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## Article

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## Internal and External Determinants of Capital Structure in Large Korean Firms

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### ABSTRACT

We examine the internal and external determinants of the capital structure of large Korean companies during the 2010-2017 period. Using total, short-term, and long-term debt ratios as proxies for capital structure, we found that both profitability and liquidity affect leverage negatively and significantly. These results are consistent with the experience of other nations, such as Malaysia, Pakistan, and Vietnam. We also show that both asset tangibility and firm size have a positive effect on long-term borrowings but a negative effect on short-term borrowings. These findings are aligned with observations from Pakistani and Vietnamese firms. The external determinants, however, show little statistical significance. Using an empirical approach simultaneously including both firm-specific and external determinants that influence the debt-equity choice for large companies listed on the Korea Exchange, our study complements the literature on corporate finance. For future research, we suggest including a dummy variable for structural changes (e.g. the world financial crisis) and measures of leverage dispersion and industry concentration to increase the power of the statistical models.

*Keywords: Capital structure, Leverage, Large Korean Firms, Internal Determinants, Macroeconomic Factors.*

### 1. Introduction

Since Modigliani and Miller (1958), several theories and hypotheses have been contributed to the corporate capital structure such as agency cost, trade-off, information asymmetry, and follow-the-leader. Empirical researchers have already shown that firm-specific and macroeconomic factors affect the borrowing designs of firms choosing between debt and equity, depending on the external and internal circumstances

(Deesomsak, Paudyal, & Pescetto, 2004; Frank & Goyal, 2007; Gajurel, 2005; Jong, Kabir, & Nguyen, 2008; Zani, Tomedi, Macagnan, & Telles, 2014). Referring to the external determinants, previous studies find a relationship between the capital structure decisions of corporations and macroeconomic variables such as growth rate in the gross domestic product (GDP), expected inflation rate, and lending rate (Bastos, Nakamura, & Basso, 2009; Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001; Hanousek & Shamshur, 2011; Rehman, 2016; Sett & Sarkhel, 2010). By contrast, the main internal determinants of debt-equity choice considered in prior studies were growth opportunities, total asset tangibility, profitability, firm size, volatility,

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non-debt tax shield (NDTS), liquidity, and business risk (Correa, Basso, & Nakamura, 2007; Gao, 2016; Khan, Shah, Haq, & Shah, 2014; Ozkan, 2001; Sheikh, 2011; Vo, 2017). The importance of capital structure at the micro- and macro-economic level refers to the increase in the value of the firm, full utilization of available funds, maximization of return, minimization of financial risk, reduction of cost of capital, solvency or liquidity position, and flexibility according to changing conditions or adjustment of capital. All these critical factors provide and stimulate the formation of new information to increase the probability of a firm's success (Kim, 2019). This is aligned with the improvement of corporate governance strategy that recently includes multiple directorships as an indicator of the functional efficiency of the board (Park, 2019).

This study aims to analyze the capital structure characteristics of KOSPI-100 firms. In detail, it aims to shed light on the following questions: What types of capital structure theories have Korean firms followed? Are external variables more influential than internal factors on debt-equity choice? What are the strongest influential determining factors of capital structure choice in the Korean environment? We choose the KOSPI-100 or KRX100 because it is the index of the 100 largest companies listed on the Korea Exchange, including KOSDAQ's big companies. *A priori*, as a firm grows in size, its borrowing ability increases. Because large firms might deal with high investment opportunities to expand their business around the world, they show higher cash needs and increases in their debt-equity ratio compared with small firms. In addition, the scale of operations of small firms is limited, causing a restriction on their funding needs which is perceived by banks and investors as an increase in the default risk probability while it is interpreted as distress, bankruptcy, and loss of ownership for small firms. The growth of small firms is more sensitive to internal finance management than that of large firms (Rajan & Zingales, 1995) because small firms face financial constraints, preferring to pay high-interest rates for additional loans instead of issuing external equity, causing a reduction of their financial resources.

The relationship between capital structure and its determinants is both theoretically and empirically controversial and inconclusive. We, therefore, approached the topic more empirically to determine the significant variables that affect the capital structure of Korean firms because previous research generally focuses more on the theoretical explanation. Our study simultaneously included both internal and external factors that affect the debt-equity choice. In this context, this study's general objective is to determine the firm-specific and macroeconomic factors that might affect the capital structure of Korean firms using a sample of KOSPI-100 companies during the 2010-2017 period. The specific objectives aim to determine any relationship between the most important financial and macroeconomic variables that affect the capital structure of Korean firms, to construct a statistical model using the internal and external determinants of capital structure for the KOSPI-100 sample, and to evaluate the results achieved by the constructed statistical model.

The rest of the paper is composed of four sections. The first presents the literature review which refers to the theoretical framework through the role of capital structure and its determinants. The second section shows the research methodology. The third describes the data collection procedure and provides empirical results. Finally, the last section analyzes the findings and summarizes the outcome of this study before finally covering conclusions and recommendations for future research.

## II. Determinants of Capital Structure

The relationship between growth and capital structure tends to differ between different proxies for the dependent variable. The agency theory predicts a negative relationship between growth and leverage because firms with high growth opportunities tend to retain financial flexibility to be able to borrow more in subsequent years (Myers, 1977; Vo, 2017). Firms with high growth opportunities are likely to

show lower agency costs of free cash flow proving a negative relationship between sales growth and leverage (Jensen, 1986). Conversely, the pecking order theory argues a positive relationship between growth opportunities and leverage as firms prefer to use retained earnings in the first place, then, low-risk debt, followed by high-risk debt, and as a last resource, new equity.

Referring to empirical studies, Pandley (2001) concludes that growth opportunities have a significant positive relationship with debt ratios because sales growth increases retained earnings in Malaysian companies. Vo (2017) determines a positive relationship between growth opportunities and the ratio of long- to short-term debt in Vietnamese firms because high market value firms tend to use more debt to finance their investment. Arsov and Naumoski (2016) find that sales growth affects leverage in companies in the Balkan countries positively and statistically significantly. By contrast, Myers (1977) identifies a negative relationship between growth opportunities and debt ratio. His argument focuses on the sub-optimal investment strategy caused by the reduction of the present market value of a firm. Findings from Rajan and Zingales (1995) imply that growth opportunities are negatively correlated with leverage in G-7 countries, namely, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States. To sum up, sales growth has a positive influence on capital structure supported by the pecking order and trade-off theories while it has a negative affect according to agency cost theory. Thus, our first hypothesis is:

**Hypothesis 1:** Sales growth affects the capital structure of large Korean firms.

Asset tangibility is generally used as collateral and is considered a positive determinant for capital structure in the trade-off theory because a high fraction of tangible assets allows firms to obtain external finance easily, resulting in high leverage. Tangible assets are used as collateral for debt holders to secure the debt repayment, which explains the positive relationship between the variables (Harris & Raviv, 1991). Morellec (2001) mentions that selling tangible

assets is considered the cheapest funding, with external financing being considered the most expensive (Morellec, 2001). Conversely, asset tangibility influences capital structure negatively in the agency cost theory because the conflict between managers and shareholders is reduced when a firm has a high ratio of collateralized fixed assets because managers do not administer enough free cash to engage in empire-building. A company with a high level of tangible assets might forecast significant confidence for managers and shareholders. A firm's asset tangibility may mitigate concerns over insider resource expropriation and it is associated with agency costs of debt and the costs of financial funds (Booth et al., 2001; Myers, 1977).

