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## Determinants of Capital Structure of Listed Food and Beverage Manufacturing Companies: the Case in Vietnam

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### **Abstract:**

*This study focused on examining determinants of the capital structure of listed food and beverage manufacturing companies in Vietnam stock market. The purpose of this study also contributes towards a better understanding of financing behavior in Vietnamese food and beverage companies during the period of 2011-2015. Panel data of 47 listed food and beverage manufacturing companies over the period 2011-2015 was analyzed using two estimation models: Random-effects model and Fixed-effects model. The initial nine independent variables represent factors that potentially determine capital structure are adopted in the study including profitability, business risk, firm size, growth opportunities, assets tangibility, liquidity, effective tax rate, non-debt tax shields, and lending interest rate. Empirical results indicate that capital structure of the Vietnamese listed food and beverage manufacturing companies have relationships with 6 main determinants: profitability, business risk, firm size, firm growth, assets tangibility, liquidity.*

### **1. Introduction**

Capital structure refers to mixing debt and equity used by a firm in financing its assets. The capital structure decision is one of the most important decisions for any business because it affects not only the financial performance but also the risk of the firm. According to trade-off theory a firm with an optimal mix of debt and equity can achieve the minimum cost of capital structure (Kraus & Litzenberger, 1973). Therefore, in making financing decisions, firms always try to achieve the best financing combination that can maximize firm value and work best with their projects but "How do firms choose their capital structure? The determinants of financial leverage play an important role in making capital structure decisions. There are reasonable numbers of researches on the determinants of capital structure have been conducted around the world since Modigliani and Miller introduce their theory in 1958 but remain one of the most significant unsettled issues in the field of corporate finance.

The relationship between capital structure and firm's performance, firm' value is a focal point for most of the capital structure theories, especially Modigliani and Miller's theory, agency theory, trade-off theory, pecking order theory.

Modigliani and Miller (1958) suggested that in the absence of taxes, bankruptcy costs, agency costs, asymmetry information, and in an efficient market, the level of debt in a firm's capital structure would have no impact on the firm's value and performance, as well as shareholders' value. In a further study, Modigliani & Miller (1963) focus initially on the advantages of debt finance through the effects of corporate tax. They affirmed that the firm's value does depend on the amount of debts employed by the firm. Debt is useful through the trading-off between the benefits of tax reduction on interest payments and the costs of financial distress. Given the existence of the agency problem, Jensen & Meckling (1976) indicated that the optimal capital structure is the debt-equity level at which the firm achieves the lowest total agency cost. Trade-off theory stated that the firm has an incentive to use debt and will continue to do so until their additional supply drives up interest rates to the point where the tax advantages of interest deduction are completely offset by higher rates. In other words, the firm will use the debt until the optimal level of debt is reached, which occurs by the trading-off between benefits and costs of that debt. Theoretically, the appropriate capital structure mix minimizes a firm's cost of capital, which consequently maximizes the firm's performance. Managers who are willing to recognize and maintain this appropriate mix minimize financing costs and improve their firm's performance. Nevertheless, the pecking order model was developed by Myers & Majluf (1984) and Myers (1984). Based on the observed behavior of companies, they showed that firms prefer internal finance (retained earnings and depreciation) to external finance (debt or equity). Myers & Majluf (1984) asserted that information asymmetry influences financing choices between internal and external, debt and equity choice. This is for the reason that inside finance will provide more information about the firm than would new equity holders. According to the pecking order theory, changes in debt ratio are determined by the need for external funds, not by optimal capital structure decisions. Thus, it concludes that there is no optimal capital structure.

Following capital structure theories, some empirical researches have been conducted on the determinants of capital structure of Vietnamese firms. An early study on capital structure of Vietnamese firms done by Nguyen and Ramachandran (2006), they focused only on small and medium-sized enterprises in Vietnam for the period 1998-2001. This study found that level of debt used small and

medium-sized companies in Vietnam is positively related to firm growth, business risk, firm size, networking, and relationships with banks but negatively related to asset tangibility. In follow-up studies Huy (2013) and Khanh & Anh (2012) researched in manufacturing firms. Results of study conducted by Khanh & Anh (2012) identified that level of debt of the listed manufacturing company in Vietnam has relationships with five main factors: firm size, profitability, asset tangibility, firm growth and liquidity. Meanwhile Huy (2013) pointed out that firm size, growth opportunity, tangibility of asset, profitability and business risk have correlations with the leverage structure chosen by manufacturing firms in the Vietnamese context. Soon after, Anh & Yen (2014) conducted on 180 non-financial companies on the Ho Chi Minh Stock Exchange and using the fixed effect estimation method reported that financial leverage of Vietnamese listed firms increase with profitability and firm size, decrease with taxes. Despite this study was conducted on only Ho Chi Minh Stock Exchange, whereas Chi (2013) studied on a broad set of Vietnamese listed firms, both studies conclude that profitability and taxes impacted on leverage; however, they disagree over the direction of the relationship. Chi (2013) suggested that return on assets has a negative relationship with financial leverage, matching with the pecking order theory, and effective tax rate has a positive relationship with financial leverage, following the trade-off theory.

