**UNIVERSITY OF ECONOMICS AND LAW**

**FINANCE – BANKING FACULTY**

**GRADUATION THESIS**

**DETERMINANTS OF CAPITAL STRUCTURE: EMPIRICAL EVIDENCES IN FOOD PROCESSING AND HOUSEHOLD APPLIANCES SECTORS IN VIETNAM**

**Supervisor: Duong Nhu Hung, PhD**

**Student: Phan Nguyen Vu**

Class: K10404T

Student code: K104040451

**HO CHI MINH CITY, MAY 2014**

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# Abstract

This thesis investigates the determinants of capital structure of 52 Vietnamese listed companies from 2008-2012, which operate in Food Processing and Household Appliances industries using panel data. We utilize 3 panel models, namely pooled OLS, fixed effects and random effects model to evaluate their effectiveness in predicting leverage ratios of the target firms.

The results of the study reveal that fixed effects model is the most appropriate. Under this model, large companies rely on more debt. Contrasting theories, high growth companies tend to use more leverage. Non-debt tax shields are statistically significant substitutes for debt tax shield, as firms with high depreciation costs have less debts overall. Profitable firms in the two industries rely on internal finance rather than issuing debts. Liquid firms are inclined to raise long-term debt. Firms with unique products stay away from debt as they face higher costs of liquidation and bankruptcy. The availability of collaterals for firms is an important aspect, but it has different effects on long-term and short-term debt.

Contents

[Abstract i](#_Toc389813436)

[Contents ii](#_Toc389813437)

[List of Tables iv](#_Toc389813438)

[*Acknowledgements* v](#_Toc389813439)

[*Introduction* 1](#_Toc389813440)

[*Literature Review* 2](#_Toc389813441)

[2.1. Theories of Capital Structure 2](#_Toc389813442)

[2.1.1. Modigliani and Miller Proposition: 2](#_Toc389813443)

[2.1.2. Trade-off Theory: 2](#_Toc389813444)

[2.1.3. Pecking Order Theory: 3](#_Toc389813445)

[2.1.4. Agency cost Models: 3](#_Toc389813446)

[2.2. Empirical Studies on Capital Structure: 3](#_Toc389813447)

[2.2.1. Empirical Evidences from the United States: 3](#_Toc389813448)

[2.2.2. International Empirical Evidences: 4](#_Toc389813449)

[2.2.3. Empirical Evidences in Vietnam: 4](#_Toc389813450)

[*Research Methodology* 5](#_Toc389813451)

[3.1. Measurement of Variables 5](#_Toc389813452)

[3.1.1. Dependent variables 5](#_Toc389813453)

[3.1.2. Independent variables: 5](#_Toc389813454)

[3.2. Estimation Model: 8](#_Toc389813455)

[3.3. Research Limitations 10](#_Toc389813456)

[*Data* 11](#_Toc389813457)

[4.1. Sample Set: 11](#_Toc389813458)

[4.2. Descriptive Analysis 11](#_Toc389813459)

[*Findings and Analysis* 13](#_Toc389813460)

[5.1. Comparison of the models 13](#_Toc389813461)

[5.1.1. Hausman Specification Test 13](#_Toc389813462)

[5.1.2. Pooled OLS against Fixed Effects Model: 13](#_Toc389813463)

[5.2. Model Fit 14](#_Toc389813464)

[5.3. Multicollinearity Tests 15](#_Toc389813465)

[5.4. Regression Results 16](#_Toc389813466)

[5.4. Discussion: 18](#_Toc389813467)

[5.4.1. Size (SIZE): 18](#_Toc389813468)

[5.4.2. Growth opportunities (GROWTH): 18](#_Toc389813469)

[5.4.3. Non-debt tax shield (NDTS): 19](#_Toc389813470)

[5.4.4. Profitability (PROFIT\_TA): 19](#_Toc389813471)

[5.4.5. Liquidity (LIQD\_C): 20](#_Toc389813472)

[5.4.6. Uniqueness (UNIQ): 20](#_Toc389813473)

[5.4.7. Tangibility (TANG): 21](#_Toc389813474)

[*Conclusion* 22](#_Toc389813475)

[6.1. Overall results: 22](#_Toc389813476)

[6.2. Recommendation for Future Study: 23](#_Toc389813477)

[*Appendices* 24](#_Toc389813478)

[Appendix 1: Capital Structure Theories. 24](#_Toc389813479)

[Appendix 2: Measurement of Variables 25](#_Toc389813480)

[Appendix 3: List of target companies 25](#_Toc389813481)

[Appendix 4: Correlation matrix 27](#_Toc389813482)

[Appendix 5: Regression results from OLS and random effects models 28](#_Toc389813483)

[*References* 31](#_Toc389813484)

# List of Tables

[Table 4: Descriptive Analysis 12](#_Toc389813564)

[Table 5.1: Hausman Specification Test Results 13](#_Toc389813565)

[Table 5.2: F-test results 14](#_Toc389813566)

[Table 5.3: R-square and Adjusted R-square for fixed effects model 14](#_Toc389813567)

[Table 5.4: Tolerance and VIF test 16](#_Toc389813568)

[Table 5.5: Correlation results of fixed effects model 17](#_Toc389813569)

[Table 6: Theoretical versus Regression Result 23](#_Toc389813570)

[Table A1: Capital structure theories 24](#_Toc389813571)

[Table A2.1: Dependent variables 25](#_Toc389813572)

[Table A2.2: Independent variables 25](#_Toc389813573)

[Table A3: List of target companies 25](#_Toc389813574)

[Table A4: Correlation matrix 27](#_Toc389813575)

[Table A5.1: Correlation results of pooled OLS model 29](#_Toc389813576)

[Table A5.2: Correlation results of random effects model 30](#_Toc389813577)

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The lack of knowledge, practical experience, limitations of time and data resources might cause some unavoidable mistakes in my study. I expect to receive valuable remarks of my supervisors, as well as other teachers, to improve this study.

Thank you!

# *Introduction*

Capital structure has been one of the most enigmatic issues in the field of finance since the beginning of the modern theory of capital structure offered by Modigliani and Miller (1958). Following the theory, much theoretical and empirical work has been done to solve the debt – equity choice but has produced contradicting results.

