



DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM VIETNAM INDUSTRIAL FIRMS

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ABSTRACT

The paper observes the factors affecting the capital structure of 102 industrial firms listed on the Vietnam stock market for 2008-2018. The study used table data methods including Pooled Regression (Pooled OLS), Fixed effects model (FEM), Random effects model (REM). Afterward, the Generalized Method of Moment (GMM) is adopted to test the hypotheses and control autocorrelation, heteroscedasticity, and potential endogeneity issues. The results reveal the positive impact of firm size and previous capital structure on the current capital structure. Also, they report that liquidity, tangibility, firm profitability, and foreign ownership are negatively correlated to capital structure. The study greatly contributes towards the enrichment of empirical evidence on capital structure in the industry.

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1. INTRODUCTION

An earlier study of Modigliani and Miller (1958) suggested that capital structure does not affect the firm's market value in a well-functioning market. Firms with similar business risk and expected rate of return share the same firm value regardless of the differences in how their capital is structured. Therefore, should financial managers pay attention to their firms' debt policy or capital structure in a well-functioning market? With the presence of the imperfection in the capital market, it is always necessary to calculate how firms should utilise their loans, issue bonds, stock or use their remaining profit for the optimal capital structure. Accordingly, many scholars have developed other trade-off, pecking order, and agency theories in the effort to explain how the capital structure works in reality. In the recognition of its importance in financial management, many empirical studies try to examine the plausibility of these theoretical models. These studies are divided into two mainstreams which are examining the impact of capital structure on firm value and identifying determinants of capital structure. However, these studies have spotlighted developed countries, not emerging economies.

As an emerging country, Vietnam has not only opportunities but also challenges thanks to international integration (Doan, 2020). Also, its firms cannot avoid facing big challenges that capital structure is one of the big concerns of financial managers. How is capital structured? How much should equity be? How much should they loan? Should they issue bonds or utilise their remaining profit for the optimal effect? As a result, research on the capital structure of industrial firms in Vietnam contributes both theoretical and practical values. This paper aims to explain the theory of capital structure as well as identify determinants of capital structure among industrial firms in Vietnam. The study identifies how these determinants influence capital structure decisions, thereby making suitable decisions on how capital is structured for good firm performance.

2. LITERATURE REVIEW

Capital structure: The theory of Modigliani and Miller (M&M theorem) is the foundation of other studies on capital structure theories. M&M theorem is stated into 2 basic propositions. Meanwhile, the first proposition assumes on the valuation of a firm, the second one assumes on the capital cost. These propositions are respectively considered in environments with taxes and no taxes. On the other hand, Modigliani and Miller also assume that the capital market is perfect, so transaction and bankruptcy cost are nil. According to Modigliani and Miller (1958), using more debt brings the owner higher profitability ratios which are exactly what they compensate for a higher risk in the debt-equity ratio in return. Alternatively, the valuation of firms using debt is equal to one of the firms using no debt. With a firm income tax, the value of a firm increases as its debt ratio increases (Modigliani & Miller, 1963). Because interest expenses are a reasonable expense deducted when calculating firm income tax, a portion of the firm's income goes to investors. In general, the above statements are assumed on the propositions of the perfect market. However, these hypotheses are difficult to perform in reality, thereby constraining the application of the M&M theorem.

Static Trade-off Theory: Following the M&M theorem, Kraus and Litzenberger (1973) developed static trade-off theory. According to this theory, firms set different targets on debt-equity ratios for the optima firm benefits. The firm's capital structure is determined by the trade-off between the benefits of tax shields and the cost of exhaustion. The trade-off theory can explain the differences in capital structure among different firms and fields. Nevertheless, this theory is sufficient to explain the low debt ratio of big successful firms.

Pecking Order Theory: The first foundation of pecking order theory is the studies of Donaldson (1961). The pecking order theory primarily considers the impact of information asymmetry on firms' investment and financing decisions (Myers and Majluf; 1984). Information between managers and investors is disproportionate, which can lead to an increase in the costs of external sources of finances. Hence, these firms prefer to use internal sources to external ones. This is why big and successful firms tend to have a low debt ratio.

Agency Cost Theory: Agency cost arises due to conflicts of interest among firm parties. There are two types of conflict: between owners and management; between owners and creditors (Jensen & Meckling, 1976). The management intends to invest in risky businesses to bring shareholders more profits. However, the failure of the investment can bring borrowers more risks, so shareholders only accept limited liability. From the agency cost theory, the optimal capital structure is determined by reducing agency costs. Further, the debt allocation in capital structure is a good way to minimise agency costs (Jensen (1986). More specifically, this provides the borrowers with a right to obtain part of their capital in case the firm is not able to afford interest and initial loan.