Though empirical studies on capital structure in Vietnam have pointed out some of the critical determinants of the capital structure of enterprises, they have not provided unified findings. On other words, pervious researches indicate that these capital structure determinants do not always hold similarly across different contexts and are significantly affected by factors such as the laws and regulations of the country, corporate and personal tax systems and corporate governance. Moreover, there is lack of empirical research to investigate factors that influence financial leverage of the food and beverage manufacturing companies in Vietnam.

Food and beverage industry plays an important role in Vietnam's economic development. These companies' products are necessary in every condition, whether it is in a crisis condition or not. According to the latest statistics from the General Statistics Office (GSO) in 2015, food and beverage industry contribute to about 17% of gross domestic product (GDP). Moreover, increased consumer demand for food and beverage products is fueled by the continuous growth of the world population, which demonstrates that food and beverage industry is a potential and promising industry.

For some mentioned reasons, this is necessary to study determinants of capital structure decision of listed food and beverage firms in Vietnam stock exchange over the period 2011- 2015. This study explores the factors affecting financial leverage of food and beverage manufacturing Vietnamese listed firms. The purpose of this study contributes towards a better understanding of financing behavior in Vietnamese companies during the period of 2011- 2015. The findings not only contribute to the literature on this subject, but also offer useful insights for financial managers, investors, and financial management consultants of listed food and beverage firms. Based on the effect of each determinant, the companies can make their funding decisions in order to get right capital structure through each stage of development.

## 2. Literature Review

### 2.1. Capital Structure Definitions

Capital structure refers to mixing debt and equity used by a firm in financing its assets. Specifically, capital structure is the way a company finances itself by combining long-term debt, short-term debt and equity (Ross *et al.*, 2005; Abor, 2005). It could be defined as a mix of sources of financing that appears in the balance sheet (Keown *et al.*, 1985). According to Romano *et al.* (2000), capital structure is categorized into four main parts: capital and retained profits, family loans, debt, and equity. Alternatively, Gibson (2002) suppose that five types of source of finance, namely owner equity, related person debt, trade credit, bank loan, and other debt or equity such as credit cards, venture capital, and government loans.

### 2.2. Determinants of Capital Structure

Both theoretical and empirical researches have indicated that profitability, asset tangibility, effective tax rate, firm size, non-debt tax shields, growth opportunities, business risk, liquidity, industry condition, stock market condition, lending interest rate, and macroeconomic condition etc affect capital structure. Based on the existing literature and data availability, the following potential determinants of capital structure are analyzed in this study.

**Profitability:** Profitability is the benefit that is realized when the amount of revenue gained from a business activity exceeds the expenditure, costs, and taxes needed to sustain the activity (Handoo & Sharma, 2014).

Theoretical viewpoints, profitability has been found to have different influences on financial leverage. Trade-off theory and agency cost theory predicted a positive relationship between profitability and leverage. According to the trade-off theory, profitable firms benefit more from interest tax shields and face lower expected costs of financial distress, so these firms are likely to use more debt (Bradley, Jarrell, & Kim, 1984; Myers & Majluf, 1984).

In addition, Jensen & Meckling (1976) found that high leverage or debt ratio help a firm to reduce its agency cost and mitigate agency conflicts. This debt ratio also encourages managers to act more in the interests of shareholders. As a result, the firm's profit increases.

On the other hand, Myers & Majluf (1984) predicted a negative relationship between profitability and leverage based on the pecking order theory. Profitable firms are likely to accumulate more retained earnings as a source of internal funds, and will therefore need less debt overtime.

Empirical studies also do not totally agree on one particular conclusion. The majority of studies found that a negative relationship between profitability and leverage, for example (Frank & Goyal, 2009; Gill, Biger, Pai, & Bhutani, 2009; Titman & Wessels, 1988), for U.S. firms, (Chen, 2004; Huang & Song, 2002) for Chinese firms, (Handoo & Sharma, 2014) for Indian firms, (Serghiescu & Văidean, 2014) for Romanian firms, (Thippayana, 2014) for Thailand firms. In contrast, some authors found a positive relationship

between profitability and leverage, for example, (Nunkoo & Boateng, 2010) for Canadian firm, (Abor, 2005) listed firms in Ghana, (Akinyomi & Olagunju, 2013) Nigeria firms. The literature also indicates conflicted findings on how profitability influences the use of debt with Vietnamese listed firms. While (Biger, Nguyen, & Hoang, 2008; Chi, 2013; Phi Anh, 2010; Tran, 2015) pointed out an inverse relationship, Anh & Yen (2014) identified a positive relationship.

