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DETERMINANTS OF CAPITAL STRUCTURE CHOICE: EMPIRICAL EVIDENCE FROM VIETNAMESE LISTED COMPANIES

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This paper examines the impact of firm-specific and industry characteristics on capital structure during a sample period spanning from 2007 to 2013. We used panel regression with fixed effects and found strong evidence that capital structure is most affected by firm-specific factors such as tangibility, non-debt tax shields, liquidity, firm size, taxes paid, profitability, Tobin's Q ratio, and growth assets. In addition, the empirical results indicate that firms operating in different industries have dissimilar capital structures.

Keywords: capital structure, pecking-order theory, trade-off theory

JEL-codes: C23, G32, G30

1. INTRODUCTION

In recent years, determining how firms select and adjust their strategic mix of debt and equity has been a topic of considerable debate. In addition to numerous discussions on the two most prominent theories, trade-off theory and pecking order theory, studying the determinants that affect firm capital structure behavior and investigating the relationship between a firm's capital choice and performance have become the focus of an increasing number of empirical studies. Such studies have provided practical evidence concerning whether academic models have descriptive power when applied to the practical business world. Although there is strong empirical evidence proving that the selection between debt and equity mostly depends on firm-specific uniqueness and industry characteristics,

the evidence is generally debatable and complicated to interpret. In addition, most studies on capital structure have been conducted in either developed or emerging countries, producing a research gap in developing countries where firms' financial information is difficult to access.

In this paper, we investigate the capital structure choice of numerous Vietnamese companies. The paper expands on the current capital structure literature and enhances the understanding of capital structure in Vietnam in three crucial manners. First, the sample size is updated and includes all companies listed on both Ho Chi Minh and Hanoi Stock Exchanges (HOSE and HNX, respectively). Second, we provide additional insight on firms' financing decisions under different industry perspectives. Third, new firms' attribute factors are incorporated as a determinant of capital structure. Therefore, the study findings are expected to help financial managers in determining appropriate choices in addressing capital structure matters and are also important for the improvement of firms' business performance.

The remainder of this paper is organised as follows. In Section 2, we review the literature and empirical studies that have been conducted. Section 3 describes the data and methodology employed. Empirical results are presented in Section 4, while the findings discussion and implications are provided in Section 5.

2. LITERATURE REVIEW

Studies on capital structure are usually based on one of two theories, the pecking order framework or trade-off theory. Myers (1984) initially suggested the pecking order theory of corporate leverage, and this theory has since been the most popular theory in corporate finance. The theory states that firms, while making their funding choice, prefer using internal financing (retained earnings) to external financing. However, if they are forced to use external funding, they prefer debt financing to equity financing. Jean (2004) agreed that this model is significant in explaining several patterns in corporate finance, including the tendency of companies to not issue shares and their option to hold high level of retained cash. From the perception of firms, issuing equity is the most risky decision due to investors' high expected return; by contrast, arrying more debt has a minor risk and retained earnings can prevent the problem. Hence, retained earnings are used as much as possible. If retained earnings are not sufficient, debt financing is used. Equity financing is employed only as a final option.

The greatest limitation of the pecking order framework is that it ignores the effects of interest tax shields, financial distress, security issuance costs, agency costs, and investment opportunities, which have been widely included in recent

studies on capital structure. In addition, considerable empirical evidence exists against the pecking order hypothesis, indicating that it ignores several practical leverage choice patterns of firms (Dimitrios et al. 2009; Chirinko – Singha 2000; Seifert – Gonenc 2008). Frank and Goyal (2005) argued that most firms reserve some internal funds (cash and short-term investments) even when they employ debt financing. Hence, further research and alternative methodologies are warranted to analyse the existence of the pecking order financing pattern.

The trade-off theory is the second prominent theory of capital structure. The trade-off theory originated from the discussion by Modigliani and Miller (1963). The assumption of this theory is that the cost of debt can protect firm earnings from corporate income tax and thus 100% debt should be employed to maximise profit. However, acquiring 100% debt is extremely risky to firms. Hence, to avoid this extreme case, bankruptcy cost was introduced to offset the cost of debt. Kraus and Litzenberger (1973) concluded that the trade-off theory presumes that the optimal leverage of firms is a trade-off between the tax benefits of debt and the costs of debt, which is known as deadweight costs of bankruptcy. Firms adopting the trade-off theory must identify an objective debt-to-value ratio and then slowly achieve the target (Myers 1984). According to the trade-off theory, highly profitable firms have more profits to use and are in less risk of bankruptcy. Highly profitable firms therefore aim to maintain a higher debt-to-capital ratio. However, empirical evidence indicates that this assumption is not true and does not entirely support the trade-off model. Baskin (1989) obtained data recorded for more than 50 years in different countries and showed that highly profitable firms tend to have less debt, even though they have high levels of earnings to cover the risk of bankruptcy.

