Testing the optimal capital structure hypothesis: A case of property firms in Vietnam

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Abstract:

This study examines the relationship between capital structure and firm value to test the optimal capital structure hypothesis. By collecting accounting and market data of Vietnamese property firms listed on the Ho Chi Minh City Stock Exchange for the period from 2017 to 2022, we employ a panel data approach with a total of 306 observations. With data that ensures stationarity, the study utilises the Feasible Generalised Least Squares (FGLS) method to address potential concerns related to heteroskedasticity within the model. The results indicate that the relationship between capital structure in general, capital structure by term, and firm value is quadratic, suggesting the presence of an optimal level of capital structure. Firm value increases with the increase in the debt ratio, and firms can maximise value at the optimal debt threshold. Additionally, the study finds that firm value is influenced by scale and asset structure, both of which have a positive impact on firm value. However, there is no evidence of the impact of sales growth and liquidity on firm value in this analysis.

Keywords: **capital structure, debt ratio, firm value, optimal capital structure**.

Classification numbers: **2.2, 2.3**

1. Introduction

Capital structure is the specific combination of debt and equity utilised by a firm to finance its overall operations and growth. The relationship between firm value and capital structure has been addressed by various theories. According to the perfect financial market hypothesis of F. Modigliani, et al. (1958) [1], in the absence of transaction costs, information costs, and taxes, there will be no distinction between internal and external capital costs. This implies that firms can access unlimited sources of capital, and thus, the capital structure does not affect firm value. However, F. Modigliani and M.H. Miller's own theory in 1963 [2] and subsequent theories have challenged these conclusions. Considering the context of taxes, firm value will increase if they increase debt capital due to benefits from new tax shields [2]. The trade-off theory of S.C. Myers (1977) [3] suggests that by balancing the benefits from tax shields and the costs of financial distress, firms can attain an optimal capital structure that maximises the value of the firm. Additionally, the pecking order theory asserts that firm value will increase but up to a certain limit [4].

Regarding empirical studies, some research indicates that capital structure has a positive effect on firm value, with increased debt leading to higher operating profits [5-9]. In contrast, the research of R. Zeitun, et al. (2014) [9], Z. Ahmad, et al. (2012) [10], and K.O. Asante, et al. (2022) [11] provided empirical evidence of the negative impact of debt on firm value. They showed that utilising loans increased the financial risk of firms due to interest payments and financial distress. On the other hand, some empirical evidence suggested that the effect of capital structure on firm value is non-linear. There is a trade-off between the benefits and costs related to debt capital, implying that firms have limits on the use of debt, suggesting the existence of an optimal capital structure. An optimal capital structure is the best mix of debt and equity financing that maximises a company's market value while minimising its cost of capital [12, 13].

From a financial management perspective, a carefully chosen capital structure not only helps firms take full advantage of the positive effects of financial leverage, such as tax savings or improving the efficiency of

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capital use, but also minimises the possibility of financial distress to achieve the goal of enhancing firm value. As the results of the above empirical studies review, however, the impact of capital structure on firm value yields relatively different results with variations in space and time. Therefore, it is impossible to ascertain whether an optimal capital structure exists for all companies.

The scale of Vietnam's financial market is still small compared to other countries in the region; thus, firms require debt capital to operate and grow, especially small firms. Therefore, capital structure is one of the important factors affecting business performance and firm value. Particularly, from the beginning of 2020 until now, the emergence and strong outbreak of the COVID-19 pandemic have had a substantial negative impact on Vietnamese businesses. In this context, debt-related costs have increased. Therefore, it is necessary for firms to determine an optimal capital structure. In Vietnam, in recent years, there have been many studies interested in the relationship between capital structure and business performance or firm value, but research results remain discrepant. The study of N.V. Chien, et al. (2022) [14] concluded that debt ratio has a positive impact on the performance of the firms listed on the Vietnamese stock market, meanwhile, D.V. Chi, et al. (2013) [15] show a negative effect of debt on the performance of consumer goods firms. Among business sectors in Vietnam, property is one of the critical sectors of the national economy, playing a vital role in attracting resources and creating fixed assets for the economy, promoting the development of other economic sectors as well [16]. Due to the significant capital requirements, property firms often have high debt ratios, accompanied by high financial risks. Therefore, we test the existence of the optimal capital structure hypothesis on property firms by examining the relationship between capital structure and firm value. If the results obtained show that the above relationship is quadratic, our hypothesis is verified.