The major of the papers researching on this issue have largely been confined to the United States and other developed economies with fully grown financial markets. This study will attempt to tackle the problem in Vietnam, specifically in Food Processing and Household Appliances industries. These industries are chosen because of the lack of previous studies on them as well as large number of observations, varied sizes and capital structures.

Given the time constraint, this study empirically tests seven firm-specific variables which include firm size, growth opportunities, the non-debt tax shield, profitability, liquidity, uniqueness and tangibility.

In order to statistically test seven independent measures, three dependent variables are employed which includes short term debt, long term debt and total debt.

Three panel models, which are pooled OLS, fixed effects and random effects, are used to determine statistical significance of the variables formulated for 52 listed companies on HOSE and HNX. These firms are analyzed over a period of five years from 2008 – 2012. Panel data is used because of several advantages: it gives more informative data, more variability, less collinearity and more degrees of freedom

This study is organized in six sections as follows. The next section explores the range of theory related to determinants of capital structure. The third section puts forward the research methodology of the study, as well as variables formulated. Section 4 describes the data set and them while section 5 is about the analysis and discussion on the regression results. The last chapter concludes this study.

# *Literature Review*

The finance literature on capital structure has developed since the paper of Modigliani and Miller (1958) was published. Since then many theories have emerged which have supplemented the arguments of these authors by introducing frictions which were previously omitted in there framework, such as corporate taxes, bankruptcy cost and agency problems. The main purpose of this chapter is to have a closer look into the available theories and discuss their significance in the quest to offer a solution the capital structure debate.

A quick summary of the theories discussed in this chapter can be found in Appendix 1: Capital Structure Theories.

## 2.1. Theories of Capital Structure

### 2.1.1. Modigliani and Miller Proposition:

Modigliani and Miller’s proposition is that the value of the firm remains the same regardless of the debt and equity ratio in the capital structure, provided that assets and growth opportunities on the balance sheet are held constant. Thus, according to this proposition financial leverage is irrelevant, as firm value only depends on the asset side of the balance sheet.

Modigliani and Miller proposition was based on strict assumptions, which were highly criticized in researchers and in academics. Market imperfections make reality much different from what suggested in their theory.

### 2.1.2. Trade-off Theory:

The second important theory in corporate finance literature is the trade-off theory. According to this theory, a firm borrows to the point where the marginal value of tax shields on additional debt just offset the increase in the present value of costs of financial distress.

When a firm raises debt, the first advantage is that interest payments are treated as a tax deductible expense. However, the other side of debt is that the company is now exposed to default if it cannot meet cash repayment requirement.

There are three types of bankruptcy costs: (1) the direct administrative cost paid in the bankruptcy proceedings, (2) the loss or shortfall when assets are sold in liquidation, (3) the loss of tax credits when the firm is bankrupt.

### 2.1.3. Pecking Order Theory:

The next theory in the corporate literature is pecking order theory. It states that firms prefer internal finance, and if external finance is required, they first issue the safest security that is; it starts with debt, and then uses equity as the last resort.

### 2.1.4. Agency cost Models:

An agency cost is an economic concept concerning the cost to a "principal", when the principal chooses or hires an "agent" to act on its behalf.

The first agency problem is between managers and shareholders. It is likely that managers may show more commitment towards their personal interests. Debt in the capital structure can be one way to reduce agency problems.

Another type of conflict that exists in an organization is between debt and equity holders. Because bondholders know this, they often charge more interests on firms with high agency problems.

## 2.2. Empirical Studies on Capital Structure:

As mentioned in the introduction, the objective of the study is to gain empirical evidence on firm specific determinants of capital structure. Before coming to the methodology and empirical results, it might be helpful to summarize empirical evidences of some of the major studies done in the past years.

### 2.2.1. Empirical Evidences from the United States:

Ferri and Jones (1979) investigated the relationship between a firm’s financial structure and its industrial class, size, variability of income and operating leverage. It was found that industry class directly affects firm’s leverage, size is negatively related to leverage; variation in income is insignificant and operating leverage negatively influences leverage.

Titman and Wessels (1988) applied factor analytic technique for estimating the determinants of capital structure. The variables of the study were analyzed from 1974 to 1982. They concluded short term debt ratios to be negatively related to firm size and uniqueness. Moreover, their results were inconclusive regarding the effect of debt ratios arising from non-debt tax shields, volatility, collateral value of assets and future growth.

### 2.2.2. International Empirical Evidences:

Rajan and Zingales (1995) investigated the determinants of capital structure by analyzing the financing decisions of public firms in the major industrialized countries. Their results showed that tangibility is positively and profitability is negatively related with leverage in all countries. They found firm size to be positively related with leverage except for Germany.

The paper of Deesomsak, Pauyal and Descetto (2004) tests the determinants of capital structure for the countries in the Asian Pacific region. OLS estimation model was used to analyze sample data from Thailand, Malaysia, Singapore and Australia. Overall they found leverage to be positively related to firm size, while growth opportunities, non-debt tax shields, liquidity to be negatively related.

### 2.2.3. Empirical Evidences in Vietnam:

There are fewer studies in this field that in other countries. In their study ‘Capital Structure in Small and Medium-sized Enterprises: The Case of Vietnam’, Tran Dinh Khoi Nguyen and Neelakantan Ramachandran (2006) concluded that firm’s ownership also affects the way a SME finances its operations. The capital structure of SMEs in Vietnam is positively related to growth, business risk, firm size, networking, and relationships with banks; but negatively related to tangibility. Profitability seems to have no significant impact on the capital structure of Vietnamese SMEs. The strong impact of such determinants as firm ownership, firm size, relationships with banks, and networking reflects the asymmetric features of the fund mobilization process in a transitional economy like that of Vietnam.

# *Research Methodology*

This chapter introduces the method adopted in the study to find the determinants of capital structure. It also highlights the process of constructing the data set and the regression model to produce empirical evidences.

## 3.1. Measurement of Variables

A summary of dependent variables as well as independent variables, with their measurements and predicted signs can be found in Appendix 2: Measurement of Variables.