The two aforementioned theories are not the only hypotheses on capital structure choice; various studies have also found many firm and industry determinants that affect a firm's financial choices. Titman and Wessels (1988) suggested eight determinants of capital structures, namely asset structure, non-debt tax shields, growth, uniqueness, industry classification, firm size, earnings volatility, and profitability. DeAngelo and Masulis (1980) also revealed the potential effects of corporate taxes, personal taxes, and non-debt-related corporate tax shields. In addition, researchers have identified other factors, such as the effect of location (Abor 2008), the educational background of an entrepreneur (Murinde 2002), the effect of gender (Brush 1992), and industry classification (Bradley et al. 1984; Titman 1984). These factors are considered to have a certain influence on a firm's capital structure behaviour.

The most common determinant of capital structure is a firm's tangibility. Most capital structure hypotheses agree that the category of assets held by a firm is positively related to the firm's financing choices. Titman and Wessels (1988) and

Bradley et al. (1984) have argued that companies with assets that can be used as collateral tend to acquire more debt. Since the tangible assets can be used as collateral in external borrowing, holding assets with higher liquidation provides firms with easier access to lower interest rates. Furthermore, tangible assets give a higher liquidation value compared with intangible assets, thus reducing the probability of mispricing in the case of bankruptcy.

Liquidity is another factor affecting a firm's debt choice. As suggested by the pecking order theory, firms use internal sources of finance and then proceed to use external sources (Myers 1984). In particular, firms are likely to raise capital in the order of retained earnings, debt, and then new equity. Firms are thus likely to hold high liquid reserves from retained earnings, consequently borrowing less debt from external sources. If a firm's liquid assets are sufficient for it to fund investments, the firm is not required to increase external funds. Hence, liquidity is expected to have a negative relationship with the leverage level of firms.

Firm size is positively associated with leverage. According to Castanias (1983), larger firms are usually more diversified and have more secure cash flows, resulting in less variation in earnings. This enables firms to endure high debt ratios. Conversely, information asymmetries and managerial discretion may be greater concerns for smaller firms, rendering them riskier from the lenders' perspective; thus, smaller firms may have lower debt ratios (Castanias 1983). Marsh (1982) also argued that large firms are likely to have the benefit of economies of scale and negotiating power over creditors, enabling them to attain high levels of debt. In addition, lenders are more likely to be repaid by lending to large firms, which are less risky compared with lending to small firms.

Following the study of Modigliani and Miller (1958), which confirmed the association between profitability and leverage, numerous studies have investigated the association betweeen profitability and leverage but have reported mixed results. Tax-based models propose that profitable firms should borrow more because they would benefit substantially from protecting their income from income tax (Huang – Song 2006). In addition, profitable companies are capable of accruing more liability because they can repay their debt more easily. Moreover, profitable firms are more appealing to financial organizations in terms of lending prospects, hence they can obtain more debt capital (Ooi 1999). However, the pecking order framework proposes that the historical profitability of a firm plus high retained earnings can negatively affect the firm's capital structure choice. In particular, Titman and Wessels (1988) and Barton et al. (1989) have agreed that firms with higher profit ratios may choose to maintain less leverage because they are capable of generating funds from internal sources. Mateev et al. (2013) also reported strong evidence of a negative and significant correlation between a firm's profitability and its leverage.

Volatility of earnings, known as business risk and a proxy for the probability of financial distress, has also been suggested as a capital structure determinant. Numerous studies have argued that higher volatility of earnings enhances the probability of financial distress because firms may be unable to service their debt commitments. Johnson (1998) reported that firms with unstable earnings growth may encounter more circumstances in which their cash flow is insufficient for debt. Such firms consequently borrow less and prefer equity to debt when facing external financing choices. Therefore, an inverse correlation between a firm's earnings volatility and leverage is expected.

Nondebt tax shield is another factor that has been commonly investigated in studies on capital structure. As proposed by the trade-off theory, a major advantage in employing debt instead of equity is that it reduces corporate income tax. Hence, firms bearing a higher tax rate are more likely to accrue a higher level of debt. However, DeAngelo and Masulis (1980) proved that the positive correlation is not consistent in the case of non-tax debt shield. A model of optimal capital structure that explores the effect of corporate taxes, personal taxes, and non-debt related corporate tax shields was obtained. They observed that non-debt tax shields such as tax deduction for depreciation and investment tax credits can reduce corporate income tax. Thus, nondebt tax shields reduce the tax benefits of debt financing. Firms with larger non-debt tax shields therefore tend to use less debt in their capital structures.