**Firm size:** Generally, capital structure theories have predicted that large firms are more debt to equity ratio. Large firms are less affected by asymmetric information problems, as they will disclose information to outsiders (Rajan & Zingales, 1995). Mature firms are also able to issue debt at lower costs due to their better reputation in the financial market. These reasons explain why larger firms often take on more debt than smaller firms, according to trade-off theory. Nevertheless, it contradicts agency, pecking order theories that suggest larger firms have a lower degree of information asymmetry, and more retained cash, causing them to use less debt.

Previous papers illustrated that firm size has a positive relationship with firm leverage including (Anh & Yen, 2014; Biger et al., 2008; Frank & Goyal, 2009; Huang & Song, 2002; Nguyen & Ramachandran, 2006; Phi Anh, 2010; Serghiescu & Văidean, 2014; Thippayana, 2014). Besides, other researchers found a negative relationship between firm size and leverage, including (Akinyomi & Olagunju, 2013; Chen, 2004; Handoo & Sharma, 2014; Nunkoo & Boateng, 2010; Titman & Wessels, 1988). Chi (2013) found no evidence of the influence of size on leverage for Vietnamese firms.

**Firm growth:** According to Handoo & Sharma (2014), firms with growth options are those that have relatively more capacity expansion projects, new product lines, acquisitions of other firms and maintenance, and replacement of existing assets. Theories and empirical studies provide contrasting predictions on the relationship between firm growth and financial leverage.

Firstly, pecking order theory implied that there is positive relationship between growth and capital structure because firms with higher growth opportunities need more funds to finance their projects. According to Myers & Majluf (1984), when internal financing cannot meet capital needs, these firms will need more external financing, particularly debt, according to the order of preference. By contrast, Myers (1977) argued that high-growth companies may have more options for future investment than low-growth companies. Therefore, highly leveraged firms are more likely to pass up profitable investment opportunities, because such an investment will effectively transfer wealth from the firm's owners to its debt holders. As a result, companies with high growth opportunities may not issue debt in the first place, and leverage is expected to be negatively related to firm growth. However, Myers (1977) argued that the agency problem could be mitigated if long-term debt is replaced by short-term debt. It inferred that the short-term debt ratio might be positively related to growth rate, if growing firms substitute short-term financing for long-term financing. Trade-off theory and free cash flow theory also suggested that the level of debt used by a firm is inversely related to its growth opportunities.

On the other hand, empirical findings provide two opposite directions in the relationship between growth opportunities and firm's capital structure. Titman & Wessels (1988), Frank & Goyal (2009), Nunkoo & Boateng (2010), confirmed that growth has a negative on leverage. However, Chen (2004), Nguyen and Ramachandran (2006), Biger *et al.*, (2008), Akinyomi & Olagunju (2013) found positive relationship between debt ratio, short-term debt ratio and growth of businesses. Moreover, Handoo & Sharman (2014) identified that growth has a negative on debt ratio, long-term debt ratio. Huang & Song (2002) identified a positive relationship between growth and leverage. Tran (2015) study identified that financial leverage of Vietnam firms is influenced by growth opportunities. Nonetheless, Anh & Yen (2014), Phi Anh (2010) and Thippayana (2014) found that there are no significant relationships between growth and leverage ratios.

**Business risk:** Titman & Wessels (1988) mentioned in their study "many authors have also suggested that a firm's optimal debt level is a decreasing function of the volatility of earnings". According to the financial distress costs theory, higher business risk increases the probability of financial distress, so firms have to trade off between tax benefits and bankruptcy costs. Thus, it predicts that there is a negative relationship between business risk and debt ratio. Kraus & Litzenberger (1973) presented more risky cash flows resulting from cyclicity or seasonality of business lines will reduce the benefits of tax shields, it one of reasons trade-off theory supported a negative relation between volatility and leverage.

Likewise, empirical studies reported conflicting results. Some authors such as Huang & Song (2002), Nguyen & Ramachandran (2006), Tran (2015) showed a positive impact. Nevertheless, Phi Anh (2010), Serghiescu & Văidean (2014) pointed out a negative relationship between volatility and leverage. Frank & Goyal (2009), confirmed that there is significant relationships between business risk and leverage. Besides, study of Thippayana (2014) indicated that there are no significant relationships between asset tangibility, firm growth, business risk and leverage ratios.