### 3.1.1. Dependent variables

Dependent variables are computed by using book values. We forego the market values because of data and time limitations. Secondly, many researches have used book values for their studies.

To calculate leverage ratio, the broadest method is to divide total liabilities by total assets. However, this ratio alone does not provide a good indication of whether the firm is at risk of default in the near future. In addition, the amount of total liabilities includes items like accounts payable or accruals, which may be used for transaction purposes rather than financing needs. Therefore, we treat long-term debt and short-term debt separately, as well as use total debt to calculate dependent variables.

Leverage costs of short-term and long-term debt may be very different. It should also be noted that they are used for different purposes. When short-term credits are used to meet the need for working capital, long-term debts are required for investment and growth projects. Therefore, using only the total debt ratio may be insufficient to provide confident results.

### 3.1.2. Independent variables:

In this study, seven determinants of capital structure are selected and tested. They are firm size, growth opportunities, non-debt tax shield, profitability, liquidity, uniqueness and asset tangibility.

**3.1.2.1. Firm size (SIZE)**

The trade-off theory proposes a positive relationship between firm size and debt. Small firms tend to rely on low leverage as they face high costs when they issue long term debt. Small firms are less diversified; therefore their cash flows are less stable to meet with cash repayment needs. They also has less assets to act as collateral for bank loans. This results in a higher interest rate for their loan. Moreover, because of the small size of the loans, they face higher transaction cost for the same amount of debt.

These factors in combination lead to restriction in using debt for small firms.

To sum up, firm size (the natural log of sales) is expected to have positive relation with leverage.

**3.1.2.2. Growth opportunities (GROWTH):**

Firms that have greater investment options have more flexibility in their choice of future investment, and thus greater problem of under-investment. These firms, therefore, have higher agency costs and are charged higher interest rates by bondholders. Agency models suggest a negative sign for growth opportunities.

We can also argue that growth opportunities are intangible and its value will fall significantly when a firm faces liquidation. Firms with greater growth will have higher bankruptcy costs, implying a lower financial leverage in trade-off theory.

Thus, growth opportunities (measured by annual percentage change in total assets) are expected to be negatively related to leverage.

**3.1.2.3. Non-debt tax shield (NDTS):**

Tax-shield benefit from debt can be substituted by other tax-deductible costs, for example, accounting depreciation. As benefits from debt reduce, trade-off theory suggests firms with large non-debt tax shields are expected to not opt for debt financing.

The ratio of depreciation cost to total assets is used as the proxy for non-debt tax shield. We expect an inverse relationship between non-debt tax shield and leverage ratios.

**3.1.2.4. Profitability (PROFIT\_TA or PROFIT\_S):**

According to the pecking order theory, firms prefer using retained earnings, then debt and lastly equity. The theory suggests profitable firms with a slow growth rate will use low leverage as they have available cash with them. Therefore, according to the theory a negative relationship should hold between debt and profitability.

Either the ratio of operating income to total assets or operating income to sales will represent profitability. After examining the regression result, we choose operating income to total assets as the sole representative.

**3.1.2.5. Liquidity (LIQD\_C or LIQD\_Q):**

Fairly few studies in the past examine the effect of liquidity on capital structure decision.

Firms with higher liquidity ratios might use a higher debt ratio due to greater ability to meet short term obligations when they become due. This implies a positive relationship between a firm’s liquidity position and debt ratios. On the other hand, firms with liquid assets may wish to use these assets to finance their investment rather than debts. This suggests a positive impact of liquidity on debts. Therefore, we cannot predict a certain sign for liquidity.

At first, both current ratio and quick ratio are used in the model, but quick ratio is later excluded from the research.

**3.1.2.6. Uniqueness (UNIQ):**

Firms that produce unique products usually use specialized machines, which see their value drops significantly during liquidation event. Moreover, these firms’ workers and suppliers also have job-specific skills and capital, thus they may find it difficult to find alternative servicing for their unique products. For these reasons, uniqueness is expected to be negatively related to debt ratios by trade-off theory.

We use the ratio of selling expenses to net sales as the indicator for uniqueness. This implies firms with unique products are expected to advertise and promote more.

**3.1.2.7. Tangibility (TANG):**

Firms with great amount of fixed asset on their balance sheet will have more collateral for bank loans, making them more attractive to debt holders. This implies a positive relationship between tangibility and leverage.

The ratio of net fixed assets over total assets is used as proxy for tangibility.

## 3.2. Estimation Model:

Real life data is principally collected and recorded in 2 ways. In cross sectional data, different units are observed at one point in time. In time series data, the same units are observed over different time period. In this model, we use panel data where different units are observed over different time periods (52 separate time series data set that is one for each firm, 5 separate cross-sectional data sets that is one for each year).

Panel data analysis has 3 competing approaches, namely pooled ordinary least square (OLS), fixed effects model and random effects model. Each of the models is subject to its limitations. Therefore, in this study, we at first use all 3 models to test the data, and next evaluate their effectiveness in predicting the capital mix of the target firms. OLS is the most widely used model in similar studies; however, as the model fails to control for time invariant firm specific hererogeneity, the estimation is likely to be biased.

In the panel data the basic issue is the error term () in the regression model:

The pooled OLS regression ignores the nature of panel data and treats the error is identically and independently distributed disturbances that are uncorrelated with x. However, this assumption might be overly restrictive, and can be prone to error when there is heteroskedasticity across panel units or serial correlation within panel units. Thus, the pooled OLS solution is not often considered to be practical.

The second and third estimation models approach that each unit has its own intercepts and assumes the slope to be homogenuous. In order to accommodate such hetorogeneity, the error term is decomposed into two independent components:

For these models, we assume that has mean zero and variance ,is called individual-specific effect and it is time invariant. If is assumed to be a random variable with mean zero and variance and uncorrelated with the independent variants, then the model is called random effects model. The fixed effects model comes into play when we allow each firm to have a different intercept.

To choose the appropriate model, several tests are conducted, including Hausman specification test and F-test between restricted model (pooled OLS model) and unrestricted model (fixed effects model). Details and results of these tests are provided in the next chapters.

The panel data model for this study is as follows:

Where i = 1 …52 and t = 2008 …2012

In the model i represents the cross-sectional dimension and t for the time dimension.

yit = total leverage, long term leverage and short term leverage.