In this section, we will examine the impact of firm profitability, tangibility, liquidity, firm size, foreign ownership on capital structure.

Firm profitability: There is a close relationship between firm profitability and capital structure. From the trade-off theory, vastly profitable firms tend to have financial distress at a low cost. Benefits from the tax shield encourage the firm to borrow more. Conversely, according to the pecking order theory, profitability has a negative impact on the debt ratio. Because firms with high profitability will prefer to use internal capital. Thus, the findings vary considerably between specific situations. A majority of earlier scholars who are Bauer (2004), Baharuddin et al. (2011), Tongkong (2012), Ajanthan (2013), Chang et al. (2014), Wahab and Ramli (2014), Acaravci (2015), Le and Tannous (2016), Windayu (2016), Vuran et al. (2017), Cevheroglu-Acar (2018), Thai (2018), and Li and Islam (2019) in particular support the trade-off theory. Their results affirm the reverse influence of profitability on capital structure. Conversely, with their analyses, Moosa and Li (2012), and Agrawal and Singh (2014) affirmed that profitability is concurrently related to how capital is structured. In Vietnam, the author expects that there is a negative impact of firm profitability on the capital structure of industrial firms. Therefore, the following assumption is proposed:

H1: Firm profitability negatively affects the capital structure of industrial firms.

Firm size: According to the trade-off theory, firm size exerts concurrent influence on capital structure. Particularly, big size firms with and diversified portfolios have lower financial exhaustion costs and better access to financial organizations than a small firm. This eventually encourages firms to borrow more. Many studies corroborate this parameter including those of Baharuddin et al. (2011), Moosa and Li (2012), Tongkong (2012), Agrawal and Singh (2014), Chang et al. (2014), Wahab and Ramli (2014), Le and Tannous (2016), Vuran et al. (2017), Thai (2018) and Li and Islam (2019). Conversely, Windayu (2016) confirmed that firm size is inversely correlated to capital structure. Acaravci (2015) also found the positive and negative impact of firm size on capital structure. In particular, this impact is negative with firms in sectors of fabricated metal products, machinery and equipment, and positive with the rest sectors. In Vietnam, the author expects a positive impact of firm size on the capital structure of industrial firms. Therefore, the assumption is proposed:

H2: Firm size positively affects the capital structure of industrial firms.

Tangibility: Most researches on capital structure show the relationship between tangibility and capital structure of the firm. According to the trade-off and pecking order theory, tangibility is positively associated with capital structure. By their recent analyses, Baharuddin et al. (2011), Jame-Kausar (2012), Moosa and Li (2012), Agrawal and Singh (2014), Chang et al. (2014), Wahab and Ramli (2014), Cevheroglu-Acar (2018) and Thai (2018) support this hypothesis. On the other hand, Acaravci (2015), Windayu (2016) and Li and Islam (2019) support the agency cost theory. The results of these studies show a negative correlation between tangibility and capital structure. In Vietnam, the author expects that there is a negative impact between tangibility on the capital structure of industrial firms. So, the assumption is proposed:

H3: Tangibility negatively affects the capital structure of industrial firms.

Liquidity: Liquidity represents the ability to pay short-term liabilities, and is measured by short-term assets divided by short-term liabilities. Research on the impact of liquidity on capital structure reveals different results. A majority of the studies affirm the reverse influence of liquidity on capital structure (Moosa & Li, 2012; Wahab & Ramli, 2014; Le & Tannous, 2016; Cevheroglu-

Acar, 2018). Differently, Pahuja and Sahi (2015) reported that liquidity is concurrently related to capital structure. In Vietnam, the author expects a negative impact between liquidity on the capital structure of industrial firms. Thus, the assumption is proposed as

H4: Liquidity negatively affects the capital structure of industrial firms.

Foreign ownership: In emerging countries, foreign ownership is considered as the most essential element in a firm's capital structure. According to Le & Tannous (2016) and Thai (2018), foreign ownership is negatively correlated to the capital structure. These firms have access to diverse sources of capital and the ability to control excessive investments. In Vietnam, the author expects a negative impact of foreign ownership on the capital structure of industrial firms. Therefore, the assumption is given

H5: Foreign ownership negatively affects the capital structure of industrial firms.

Capital structure in the previous year: The current capital structure is relevant to capital structure in the past and the hypothesis that the adjustment in capital structure does not raise any expense is unreal (Gaud et al., 2005). The author expects a positive impact on the capital structure in the previous year on the current capital structure of industrial firms. Hence,

H6: Capital structure in the previous year positively affects the current capital structure of industrial firms.