**Asset tangibility:** On the relationship between tangibility and capital structure, theories generally shown that tangibility of asset is positively related to leverage. Jensen & Meckling (1976) pointed out that the agency cost of debt exists as the firm may shift to riskier investment after the issuance of debt, and transfer wealth from creditors to shareholders to exploit the option nature of equity. If a firm's tangible assets are high, then these assets can be used as collateral, diminishing the lender's risk of suffering such agency costs of debt. Hence, a high fraction of tangible assets is expected to be associated with high leverage. In addition, the value of tangible assets should be higher than intangible assets in case of bankruptcy. Myers & Majluf (1984) also proposed a positive relationship between the collateral value of assets and leverage. They argued that firms may be better-off selling secured debt as means to reduce information asymmetries. It may be more costly for firms to sell a security about which outside investors have little information.

On the other hand, empirical studies have reported conflicting results. A positive relationship between tangibility and leverage was found in some studies such as Frank & Goyal (2009), Huang & Song (2002), Nunkoo & Boateng (2010), Akinyomi & Olagunju (2013), Handoo & Sharman (2014), Tran (2015). By contrast, a negative relationship was observed in studies such as Chen (2004), Nguyen & Ramachandran (2006), Biger *et al.* (2008) and Serghiescu & Văidean (2014). Besides, there is no significant relationship reported by Titman and Wessels (1988), Chi (2013), Thippayana (2014), Anh & Yen (2014), and Phi Anh (2010) in Vietnam.

**Non-debt tax shields:** Non-debt tax shields such as accounting depreciation, depletion allowances, and investment tax credits have been found to have a negative influence on leverage because they act as substitutes for the benefit of debt financing coming from interest tax shields (DeAngelo & Masulis, 1980). Moreover, the trade-off theory predicted higher leverage when a firm is forced to pay higher taxes on its earnings. Non-debt tax shields, often relating to depreciation and other operating expenses, were observed in the empirical work of Bauer (2004) and Huang and Song (2002) have a negative relationship with leverage. On the other hand, Titman and Wessels (1988) found that leverage increased with non-debt tax shields. Besides, Gill & Mathur (2011) identified that no significant relationships between non-debt tax shields and leverage. Especially, Tran (2015) also concluded that non-debt tax shields have no relationship with leverage for Vietnamese listed firms.

**Effective tax rate:** Although tax rate is not one of the most popular factors, empirical research has shown support for the above predictions regarding the relationship between taxes and leverage. Gill & Mathur (2011), Akinyomi & Olagunju (2013), Handoo & Sharman (2014), Anh & Yen (2014) identified a negative relationship between leverage and tax rate. While Bauer (2004) and Chi (2013) found that taxes have a positive influence on the use of debt. Besides, Tran (2015) also concluded that tax rates have no relationship with leverage for Vietnamese listed firms.

**Liquidity:** The liquidity ratio is the ability of the firm to pay back its short-term obligations. A higher liquidity ratio shows that the firm has enough current assets to pay its current liabilities for its day-today operations. Most of previous studies supported that high liquidity firms tend to borrow less for their future growth as predicted by the pecking order theory. The pecking order theory suggests a negative relationship between liquidity and leverage because firms are able to use their current assets to finance their operation and thus there is no urgent need for external financing. De Jong, Kabir, & Nguyen (2008), Ab Ramli & Wahab (2014), Serghiescu & Văidean (2014) found that there is a negative relationship between liquidity and firm leverage. However, Handoo & Sharman (2014) shown that there was no significant impact of liquidity of Indian companies' debt ratios. One exception is Chau (2013), who found a statistically significant relationship between liquidity and firm leverage, studies of Vietnamese firms have not included liquidity.

**Lending interest rate:** Interest rate refers to the cost of borrowing for the firm. It is the rate offered by financial institutions, to be used as a benchmark to capture customer demand when acquiring loans from institutions. Previous studies identified the existence of a link between interest rate and debt ratios. Particularly, Ooi (1999) found that relationship between prevailing market interest and debt ratio is negatively related. Firms borrow more in the periods of relatively low interest rates due to lower cost of borrowing.

On the other hand, the trade-off theory and Yat Hung *et al.* (2002) found that there is a positive relationship between leverage ratio and interest rate. This implied that firms tend to borrow more when there is a rise in interest rate or when there is expected inflation because it is a signal for market boom.

In contrast, De Jong *et al.* (2008), (Ab Wahab & Ramli, 2013), showed that the relationship between leverage ratio and interest rate is not significant. However, most studies of Vietnamese firms have not examined lending interest rate factor.

### 3. Research Methodology

#### 3.1. Variables Measurement

##### 3.1.1. Dependent Variables Measurement

Capital structure can be measured in different way. Rajan & Zingales (1995) mentioned that the relevant measure of capital structure is inconclusive and depends on each research objective. Titman & Wessels (1988) and Rajan & Zingales (1995) obtained similar results using both market and book leverage ratios, they used six measure of capital structure by long-term, short-term, and total debt divided by market or book values of equity. However, some studies put more emphasis on book values than market values. Thies & Klock (1992) argued that book values give a better reflection of management's target book ratios than market values that are highly dependent on a few factors that are beyond the control of the firm. Additionally, study of Bowman (1980) assures that there is a large correlation between book and market value of debt. The book value debt performs as well as market value debt, so no need arises for the incremental costs of estimating market value of debt. In this study, the information on market values is limited and only caters for a shorter period of observations. In order to maintain the sample size and a longer time-series, the study does not consider the market values. Therefore, this study is restricted mainly to the book value of debt and three different measures of capital structure including total debt ratio, long-term debt ratio, and short-term debt ratio, as the dependent variables. The formulation of book leverage is shown in Table 1 following with the evidence of past studies that utilizes the book leverage solely, or together with market leverage.