Rajan and Zingales (1995) find a significant positive relationship between asset tangibility and leverage in firms from G-7 countries. Findings from Hussain and Miras (2015) suggest that asset tangibility and total debt ratio are positively correlated concluding that Malaysian's food producer companies are using their asset tangibility as collateral to obtain debt finance and follow trade-off theory. Vo (2017) performs a study of the determinants of capital structure in Vietnam. His results suggest both significant positive and significant negative relationships between tangibility and long-term leverage and tangibility and short-term leverage, respectively. Arsov and Naumoski (2016) examine the factors that influence capital structure in the Balkan countries. Their findings exhibit a significant negative relationship between tangibility and debt explained by lower borrowing needs and less investment in companies which are already better equipped with fixed assets. We conclude that the relationship between tangibility and leverage is positive according to pecking order and trade-off theory while it is negatively supported by agency cost theory. Therefore, our second hypothesis is:

**Hypothesis 2:** Asset tangibility affects the capital structure of large Korean firms.

Jensen (1986) and MacKay and Phillips (2005) demonstrate a positive relationship between profitability and leverage which is grounded in the trade-off theory, tax benefit, and agency cost (Jensen, 1986; MacKay

& Phillips, 2005). Profitable firms are inclined to use more debt, taking advantage of tax benefits, and reducing company insolvency. An increase in the profitability of Nigerian firms is positively related to their leverage meaning that more profitable companies use more debt in manufacturing firms located in Nigeria (Akinyomi & Olagunju, 2013).

Conversely, profitability and leverage show a negative relationship according to the pecking order theory, which explains that profitable firms tend to have low leverage (Frank & Goyal, 2007). Firms prefer to use internal funds, such as retained earnings, initially instead of external funds. Therefore, debt issuing is considered less costly than equity financing. The findings of Awan and Amin (2014) suggest that profitability is statistically significant and negatively correlated with financial leverage in Pakistani textile firms. Vo (2017) finds a significant negative relationship between profitability and short-term leverage, and profitability and the ratio of short- to long-term debt in Vietnamese firms. Arsov and Naumoski (2016) demonstrate that profitability has a negative statistical effect on leverage in Croatia, Macedonia, Serbia, and Slovenia. Ozkan (2011) shows that high profitability is associated with lower leverage in non-financial firms in the United Kingdom. To sum up, the relationship between profitability and leverage is positive according to trade-off and agency cost theory, while it is negatively affected according to the pecking order theory. Thus, our third hypothesis is:

**Hypothesis 3:** Profitability affects the capital structure of large Korean firms.

NDTS is inversely related to debt usage and it is favorable to the firms when the benefit from the interest tax shield is reduced, which is consistent with the trade-off theory (Awan & Amin, 2014). A large NDTS reduces the expected value of interest tax savings and lessens the advantage of debt financing. Handoo and Sharma (2014) find that NDTS has a significant negative effect on short-term, long-term, and total debt in Indian companies. Gao (2016) establishes a significantly negative relationship between NDTS and corporate debt levels in Chinese firms.

Conversely, Bradley et al. (1984) prove that NDTS had a positive effect on the debt ratio because NDTS is an auxiliary variable for asset security, where firms with more securable assets evidenced greater leverage ratios, which is consistent with the pecking order theory (Bradley, Jarrell, & Kim, 1984). Findings from Khan et al. (2014) and Awan and Amin (2014) employing non-financial companies of Pakistan, suggest that NDTS and debt are positively correlated. We conclude that NDTS has a positive effect on the level of leverage supported by the pecking order theory while it has a negative influence according to trade-off theory. Therefore, our fourth hypothesis is:

**Hypothesis 4:** NDTS affects the capital structure of large Korean firms.

Jensen (1986) indicates a positive relationship between size and debt usage because equity financing is costlier to large firms than small firms, suggesting that debt issuing is the better alternative for big firms, which have more incentives to use debt to improve their production process. According to the trade-off theory, large companies should borrow more because these firms are more diversified with less possibility of bankruptcy while small companies should operate with low leverage because they may face financial distress and be liquidated. Furthermore, innovation and competitive market changes are adopted easily by large corporations compared with new firms and small and medium enterprises because of the high amount of resources for investment activities of large firms (Lee, 2017). Large companies have lower agency costs of debt caused by low monitoring costs for their less volatile cash flows and their easy access to capital markets, predicting a positive relationship between size and leverage (Shah & Manja, 2018). Findings from Sheikh and Wang (2010) and Vo (2017) indicate that the size of a firm is significantly positively correlated with leverage in Pakistani and Vietnamese companies, respectively.

By contrast, pecking order theory suggests a negative relationship between size and debt caused by the less severe information asymmetry in large companies. Thus, rationally, small firms might borrow short-term

bank loans instead of engaging long-term debt (Sheikh & Wang, 2010). Awan and Amin's (2014) and Khan et al.'s (2014) studies show that the size of firms is statistically significant and negatively correlated to debt ratios in Pakistani firms. Handoo and Sharma's (2014) results show a negative significant relationship between size and short-term debt in Indian firms. Rajan and Zingales (1995) conclude a negative relationship between size and level of debt caused by the low asymmetry of information in large corporations than small firms in G-7 countries (Rajan & Zingales, 1995). To sum up, the relationship between size and leverage is positively supported by the trade-off and agency cost theories while size might have a negative relationship with leverage according to the pecking order theory. Thus, our fifth hypothesis is:

**Hypothesis 5:** Firm size affects the capital structure of large Korean firms.

Liquidity ratios have a mixed effect on the capital structure decision. On one hand, Morellec (2001) finds a positive relationship between liquidity and leverage under the assumptions of the trade-off theory, which mentions that highly liquid companies have more ability to meet debt obligations and will borrow more. Awan and Amin's (2014) results are in accordance with the trade-off theory indicating that liquidity is significantly positively correlated with financial leverage in Pakistani firms. On the other hand, agency theory, information asymmetry, and the pecking order theory emphasize a negative relationship between liquidity and debt ratio. Companies with a high level of liquidity will have low debt financing because managers are more likely to use internal funds to finance their personal projects, and lenders may not be satisfied with firms' administration if managers take liquid resources to benefit shareholders. Deesomsak et al. (2004) investigate the determinants of capital structure of firms operating in four countries in the Asia Pacific region, namely Australia, Malaysia, Singapore, and Thailand. Their findings suggest that liquidity and leverage are negatively correlated. Sheikh and Wang's (2010) and Khan et al.'s (2014) results suggest that liquidity and debt are negatively correlated

in Pakistani firms, meaning that highly liquid firms prefer to finance new investment with internally available funds than through external funding. Vo (2017) proves a negative relationship between liquidity and leverage in Vietnamese companies. We conclude that liquidity has a positive effect on leverage supported by the trade-off theory while it has a negative influence promoted by the agency and pecking order theories. Thus, our sixth hypothesis is:

**Hypothesis 6:** Liquidity affects the capital structure of large Korean firms.

The bankruptcy cost and agency cost theories suggest that risk is a determinant of the capital structure of firms because there is a strong relationship between the high volatility of firm results and the great probability of insufficient cash flow to cover present and future debt repayments. Thus, the riskier the firm, the higher the costs of financial distress, and the greater the probability of default (Correa et al., 2007). Correa et al. (2007) demonstrate that risk has a positive statistical effect on the leverage of the largest Brazilian companies. Their findings prove that riskier firms are apparently less subject to sub-investment problems reducing agency costs. Moreover, the correlation between risk and leverage may be very sensitive to the size of firms. Therefore, creditors tend to continue financing riskier large firms in order to avoid their bankruptcy (Gaud, Jani, Hoesli, & Bender, 2005). Results from Gaud et al. (2005) show a positive relationship between debt and risk in Swiss companies. They attribute their findings to the size of firms and its relationship with the creditors' confidence.

Earnings volatility and leverage have a negative relationship supported by the trade-off theory because more debt increases the firm's risk and firms with volatile results would accumulate capital at times of surplus to counter the loss of investment opportunities in deficit periods. Findings from Sheikh (2011) and Awan and Amin (2014) suggest that the earnings volatility of Pakistani firms is negatively correlated with leverage confirming the predictions of the trade-off theory which suggests that firms with less volatile earnings should operate at high debt levels because

of their ability to satisfy their contractual claims. To sum up, the relationship between leverage and risk is positively sustained by the agency cost theory while risk might have a negative relationship with debt according to the trade-off theory. Therefore, our seventh hypothesis is:

**Hypothesis 7:** Risk affects the capital structure of large Korean firms.

The GDP growth of a country is considered an incentive for banks because they will offer more loans to firms with low lending rates. Booth et al. (2001) mention that macroeconomic factors are determinants of countries capital structure, showing differing effects on debt policy. Hanousek and Shamshur (2011) demonstrate that GDP growth has a positive and significant statistical effect on leverage in non-financial companies from the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, and the Slovak Republic. Rehman's (2016) results suggest that GDP growth rate and leverage are positively correlated in Pakistani firms. Conversely, Gajurel (2005) suggests that annual growth in GDP has a negative relationship with leverage, proving that Nepalese firms use less debt when the GDP growth rate is high. Bastos et al. (2009) mention that GDP growth negatively influences leverage in companies of five countries in Latin America. Therefore, our eighth hypothesis is:

**Hypothesis 8:** GDP growth affects the capital structure of large Korean firms.

Corcoran (1977) and Taggart (1985) find a positive relationship between the inflation rate and debt in American firms. The authors mention that the inflation rate reduces the cost of debt and increases the true value of tax deduction (Corcoran, 1977; Taggart, 1985). Sett and Sarkhel (2010) demonstrate that the inflation rate has a positive statistical effect on financial leverage in non-financial private companies from India. By contrast, Booth et al. (2001) demonstrate that the inflation rate has a negative statistical effect on long-term debt ratio in firms in Brazil, India, Jordan, Korea, Malaysia, Mexico, Pakistan, Turkey, Zimbabwe, and the United

States because the bond market falls when the inflation rate is high, causing a negative effect on debt usage. Findings from Dincergok and Yalciner (2010) suggest that the interest rate has a negative effect on debt in Argentinian, Brazilian, Indonesian, and Turkish manufacturing companies. Bastos et al. (2009) determine that the annual inflation rate does not influence the capital structure in Argentinian, Brazilian, Chilean, Mexican, and Peruvian public-traded firms. Thus, our ninth hypothesis is:

**Hypothesis 9:** The inflation rate affects the capital structure of large Korean firms.

Bokpin (2009) analyzes companies from 34 emerging countries for the period 1990-2006. He finds that the interest rate has a significant positive effect on leverage. Zani et al. (2014) investigate the influence of real interest rates on equity and capital structure in Brazil. Their findings imply that the high-interest rate will be likely to reduce debt, thus, there is a negative relationship between the real interest rate and leverage, meaning that the increase in the interest rates is conducive to the reduction of the debt capital and investment, generating lower debt usage with higher interest rates. Therefore, our tenth hypothesis is:

**Hypothesis 10:** The real interest rate affects the capital structure of large Korean firms.

### III. Research Model

We used multiple linear regression models to investigate the firm-specific and macroeconomic determinants of capital structure in Kospi-100 firms. Our multiple regression analyses satisfy the ordinary least squares (OLS) assumptions that is, the normality test, homoscedasticity test, linear test of variables, serial correlation test, and multicollinearity test. Furthermore, when each series was represented graphically, their trend suggests linear adjustment which reinforces our theoretical and empirical approach. Our study follows the methodology and inferences make by previous

studies which adopt OLS as a research model to examine the factors that influence the debt-equity choice in different nations (Akinyomi & Olagunju, 2013; Arsov & Naumoski, 2016; Deesomsak et al., 2004; Gill, Biger, Pai, & Bhutani, 2009; Handoo & Sharma, 2014; Hussain & Miras, 2015; Jong et al., 2008). Factors that may affect capital structure are based on the existing capital structure studies in the current literature. We use total, short-term, and long-term debt ratios as the dependent variable, with sales growth, asset tangibility, profitability, NDTs, size, firm liquidity, risk, GDP growth, inflation rate, and real interest rate as the independent variables. The models for this study are described below:

Model 1 (Equation 1) - internal determinants:

$$\begin{aligned} Lev_{i,t} = & \beta_0 + \beta_1 SalesGrowth_{i,t} + \beta_2 Tang_{i,t} \quad (1) \\ & + \beta_3 Prof_{i,t} + \beta_4 NDTs_{i,t} + \beta_5 Size_{i,t} \\ & + \beta_6 Liq_{i,t} + \beta_7 Risk_{i,t} + \sum_{j=1}^8 \beta_j Year_{i,t} \\ & + \sum_{k=9}^{17} \beta_k Industry(capital\ letter)_{i,t} + \epsilon_{i,t} \end{aligned}$$