Xit = firm size, growth opportunities, the non-debt tax shield, profitability, liquidity, uniqueness and tangibility.

represents the coefficients and indicates the disturbance term.

The specific OLS model used in this study is:

**LEV = α + β1 \* SIZE + β2 \* GROWTH + β3 \* NDTS + β4 \* PROFIT\_TA + β5 \* LIQD\_C + β6 \* UNIQ + β7 \* TANG + μ**

Where LEV (can be TLEV, LTLEV or STLEV): total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).

## 3.3. Research Limitations

As for all researches, this study has some limitations. Most of the limitations are due to time and data constraints.

First, data has limitations because it excludes those firms with any absent numbers; therefore new companies that were listed after 2008 are not included for which updated financial statements are not available.

As mentioned earlier, book values are used to measure and it would have been better if market values were available for debt. Secondly, the values for all the formulated variables are dependent on information present in the annual reports of the companies which do not reflect their true market value.

Next, some important explanatory variables are not included due to different reasons. For example, to come up with risks (measured by standard error of operating profit in 5 years), we will need to collect data of operating profits as far as 2003, which reduces our observations significantly. Ownership structure is also not included because of difficulty in finding a trustworthy information source.

# *Data*

## 4.1. Sample Set:

Our sample set is chosen based on the following criteria:

• Public listed companies.

• Non-financial companies, as banks and other financial institutions have a different balance sheet structure.

• Having no missing figures

• Time horizon: 2008 – 2012 (5 years)

• Operating in 2 industries: Food Processing and Household Appliances. Food Processing companies are the main target of this study, while Household Appliances industry is included to provide a comparison.

Based off these criteria, we are able to collect data from 52 firms x 5 years, which produces a sample set of 260 observations. A list of firms included in this study can be found in Appendix 3: List of target companies.

## 4.2. Descriptive Analysis

The study examines the capital structure for a panel of 52 companies operating in Food Processing and Household Commodities industries listed on HOSE and HNX over the time period from 2008 – 2012. The descriptive statistics for the leverage and explanatory variables for the firms are reported in Table 4. The total observation for each dependent and independent variable is 260. In addition, the table also illustrates the minimum and maximum values, as well as mean and standard deviation for the variables.

We do not remove the outliers as the decent size of 260 observations in this study is sufficient to reduce mostly their effects on the results.

Table 4: Descriptive Analysis

|  | **N** | **Minimum** | **Maximum** | **Mean** | **Std. Deviation** |
| --- | --- | --- | --- | --- | --- |
| TLEV | 260 | .00000 | .76390 | .30272 | .23637 |
| LTLEV | 260 | .00000 | .41296 | .04755 | .07450 |
| STLEV | 260 | .00000 | .76390 | .25516 | .22316 |
| SIZE | 260 | 10.63363 | 17.47133 | 13.33969 | 1.19724 |
| GROWTH | 260 | -.67422 | 3.45419 | .24388 | .37832 |
| NDTS | 260 | .00076 | .08834 | .02555 | .01649 |
| PROFIT\_TA | 260 | -.52964 | .53436 | .11118 | .10033 |
| LIQD\_C | 260 | .68915 | 16.17199 | 2.13441 | 1.85903 |
| UNIQ | 260 | .00148 | .22370 | .05741 | .04472 |
| TANG | 260 | .02628 | .63418 | .26213 | .12693 |
| Valid N (listwise) | 260 |  |  |  |  |

*Notes: TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

# *Findings and Analysis*

## 5.1. Comparison of the models

### 5.1.1. Hausman Specification Test

Hausman specification test is used to test the fixed effects model against the random effects model. It checks whether the the correlation between the specific effects and the regressors is statistically evident or not. The null hypothesis for the Hausman test is that the group specific random effects and the regressors are not correlated, and thus random effect model is suitable. Therefore, if this test shows a p-value of less than 0.05 then it would mean that fixed effect model is appropriate. The results are shown as follows:

Table 5.1: Hausman Specification Test Results

|  |  |  |
| --- | --- | --- |
| **Dependent variables** | **Chi** | **Prob>chi2** |
| TLEV | 26.103 | 0.0005 |
| LTLEV | 14.061 | 0.0491 |
| STLEV | 24.561 | 0.0009 |

*Note: in the above table, TLEV, LTLEV, STLEV refer to total leverage, long term leverage and short term leverage respectively.*

The results suggest that fixed effects model is better than random effects model as the p-value is less than 0.05 for each of the three dependent variables. Thus the analysis is based on the fixed effects estimates.

### 5.1.2. Pooled OLS against Fixed Effects Model:

To test the two models, we conduct the F-test between the restricted model (pooled OLS) and the unrestricted model (fixed effects). The null hypothesis for this test is that all the dummy variables for specifict firms in the fixed effects equal zero, and thus pooled OLS model is suitable. Therefore, if this test shows a p-value of less than 0.05 then it would mean that fixed effect model is appropriate. The results are shown as follows:

Table 5.2: F-test results

|  |  |  |
| --- | --- | --- |
| **Dependent variables** | **F-test** | **Prob>F** |
| TLEV | 24.181 | 0.0000 |
| LTLEV | 4.371 | 0.0000 |
| STLEV | 23.075 | 0.0000 |

*Note: in the above table, TLEV, LTLEV, STLEV refer to total leverage, long term leverage and short term leverage respectively.*

The results suggest that fixed effects model is better than pooled OLS model as the p-value is less than 0.05 for each of the three dependent variables. Thus the analysis is based on the fixed effects estimates.

On the basis of the tests above, the results from fixed effects model are chosen for the analysis in the remaining parts of this study.

## 5.2. Model Fit

Model effectiveness (model fit) can be evaluated by checking the amount of variance in outcome variables that can be explained by independent variables in the regression model. We use three methods to assess model fit: R-square, adjusted R-square and F-test.

