applied in this study was measured by using debt-equity ratio (*Leverage*), a measure of firm's financial leverage which calculates total debt to total assets. Wen et al. (2002), Brailsford et al. (2002), Driffield et al. (2007) and Kuo et al. (2012) established a same measure that represents a major indicator of the corporate capital structure of a firm (Rao, 1989).

### 3.2.2. Independent variables

With the aim to predict the potential effects of some features of corporate governance on the leverage level of NTBFs four independent key variables were used in the regression models. First, in line with Margariti's and Psillaki's suggestions (2010), the ownership concentration was measured by the percentage of the firm's equity held by the largest shareholders (*Ownership\_Concentration*). Secondly, according to Wang and Judge's (2012) suggestions, the managerial ownership was measured by a dummy variable, taking value 1 in case of managerial shareholdings in the firm and value 0 in the contrary case (*Manager\_Ownership*). Third, as stated by Abor and Biepkke (2006) and Berger et al. (1997), the board size was measured by the number of directors on the board (*Board\_Size*). Finally, in line with Kuo et al. (2012) and Wen et al. (2002), the independence of directors was measured by calculating the number of directors categorised as independent, on the following basis: directors who are neither managers nor shareholders of the firm and who don't have any contractual relationships with it, as well as any family relationships with their leaders (*Independent\_Director*).

### 3.2.3. Control variables

In addition to the above dependent and independent variables, firm's features variables were employed to control the effects of the firm's profitability and its size on the capital structure (Kuo et al., 2012; Wen et al., 2002). The firm's size was measured by the natural log of the firm's total assets; while the firm's profitability was measured by the ROA (*Return on assets*) index (%ROA), defined as earnings before depreciation, interest and taxes, divided by total assets of the firm (*Firm\_Size*).

### 3.3. Analytical approach

In order to test the research hypotheses developed a linear mixed-effect model was used, which is a very useful statistical model for the analysis of longitudinal data, and which also offers a high flexibility in modelling the within-subject correlation frequently existing in longitudinal data while handling with both the balanced and as well as the unbalanced data (Pinheiro, 2005; Verbeke and Molenberghs, 2009; Zhang and Davidian, 2001). The conventional approaches for the analyses of longitudinal data, as those based on generalized linear models (GLM), are criticized in literature for violating the assumption of independence of observations (Francis et al., 1991; Hox, 2010; Singer and Willett, 2003; Graves and Frohwerk, 2009). In addition, linear mixed-effect models are more powerful than classical techniques (e.g., ANOVA, MANOVA, multiple regression analyses) in exploring the effects related with repeated measures, as they model the covariance matrix instead of imposing a definite form of structure as employed in standard univariate and multivariate methods (Shek and Ma, 2011). In line with these considerations, the following linear mixed-effect model was developed, and it allows for time and firm fixed effects:

$Leverage_{it} = f(\beta_0 + \beta_1 Ownership\_Concentration_i + \beta_2 Manager\_Ownership_i + \beta_3 Board\_Size_i + \beta_4 Independent\_Director_i + \beta_5 \%ROA_{it} + \beta_6 Firm\_Size_{it} + \delta_t + \epsilon_{it})$  where  $i$  indexes universities and  $t$  indexes years. In addition,  $\delta_t$  is the time effect and  $\epsilon_{it}$  is the error term.

Analyses were performed using the mixed model procedure in SPSS 21.0 statistical software, employing first-order ante dependence covariance pattern ANTE(1), which is a suitable model for the covariance structure of continuous longitudinal data that allows for a serial correlation within subjects, but which requires neither that the variance has to be constant nor that correlations between measurements equidistant in time have to be equal, as it happens in the similar stationary autoregressive (AR) models. Such a model is more parsimonious than the fully unstructured one (Zimmerman and Nunez-Anton, 1997). The data were analysed by using the mixed-effect model developed with a restricted maximum likelihood (REML) estimation, which takes into account the degrees of freedom used to estimate fixed effects - when estimating variance components - in contrast with the maximum likelihood method (ML) - and produces unbiased estimating equations for the variance parameters (Patterson and Thompson, 1971).

## 4. Results

### 4.1. Descriptive statistics

Table 1 shows the descriptive statistics of variables used in the study. The results indicate that sampled firms show an average of leverage index of 2.47, with a high dispersion in the sample (S.D. = 23.74), and highlight how the NTBFs sampled have a generally unbalanced capital structure, with high levels of debt.