Model 2 (Equation 2) - external determinants:

$$\begin{aligned} Lev_{i,t} = & \beta_0 + \beta_8 GDP_t + \beta_9 Inf_t + \beta_{10} Int_t \quad (2) \\ & + \sum_{j=1}^8 \beta_j Year_{i,t} + \sum_{k=9}^{17} \beta_k Industry_{i,t} \\ & + \epsilon_{i,t} \end{aligned}$$

Model 3 (Equation 3) - internal and external determinants:

$$\begin{aligned} Lev_{i,t} = & \beta_0 + \beta_1 SalesGrowth_{i,t} + \beta_2 Tang_{i,t} \quad (3) \\ & + \beta_3 Prof_{i,t} + \beta_4 NDTs_{i,t} + \beta_5 Size_{i,t} \\ & + \beta_6 Liq_{i,t} + \beta_7 Risk_{i,t} + \beta_8 GDP_t \\ & + \beta_9 Inf_t + \beta_{10} Int_t + \sum_{j=1}^8 \beta_j Year_{i,t} \\ & + \sum_{k=9}^{17} \beta_k Industry_{i,t} + \epsilon_{i,t} \end{aligned}$$

Model 4 (Equation 4) - internal and external determinants (with lag of the dependent variable):

$$\begin{aligned} Lev_{i,t} = & \beta_0 + \alpha Lev_{i,t-1} + \beta_1 SalesGrowth_{i,t} \quad (4) \\ & + \beta_2 Tang_{i,t} + \beta_3 Prof_{i,t} + \beta_4 NDTs_{i,t} \\ & + \beta_5 Size_{i,t} + \beta_6 Liq_{i,t} + \beta_7 Risk_{i,t} \\ & + \beta_8 GDP_t + \beta_9 Inf_t + \beta_{10} Int_t \\ & + \sum_{j=1}^8 \beta_j Year_{i,t} + \sum_{k=9}^{17} \beta_k Industry_{i,t} \\ & + \epsilon_{i,t} \end{aligned}$$

Where:

$Lev_{i,t}$  is debt ratio for firm  $i$  in year  $t$ . It is composed of total debt ratio  $TLev_{i,t}$ , short-term debt ratio  $StLev_{i,t}$ , and long-term debt ratio  $LtLev_{i,t}$ ,

$$TLev_{i,t} = \frac{Total\ Current\ Liabilities + Total\ Non-Current\ Liabilities}{Total\ Assets}$$

for firm  $i$  in year  $t$ ,

$$StLev_{i,t} = \frac{Total\ Current\ Liabilities}{Total\ Assets} \text{ for firm } i \text{ in year } t,$$

$$LtLev_{i,t} = \frac{Total\ Non-Current\ Liabilities}{Total\ Assets} \text{ for firm } i \text{ in year } t,$$

$\beta_0$  is the intercept term,

$Lev_{i,t-1}$  is the lag of the dependent variable,

$$SalesGrowth_{i,t} = \frac{Sales_t - Sales_{t-1}}{Sales_{t-1}} \text{ for firm } i \text{ in year } t,$$

$$Tang_{i,t} = \frac{Net\ Fixed\ Assets}{Total\ Assets} \text{ for firm } i \text{ in year } t,$$

$$Prof_{i,t} = \frac{Earnings\ before\ interest,\ tax,\ depreciation,\ and\ amortization}{Total\ Assets}$$

for firm  $i$  in year  $t$ ,

$$NDTs_{i,t} = \frac{Annual\ Depreciation}{Total\ Assets} \text{ for firm } i \text{ in year } t,$$

$$Size_{i,t} = \text{Log}(Total\ Assets) \text{ for firm } i \text{ in year } t,$$

natural logarithm of total assets,

$$Liq_{i,t} = \frac{Total\ Current\ Assets}{Total\ Current\ Liabilities} \text{ for firm } i \text{ in year } t,$$

$$Risk_{i,t} = \text{Standarddeviation} \left( \frac{Earnings\ before\ interest\ and\ taxes\ (EBIT)}{Total\ Assets} \right)$$

for firm  $i$  in year  $t$ ,

$$GDP_t = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \text{ in year } t,$$

$Inf_t$  is the inflation rate at the end of year  $t$ ,

$Int_t$  is the real interest rate at the end of year  $t$ ,

$Year_{i,t}$  a dummy that represents the year of information of firm  $i$ ,

$Industry_{i,t}$  a dummy that represents a firm's industry.

There are eight non-financial industries listed on the KOSPI-100,

$\epsilon_{i,t}$  is the error term for firm  $i$  in year  $t$ .

## IV. Empirical Analysis and Results

### A. Descriptive Analysis

The data sample consists of 81 companies listed on the Korea Composite Stock Price Index (Kospi-100). The dataset is integrated by 548 firm-year observations from the period 2010-2017. Information from firms was collected by Kis-Value version 3.2 ("Kis-Value version 3.2," 2018) from Consolidated Financial Statements, which includes the Consolidated Statement



of Financial Position, Consolidate Income Statement, and Consolidated Financial Ratios. The fiscal year-end for the annual report for all firms is December 31<sup>st</sup>. The macroeconomic data (GDP, inflation rate, and real interest rate) was extracted from The World Bank webpage (The World Bank, 2018). Sixteen financial and insurance firms were excluded from the initial sample (100 companies), resulting in 84 firms. Both sectors were ignored because these companies are considered to be different from industrial firms for their peculiarity in operations and accounting mechanism (Fama & French, 1992). In addition, three firms were omitted from this empirical study because they did not report complete information. As mentioned above, the final sample contains 81 firms and 548 firm-year observations, because of missing information in annual reports and extreme observations (Chen & Dixon, 1972). We selected 2010 as the starting point of our analysis because South Korea's economic growth rate reached 6.1% in 2010, becoming one of the few developed nations that avoided a recession during the global financial crisis with a sharp recovery from its economic growth rates of 2,3% and 0,2% in 2008 and 2009, respectively (Newsweek, 2010).