Regression output gives R-square and adjusted R-square, which are shown in table 4.1:

Table 5.3: R-square and Adjusted R-square for fixed effects model

|  |  |  |
| --- | --- | --- |
| **Dependent variables** | **R-Square** | **Adjusted R-square** |
| TLEV | 0.928 | 0.908 |
| LTLEV | 0.704 | 0.619 |
| STLEV | 0.922 | 0.899 |

*Note: in the above table, TLEV, LTLEV, STLEV refer to total leverage, long term leverage and short term leverage respectively.*

The R2 among the three models is satisfactory, with values around 0.928, 0.704 and 0.922 for total leverage, long term leverage and short term leverage respectively. Hence, it can be said that the independent variables and the dummy firm specific variables can explain 92.8% of variation in total leverage, 70.4% of variation in long term leverage and 92.2% of variation in short term leverage. It can be concluded that the model of this study is satisfactory.

F-test results indicate that p-value for F-test (Prob>F) remains 0.000 for all the models, which also implies model fit.

## 5.3. Multicollinearity Tests

As this study includes 7 independent variables, it is important to check if there is any sign of multicollinearity. This situation arises when there is a strong relationship between two or more explanatory variables. When this happens, the regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get wildly inflated.

To diagnose collinearity, firstly we check from the correlation matrix in the Appendix 4: Correlation matrix. The correlation matrix shows that the explanatory variables are not correlated with each other; as the correlation coefficients are all lower than 0.300. Therefore, there is no problem of multicollinearity for this study.

The next test to check for multicollinearity is Tolerance and VIF test. For this test, a VIF value of more than 10 indicates multicollinearity. VIF values are all around 1, which again confirms that there is no problem of multicollinearity.

Table 5.4: Tolerance and VIF test

| **Model** | | **Collinearity Statistics** | |
| --- | --- | --- | --- |
| **Tolerance** | **VIF** |
| 1 | (Constant) |  |  |
| SIZE | .836 | 1.196 |
| GROWTH | .870 | 1.149 |
| NDTS | .784 | 1.275 |
| PROFIT\_TA | .893 | 1.119 |
| LIQD\_C | .857 | 1.167 |
| UNIQ | .927 | 1.079 |
| TANG | .884 | 1.132 |
|  |  |  |

*Notes: \*, \*\* and \*\*\*: significant at 10, 5 and 1% levels. TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

## 5.4. Regression Results

The overall results of the fixed effects model are reported in Table 5.5. For the results from the remaining 2 models, see Appendix 5.

The result for total debt reveals that except for non-debt tax shield, growth and tangibility, all other variables are very significant. The results also show that profitability, liquidity and uniqueness are negatively related to total leverage, while size has a positive impact. R-square for this model is 0.928

For long term debt regression, the variables which are significant and have a positive effect on long term leverage are size, growth, liquidity and tangibility. Non-debt tax shield is also significant, though it is positively related to long term gearing. Profitability and uniqueness have no significant impact on long-term gearing. R-square for this model is 0.704.

When short term debt becomes the outcome variable, we found that profitability, liquidity, uniqueness and tangibility are all significant and negatively related to short term leverage. Size meanwhile has a postive relation, while growth and uniqueness are irrelevant in predicting short-term leverage. R-square for this model is 0.922.

Table 5.5: Correlation results of fixed effects model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Independent variables** | | **TLEV** | **LTLEV** | **STLEV** |
| **constant** | **Coefficient** | **-0.359\*\*** | **-0.235\*\*** | **-0.124** |
| Significance | 0.0403 | 0.0365 | 0.4702 |
| **SIZE** | **Coefficient** | **0.058\*\*\*** | **0.018\*\*** | **0.040\*\*\*** |
| Significance | 0.0000 | 0.0230 | 0.0013 |
| **GROWTH** | **Coefficient** | **0.026\*** | **0.023\*\*** | **0.003** |
| Significance | 0.0857 | 0.0187 | 0.8330 |
| **NDTS** | **Coefficient** | **-0.695** | **-0.871\*\*** | **0.176** |
| Significance | 0.2187 | 0.0167 | 0.7523 |
| **PROFIT\_TA** | **Coefficient** | **-0.411\*\*\*** | **-0.047** | **-0.364\*\*\*** |
| Significance | 0.0000 | 0.2860 | 0.0000 |
| **LIQD\_C** | **Coefficient** | **-0.013\*\*\*** | **0.007\*\*** | **-0.020\*\*\*** |
| Significance | 0.0035 | 0.0253 | 0.0000 |
| **UNIQ** | **Coefficient** | **-0.736\*\*** | **-0.358\*** | **-0.377** |
| Significance | 0.0194 | 0.0747 | 0.2219 |
| **TANG** | **Coefficient** | **0.055** | **0.258\*\*\*** | **-0.203\*\*\*** |
| Significance | 0.3760 | 0.0000 | 0.0012 |
| **Observations** | | 260 | 260 | 260 |
| **R-square** | | 0.928 | 0.704 | 0.922 |
| **Adj R-square** | | 0.908 | 0.619 | 0.899 |
| **F-statistics** | | 44.985 | 8.255 | 40.846 |
| **Prob>F** | | 0.000 | 0.000 | 0.000 |

*Notes: \*, \*\* and \*\*\*: significant at 10, 5 and 1% levels. TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

## 5.4. Discussion:

### 5.4.1. Size (SIZE):

The regression result for firm size shows that it is positively correlated with total leverage, long-term leverage and short-term leverage. The relationships are significant. Under fixed effects model, a 1% increase in firm size will result in an increase of 0.058% in total leverage, 0.018% in long term leverage and 0.040% in short term leverage ceteris paribus.

This result implies that firm size has significant positive effect on the book value of the debt ratios. The overall result supports the trade-off theory. Larger companies have lower interest cost and lower transaction costs as they enjoy the benefits from diversification and economies of scale. They therefore rely more on more debts in comparison with the smaller firms.

Nguyen and Ramachandran (2006) also found a positive relation, also very significant, between firm size and leverage in Vietnam.

### 5.4.2. Growth opportunities (GROWTH):

Following fixed effects model, a significantly positive relationship between growth opportunities and long-term leverage is found in this study. The effects of growth opportunities on total leverage and short-term leverage are also positive, albeit less significantly. It can be concluded that a 1% increase in growth opportunities will result in an increase in total debt by 0.026%, long-term debt will increase by 0.023%, and short-term debt will increase by 0.003% ceteris paribus.