Nevertheless, this evidence is very uneven within the sample, and highlights the heterogeneity characterizing the financing decisions and the peculiar conditions of performance of the NTBFs sampled. Concerning the corporate governance aspects, it can be seen that an ownership concentration denotes a sample-wide mean of 87.59, and reveals how NTBFs firms show large-block shareholders. Nonetheless this result presents a high-moderate dispensation in the sample (S.D. = 19.88); such an element reduces the explicative impact of the assumptions made previously. With regard to the managerial ownership, the results show a sample-wide mean of only 0.32 shareholder manager. Considering that this data is low dispersed in the sample (S.D. = 0.57), the same is symptomatic of a low degree of managerial involvement in the ownership of the NTBFs. The results referring to the board size show a sample-wide mean of 1.48 directors, with a moderate dispersion in the sample (S. D. = 1.31), and denote a small dimension of board of directors in the sampled firms. The results show a small presence of independent directors with a sample-wide mean of 0.52; however, these data are moderately dispersed in the sample (S. D. = 1.12). Finally, the absence of significant correlations between the main explicative variables reveals that multicollinearity is not a major issue in this analysis.

#### *4.2. Linear mixed-model model estimation*

Table 2 shows the results of the linear mixed-model estimating the impact of corporate governance features on capital structure of NTBFs. Hypothesis 1 states a negative relationship between ownership concentration and leverage level. The coefficient on ownership concentration is negative and statistically significant (coeff. = -0.027,  $p < .01$ ), thus providing support to Hypothesis 1. Hypothesis 2 states a negative relationship between managerial ownership and leverage level. The coefficient on managerial ownership is negative and statistically significant (coeff. = -0.719,  $p < .10$ ), thus providing support to Hypothesis 2. Hypothesis 3 states a negative relationship between board size and leverage level. The coefficient on board size is negative but not statistically significant; hence, the Hypothesis 3 is rejected. Finally, Hypothesis 4 states a negative relationship between independent directors and leverage level. The coefficient on independent directors is negative and not statistically significant. These results do not provide support for Hypothesis 4.

### **5. Results discussion and conclusion**

The paper aimed to study the effects of corporate governance on capital structure of NTBFs. In detail, and based on existing literature, it was stated that ownership concentration, managerial ownership, board size and independent directors negatively influence the leverage level of these types of firms. In order to test the developed hypotheses, a sample of Italian firms was investigated during an exploration period of nine years (from 2004 to 2013) and consists of 303 observations. The results show that firms with a concentrated ownership denote a less level of firm's leverage. This finding is consistent with the evidences found by Kasbi (2009), who pointed out that large block-holders tend to reduce the use of debt in order to avoid all those financing choices impeding their control over the firm; jointly at the problems linked to the adverse selection (Leary and Roberts, 2005) - especially in the context of NTBFs - which faced financing constraints. Second, in line with the findings of Berger et al. (1997) and Al-Fayoumi and Abuzayed (2009), managerial ownership was found to be negatively related to the firm's leverage. They also highlighted that manager shareholders of NTBFs tend to reduce the level of firm's debt with the aim to decrease the bankruptcy risk.

Nonetheless, this evidence is in contrast with the results obtained by Kuo et al. (2012), who stress that in the high-tech industry and in small firms the managerial shareholders can gain agency-related benefits by increasing debt financing; while in large firms the managerial shareholders prefer to decrease debt financing. On this view, the results of the paper seem to be closer to the previous evidences on large firms, but confirm, at the same time, the major suggestion found in literature: agency-related advantages decrease with the increasing of managerial ownership, either in SMEs or in the high-tech sector. Additionally, the board size seems to have no effects on capital structure of NTBFs. This evidence is in contrast with the findings of Berger et al. (1997) and Abor and Biepkke (2006), and denotes how a higher major pressure of large board on managers does not decrease the firm's leverage to improve firm value and performance.

However, as suggested by Wen et al. (2002) – who obtained in their study not statistically significance on the same coefficient but they hypnotized a positive relation between board size and firm's leverage – the peculiar company culture can affect the relations among directors, who, by the way, are exposed to conflicts with the increasing of the board size, which limits the effectiveness of the decision making process.