In addition to confirming the relationship between a firm's characteristics and its capital structure choice, numerous studies have strongly suggested that leverage ratios differ across industries. Degryse et al. (2012) indicated that studies on industry effect have particularly investigated the extent to which industry characteristics, compared with firm-specific factors, explain the difference in capital structure among firms. Balakrishnan and Fox (1993) suggested that 52% of capital structure variation is explained by firm effects and 11% by industry differences. The conclusion is consistent with that of MacKay and Phillips (2005). Michaelas et al. (1999) employed industry fixed effects to investigate whether industry characteristics have any influence on the leverage of small and medium-sized enterprises (SMEs). They discovered significant industry fixed effects, but the impacts were primarily on short-term debt. Degryse et al. (2012) applied a panel data analysis approach to a Dutch SMEs and noted that inter- and intra industry effects play a role in explaining a small firm's capital structure variation.

Although the determinants of capital structure in the Vietnamese stock market have not been substantially investigated in comparision to the developed economies, existing studies still provide valuable information with mixed evidence. Nguyen et al. (2012) investigated the leverage of 116 non-financial firms listed on both the HOSE and HNX for the period 2007 to 2010. The results obtained from

a panel generalised method of moments model indicated that profitability and liquidity have negative effects on leverage, whereas growth and state-ownership exhibit a positive one. Firm's size and tangibility positively affect long-term leverage but negatively affect short-term leverage. Biger et al. (2008) employed data from 2002 to 2003 to examine the relationship between a firm's debt ratio and various attributes of a firm such as collateralised assets, profitability, tax rates, non-debt tax shield, size, growth opportunities, industry classification, and ownership structure. The results revealed a positive relationship between Vietnamese firms' leverage and their firm size and managerial ownership, and a negative relationship with profitability, non-debt tax shield and industrial characteristics. Nguyen and Ramachandran (2006) conducted a similar study on all SMEs in Vietnam and concluded that the capital structure of Vietnamese SMEs is positively related to growth, business risk, firm size, networking, and relationships with banks, but negatively related to tangibility. However, profitability seems to have no effect on the capital choice of Vietnamese SMEs.

3. DATA AND METHODOLOGY

3.1. Methodology

In this study, we employ panel data analysis to investigate the relationship between the capital structure choice and a certain number of firm-specific and industry-specific factors. In particular, this study investigates a range of firm-specific independent variables including tangibility, non-debt tax shield, liquidity, firm size, taxes paid, profitability, Tobin's Q ratio, and growth assets. The definition and measurement of these variables are shown in *Table 1*. Firms' data are only available during a period of 2–6 years, resulting in an unbalanced dataset. We index all variables with i for individual (i = 1, 2,…, N) and t for the time (t = 1, 2,…, T). According to our model as detailed subsequently, an individual i may be a firm or an industry. The general panel data regression model can be expressed as follows:

$$y_{it} = \beta_0 + x_{it}\beta + \varepsilon_{it} \quad i = 1, 2, \ldots, N \quad \text{and} \quad t = 1, 2, \ldots, T \tag{1}$$

where x_{it} is a K-dimensional vector of explanatory variables, which does not contain an intercept term. The assumption in this model is that the intercept β_0 and the slope coefficients in β are identical for all individuals (i.e., firms or industries) and periods.

In addition to adopting the approach presented by previous studies on capital structure, which also involved using a fixed-effects panel data model (Van der Wijst – Thurik 1993; Mira 2005; Degryse et al. 2012), we assume a fixed-effects

model for unobservable individual effects. According to Degryse et al. (2012), a fixed-effects model includes an individual-specific intercept that can capture any firm-specific or industry-specific factor. A fixed-effects model is statistically preferable because it can address correlations between explanatory variables and individual effects.

3.2. Data

To empirically investigate capital structure behaviour, we collect the necessary data from annual reports of all companies listed on the HOSE and HNX during the period from 2007 to 2013. The annual financial data extracted from each company range from 2 to 7 years. The total observations employed in this study are 2,946 firm-years. The studied companies are classified into nine industries: material, construction and material, goods and industrial services, consumer goods, pharmacy and health, consumer services, public utilities, information technology, and real estate. Firms operating in the finance and banking industry are eliminated from our samples. The petro industry only comprises four firms and hence is also eliminated. Firms that terminated their listing on the stock market during the studied period are also removed. Moreover, six other firms are excluded from our samples because of a computation error.

We employ four measures of leverage. The first proxy is the total debt ratio, which is defined as total debt divided by total assets. The ratio of short-term debt and long-term debt are separately considered as a measure of firm financing choice. To reflect the capital structure change compared with the listed stock market value, a variable called LTATM is used and defined as total long-term debt divided by the sum of total long-term debt and market value.