Dependent Variables	Calculation	Previous studies
Total Debt Ratio	Total debt / book value of total assets	Rajan & Zingales (1995), Booth <i>et al.</i> (2001), Chen (2004), Huang & Song (2002), Nguyen & Ramachandran (2006), Frank & Goyal (2009), Gill & Mathur (2011), Handoo & Sharman (2014)
Long-Term Debt Ratio	Long-term debt /book value of total assets	
Short-Term Debt Ratio	Short-term debt /book value of total assets	

Table 1: Dependent Variables Measurement

##### 3.1.2. Independent Variables Measurement

A complete set of the potential determinants of capital structure, the proxies to measure them are presented in Table 3-2.

Independent Variables	Calculation	Previous studies
Profitability	Earnings before interest and taxes/Total assets	Huang & Song (2002), Biger <i>et al.</i> (2008), Handoo & Sharman (2014)
Business risk	Standard deviation of ROA ROA= Profit before tax/ Total assets	Huang & Song (2002), Frank & Goyal (2009), Nguyen & Ramachandran (2006)
Firm Size	Natural logarithm of firm sales	Phi Anh (2010), Gill and Mathur (2011)
Firm Growth	Percentage change in total assets	Titman & Wessels (1988), Nguyen & Ramachandran (2006), Phi Anh (2010), Handoo & Sharman (2014)
Asset Tangibility	Fixed assets/ Total assets	Huang & Song (2002), Nguyen & Ramachandran (2006), Chi (2013), Handoo & Sharman (2014)
Non-debt tax shields	Depreciation expense / Total assets	Titman & Wessels (1988), Chen (2004), Huang & Song (2002)
Effective Tax rate	Tax Expenses / Earning before taxes	Titman & Wessels (1988), Huang & Song (2002)
Liquidity	Current asset/Current liabilities	Deesomsak <i>et al.</i> (2004), De Jong <i>et al.</i> (2008)
Lending interest rate	Average lending interest rate	Ab Ramli & Wahab (2014), De Jong <i>et al.</i> (2008)

Table 2: Independent Variables Measurement

### 3.2. Data Collection

The target population for this study is the food and beverage-manufacturing firms listed on two stock exchanges in Vietnam, including Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX), over a period of five years from 2011 to 2015. Those companies with any missing observations for any variable in the model during the period 2011 to 2015 are dropped. As a result, the final sample set consists of a balanced panel of 47 companies over a period of 5 years, resulting in 235 observations in total. This relatively large panel data set allows constructing and testing more complicated models than cross-sectional or time series data in order to give confidence findings. Annually financial statements were collected from chosen firms through company websites, Vietnamese securities company websites such as CafeF, Vietstock, Cophieu 68, and VnDirect etc.

### 3.3. Data Analysis

The multiple regression analysis was performed to determine factors influencing capital structure decisions of food and beverage manufacturing firms in Vietnam using Stata 13 software as an analysis tool for panel data in this study. There are two popular estimation methods for panel data, including fixed-effects model (FEM) and random-effects model (REM). This study applied the Hausman (1978) test to find out which estimation model, the fixed-effects model versus the random-effects model, works better for the data set being studied. Specifically, to ensure validity of the statistical results, the regressions are run with Driscoll and Kraay standard errors to account for the possible problem of heteroskedastic and auto correlated error structure.

## 4. Results and Discussions

### 4.1. Descriptive Statistics

Table 3 presents descriptive statistics of financial leverage and determinants of capital structure of listed food and beverage manufacturing companies in Vietnam stock market from 2011 to 2015. Statistics show that, compared to listed companies other industries, the Vietnamese listed food and beverage manufacturing companies use relatively high debt ratio with total liabilities account for 50.02% of the firm's total assets, of which long-term debt ratio approximate to 6.36 % and short-term debt ratio account for 43.66%. It should be noted that most of the debt used by non-financial companies are short-term debt ratio. While the mean total debt ratio of Vietnamese listed manufacturing companies from 2008 to 2012 is about 44.78% (Huy, 2013), and that of Vietnamese listed firms in the 2009-2013 period is 45.93% (Tran, 2015).