All leverage variables of Kospi-100 firms decreased during the 2010-2017 period, caused by the progress of South Korea's private equity market and the prevalence of large conglomerates. Private equity firms in South Korea represent a broad-based source of equity capital. Furthermore, the South Korean economy has strongly stimulated the domestic consumption of products to compensate for the drop in exports. Total leverage was reduced by 8.3% in large Korean companies, while short-term and long-term debt ratios declined by 10.7% and 4.3%, respectively. The highest ratios for short-term debt and total debt are seen in 2010 (0.319 and 0.513, respectively) whereas the maximum figure for long-term debt was reached in 2013 (0.204). Conversely, the lowest ratios for short-term, long-term, and total debt ratios are found in 2015 (0.277), 2011 (0.178), and 2017 (0.470), respectively. The ratio between long-term and short-term debt presents a growth of 7.1% in the 2010-2017 period because it increased from 0.608

to 0.652, its maximum is seen in 2015 (0.712) and its minimum in 2011 (0.569). Goyal and Packer (2017) examine the leverage of firms of seven economies in emerging Asia (namely Korea, Hong Kong, Indonesia, Malaysia, Singapore, Thailand, the Philippines) during the 1991-2015 period. Their findings suggest that for Indonesian, Korean, and Thai firms long-term debt was higher, ranging between 34% and 37% for book leverage and between 31% and 36% for market leverage. These countries were called the "high leverage" group. Korean companies leverage stood out in the early 1990s with 60% for both book and market leverage and then its leverage fell below 40%. In addition, Korean companies averaged significantly higher profitability than firms in other jurisdictions accompanied by more short-term debt (Goyal & Packer, 2017).

The descriptive statistics for the sample of the Kospi-100 firms are given in Table 1. The mean for total, short-term, and long-term debt ratio is 0.484, 0.290, and 0.193, respectively. Analyzing the independent variables, the average value of growth in sales, asset tangibility, and profitability is 0.883, 0.364, and 0.133, respectively. Furthermore, the mean values of NDTs, size, liquidity, and business risk are 0.011, 12.926, 1.505, and 0.241, respectively. Finally, the macroeconomic variables divided into GDP growth, inflation rate, and real interest rate exhibit an average of 3.383, 1.763, and 2.769, respectively.

## B. Correlation Analysis

The correlation matrix in Table 2 reveals that the total debt ratio has a significant positive correlation at 0.01 level with the short-term and long-term debt ratios, showing coefficients of 0.636 and 0.727, respectively. The relationship between the short-term and long-term debt ratios is negative, but not significant. The total debt ratio is positively correlated (1% level) with the asset tangibility and size, and it is significantly negatively associated at the 1% level with profitability, liquidity, and firm risk. The short-term debt ratio presents a significant negative correlation with asset tangibility, profitability, firm liquidity, and business

**Table 1.** Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Lower Quartile (Q1)	Median	Upper Quartile (Q3)	Max
TLev	0.484	0.171	0.117	0.346	0.499	0.606	0.922
StLev	0.290	0.118	0.066	0.200	0.276	0.359	0.686
LtLev	0.193	0.133	0.001	0.089	0.179	0.258	0.820
Sales growth	0.883	1.441	-2.792	0.058	0.653	1.575	6.453
Asset tangibility	0.364	0.169	0.027	0.255	0.363	0.468	0.838
Profitability	0.133	0.080	0.002	0.076	0.113	0.170	0.393
NDTS	0.011	0.021	0.000	0.001	0.003	0.010	0.123
Size	12.926	0.553	11.487	12.563	12.873	13.344	14.480
Liquidity	1.505	0.849	0.309	0.980	1.327	1.711	6.507
Risk	0.241	0.298	0.000	0.057	0.126	0.290	1.548
GDP growth	3.383	1.186	2.292	2.790	2.896	3.341	6.497
Inflation rate	1.763	1.048	0.830	1.130	1.340	1.460	4.160
Real interest rate	2.769	1.231	1.112	1.500	2.960	3.758	4.307
Number of observations (N)	548						
Number of firms	81						

risk. This variable shows a positive and significant relationship with GDP growth and inflation rate. The long-term debt ratio reveals a positive and significant relationship with asset tangibility, NDTS, and size. By contrast, it presents a significant negative correlation with profitability, liquidity, and company risk. Most of the correlation coefficients do not exceed the value of 0.700 showing no multicollinearity between variables.

### C. Regression Analysis

Table 3 shows the results of twelve multiple linear regressions using internal and external factors that affect the capital structure measured by total, short-term, and long-term debt ratios for Kospi-100 firms. Model 1 includes firm-specific factors, Model 2 contains macroeconomic factors, Model 3 involves both firm-specific and macroeconomic factors, and Model 4 combines the lag of the dependent variable with internal and external determinants of capital structure. The highest adjusted R-squared is shown in Model 4 using total debt ratio as the dependent variable with an F-statistic of 167.393 and a Durbin-Watson statistic of 1.921. Conversely, the lowest

explanatory power is exhibited in Model 2 because the macroeconomic coefficients have an insignificant effect on leverage. Almost all the models are valid because their F-statistics are higher and significant. The exception is Model 2 with total and long-term debt ratios as the dependent variable.

Our results indicate that both profitability and liquidity have a negative influence on the leverage ratios, while both asset tangibility and size have a positive effect on long-term borrowings but a negative effect on short-term borrowings. In addition, the previous year's leverage and the business risk have a positive influence on Kospi-100 firms' leverage. The macroeconomic factors do not play a significant role as determinants of capital structure in Kospi-100 firms, except GDP growth in Model 4 when the total and short-term borrowings are the dependent variables<sup>1)</sup>. We conclude that internal variables are more dominant

1) When we introduce the dummy variable for the firm's industry and the dummy variable of the year, we find similar results as the previous regressions. For Model 4, last year's leverage, sales growth, tangibility of assets, size, business risk, and GDP growth have a significant positive impact on total debt ratio while firm's profitability and liquidity show a significantly negative influence on total leverage. The remaining variables are insignificant factors for capital structure in Kospi-100 firms.

Table 2. Pearson Correlation Matrix

	TLLev	StLev	LtLev	Sales growth	Asset tangibility	Profitability	NDTS	Size	Liquidity	Risk	GDP growth	Inflation rate	Real interest rate
TLLev	1												
StLev	0.636***	1											
LtLev	0.727***	-0.065	1										
Sales growth	-0.030	0.007	-0.045	1									
Tangibility	0.159***	-0.186***	0.378***	-0.115***	1								
Profitability	-0.404***	-0.388***	-0.175***	0.018	0.228***	1							
NDTS	0.050	-0.024	0.088**	0.029	0.146***	0.260***	1						
Size	0.352***	0.003	0.446***	-0.131***	0.230***	-0.023	-0.014	1					
Liquidity	-0.664***	-0.457***	-0.454***	0.038	-0.345***	0.268***	-0.179***	-0.270***	1				
Risk	-0.360***	-0.322***	-0.177***	-0.007	0.148***	0.269***	0.234	-0.036	0.273	1			
GDP growth	0.060	0.099**	-0.008	0.256***	0.022	0.034	0.006	-0.009	-0.020	0.016	1		
Inflation rate	0.047	0.111***	-0.035	0.233***	-0.005	0.041	-0.015	-0.037	-0.009	0.029	0.575***	1	
Real interest rate	0.028	0.031	0.004	0.033	0.021	-0.045	-0.001	-0.092**	-0.002	-0.039	-0.107**	0.226***	1

Note: \*\*\* and \*\* indicate statistical significance at the 1% and 5% levels, respectively.