4. EMPIRICAL RESULTS

4.1. Descriptive statistics

Table 1 shows the definitions and descriptive statistics of all variables. According to *Table 1,* the mean total debt of all sample companies is approximately 51.6%, with the maximum and minimum being 99.69% and 0%, respectively. This implies that Vietnamese firms on average retain a high level of debt at approximately 50% of total capital. The minimum debt ratio employed is 0.3%, whereas the maximum leverage is 155.2%. The results also show a considerable difference between long-term and short-term debt. The long-term and short-term arithmetic

Table 1. Descriptive Statistics

Definition		Mean	Std. Dev.	Min	Max
Dependent variables					
DTAT	Total debt/ Total asset	0.51	0.22	0.00	0.9969
LTAT	Long-term debt/Total assets	0.11	0.15	0.00	0.80
STAT	Short-term debt/Total assets	0.41	0.20	0.00	0.60
LTATM	Long-term debt/(Long-term debt + market value of equity)	0.06	0.10	0.00	0.94
Firm characteristics					
TANGF	Fixed-asset/Total assets	0.28	0.21	0.00	0.98
TANGD	Depreciation expense/Total assets	0.02	0.03	0.00	0.37
LIQ	Cash and cash equivalents/Total assets	0.09	0.11	0.00	0.94
LASSETS	Log(Total assets)	1.43	1.40	–3.83	8.83
LSALES	Log (Net sales)	3.50	1.53	–2.11	6.63
ETAX	Taxes paid/Earning before tax	0.18	1.68	–45.06	34.52
PROFIT	EBITD/Total assets	0.11	0.10	–0.52	0.67
TBINQ	Market value/Total assets	4.34	4.57	0.98	107.41
GROWTH	(Total asset$_t$ - Total asset$_{t-1}$)/Total asset$_{t-1}$	0.16	0.36	–0.72	5.58

Source: authors' calculations.

means are approximately 41% and 11%, respectively. This figure strongly implies that Vietnamese firms prefer using short-term debt over long-term debt. In particular, the maximum level of long-term debt is lower than the maximum level of short-term debt at approximately 80% and 60%, respectively. This maximum debt level is registered by a firm in real estate, an industry that experienced a collapse in Vietnam in 2010, which it has not yet recovered from.

Table 1 also shows descriptive statistics for firm-characteristic variables. First, the average growth rate of an asset is approximately 16%, with a maximum value notably at 558% being registered by the materials industry. This figure is attributable by a robust growth in assets in the industry during 2009 and 2010. The electrical sector (public utilities industry) shows the highest fixed-asset ratio value at 90%. However, this industry has less depreciation expense compared with other industries because of its longer depreciation period.

Table 2 shows the correlation among variables in the regression model. The PROFIT, TBIN'S Q, and LIQ variables have a negative relationship with the proxy variables of capital structure. The TBIN'S Q variable has a particularly strong relationship with capital structure, which is confirmed by a high correlation coefficient with DTAT, LTAT, STAT, and LTATM at –0.438, –0.178, –0.352, and –0.275, respectively.

Table 2. Correlation among Variables in the Regression Model

	DTAT	LTAT	STAT	LTATM	TANGF	TANGD	LIQ	LSALE	LASSET	ETAX	PROFIT	TBINQ
LTAT	0.439	1.000										
STAT	0.767	–0.240	1.000									
LTATM	0.523	0.810	–0.014	1.000								
TANGF	0.000	0.472	–0.337	0.385	1.000							
TANGD	–0.036	0.111	–0.118	0.109	0.354	1.000						
LIQ	–0.331	–0.230	–0.193	–0.254	–0.198	0.016	1.000					
LSALE	0.328	0.134	0.258	0.133	0.023	0.137	0.054	1.000				
LASSET	0.338	0.369	0.101	0.298	0.042	0.001	–0.109	0.771	1.000			
ETAX	–0.016	0.028	–0.038	0.003	0.031	0.002	0.009	0.017	–0.017	1.000		
PROFIT	–0.297	–0.121	–0.235	–0.157	0.097	0.502	0.348	0.211	0.017	0.013	1.000	
TBINQ	–0.438	–0.170	–0.352	–0.275	0.001	0.029	0.254	–0.020	–0.011	0.006	0.312	1.000
GROWTH	0.093	0.071	0.050	0.004	-0.029	-0.059	0.075	0.107	0.140	0.012	0.107	0.187

Source: authors' calculations.