The regression result is not consistent with the prediction of the theories. According to trade-off theory, firms holding future growth opportunities tend to borrow less because growth opportunities cannot be collateralized. Furthermore, agency theory suggests that as the potential of underinvestment is most severe to firms with high growth opportunities, and lenders may be reluctant to provide finance to such firms.

However, it can also be argued that while short-term debt is used primarily to fulfill working capital needs, when companies want to support long-term growth, they turn to long-term debt. Thus, higher growth opportunities can indicate a higher long-term debt ratio.

The results of previous studies are different. Ozkan (2001) found a negative and significant coefficient of growth opportunities. Furthermore, the results of Lasfer (1995) are also consistent with agency theory as they found that firms that have fewer growth opportunities have more debt in their capital structure.

### 5.4.3. Non-debt tax shield (NDTS):

Another important factor tested is non-debt tax shield, indicated by the ratio of depreciation costs on total assets. Regression result under the fixed effects estimation shows a negative, significant relationship between non-debt tax shield and long-term debt ratio. The relationships between the depreciation shield on total leverage and short-term leverage have different signs, though they are statistically very insignificant. From this model, it can be said that a 1% increase in non-debt tax shield will decrease total debt by 0.695% and long term debt by 0.871% while increase short term debt by 0.176% ceteris paribus.

This result confirms the theories’ predictions. Companies which have non-debt tax shield available will not opt to borrow, as depreciation acts as a substitute for tax benefits of debt financing. As the benefits from debts reduce, while costs remain the same, trade-off theory suggests lower debt ratios.

This result is consistent with previous studies. Ozkan (2001) results found that firms with high depreciation costs will use less debt. However, Rehmoo (2008) found that the availability of non-debt tax shields have insignificant influence on capital structure.

### 5.4.4. Profitability (PROFIT\_TA):

The fixed effects results show, as expected, a negative and significant between profitability and leverage, except for long-term leverage, which is insignificantly affected by profitability. Under this model, a 1% increase in profitability will lead to a 0.411% decrease in total leverage, a 0.047% decrease in long-term leverage and a 0.364% decrease in short term leverage, ceteris paribus.

Pecking order theory predicts a preference for internal finance rather than debt or equity. Profitable firms have more cash available to them; therefore, they will naturally have less debt. In addition, past profitability can be viewed as proxy for future growth opportunities, whose value could be severely damaged in financial distress. Therefore, trade-off theory suggests that firms with high profit will prefer internal source of finance.

In their study, Nguyen and Ramachandran (2006) also found a negative and significant coefficient for profitability in Vietnam. Ozkan (2001) also had the same findings.

### 5.4.5. Liquidity (LIQD\_C):

The regression results for liquidity against the three leverage ratios under this model suggest a significantly negative relationship between liquidity and total leverage, as well as short term leverage. However, long-term leverage is positively correlated to liquidity, though this relationship is of a very small magnitude (indicated by the small coefficient). Overall, a 1% increase in liquidity will cause total debt to decline by 0.013%, long-term debt to rise by 0.007% and short-term debt to drop by 0.020% ceteris paribus.

The result implies that raising long-term debt does not depend on the liquidity of the firm. It also suggests that firms with higher liquidity opt for lower short-term debt as they are able to meet their working capital requirements.

Few studies examined the effect of liquidity on leverage. Ozkan (2001) result showed that liquidity of firms exerts a negative impact of firms’ borrowing decisions. Rehmoo (2008) found that liquidity reduces short-term borrowings, but has little effects on long-term debts.

### 5.4.6. Uniqueness (UNIQ):

Very few previous studies include uniqueness as an explanatory variable. However, as it turns out, uniqueness actually has a significant impact on total leverage. Its effect on long term and short term debt is nonetheless less significant. It can be concluded that in general, a 1% increase in uniqueness will mean a 0.736% decrease in total debt, a 0.085% decrease in long-term debt and a 0.377% decrease in short-term debt.

This result is consistent with our prediction. Firms with unique products have to use workers with very job-specific skills, have to purchase customized fixed assets and equipment. Therefore, they borrow less as to avoid the costs in case of bankruptcy.

Rehmoo (2008) found that unique firms stay away from debt with very low debt ratios.

### 5.4.7. Tangibility (TANG):

The results of tangibility are also consistent with the predictions. Hence, a 1% increase in tangibility of assets will lead to a 0.055% increase in total debt, a 0.258% increase in long-term debt and a 0.203% decrease in short term debt.

Firms with higher proportion of fixed assets in total asset will have more collateral for bank loans, and thus have more access to debt. The negative relation between tangibility and short-term leverage suggests that when firms have collateral available with them, they prefer long-term debt and this reduces dependence on short-term debt.

Nguyen and Ramachandran (2006) found an opposite result: a negative coefficient of tangibility for long-term debt, but positive for short-term debt in Vietnam. They argued their study was on SMEs in Vietnam, which mainly operate in the trade and service sectors, so these firms require high demand for working capital. They therefore use less long-term debt and more short-term debt.

# *Conclusion*

The study aims to uncover the determinants of capital structure of firms operating in Food Processing and Household Appliances in Vietnam for the time span of 5 years between 2008 and 2012.

## 6.1. Overall results:

Following fixed effects model, the result suggests the following associations between debt and the seven independent variables. Company size is positively related to all debt ratios, and these relationships are significant. There is a positive relation between growth opportunities long-term leverage. It signifies that when firms have great growth opportunities and want to support long-term growth, they have to turn into long-term debt.

The results also provide a significant, negative relationship between non-debt tax shields and long-term leverage. A negative association between profitability and the three dependent variables are also found. These results are consistent with the theoretical predictions.

Liquidity remains unverified in this research, as it has different impacts on short-term and long-term leverage. According to regression results, highly liquid companies have more long-term debt, but less short-term debt. A negative sign for short-term debt means that firms are liquid enough to support its working capital do not need to depend on external finance.

Uniqueness is rarely tested in previous studies. It shows a negative relationship with total leverage ratio in this study, which confirms the predictions of the theories.