**Table 3.** Regression Results

Variables	Model 1 (Equation 1) N=548			Model 2 (Equation 2) N=548			Model 3 (Equation 3) N=548			Model 4 (Equation 4) N=470		
	TLev	StLev	LtLev	TLev	StLev	LtLev	TLev	StLev	LtLev	TLev	StLev	LtLev
Last year's leverage												
Sales growth	0.005 (1.324)	0.001 (0.071)	0.004 (1.387)				0.002 (0.593)	-0.003 (-0.994)	0.005 (1.496)	0.643*** (23.703)	0.560*** (16.956)	0.764*** (29.275)
Asset tangibility	0.033 (0.956)	-0.190*** (-6.718)	0.230*** (7.190)				0.030 (0.857)	-0.191*** (-6.816)	0.228*** (7.097)	0.006** (2.300)	-0.003 (-0.116)	0.006*** (2.710)
Profitability	-0.016*** (-7.259)	-0.010*** (-5.104)	-0.008*** (-3.547)				-0.018*** (-7.270)	-0.012*** (-5.277)	-0.009*** (-3.446)	-0.013*** (-7.010)	-0.008*** (-4.678)	-0.005*** (-3.315)
NDTS	0.267 (1.082)	-0.150 (-0.752)	0.419* (1.862)				0.285 (1.157)	-0.120 (-0.611)	0.410* (1.813)	-0.004 (-0.024)	-0.285 (-1.172)	0.296** (2.085)
Size	0.063*** (6.876)	-0.014** (-2.143)	0.073*** (9.228)				0.065*** (6.945)	-0.016** (-2.123)	0.079*** (9.207)	0.018** (2.399)	-0.021*** (-3.230)	0.030*** (5.164)
Liquidity	-0.103*** (-15.057)	-0.075*** (-13.112)	-0.032*** (-4.982)				-0.106*** (-15.018)	-0.074*** (-13.102)	-0.032*** (-5.008)	-0.049*** (-8.721)	-0.038*** (-7.462)	-0.012*** (-2.927)
Risk	0.002*** (5.267)	0.001*** (4.098)	0.001** (2.260)				0.003*** (5.277)	0.002*** (4.225)	0.001** (2.192)	0.002*** (5.467)	0.001*** (3.645)	0.001*** (2.739)
GDP growth				0.009 (0.263)	0.006 (1.107)	0.003 (0.446)	0.007 (1.364)	0.007 (1.274)	0.000 (-0.006)	0.014** (2.278)	0.014** (2.366)	0.001 (0.057)
Inflation rate				0.001 (0.938)	0.008 (1.290)	-0.007 (-0.958)	0.005 (0.789)	0.009 (1.256)	-0.004 (-0.643)	0.006 (1.308)	0.006 (1.438)	0.001 (0.367)
Real interest rate				0.005 (0.467)	0.002 (0.474)	0.002 (0.405)	0.003 (0.746)	0.000 (0.112)	0.002 (0.537)	-0.001 (-0.240)	-0.003 (-1.178)	0.003 (1.147)
Constant	-0.054 (0.438)	0.767*** (7.669)	-0.800*** (-7.063)	0.440*** (14.756)	0.250*** (12.262)	0.190*** (8.209)	-0.103 (-0.812)	0.727*** (7.168)	-0.804*** (-6.918)	0.049 (0.517)	0.511*** (-5.717)	-0.332*** (-4.386)
Adjusted R-Square	0.551	0.385	0.379	0.001	0.009	0.001	0.554	0.399	0.376	0.796	0.617	0.792
F-statistics	96.962***	49.926***	48.629***	0.882	2.698**	0.320	68.965***	37.314***	33.982***	167.393***	69.599***	163.838***
Durbin-Watson	1.746	1.676	1.648	1.732	1.640	1.596	1.840	1.649	1.644	1.921	1.892	1.904

Note: Beta corresponds to unstandardized coefficients. Numbers in parenthesis are t-statistics. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

than external factors in the Korean context because at least five of seven firm-specific determinants show a significant positive or negative relationship with debt ratios. We do not include endogeneity analysis (two-stage least square regression analysis) because its main assumption is that the dependent variable's error terms are correlated with the independent variables. Our results show that error terms are not normally distributed in our sample which does not violate the assumption of the OLS method. The Pearson correlation matrix between the main variables and the error terms (residuals) for each model is presented in Appendix 1 and does not reveal high or significant (5% level) coefficients for the measurements of cost stickiness.

Sales growth only presents a significant positive relationship with total and long-term debt ratios in Model 4; therefore, large Korean companies might be motivated to increase their sales to raise their retained earnings, which affects the next period because we used the previous year's leverage as the dependent variable. For the remaining models, the positive and negative coefficients of sales growth are not statistically significant for the leverage ratios. Therefore, the results for hypothesis 1 showed a positive relationship between capital structure and growth in sales in large Korean companies only for one of our four models. Our results are similar to Arsov and Naumoski's (2016) findings because they establish a positive and significant relationship between sales growth and leverage in the Balkan countries. In addition, our positive but insignificant relationship between growth opportunities and total debt ratio agree with Hussain and Miras' (2015) and Vo's (2017) results in Malaysian and Vietnamese companies, respectively.

The asset tangibility results for KOSPI-100 firms indicate (1) a positive and strongly significant relationship with long-term debt ratio, (2) a negative and strong relationship with short-term debt ratio, and (3) a positive but insignificant relationship with total debt ratio. Thus, findings for hypothesis 2 indicated a positive relationship between asset tangibility and long-term leverage and a negative association between asset tangibility and short-term borrowings in large

Korean companies. Our results are aligned with previous studies such as Vo's (2017) findings in Vietnam. To sum up, our findings confirm the presence of the pecking order, trade-off, and agency cost theories because the first two support the positive relationship between asset tangibility and leverage, while the latter emphasizes the negative relationship between these variables. If we compare the absolute value of asset tangibility in our long- and short-term debt models, we find evidence of high coefficient magnitude when we use long-term debt as the dependent variable, meaning that both pecking order and trade-off theory are stronger than the agency cost theory in the Korean context.