4.2. Panel regression results

Table 3 shows the panel data regression results with total debt, long-term debt, short-term debt, and the long-term debt market as dependent variables. In the four models, most of the firm-specific variable coefficients are statistically significant, implying a relationship between those variables and the firm capital structure. Specifically, empirical results confirm that a firm's profitability negatively affects its financing choice, with the statistically significant coefficient at 1% and 5% levels. This finding, however, is inconsistent with the trade-off theory but consistent with the pecking order theory. The trade-off theory basically proposes that firms with more profit should take on more debt to protect their income from income tax, whereas the pecking order theory suggests that profitable firms tend to maintain less leverage because they can finance by themselves. Hence, our findings support the pecking order theory and are consistent with the findings of previous studies such as Titman and Wessels (1988), Barton et al. (1989), and Mateev et al. (2013).

The results also indicate a statistically positive association between a firm's growth and its choice between debt and equity. The positive relationship is consistent with the pecking order theory and the findings of other studies on capital structure such as Titman and Wessels (1988) and Bradley et al. (1984). The au-

*Table 3.*Panel Regression Results

	DTAT		LTAT		STAT		LTATM	
	Model1		Model2		Model3		Model4	
	Coef.	**t-stat.**	**Coef.**	**t-stat**	**Coef.**	**t-stat.**	**Coef.**	**t-stat.**
TANGF	0.1693*	10.00	0.3297*	33.56	–0.1603*	–10.17	0.1771*	24.74
TANGD	0.4569*	3.61	0.1565**	2.13	0.3004**	2.55	0.1678*	3.14
LIQ	–0.2644*	–7.29	–0.0068	–0.33	–0.2576*	–7.62	–0.0203	–1.32
LASSETS	–0.0521*	–11.70	0.0467*	18.07	–0.0989*	–23.82	0.0213*	11.33
LSALES	0.1273*	37.07	–0.0173*	–8.73	0.1447*	45.24	–0.0034**	–2.36
ETAX	–0.0018	–0.93	0.0023**	1.98	–0.0041**	–2.23	0.0003	0.38
PROFIT	–0.5578*	–12.18	–0.0886*	–3.34	–0.4691*	–11.00	–0.0830*	–4.29
TBINQ	–0.0088*	–11.03	–0.0046*	–9.96	–0.0041*	–5.64	–0.0043*	–12.91
GROWTH	0.1005*	10.30	0.0332*	5.87	0.0672*	7.40	0.0090**	2.18
Industry fixed effects								
Materials	Omitted		Omitted		Omitted		Omitted	
Construction & Materials	0.2938*	32.21	0.0328*	6.22	0.2609*	30.72	0.0333*	8.65
Goods & Industrial Services	0.1562*	14.03	0.0341*	5.29	0.1220*	11.77	0.0126*	2.68
Consumer Goods	0.1006*	8.33	–0.0080	–1.15	0.1086*	9.66	–0.0141*	–2.76
Pharmacy & Heath	0.1190*	5.62	–0.0028	–0.23	0.1219*	6.18	–0.0098	–1.10
Consumer Services	0.1251*	8.24	0.0277*	3.15	0.0973*	6.89	0.0069	1.08
Public Utilities	0.1334*	7.61	0.0589*	5.80	0.0744*	4.56	0.0021	0.29
Information Technology	0.1927*	10.42	0.0112	1.05	0.1815*	10.53	–0.0018	–0.23
Real Estate	0.3197*	24.81	0.1120*	14.99	0.2076*	17.30	0.0389*	7.14
Number of obs.	2,9460		2,946		2,946		2,946	
Adj. R-squared	0.8928		0.6540		0.8596		0.5224	

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

Source: authors' calculations.

thors have argued that firms with more assets tend to acquire more debt by using their assets as collateral in external borrowing.

Most of the listed companies in Vietnam are small firms with low asset turnover ratios. In our sample, more than 50% of the companies have asset turnover ratios less than 1. Hence, to capture the effect of firm size on financing choice, we simultaneously use two proxies of firm assets, namely log (asset) and log (net

sales). The two proxies have opposite signs in the four regression models and the coefficients of both are statistically significant. In models 2 and 4, in which long-term debt is used as the dependent variable, LASSETS is positively correlated with capital structure, which is consistent with both the pecking order and trade-off theory. However, empirical results for models 1 and 3 show conflicting figures. A possible explanation for this contradiction is that Vietnamese companies prefer using short-term debt to long-term debt, which is implied by a significant difference between average long-term and short-term debt. Employing excessive short-term debt is believed to cause an increase in the firm's financial risk, resulting in a weak liquidity. Therefore, the size of assets owned by a firm is negatively correlated with the firm's short-term and long-term capital structure.