Tangibility will increase long-term debt, but decrease short-term debt. Thus, the presence of collateral implies a higher dependence on long-term debt financing.

Table 6 reports a summary of the determinants of capital structure and illustrates the theoretical signs versus result observed in this study under OLS model.

Table 6: Theoretical versus Regression Result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Theoretical prediction** | **Regression results following fixed effects model** | | |
| **TLEV** | **LTLEV** | **STLEV** |
| **SIZE** | + | + | + | + |
| **GROWTH** | - | No evidence | + | No evidence |
| **NDTS** | - | No evidence | - | No evidence |
| **PROFIT\_TA** | - | - | No evidence | - |
| **LIQD\_C** | +/- | - | + | - |
| **UNIQ** | - | - | No evidence | No evidence |
| **TANG** | + | No evidence | + | - |

*Notes: significant at 5% level. TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

## 6.2. Recommendation for Future Study:

The empirical model of this study can be expanded to provide further empirical results. The expansion can be done by increasing the data set to other industries, increasing time span or increasing the number of alternative indicators for independent variables.

To sum up, the capital structure theory remains one of the challenging subjects of corporate finance which has potential to bring out new and interesting results.

# *Appendices*

## Appendix 1: Capital Structure Theories.

Table A1: Capital structure theories

|  |  |
| --- | --- |
| **Theory** | **Propositions in capital structure decisions** |
| Modigliani and Miller | The value of the firm is determined by the left-hand side of the balance sheet that is by real assets and they remain unaffected whether the liability side of the firm’s balance sheet is sliced in to more or less debt. Therefore, to increase the value of the firm, investment should be done in positive net present value projects. |
| Trade-off theory | A firm borrows to the point where the marginal value of tax shields on additional debt just offset the increase in the present value of costs of financial distress. |
| Pecking order theory | Firms prefer internal finance. If external financing is required firm first opt for safest security that is debt and equity is raised as a last resort. |
| Agency Cost models | According to the theory, raising debt has the potential to reduce agency problems. |

## Appendix 2: Measurement of Variables

Table A2.1: Dependent variables

|  |  |
| --- | --- |
| **Dependent variables** | **Measurement** |
| Total leverage – TLEV | Book value of total debt / total assets |
| Long term leverage – LTLEV | Book value of long term debt / total assets |
| Short term leverage – STLEV | Book value of short term debt / total assets |

Table A2.2: Independent variables

|  |  |  |
| --- | --- | --- |
| **Independent variables** | **Measurement** | **Theoretical sign** |
| Firm size – SIZE | Ln (Net sales) | + |
| Growth opportunities – GROWTH | Percentage change in total assets over 2 consecutive years | - |
| Non-debt tax shields – NDTS | Depreciation costs / total assets | - |
| Profitability – PROFIT | EBIT / total assets  (or)  EBIT / net sales  (of last year) | - |
| Liquidity – LIQD | Current ratio  (or)  Quick ratio | + / - |
| Uniqueness – UNIQ | Selling expenses / Net sales | - |
| Tangibility – TANG | Fixed assets / Total assets | + |

## Appendix 3: List of target companies

Table A3: List of target companies

|  |  |  |
| --- | --- | --- |
| **No.** | **Symbol** | **Name** |
| *Food Processing* | | |
| 1 | AAM | Mekong Fisheries Joint Stock Company |
| 2 | ABT | Bentre Aquaproduct Import And Export JSC |
| 3 | ACL | Cuu Long Fish Joint Stock Company |
| 4 | AGF | Angiang Fisheries Import Export JSC |
| 5 | ANV | Nam Viet Corporation |
| 6 | ATA | Ntaco Corporation |
| 7 | AVF | Viet An Joint Stock Company |
| 8 | BBC | Bibica Corporation |
| 9 | BHS | Bien Hoa Sugar Joint Stock Company |
| 10 | BLF | Bac Lieu Fisheries Joint Stock Company |
| 11 | CAN | Ha Long Canned Food Joint Stock Corporation |
| 12 | CMX | Ca Mau Frozen Seafood Processing Import Export Corporation |
| 13 | DBC | Dabaco Group |
| 14 | FDG | Dong Thap Trading Corporation |
| 15 | FMC | Sao Ta Foods Joint Stock Company |
| 16 | HHC | Haiha Confectionery JSC |
| 17 | HNM | Hanoimilk Joint Stock Company |
| 18 | HVG | Hung Vuong Joint Stock Corporation |
| 19 | ICF | Investment Commerce Fisheries Corporation |
| 20 | KDC | Kinh Do Corporation |
| 21 | LAF | Long An Food Processing Export Joint Stock Company |
| 22 | LSS | Lam Son Sugar Joint Stock Corporation |
| 23 | MPC | Minh Phu Seafood Corporation |
| 24 | MSN | Masan Group Corporation |
| 25 | NGC | Ngo Quyen Export Seafood Processing JSC |
| 26 | NHS | Ninh Hoa Sugar Joint Stock Company |
| 27 | NSC | National Seed Joint Stock Company |
| 28 | PIT | Petrolimex International Trading Joint Stock Company |
| 29 | SAF | Safoco Foodstuff Joint Stock Company |
| 30 | SBT | Thanh Thanh Cong Tay Ninh JSC |
| 31 | SEC | Gia Lai Sugar - Thermal Power Joint Stock Company |
| 32 | SGC | Sa Giang Import Export Corporation |
| 33 | SJ1 | Seafood Joint Stock Company No 1 |
| 34 | SSC | Southern Seed Corporation |
| 35 | TAC | Tuong An Vegetable Oil Joint Stock Company |
| 36 | TS4 | Seafood Joint Stock Company No4 |
| 37 | TSC | Techno - Agricultural Supplying Joint Stock Company |
| 38 | VCF | Vinacafé Bienhoa Joint Stock Company |
| 39 | VHC | Vinh Hoan Corporation |
| 40 | VLF | Vinh Long Cereal and Food Corporation |
| 41 | VNH | Viet Nhat Seafood Corporation |
| 42 | VNM | Viet Nam Dairy Products Joint Stock Company |
| 43 | VTF | Viet Thang Feed Joint Stock Company |
| *Household Appliances* | | |
| 44 | DCS | Dai Chau Group Joint Stock Company |
| 45 | DLG | Duc Long Gia Lai Group Joint Stock Company |
| 46 | EVE | Everpia Vietnam JSC |
| 47 | GDT | Duc Thanh Wood Processing JSC |
| 48 | GTA | Thuan An Wood Processing Joint Stock Company |
| 49 | LIX | Lix Detergent Joint Stock Company |
| 50 | NET | NET Detergent Joint Stock Company |
| 51 | SAV | Savimex Corporation |
| 52 | TTF | Truong Thanh Furniture Corporation |