Furthermore, all debt ratios are significantly negative (1% level) influenced by firm profitability in KOSPI-100 firms. The regression coefficient of profitability indicates that when profitability increases by one unit, with the assumption that other variables remain constant, the total leverage of KOSPI-100 firms will decrease by 0.016, 0.018, and 0.013 in Models 1, 3, and 4, respectively. Therefore, hypothesis 3 showed that profitability has a positive effect on capital structure suggesting that more profitable Korean companies tend to borrow less. Our results are aligned with prior studies in Indian, Malaysian, and Pakistani firms (Awan & Amin, 2014; Handoo & Sharma, 2014; Hussain & Miras, 2015).

Findings from hypothesis 4 showed that the NDTS has a significantly positive relationship with long-term borrowings while the relationship between the NDTS and the rest of the debt ratios is insignificant. Similarly, Khan et al. (2014) and Awan and Amin (2014) show a positive relationship between the NDTS and leverage in Pakistani companies. We conclude that large Korean companies might increase their NDTS to reduce the expected value of interest tax savings and lessen the advantage of debt financing because the NDTS can be used as an auxiliary variable for asset security showing the motivation of the pecking order theory.

Our findings for hypothesis 5 suggest that capital structure measured by total and long-term debt ratios has a positive and significant relationship with size, while the short-term debt ratio is negatively and

significantly affected by size. Arsov and Naumoski (2016) and Vo (2017) show a positive relationship between size and total leverage in the Balkan countries and Vietnamese companies, respectively. By contrast, Akinyomi, and Olagunju (2013) and Handoo and Sharma (2014) indicate that size and leverage are negatively correlated in Nigerian and Indian firms, respectively. To sum up, large Korean firms might use more debt to improve their production process as bigger firms are frequently more diversified and successful with less probability of bankruptcy than smaller firms. This demonstrates a positive relationship between size and capital structure, which is supported by the high absolute magnitude of the size coefficient in the total and long-term borrowing models.

The liquidity ratio is statistically significant in all models and its relationship with debt ratios is negative. Thus, hypothesis 6 indicated that liquidity has a negative effect on capital structure. The regression coefficient of liquidity indicates that when liquidity increases by one unit, with the assumption that other variables remain constant, the total leverage of Kospi-100 firms will decrease by 0.103, 0.106, and 0.049 in Models 1, 3, and 4, respectively. Our results are consistent with previous studies presenting a negative relationship between liquidity and leverage in British, Malaysian, Pakistani, and Vietnamese firms (Hussain & Miras, 2015; Ozkan, 2001; Sheikh & Wang, 2010; Vo, 2017).

The regression coefficient of risk is 0.002, 0.003, and 0.002 for Models 1, 3, and 4, respectively, using total leverage as the dependent variable. Therefore, the results for hypothesis 7 show that risk has a positive effect on capital structure in large Korean firms. Correa et al. (2007), Gaud et al. (2005), and Deesomsak et al. (2004) show a positive relationship between risk and leverage in Brazilian and Swiss companies and firms from the Asia Pacific Region, respectively. To sum up, large Korean firms might evidence a high positive correlation between risk and leverage caused by their size, producing a reduction in their agency costs because they do not incur sub-investment problems.

Macroeconomic variables show an insignificant

positive and negative relationship with debt ratios in Kospi-100 firms, except in Model 4 where GDP growth presents a significant positive relationship with total and short-term borrowings. Thus, our results for hypothesis 8 indicated a positive relationship between GDP growth and total and short-term debt in large Korean companies. Booth et al. (2001) find a positive and significant relationship between GDP growth and leverage in firms from Brazil, India, Jordan, Korea, Malaysia, and the United States. Conversely, capital structure is insignificantly affected by the inflation rate and real interest rate in Kospi-100 firms, therefore, our findings for hypothesis 9 and 10 do not support a positive or negative relationship between external factors and capital structure. Our results are aligned with Bastos et al.'s (2009) study that found an insignificant relationship between annual inflation rate and capital structure in Argentinian, Brazilian, Chilean, Mexican, and Peruvian public-traded firms.

Most of our findings are supported by the pecking order theory suggesting that large Korean firms might prefer to use retained earnings in the first place, then low-risk debt, followed by high-risk debt, and as the last resort, new equity. Outsiders can see these signals based on the manager's actions suggesting that an equity issuing would mean stock overvaluation, while an increase in debt could signal confidence in a firm's future. Our results are aligned with Ilyukhin's (2017) findings in Russia as he provides evidence of the high and moderate influence of internal capital structure determinants compared with the irrelevant effect of external factors.

## V. Conclusion

This study determined the firm-specific and macroeconomic factors that might affect the capital structure of Korean firms using a sample of 81 companies listed on the Kospi-100 during the 2010-2017 period. Using total, short-term, and

long-term debt ratios as proxies for capital structure, we found that profitability and liquidity affect capital structure negatively, while the previous year's leverage and business risk influenced debt ratios positively. Furthermore, both asset tangibility and size have a positive effect on long-term borrowings but a negative effect on the short-term debt ratio. The remaining firm-specific factors, such as sales growth and the NDTs, and macroeconomic determinants, namely GDP growth, inflation rate, and real interest rate, do not directly affect all debt ratios in large Korean companies. Most of our findings are supported by the pecking order theory because it involves a financing hierarchy where firms first expend their internal funds. However, if external resources are needed, debt will be chosen before equity because the undervaluation is less for debt. The adoption of the pecking order is associated with capital formation to maintain the existing ownership structure.

The negative relationship between firm profitability and debt ratios is supported by the pecking order and agency cost theories because firms consider debt issuing less costly than equity financing. Our findings are consistent with previous studies, such as results from Handoo and Sharma (2014) in Indian companies, Hussian and Miras (2015) in Malaysian firms, and Vo (2017) in Vietnamese firms. The relationship between liquidity and the debt ratios of large Korean firms is significantly negative, which is aligned with agency cost, information asymmetry, and pecking order theory because managers prefer internal funds instead of external resources causing low debt financing and high levels of liquidity. Our results are similar to Ozkan's (2010) research in British firms, Sheikh and Wang's (2010) investigation of Pakistani firms, and Deesomsak, Paudyal and Pescetto's (2004) study of companies from the Asia Pacific region. The previous year's leverage and business risk have a positive effect on large Korean companies' capital structure as creditors would tend to continue financing riskier large firms to avoid bankruptcy, thus, riskier firms might incur fewer sub-investment problems reducing their agency problems. Our findings are consistent with previous studies, such as Correa et

al. (2007) in Brazilian companies, and Gaud et al. (2005) in Swiss firms.