Variables	Obs	Mean	Std. Dev.	Min	Max
Profitability	235	0.1129	0.1041	-0.5101	0.4701
Business risk	235	0.0382	0.0536	0.0015	0.4007
Firm size	235	11.986	0.5411	10.250	13.540
Firm growth	235	13.835	26.801	-67.420	201.12
Asset tangibility	235	0.2695	0.1302	0.0478	0.7322
Non-debt tax shields	235	0.0306	0.0325	-0.1595	0.3143
Effective tax rate	235	0.1714	0.1276	-0.1518	0.9598
Liquidity	235	1.9046	1.3822	0.6247	8.4808
Lending interest rate	235	12.547	2.8511	8.700	17.00
Total debt ratio	235	0.5002	0.2117	0.0854	0.9434
Short -term debt ratio	235	0.4366	0.2039	0.0721	0.9307
Long -term debt ratio	235	0.0636	0.0717	0.00	0.4312

Table 3: Descriptive Statistics

#### 4.2. Correlation Analysis Results

Table 4 provides the correlation analysis results for the variables used in the regression model. This Table indicates that financial leverage is negatively correlated with profitability, business risk, non-debt tax shields, liquidity and positively correlated with firm size. Firm growth, assets tangibility, and lending interest rate also have correlation with all measures of capital structure but the relationships are mixed and moderate relationships. Firm growth is positively correlated with total debt ratio, long-term debt ratio, and negatively correlated with short-term ratio. Assets tangibility, lending interest rate have negative impact on total debt ratio and short-term debt ratio but having positive relationship with long-term debt ratio.

Effective tax rate does not have a statistically significant relationship with all three leverage ratios, which indicates that when taxes increase, Vietnamese listed firms do not necessarily borrow more to benefit from the debt-tax shields. Therefore, this factor is eliminated regression model.

	PROF	RISK	SIZE	GROW	TANG	NDTS	TAXR	LIQ	LENDIR	TDR	STDR	LTDR
PROF	1.000											
RISK	-0.183	1.000										
SIZE	0.146	-0.139	1.000									
GROW	0.275	-0.146	0.262	1.000								
TANG	-0.108	0.072	-0.056	-0.089	1.000							
NDTS	0.199	-0.096	-0.088	-0.119	0.220	1.000						
TAXR	0.093	-0.162	-0.084	0.101	0.014	0.069	1.000					
LIQ	0.404	0.090	-0.139	-0.051	-0.186	0.139	-0.004	1.000				
LENDIR	0.248	-0.054	-0.007	0.126	0.037	0.054	-0.097	0.060	1.000			
TDR	-0.449	-0.090	0.095	0.090	-0.070	-0.263	0.003	-0.747	-0.089	1.000		
STDR	-0.425	-0.073	0.047	-0.095	-0.163	-0.227	0.004	-0.724	-0.057	0.941	1.000	
LTDR	-0.118	-0.064	0.142	0.188	0.348	-0.130	-0.008	-0.146	0.055	0.275	-0.069	1.000

PROF: Profitability; RISK: Business risk; SIZE: Firm size; GROW: Firm growth; TANG: Assets tangibility; LIQ: Liquidity; NDTS: Non-debt tax shields; TAXR: Effective Tax rate; LENDIR: Lending interest rate; LTDR: Long-term ratio; STDR: Short-term debt ratio; TDR: Total debt ratio. \* Significant at  $\alpha=0.05$

Table 4: Correlation Matrix of variables

#### 4.3. Regression Results

##### 4.3.1. Comparison of the Models

Table 5 shows Hausman test results help specify which of the two methods, the fixed-effects model (FEM) and the random-effects model (REM) is appropriate for this study. Results demonstrate that the fixed-effects model is suitable method for the regression model of total debt ratio with  $\text{Prob} > \chi^2 = 0.000 < 0.05$ . Conversely, the regression model of long-term debt ratio and short-term debt ratio, the Hausman test results are 0.0870 and 0.1200 respectively, indicating the null hypothesis cannot be rejected at any conventional level of significance. There is strong evidence that the random-effects model provides consistent estimates in two cases.

	Total debt ratio	Long-term debt ratio	Short-term debt ratio
Chi2	26.78	8.75	14.62
Prob > $\chi^2$	0.0008	0.0870	0.1200
Selected model	FEM	REM	REM

Table 5: Hausman Test Results

##### 4.3.2. Regression Results and Discussions

Table 6 summarizes the empirical findings on the factors that influence financial leverage of the listed food and beverage manufacturing companies in Vietnam stock market. The findings are specified in more detail below.