## 

## Appendix 4: Correlation matrix

Table A4: Correlation matrix

|  | **SIZE** | **GROWTH** | **NDTS** | **PROFIT\_TA** | **LIQD\_C** | **UNIQ** | **TANG** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **SIZE** | 1 |  |  |  |  |  |  |
| **GROWTH** | .207\*\* | 1 |  |  |  |  |  |
| **NDTS** | -.273\*\* | -.263\*\* | 1 |  |  |  |  |
| **PROFIT\_TA** | -.080 | .161\*\* | -.007 | 1 |  |  |  |
| **LIQD\_C** | -.150\* | -.051 | -.048 | .261\*\* | 1 |  |  |
| **UNIQ** | .172\*\* | .048 | .071 | .006 | .120 | 1 |  |
| **TANG** | -.082 | -.035 | .305\*\* | -.038 | -.159\* | .013 | 1 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | |

## Appendix 5: Regression results from OLS and random effects models

Table A5.1: Correlation results of pooled OLS model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Independent variables** | | **TLEV** | **LTLEV** | **STLEV** |
| **constant** | **Coefficient** | **0.414\*\*\*** | **-0.075** | **0.488\*\*\*** |
| Significance | 0.0026 | 0.1219 | 0.0002 |
| **SIZE** | **Coefficient** | **0.018\*** | **0.005** | **0.012** |
| Significance | 0.0642 | 0.1087 | 0.1794 |
| **GROWTH** | **Coefficient** | **0.019** | **0.051\*\*\*** | **-0.032** |
| Significance | 0.5308 | 0.0000 | 0.2582 |
| **NDTS** | **Coefficient** | **-3.733\*\*\*** | **-0.841\*\*\*** | **-2.892\*\*\*** |
| Significance | 0.0000 | 0.0000 | 0.0000 |
| **PROFIT\_TA** | **Coefficient** | **-0.659\*\*\*** | **-0.067\*** | **-0.592\*\*\*** |
| Significance | 0.0000 | 0.0870 | 0.0000 |
| **LIQD\_C** | **Coefficient** | **-0.052\*\*\*** | **0.002** | **-0.054\*\*\*** |
| Significance | 0.0000 | 0.3409 | 0.0000 |
| **UNIQ** | **Coefficient** | **-1.645\*\*\*** | **-0.348\*\*\*** | **-1.117\*\*\*** |
| Significance | 0.0000 | 0.0001 | 0.0000 |
| **TANG** | **Coefficient** | **0.044** | **0.311\*\*\*** | **-0.267\*\*\*** |
| Significance | 0.6177 | 0.0000 | 0.0016 |
| **Observations** | | 260 | 260 | 260 |
| **R-square** | | 0.508 | 0.382 | 0.492 |
| **Adj R-square** | | 0.494 | 0.365 | 0.478 |
| **F-statistics** | | 37.128 | 22.281 | 34.886 |
| **Prob>F** | | 0.000 | 0.000 | 0.000 |

*Notes: \*, \*\* and \*\*\*: significant at 10, 5 and 1% levels. TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

Table A5.2: Correlation results of random effects model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Independent variables** | | **TLEV** | **LTLEV** | **STLEV** |
| **constant** | **Coefficient** | **-0.161** | **-0.121\*** | **0.034** |
| Significance | 0.2811 | 0.0595 | 0.8129 |
| **SIZE** | **Coefficient** | **0.047\*\*\*** | **0.009\*\*** | **0.032\*\*\*** |
| Significance | 0.0000 | 0.0369 | 0.0018 |
| **GROWTH** | **Coefficient** | **0.025\*** | **0.032\*\*\*** | **0.000** |
| Significance | 0.0910 | 0.0005 | 0.9891 |
| **NDTS** | **Coefficient** | **-1.136\*\*** | **-0.829\*\*\*** | **-0.314** |
| Significance | 0.0338 | 0.0036 | 0.5496 |
| **PROFIT\_TA** | **Coefficient** | **-0.454\*\*\*** | **-0.060** | **-0.404\*\*\*** |
| Significance | 0.0000 | 0.1191 | 0.0000 |
| **LIQD\_C** | **Coefficient** | **-0.020\*\*\*** | **0.004\*\*\*** | **-0.026\*\*\*** |
| Significance | 0.0000 | 0.0038 | 0.0000 |
| **UNIQ** | **Coefficient** | **-1.076\*\*\*** | **-0.370\*\*\*** | **-0.720\*\*\*** |
| Significance | 0.0001 | 0.0015 | 0.0001 |
| **TANG** | **Coefficient** | **0.033** | **0.284\*\*\*** | **-0.232\*\*\*** |
| Significance | 0.5872 | 0.0000 | 0.0001 |
| **Observations** | | 260 | 260 | 260 |
| **R-square** | | 0.3379 | 0.2850 | 0.3078 |
| **Adj R-square** | | 0.3195 | 0.2652 | 0.2885 |
| **F-statistics** | | 18.3685 | 14.3528 | 16.0053 |
| **Prob>F** | | 0.000 | 0.000 | 0.000 |

*Notes: \*, \*\* and \*\*\*: significant at 10, 5 and 1% levels. TLEV, LTLEV or STLEV: total leverage, long-term leverage or short-term leverage. SIZE: firm size (ln(net sales)), GROWTH: growth opportunities (percentage change in total assets), NDTS: non-debt tax shield (depreciation cost / total assets), PROFIT\_TA: profitability (EBIT/total assets), LIQD\_C: liquidity (current ratio), UNIQ: uniqness (selling expenses / net sales), TANG: tangibility (fixed assets/total assets).*

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