Asset tangibility is positively and significantly related to long-term debt ratio, while it is negatively and significantly associated with short-term leverage. Trade-off and pecking order theory support the positive relationship between asset tangibility and leverage because selling tangible assets might be considered the cheapest funding in a firm, while the agency cost theory suggests that a high level of tangible assets might reduce the probability of resource expropriation and increase the confidence for shareholders. Asset tangibility is used as collateral to raise external funding providing more security for repayments to debt holders. Our results are aligned with Awan and Amin's (2014) study in Pakistani companies and Rajan and Zingales' (1995) research in firms from G-7 countries. Finally, larger companies have more incentive to use debt to improve their production process which is aligned with trade-off and agency theory. Because large firms show low monitoring costs according to their less volatile cash flows reducing the agency costs of debt, there is, therefore, a positive and significant relationship between size and leverage measured by long-term and total debt ratios. These results are coherent with empirical studies in Pakistani and Vietnamese firms (Awan & Amin, 2014; Vo, 2017). To sum up, internal variables have a high to moderate influence on the capital structure of large Korean companies because at least five of seven firm-specific determinants show a significant positive or negative relationship with debt ratios, while the effect of external factors on capital structure decisions is irrelevant in Kospi-100 firms.

The relationship between capital structure and its determinants is both theoretically and empirically controversial and inconclusive. We have approached the question more empirically to determine the significant variables that affect the capital structure of Korean firms because previous research generally focuses on the theoretical explanation of the main influential factors of capital structure. Our study simultaneously includes both internal and external

factors that affect the debt-equity choice. This study contributes to the prior literature by comparing empirical studies of the internal and external determinants of capital structure to identify the common variables and methodology in each case. This study calculates the relationship between sales growth, asset tangibility, profitability, NDTs, size, liquidity, risk, GDP growth, inflation rate, real interest rate, and the capital structure of Kospi-100 firms. We constructed four statistical models to explain the firm-specific and macroeconomic determinants of the Korean capital structure. This opens the possibility of adopting these models in other countries using large firms to verify our results.

The limitations of this study are the low adjusted R-squared of Model 2 because its macroeconomic coefficients affect capital structure insignificantly, meaning that macroeconomic variables by themselves are not an important determinant for Kospi-100 firms' leverage. This study focused on only a few levels of determinants to find robust explanatory factors for the capital structure of Kospi-100 firms. It does not analyze and include industrial factors of capital structure, yet there are plenty of determining factors which could be dominant elements with strong explanations for the Korean context. Our study employs leverage as a measure of capital structure; the proxies are total, short-term, and long-term debt, while it is also important to include the ratio of long-term to short-term debt to establish the preference for long-term borrowings over short-term borrowings in capital structure decisions. We adopted OLS as the research model and tested for the endogeneity problem without any correlation between the dependent variable's error terms and the independent variables. Another methodology to avoid the endogeneity problem in corporate finance is the generalized method of moments which controls the omitted variable problem and potential endogeneity problem; however, it should be used on a large cross-section and short time series. Our study follows the methodology and inferences made by previous studies that adopted OLS as their research model to examine the factors that influence the debt-equity choice in different nations. Our findings do not suggest a cause-effect

relationship between pecking order theory and the internal determinants of capital structure in large Korean firms. However, most of the signs of the coefficients of our independent variables are aligned with this theory, similar to Correa, Cruz and Nakamura's (2007) results suggesting that managers persistently follow pecking order behavior in large Brazilian firms. For future research, the authors suggest including a dummy variable for structural changes (e.g. the world financial crisis) and measures of leverage dispersion and industry concentration to increase the power of the statistical models. For Model 2, we recommend employing time series analysis integrating the econometric model in the short- and long-run. In addition, we suggest using panel data to analyze other factors that might influence leverage, especially taxes and dividends.

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## Appendix

**Appendix 1.** Pearson Correlation Matrix

	Model 1			Model 2			Model 3			Model 4		
	Res. TLev	Res. StLev	Res. LtLev	Res. TLev	Res. StLev	Res. LtLev	Res. TLev	Res. StLev	Res. LtLev	Res. TLev	Res. StLev	Res. LtLev
TLev	0.566 <sup>***</sup>	0.339 <sup>***</sup>	0.432 <sup>***</sup>	0.598 <sup>***</sup>	0.433 <sup>***</sup>	0.429 <sup>***</sup>	0.462 <sup>***</sup>	0.332 <sup>***</sup>	0.434 <sup>***</sup>	0.446 <sup>***</sup>	0.266 <sup>***</sup>	0.198 <sup>***</sup>
StLev	0.396 <sup>***</sup>	0.579 <sup>***</sup>	-0.250 <sup>***</sup>	0.430 <sup>***</sup>	0.593 <sup>***</sup>	-0.062	0.385 <sup>***</sup>	0.468 <sup>***</sup>	-0.247 <sup>***</sup>	0.324 <sup>***</sup>	0.612 <sup>***</sup>	-0.221 <sup>***</sup>
LtLev	0.508 <sup>***</sup>	-0.252 <sup>***</sup>	0.383 <sup>***</sup>	0.530 <sup>***</sup>	-0.063	0.399 <sup>***</sup>	0.513 <sup>***</sup>	-0.251 <sup>***</sup>	0.483 <sup>***</sup>	0.286 <sup>***</sup>	-0.196 <sup>***</sup>	0.450 <sup>***</sup>
Lag TLev										0.103 <sup>*</sup>	0.071	-0.015
Lag StLev										0.017	0.096	-0.014
Lag LtLev										0.092 <sup>*</sup>	0.029	-0.034
Sales growth	0.031	0.014	0.013				0.027	0.007	0.014	0.008	0.008	-0.019
Asset tangibility	-0.046	-0.034	-0.027				-0.046	-0.031	-0.027	-0.027	0.003	-0.044
Profitability	-0.008	-0.011	0.042				-0.010	-0.013	0.042	0.044	0.047	0.010
NDTS	-0.151	-0.062	-0.107				-0.149	-0.063	-0.108	-0.099	-0.014	-0.080
Size	-0.015	0.040	-0.075 <sup>*</sup>				-0.013	0.041	-0.075 <sup>*</sup>	0.023	0.048	-0.048
Liquidity	-0.104	-0.069	-0.057				-0.102	-0.067	-0.057	-0.056	-0.056	0.032
Risk	-0.008	-0.011	0.042				-0.010	-0.013	0.042	0.044	0.047	0.010
GDP growth				-0.006	-0.002	-0.014	-0.007	-0.010	-0.014	-0.071	-0.034	-0.043
Inflation rate				0.007	0.002	-0.003	-0.007	-0.007	-0.015	-0.028	-0.028	-0.007
Real interest rate				0.008	-0.006	0.016	0.008	-0.009	0.019	0.003	-0.019	0.009

Note: \*\*\* and \* indicate statistical significance at the 1% and 10% levels, respectively.