**Profitability:** The result shows that profitability is important in determining capital structure of the Vietnamese listed food and beverage manufacturing companies. The negative relationship between profitability and all measures of capital structure shows that the high profitability companies prefer to use internal funding instead of debt finance. This finding is consistent with pecking order theory that companies prefer internal financing to external financing (Myers & Majluf, 1984). This study provides similar finding to those of previous empirical studies that show an inverse relationship between profitability and capital structure, such as Titman & Wessels (1988), Frank & Goyal (2009) and Gill et al. (2009) for U.S. firms, Huang & Song (2002), Chen (2004) for Chinese firms, Handoo & Sharman (2014) for Indian firms, Serghiescu & Văidean (2014) for Romanian firms, Thippayana (2014) for Thailand firms, Chi (2013), Biger et al. (2008), Phi Anh (2010), Tran (2015) for Vietnamese firms and especially Hau (2014) for the Vietnamese listed food and beverage manufacturing companies in the period from 2009 to 2013.

The result is found contradict with trade-off theory assumption that indicated high profitability companies should use debt finance because of tax deduction. Nunkoo & Boateng (2010) for Canadian firm, Abor (2005) listed firms in Ghana, Akinyomi & Olagunju (2013) Nigeria firms especially Anh & Yen (2014) for Vietnamese firms also found a positive relationship between profitability and capital structure.

- **Business risk:** This study indicates that business risk has a negative influence on capital structure of the Vietnamese listed food and beverage manufacturing companies, which implies that these firms borrow less when business risk increases due to higher expected costs of financial distress. This finding is supported by trade-off theory and previous empirical researches (Phi Anh, 2010; Serghiescu & Văidean, 2014; Hau, 2015), but contradicts with the findings of (Huang & Song, 2002), (Nguyen & Ramachandran, 2006) and (Tran, 2015) that indicated business risk has a positive influence on leverage of the Vietnamese listed food and beverage manufacturing companies.

- **Firm size:** The results show that firm size has a positive impact on leverage for the Vietnamese listed food and beverage manufacturing companies, yet only for total debt ratio and short-term debt ratio, not long-term debt ratios. In general, larger firms will be more levered by debt financing, especially short-term debt. This finding is similar to trade-off theory showing larger firms are likely to borrow more because of having lower bankruptcy risk and ability to issue debt at lower costs thanks to better credibility. This finding also agrees with previous empirical studies such as Rajan & Zingales (1995), Huang & Song (2002), Nguyen & Ramachandran (2006), Biger et al. (2008), Frank & Goyal (2009), Phi Anh (2010), Serghiescu & Văidean (2014), Thippayana (2014), Anh & Yen (2014), and especially Khanh & Anh (2012) researching the Vietnamese listed manufacturing companies, Hau (2015) for the Vietnamese listed food and beverage manufacturing companies.

The positive relationship is opposite the prediction provided by pecking order theory that larger companies often build more internal equity, and thus have less of a tendency to borrow externally. Similarly, Titman and Wessels (1988), Chen (2004), Nunkoo & Boateng (2010), Akinyomi & Olagunju (2013), Handoo & Sharman (2014) also found the same conclusion on the negative effect of firm size on capital structure.

- **Firm growth:** This study points out that firm growth measured by percentage change in total assets is moderately and positively associated with capital structure of the Vietnamese listed food and beverage manufacturing companies. This suggests that companies with higher firm growth need more funds to finance their projects and when internal financing cannot meet capital needs; these companies will need more external financing, particularly debt, according to the order of preference. This finding demonstrates that growth opportunities of the Vietnamese listed food and beverage manufacturing companies still depend on bank loan. For that reason, Vietnam's equity market has been limited in the intervening period.

This relationship is supported by pecking order theory and empirical researches such as Chen (2004), Nguyen & Ramachandran (2006), Biger et al. (2008), Frank & Goyal (2009), Akinyomi & Olagunju (2013), Khanh & Anh (2012), Handoo & Sharma (2014), Hau (2015). On the other hand, this finding does not follow the prediction provided by trade-off theory and agency theory that companies having more growth opportunities have higher expected costs of financial distress and bear more agency costs, so they prefer equity financing and reduce leverage. Titman & Wessels (1988), Huang & Song (2006), Nunkoo & Boateng (2010) also found a positive relationship between firm growth and firm's capital structure.

- **Asset tangibility:** This study reveals that company's asset tangibility affects its debt ratios in both positive and negative ways. Asset tangibility has a negative impact on short-term debt ratio but having a positive relationship with long-term debt ratio and total debt ratio. This implies that the Vietnamese listed food and beverage manufacturing companies invest in heavily tangible assets by using long-term debt because these companies can use the tangible assets as collaterals to borrow at a lower borrowing cost. This positive relationship between asset tangibility and long-term debt ratio is supported by trade-off theory, and agency theory as well as empirical researches such as Rajan & Zingales (1995) Frank & Goyal (2009), Huang & Song (2002), Nunkoo & Boateng (2010), Akinyomi & Olagunju (2013), Handoo & Sharman (2014), Tran (2015), Hau (2015).