The effect of industry on the capital structure of firms is shown in the last part of *Table 3*. All industry dummy variable coefficients are statistically significant, confirming the difference in capital structure among industries. These findings provide evidence that industry fixed effects are significant determinants of leverage. Therefore, firm-specific characteristics cannot fully explain the capital structure behaviour of listed companies. *Table 3* additionally indicates that real estate and material and constructions industries are with strong fixed effects, and the estimated coefficients of these industries are 0.3197 and 0.2938, respectively. These two industries have a considerably higher leverage compared with the material industry. The evidence of the relationship between industry-specific factors and firms' capital structure, however, is different from that observed by Biger et al. (2008). They reported that industry classification has no influence on the capital structure of firms.

To further examine the relationship between industry characteristics and a firm's financing choice, we separately estimate the data for each industry, and the results are shown in *Table 4*. We conduct this estimation by assessing the effect of firms' fixed effects on R^2 (R^2 firm fixed effects versus R^2 pooled) in the regressions for each industry.

Table 4. Regression Results for Each Industry

	DTAT		LTAT		STAT		LTATM	
	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.
Panel A – Materials								
TANGD	0.2346*	5.07	0.2709*	7.77	–0.0363	–0.72	0.1579*	4.69
TANGF	0.2580***	1.73	–0.1145	–1.02	0.3726**	2.31	–0.0822	–0.76
LIQ	–0.1022***	–1.76	–0.0549	–1.26	–0.0473	–0.75	–0.0516	–1.22
LASSETS	0.1453*	7.78	0.0618*	4.39	0.0834*	4.12	0.0364*	2.68
LSALES	0.0081	0.69	–0.0377*	–4.22	0.0458*	3.56	–0.0230*	–2.67

Table 4. continued

	DTAT		LTAT		STAT		LTATM	
	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.
ETAX	–0.0035	–1.30	0.0082*	4.03	–0.0117*	–4.00	0.0044**	2.28
PROFIT	–0.2067*	–2.90	0.0630	1.17	–0.2698*	–3.49	0.0320	0.62
TBINQ	–0.0060*	–5.05	–0.0014	–1.59	–0.0045*	–3.55	–0.0028*	–3.32
GROWTH	0.0510*	5.83	0.0122***	1.85	0.0388*	4.09	0.0138**	2.18
R^2 (firm fixed eff.)	0.9857		0.8967		0.9751		0.8253	
R^2 (pooled)	0.9196		0.6945		0.8907		0.6120	
Panel B – Construction & Materials								
TANGD	0.4144*	3.14	0.0179	0.15	0.3965**	2.49	0.9116*	2.94
TANGF	0.1741*	5.66	0.2994*	11.00	–0.1253*	–3.38	–0.1876*	–5.32
LIQ	0.0043	0.09	0.0317	0.74	–0.0274	–0.47	–0.3419*	–3.52
LASSETS	0.0853*	8.49	0.0756*	8.51	0.0097	0.80	–0.1625*	–16.22
LSALES	–0.0024	–0.38	–0.0286*	–5.12	0.0262*	3.44	0.2387*	32.92
ETAX	–0.0001	–0.17	0.0007	0.73	–0.0009	–0.67	–0.0084*	–2.60
PROFIT	–0.2303*	–4.39	0.0525	1.13	–0.2829*	–4.48	–0.9300*	–8.83
TBINQ	–0.0079*	–5.04	–0.0013	–1.00	–0.0065*	–3.45	0.0064**	2.20
GROWTH	0.0475*	6.27	0.0247*	3.70	0.0227**	2.49	0.0741*	3.58
R2 (firm fixed eff.)	0.9898		0.9005		0.9788		0.8006	
R2 (Pooled)	0.8796		0.7092		0.8535		0.5790	
Panel C – Goods & Industrial Services								
TANGD	0.0395	0.23	–0.1271*	–0.87	0.1666	0.85	–0.2075	–1.54
TANGF	0.1407*	3.25	0.2424*	6.67	–0.1017**	–2.08	0.0892*	2.67
LIQ	–0.2007*	–3.42	–0.0814***	–1.66	–0.119***	–1.80	–0.0257	–0.57
LASSETS	0.0867*	4.84	0.0565*	3.76	0.0301	1.49	0.0378*	2.74
LSALES	0.0241**	2.09	–0.0294*	–3.04	0.0536*	4.12	–0.0124	–1.40
ETAX	–0.008	–0.56	–0.0006	–0.51	–0.0002	–0.12	–0.0034*	–2.85
PROFIT	–0.2615*	–3.20	0.0101	0.15	–0.2716*	–2.95	0.0014	0.02
TBINQ	–0.0099*	–5.14	–0.0030***	–1.88	–0.0068*	–3.16	–0.0091*	–6.16
GROWTH	0.0813*	6.53	0.0195***	1.87	0.0618*	4.40	–0.0117	–1.22
R2 (firm fixed eff.)	0.9862		0.9332		0.9715		0.8490	
R2 (Pooled)	0.8603		0.8124		0.8048		0.6780	
Panel D – Consumer Goods								
TANGD	0.3625	1.37	–0.2836***	–1.69	0.6461**	2.42	0.0228	0.21
TANGF	0.0084	0.16	0.2532*	7.62	–0.2448*	–4.64	0.0457**	2.13
LIQ	–0.0681	–1.25	0.0044	0.13	–0.0725	–1.32	–0.0164	–0.73