3. DATA AND METHODOLOGY

The study employs audited financial statements data available from websites of 102 listed industrial firms in Vietnam for 2008-2018. Following Gaud et al. (2005), the author employs dynamic panel data to examine the factors affecting the capital structure of industrial firms. Pooled Regression (Pooled OLS), both Fixed effects model (FEM) and Random effects model (REM), and Generalized Method of Moment (GMM) are selected to test the hypotheses and control issues on autocorrelation, heteroscedasticity and potential endogeneity. The estimated model is given as

$$CS_{it} = \beta_0 + \beta_1 CS_{i(t-1)} + \beta_2 FS_{it} + \beta_3 LIQ_{it} + \beta_4 TANG_{it} + \beta_5 FP_{it} + \beta_6 FO_{it} + \varepsilon_{it} \quad (1).$$

Table 1: Summary of variables in the study model.

No	Variable	Method of calculation
Dependent variable		
1	CS _{it}	Capital structure
Independent variables		
1	CS _{i(t-1)}	Capital structure in the previous year
2	FS _{it}	Firm size
3	LIQ _{it}	Liquidity
4	TANG _{it}	Tangibility
5	FP _{it}	Firm profitability
6	FO _{it}	Foreign ownership

All the β terms are the model regression coefficient and ε represents the error term.

4. RESULT AND DISCUSSION

4.1 RESULT

The correlation among variables, Table 2 indicates that FS is positively correlated to CS_t while

other independent variables are negatively related to CS_t .

Table 2: Correlation coefficients among variables

Variable	CS_t	CS_{t-1}	FS	LIQ	TANG	FP	FO
CS_t	1.000						
CS_{t-1}	0.922	1.000					
FS	0.259	0.243	1.000				
LIQ	-0.632	-0.587	-0.151	1.000			
TANG	-0.204	-0.180	0.212	-0.077	1.000		
FP	-0.453	-0.395	-0.017	0.349	-0.045	1.000	
FO	-0.199	-0.197	0.294	0.000	0.123	0.179	1.000

The author uses panel data regression models including Pooled Regression (Pooled OLS), Fixed effects model (FEM) and Random effects model (REM). Results of F test ($F(101, 912) = 3.80$ at the significance level of 1%) and Hausman test ($\chi^2(6) = 394.46$ at the significance level of 1%) show that FEM is more suitable. Therefore, the FE model is chosen for the analysis. (Table 3)

Table 3: Results of Pooled OLS, FEM, REM models

CS	Pooled OLS	FEM	REM
Constant	-0.184***	-0.607***	-0.186***
CS_{t-1}	0.747***	0.465***	0.745***
FS	0.033***	0.085***	0.034***
LIQ	-0.015***	-0.023***	-0.015***
TANG	-0.100***	-0.200***	-0.100***
FP	-0.259***	-0.288***	-0.260***
FO	-0.055***	-0.106***	-0.056***
R^2	88.10%	84.57%	88.10%
Significance level	$F(6, 1013) = 1250.14$ Prob > F = 0.000***	$F(6, 912) = 220.14$ Prob > F = 0.000***	Wald $\chi^2(6) = 7403.78$ Prob > $\chi^2 = 0.000***$
F test	$F(101, 912) = 3.80$ Prob > F = 0.000***		
Hausman test	$\chi^2(6) = 394.46$ Prob > $\chi^2 = 0.000***$		

Table 4. Results of Multicollinearity, Heteroscedasticity and Autocorrelation tests

Multicollinearity test		Heteroscedasticity test	Autocorrelation test
Variable	VIF		
CS_{t-1}	2.11	$\chi^2(102) = 1065.15$ Prob > $\chi^2 = 0.000***$	$F(1, 101) = 105.295$ Prob > F = 0.000***
FS	1.33		
LIQ	1.69		
TANG	1.20		
FP	1.26		
FO	1.24		
Mean VIF = 1.47			

Table 4 shows that the research model has multicollinearity is considered not serious. However, heteroscedasticity and autocorrelation issues really exist.

Hence, the paper uses a GMM estimator for the analysis. This is because GMM allows restricting autocorrelation, heteroscedasticity, and potential endogeneity issues (Doytch & Uctum, 2011).

Table 5. Model estimation results by GMM method

CS	Coef.	P> z
Constant	-1.058	0.039**
CS _{t-1}	0.116	0.052*
FS	0.173	0.000***
LIQ	-0.055	0.000***
TANG	-0.757	0.000***
FP	-0.215	0.005***
FO	-1.011	0.001***
Significance level	Wald chi2(5) = 7188.22 Prob > chi2 = 0.000***	
Number of instruments	11	
Number of groups	102	
Arellano-Bond test for AR(2) in first differences	Pr > z = 0.110	
Sargan test	Prob > chi2 = 0.475	

The result of the Sargan test reveals that adopted instruments are valid. Meanwhile, the Arellano-Bond test shows that there is no autocorrelation among errors. Thus, the model is appropriate and utilisable.