In contrast, asset tangibility has a negative impact on short-term debt ratio. This finding is consistent with what can be observed in the capital structure of the Vietnamese listed food and beverage manufacturing companies, these firms have high short-term ratio so they use long-term debt or issue equity as a better choice for firms to decrease pressure from bank and lender firms. Nguyen & Ramachandran (2006), Biger et al. (2008), Hau (2015) Chen (2004), and Serghiescu & Văidean (2014) also identified that short-term debt ratio is negatively related to asset tangibility.

- **Liquidity:** The study reveals that liquidity has a negative effect on the capital structure measured by total debt ratio and short-term debt ratio of the Vietnamese listed food and beverage manufacturing companies, which implies these firms are able to use their current assets to finance their operation and high liquidity companies tend to borrow less for their future growth. This finding matches the prediction made by pecking order theory as well as previous research done by De Jong et al. (2008), Ramli & Wahab (2014), Serghiescu & Văidean (2014).

- **Lending interest rate:** This study reveals that no significant relationship exists between industry lending interest rate and financial leverage for the Vietnamese listed food and beverage manufacturing companies. This finding disagrees with prediction made by trade-off theory that contends that when lending rate increases, firms can also borrow more to benefit from interest tax shields.

- **Non-debt tax shields:** The study also concludes that non-debt tax shields have no relationship with all measure of capital structure of the Vietnamese listed food and beverage manufacturing companies, which suggests that when taxes increase, these firms use different tools instead of debt financing to receive benefit from the debt-tax shields such as depreciation or investment tax credit.

Variables	Total debt ratio			Long-term debt ratio			Short-term debt ratio		
	Coef.	t	Prob.	Coef.	z	Prob	Coef.	z	Prob.
PROF	-0.291	-5.35	0.006	-0.382	-2.81	<b>0.041</b>	-0.304	-5.15	0.000
<b>RISK</b>	<b>-0.056</b>	<b>-2.51</b>	<b>0.053</b>	<b>-0.061</b>	<b>-2.65</b>	<b>0.050</b>	<b>-0.021</b>	<b>-2.17</b>	<b>0.008</b>
SIZE	0.105	8.93	0.001	0.092	0.96	0.339	0.750	2.99	0.046
GROW	0.090	1.97	0.019	0.075	1.64	0.080	0.780	1.96	0.050
TANG	0.262	8.06	0.001	0.178	4.17	0.000	-0.426	-7.00	0.000
NDTS	-0.102	-1.53	0.202	-0.229	-1.48	0.139	-0.131	-0.65	0.517
LIQ	-0.098	-8.56	0.001	0.068	0.63	0.528	-0.073	-12.0	0.000
LENDIR	0.091	1.31	0.082	0.073	0.56	0.575	0.346	1.07	<b>0.084</b>
C	-0.579	-4.11	0.015	<b>-0.159</b>	<b>-2.00</b>	<b>0.031</b>	<b>0.124</b>	<b>2.40</b>	<b>0.048</b>
R <sup>2</sup>	0.7391			0.5436			0.6094		
Prob(F_statistic)	0.0000			0.000000			0.000000		

Table 6: Summary of findings

PROF: Profitability; RISK: Business risk; SIZE: Firm size; GROW: Firm growth;  
TANG: Assets tangibility; LIQ: Liquidity; Effective tax rate: TAXR; NDTS: Non-debt tax shields.  
\*\* Significant at 0.01; \* Significant at 0.05

## 5. Conclusions

This research examines the determinants of capital structure in a sample of 47 Vietnamese listed food and beverage manufacturing companies over the period 2011-2015, and focused particularly on both firm-specific characteristics and macroeconomic factors. Multiple regression analysis was employed to examine the relationship between capital structure measured by three different ways (total debt ratio, long-term ratio, and short-term debt ratio) and the related explanatory variables (profitability, asset tangibility, effective tax rate, firm size, non-debt tax shields, firm growth, business risk, liquidity, lending interest rate). This research points out that financial leverage of the Vietnamese listed food and beverage manufacturing companies decrease with profitability, business risk, liquidity and increase with firm growth, firm size. Asset tangibility has a negative impact on short-term debt ratio but having a positive relationship with long-term debt ratio and total debt ratio. This study also reveals that no significant relationship exists between lending interest rate, non-debt tax shields, effective tax rate and these firms' capital structure.

This research provides a more comprehensive study into determinants of capital structure than itself from previous research with the introduction of key variables such as effective tax rate, business risk, liquidity, and lending interest rate that have never or rarely ever been studied by previously in papers related specifically to the Vietnamese listed food and beverage manufacturing companies. Moreover, this study utilizes larger sample size and a longer period, making for a much larger set of observations, which contributes to find reliable results. Consequently, this research not only contributes to the literature on the determinants of company's capital structure but also may be useful for chief finance officer, chief executive officer, investors, and financial management consultants.

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