Table 4. continued

	DTAT		LTAT		STAT		LTATM	
	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.
LASSETS	0.0718*	4.17	0.0035	0.32	0.0683*	3.93	–0.0082	–1.17
LSALES	0.0336*	3.08	–0.0105	–1.53	0.0441*	4.02	0.0037	0.83
ETAX	0.0025	0.62	0.0030	1.16	–0.0004	–0.12	0.0002	0.15
PROFIT	–0.2630*	–4.19	0.0137	0.35	–0.2768*	–4.37	–0.0283	–1.10
TBINQ	–0.0052*	–3.57	–0.007	–0.82	–0.0044*	–3.03	–0.0016*	–2.73
GROWTH	0.0567*	3.98	0.0232*	2.57	0.0334**	2.33	0.0079	1.36
R2 (firm fixed eff.)	0.9784		0.8129		0.9716		0.6802	
R2 (Pooled)	0.9017		0.5299		0.8819		0.3900	
Panel E – Pharmacy & Heath								
TANGD	0.7812	1.29	0.4123	1.04	0.3689	0.53	0.2790	1.35
TANGF	0.1479	1.43	0.2067*	3.06	–0.0587	–0.49	0.0322	0.91
LIQ	0.0612	0.33	–0.0209	–0.17	0.0821	0.39	–0.0116	–0.19
LASSETS	–0.0725	–1.57	0.0559***	1.85	–0.1284**	–2.41	0.0051	0.33
LSALES	0.2162	3.34	–0.0052	–0.12	0.2214*	2.98	0.0248	1.12
ETAX	–0.0513	–0.84	0.0058	0.15	–0.0572	–0.82	0.0145	0.70
PROFIT	–0.3458	–1.51	–0.1625	–1.08	–0.1833	–0.70	–0.0606	–0.77
TBINQ	0.0028	–1.29	–0.0029**	–2.06	0.0001	0.05	–0.0013***	–1.80
GROWTH	0.0848*	2.69	0.0674*	3.25	0.0177	0.49	0.0246**	2.27
R2 (firm fixed eff.)	0.9885		0.9007		0.9728		0.8360	
R2 (Pooled)	0.9199		0.5977		0.8964		0.4468	
Panel F – Consumer Services								
TANGD	0.2197	0.45	–0.3445***	–1.70	0.5642	1.13	–0.0903	–0.81
TANGF	–0.0863	–1.22	0.0585**	2.00	–0.1448**	–2.01	0.0380**	2.37
LIQ	–0.1045***	–1.79	0.0338	1.40	–0.1383**	–2.32	0.0127	0.96
LASSETS	–0.0680**	–2.59	–0.0067	–0.62	–0.0613**	–2.29	–0.0064	–1.08
LSALES	0.2003*	10.89	–0.0062	–0.82	0.2066*	11.01	–0.0014	–0.36
ETAX	0.0144	1.02	0.0025	0.44	0.0118	0.82	0.0000	0.03
PROFIT	–0.5171*	–3.24	–0.0422	–0.64	–0.4749*	–2.92	–0.0170	–0.47
TBINQ	–0.0026	–1.19	0.0006	0.68	–0.0032	–1.45	–0.0177*	–3.56
GROWTH	0.1654*	6.32	0.0218**	2.01	0.1436*	5.38	0.0015	0.26
R2 (firm fixed eff.)	0.9618		0.9112		0.9458		0.8352	
R2 (Pooled)	0.8410		0.3568		0.8519		0.2898	
Panel G – Public Utilities								
TANGD	0.3630	0.91	0.2904	0.83	0.0726	0.24	0.2131	0.76
TANGF	0.1189	1.03	0.2021**	1.99	–0.0831	–0.93	0.0209	0.26