Finally, in contrast with the findings of Wen et al. (2002) and Kuo et al. (2012), also the presence of independent directors does not have effects on the capital structure of NTBFs. This evidence points out some concerns about the assumption stating that outside or independent directors monitor managers more actively and have an influential impact on their financing decision, which leads them to adopt a lower leverage rate in order to avoid performance pressure (Jansen, 1986). In this line, a higher number of independent directors in the NTBFs does not have an actual effect on managers whose aim is to influence them in order to make them select the optimal level of debt. That may lead to the choice of a level of debt that can be not suitable for the shareholder's interest. The paper presents some limitations. First, even though it is based on extant literature and overall theory, the findings should be prudently interpreted, given that they are drawn from a sample of Italian NTBFs, which may restrict the generalization of similar firms in other countries, especially those outside the European context. Second, only four variables have been examined to explore the linkage between corporate governance and capital structure of NTBFs. Future research could benefit from including other director characteristic variables, such as those linked to their personal and social characteristics – as education, tenure, CEO's compensation and board skills - jointly to variables explaining more about the ownership structure of the firms, as institutional shareholding, for instance, which plays an important role in the NTBFs sector (Freear and Wetzel, 1990; Hogan and Hutson, 2005). In summary, the paper offers some contributions on literature extending the understanding of corporate governance effects on capital structure in NTBFs, with some implications for financing entrepreneurial opportunities and corporate governance mechanisms, which are to be pursued in this type of firm.

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**Table 1: Means, standard deviations and correlations among variables**

|                                  | <i>Mean</i> | <i>S. D.</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> | <i>6</i> | <i>7</i> |
|----------------------------------|-------------|--------------|----------|----------|----------|----------|----------|----------|----------|
| <b>1 Independent_Director</b>    | 0.520       | 1.123        | 1        | 0.772    | 0.012    | -0.031   | 0.003    | -0.049   | 0.195**  |
| <b>2 Board_Size</b>              | 1.482       | 1.307        | 0.772    | 1        | -0.129   | 0.274    | 0.103**  | -0.003   | 0.196**  |
| <b>3 Ownership_Concentration</b> | 87.593      | 19.878       | 0.012    | -0.129   | 1        | -0.042   | -0.099** | 0.018    | -0.048   |
| <b>4 Manager_Ownership</b>       | 0.319       | 0.569        | -0.031   | 0.274    | -0.042   | 1        | 0.068    | -0.109   | 0.078*   |
| <b>5 %ROA</b>                    | -4.484      | 54.665       | 0.003    | 0.103**  | -0.099** | 0.068    | 1        | 0.008    | 0.191**  |
| <b>6 Leverage</b>                | 2.473       | 23.738       | -0.049   | -0.003   | 0.018    | -0.109   | 0.008    | 1        | 0.098*   |
| <b>7 Firm_Size</b>               | 12.013      | 1.507        | 0.195**  | 0.196**  | -0.048   | 0.078*   | 0.191**  | 0.098*   | 1        |

\*\* p < 0.01; \* p < 0.05 (all two-tailed tests).

**Table 2: Estimation of linear mixed-effect model regression with leverage as the dependent variable**

| <i>Variables</i>                            | <i>Model estimation</i> |             |
|---|-------------------------|-------------|
|   | <b>B</b>                | <b>Sig.</b> |
| <i>Control variables</i>                    |                         |             |
| <b>Firm_Size</b>                            | 0.512*                  | (0.099)     |
| <b>%ROA</b>                                 | -0.039***               | (0.002)     |
| <i>Hypothesized effects</i>                 |                         |             |
| <b>Ownership_Concentration</b>              | -0.027***               | (0.005)     |
| <b>Manager_Ownership</b>                    | -0.719*                 | (0.092)     |
| <b>Board_Size</b>                           | -0.096                  | (0.720)     |
| <b>Independent_Director</b>                 | - 0.251                 | (0.391)     |
| <b>-2 Log likelihood restricted</b>         | 1518.149                |             |
| <b>Akaike's information criterion (AIC)</b> | 1556.149                |             |
| <b>Hurvich and Tsai's criterion (AICC)</b>  | 1559.202                |             |
| <b>Bozdogan's criterion (CAIC)</b>          | 1643.449                |             |
| <b>Bayesian information criterion (BIC)</b> | 1624.449                |             |

\*\*\* p < 0.01; \*\* p < 0.05; \* p < 0.10 (all two-tailed tests).