4.2 DISCUSSION

From the analysis results, the model becomes

$$CS_{it} = -1.058 + 0.116 CS_{i(t-1)} + 0.173 FS_{it} - 0.055 LIQ_{it} - 0.757 TANG_{it} - 0.215 FP_{it} - 1.011 FO_{it} + \varepsilon_{it}. \quad (2).$$

4.2.1 FIRM-SPECIFIC FACTORS

Regression results confirm that capital structure is influenced by firms' factors.

Foreign ownership (FO) is negative (-1.011) and significant at the 1% level. Firms having high foreign ownership have a low debt ratio as they can simply attract capital from other sources. Besides, foreign investors have the ability to control the problem of excessive investment of firms, thus facilitating to limit the firms' debt ratio. This result agrees with what has been found by Le & Tannous (2016), and Thai (2018).

Tangibility (TANG) exerts a significantly negative impact (-0.757) on the capital structure at the 1% level. This corroborates the results of Acaravci (2015), Windayu (2016), Li and Islam (2019). This implies that industrial firms with high fixed assets tend to borrow less. This result absolutely reflects the reality in Vietnam where firm debt is mainly short-term, so it will cause high risks if this source is used to finance the firms' fixed assets. Consequently, these firms usually invest in fixed assets by their equity. This finding supports the agency cost theory.

Firm profitability (FP) is negatively (-0.215) and significantly related to the capital structure at the level of 1%. This is consistent with findings of Baharuddin et al. (2011), Tongkong (2012), Ajanthan (2013), Chang et al. (2014), Wahab and Ramli (2014), Acaravci (2015), Le and Tannous (2016), Windayu (2016), Vuran et al. (2017), Cevheroglu-Acar (2018), Li and Islam (2019), and Thai (2018). This can be explained that the management frequently has a better understanding of the firm business situations as well as profitability than external investors. For potential and profitable projects, the best financing is to use available capital from the remaining profit because the capital cost of external capital accumulation will be higher. In case the internal source is insufficient, the accumulation from external sources should be chosen to avoid the high capital cost.

This finding is consistent with the pecking order theory.

Firm size (FS) is positively (0.173) and significantly associated with the capital structure at the level of 1%. This result supports the trade-off theory which implies that firms with big size and diversified portfolio can minimise risks, lower borrowing costs, better the ability to access to creditors as compared to small ones. This encourages these big firms to get more loans. Existing studies also reveal the similar result (Baharuddin et al., 2011; Moosa & Li, 2012; Shah & Jam-e-Kausar, 2012; Tongkong, 2012; Agrawal & Singh, 2014; Chang et al., 2014; Wahab & Ramli, 2014; Le & Tannous, 2016; Vuran et al., 2017; Li & Islam, 2019; Thai, 2018).

Capital structure in the previous year (CS_{t-1}) is positively (0.116) and significantly related to the current capital structure at the level of 10%. This confirms the importance of capital structure in the previous time in how capital is the structure at present. This totally suits the reality of Vietnam. This result is in line with those Khémiri & Noubbigh, 2018; Rao et al., 2019 have confirmed.

Liquidity (LIQ) exerts a negative impact (-0.055) on the leverage with the significance at the level of 1%. This finding is similar to those of Moosa and Li (2012), Wahab and Ramli (2014), Le and Tannous (2016), and Cevheroglu-Acar (2018). It can be deduced that firms with high liquidity tend to have a higher ability to pay off their current liabilities and lower debt ratio. This is because more liquid firms possess more current assets, finance and other equivalent amounts, thus financing themselves from internal sources without owing to debt.

5. CONCLUSION

The paper examines the impact of factors on the capital structure of 102 listed industrial firms in Vietnam during 2008-2018. The analysis is performed using Pooled OLS, FEM, REM, and GMM to collect consistent and efficient results. According to results of the investigation, foreign ownership (FO), tangibility (TANG), firm profitability (FP), firm size (FS), capital structure in the previous year (CS_{t-1}) and liquidity (LIQ) are significantly associated with the capital structure.

The results provide industry firms in Vietnam with an insight into how the factors affect their capital structure. This paper contributes to the theoretical perspective on the capital structure in the scenario of an emerging economy. Moreover, this study enriches the collection of studies on the capital structure because all variables employed are proved to exert a significant influence on capital structure. However, the study only determines firm-specific factors, not business characteristics, firm international diversification, or characteristics of the financial market. These may be interesting proposals for future research.

6. AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding author.

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