Table 4. continued

	DTAT		LTAT		STAT		LTATM	
	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.	Coef.	t–stat.
LIQ	0.0370	0.28	–0.0358	–0.31	0.0728	0.72	–0.0385	–0.42
LASSETS	0.0818	1.51	–0.0404	–0.85	0.1223*	2.93	–0.0891**	–2.33
LSALES	0.0917*	3.81	0.0478**	2.26	0.0438**	2.36	0.0611*	3.60
ETAX	0.0036	0.31	0.0010	0.10	–0.0026	0.28	–0.0088	–1.05
PROFIT	–0.3113***	–1.71	–0.0904	–0.57	–0.2208	–1.58	–0.0866	–0.68
TBINQ	–0.0122**	–2.27	–0.0074	–1.56	–0.0048	–1.17	–0.0110**	–2.90
GROWTH	0.1284*	3.21	0.0849**	2.42	0.0435	1.41	0.0578**	2.05
R2 (firm fixed eff.)	0.9744		0.9239		0.9629		0.7556	
R2 (Pooled)	0.8928		0.7405				0.5874	
Panel H – Information Technology								
TANGD	1.2964	1.27	0.0261	0.04	1.2703	1.22	0.1551	0.50
TANGF	0.3456*	3.29	0.0198	0.27	0.3258*	3.03	0.0097	0.31
LIQ	0.4903*	5.62	–0.0203	–0.33	0.5107*	5.71	–0.0194	–0.73
LASSETS	0.2606*	6.27	0.0911*	3.13	0.1694*	3.98	0.0455*	3.58
LSALES	0.0232	1.29	0.0207	–1.65	0.0439**	2.39	–0.0080	–1.47
ETAX	–0.0022	–0.61	–0.0000	–0.01	–0.0021	–0.59	–0.0001	–0.10
PROFIT	0.0555	0.24	0.0501	0.30	0.0054	0.02	0.0201	0.28
TBINQ	–0.0134**	–2.46	–0.0036	–0.95	–0.0098	–1.76	–0.0042**	–2.52
GROWTH	0.0399	0.99	0.0029	0.10	0.0370	0.90	0.0174	–1.41
R2 (firm fixed eff.)	0.9708		0.6771		0.9620		0.6154	
R2 (Pooled)	0.7691		0.3013		0.7794		0.2109	
Panel I – Real Estate								
TANGD	0.5041	1.11	–0.6677	–1.47	1.1719	2.06	–0.0414	–0.16
TANGF	–0.0675	–1.08	0.0106	0.17	–0.0782	–1.00	0.0451	1.26
LIQ	–0.1709	–1.48	0.1043	0.90	–0.2752***	–1.90	–0.0627	–0.95
LASSETS	0.1309*	11.08	0.0871*	7.36	0.0437*	2.96	0.0444*	6.54
LSALES	–0.0023	–0.29	–0.0111	–1.38	0.0088	0.88	–0.0140*	–3.02
ETAX	0.0029	0.40	0.0058	0.79	–0.0028	–0.31	0.0003	0.09
PROFIT	0.0280	0.28	–0.0374	–0.37	0.0655	0.52	0.0493	0.85
TBINQ	–0.0072*	–2.95	0.0024**	–2.20	–0.0018	–0.60	–0.0087*	–6.21
GROWTH	0.0445*	2.97	0.0150	0.62	0.0352***	1.88	–0.0054	–0.64
R2 (firm fixed eff.)	0.9775		0.8982		0.9180		0.8369	
R2 (Pooled)	0.7992		0.5747		0.6923		0.4423	

Note: *, **, *** indicate statistical significance at the 1%, 5%, 10% levels, respectively

Source: authors' calculations.

5. CONCLUSION

This study investigated the effect of firm-characteristics on the capital structure of all listed companies in Vietnam during a period spanning from 2007 to 2013. First, the overall results estimated from the fixed-effects panel data model strongly indicate that Vietnamese firms prefer using short-term debt to long-term debt. Second, firm-characteristics considerably influence firms' financing choice. The relationship is particularly strong in the case of the non-debt tax shield and a firm assets. The coefficients of the two firm size proxies show different effects on the firm capital structure. Specifically, a positive relationship is observed between a firm sales and its leverage, whereas a negative relationship is determined for firm assets. Similar to the firm size, the two proxies of firm assets exhibit an opposite relationship with capital structure. In particular, a firm's growth in the past (GROWTH) is positively related to its capital structure, whereas a firm's current growth (TBIN'Q) is negatively related to its capital structure.

This study further investigates the relationship between industry classification and the capital structure of firms by using industry dummy variables. The results confirm that industry-specific factors also influence the capital structure of firms. Specifically, three industries exhibit significant differences in capital structure, which are construction and materials, goods and industrial services, and real estate industries. This finding supports the previous argument that firm-specific factors alone cannot fully explain financing behaviour, and industry classification plays a crucial role in determining firms' capital structure.

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