The remainder of the article is structured as follows: In Section 2, we provide an economic background for our analysis. Section 3 outlines our research design. Section 4 presents our main results and discussion, and Section 5 presents conclusions.

2. Economic background

2.1. Theoretical framework

2.1.1. Modigliani and Miller's Capital Structure Theory

This theory primarily explores the association between firm value and capital costs concerning a firm's utilisation of debt. It was originally posited in 1958 and later in 1963 under two circumstances: (i) in the absence of taxes and (ii) in the presence of taxes.

(i) The firm's value remains constant when the capital structure changes. This implies that the capital structure does not impact firm value; in other words, the firm's value with debt is identical to its value without debt [1].

(ii) The firm's value with debt equals the total firm value without debt plus the present value of the tax shields, signifying that debt augments the firm's value. The relationship between capital structure and firm value is positive [2].

2.1.2. Trade-off theory

Companies strive to determine the target debt ratio that balances benefits and risks to maximise firm value. In essence, an optimal blend of debt and equity exists at which, for each additional increment in debt, the present value of the tax-shield benefits equals the present value of the cost of financial distress [17]. In greater detail, the use of debt elevates the weighted average cost of capital (WACC). The benefits accrued from tax shields may be offset by the amplified present value of bankruptcy costs. Initially, firms gain benefits from tax shields, as they pay less tax by increasing their debt. Nevertheless, excessive debt exposes firms to payment risks, potentially leading to bankruptcy. Consequently, firms might face insolvency if they become unable to meet their financial obligations.

2.1.3. Pecking order theory

Low-cost funding sources receive precedence. According to S. Myers, et al. (1984) [18], financial costs rise with asymmetrical information. Therefore, the pecking order theory classifies funding sources in the following sequence: internal capital from retained profits is utilised first, followed by debt capital with lower costs, and finally, equity (issuing shares). This implies that a firm's ability to augment debt capital is restricted because increasing debt escalates its cost of capital.

2.2. Empirical evidence

The impact of capital structure on firm value has been a subject of extensive debate, encompassing theoretical and empirical realms. These debates focus on whether an optimal capital structure exists or whether a company's debt ratio is linked to its value. When referring to a firm's capital structure, we are considering the amalgamation of debt and equity. S.C. Myers (2003) [19] argues that the selection of a capital structure essentially represents a business strategy employed by firms. The ultimate objective of firms is to identify a blend of capital sources that maximises the market value of the firm. According to J.F. Weston, et al. (1981) [20], the optimal capital structure is the structure that maximises the market value of the firm's outstanding shares.

Numerous studies have assessed the influence of capital structure on business performance and firm value, yielding divergent results. Some studies support F. Modigliani, et al. (1963) [2], indicating that financial leverage exerts a positive impact on business performance and firm value. For instance, research conducted by S. Fosu (2013) [6] and M.C. Mukumbi, et al. (2020) [7] demonstrates that utilising debt yields benefits from tax shields, resulting in reduced tax costs and enhanced profits. Consequently, increasing the debt ratio within the capital structure augments firm value.

However, the majority of empirical studies have shown that debt has an adverse impact on financial performance and firm value. For instance, the research of R. Zeitun, et al. (2014) [9], Z. Ahmad, et al. (2012) [10], K.O. Asante, et al. (2022) [11] indicates that high financial leverage generates conflicts of interest between shareholders and bondholders, leading to increased agency costs. This, in turn, elevates capital costs and bankruptcy risks, thereby heightening financial risks for firms. Firms may find themselves in a precarious situation where they struggle to manage these risks and costs, potentially leading to insolvency. According to a study conducted by D.A. Surjandari, et al. (2019) [21], capital structure adversely affects the performance of property firms in Indonesia. The findings reveal a negative correlation between the debt ratio and business profitability, signifying that increased debt levels result in decreased overall profitability.

Furthermore, certain studies suggest that the relationship between capital structure and firm value is contingent upon the extent of agency issues within companies [22, 23]. Specifically, F. Schoubben, et al. (2006) [23] argue that capital structure positively influences firm value when the firm's debt ratio remains below a certain threshold. Conversely, if the debt ratio surpasses this threshold, it negatively impacts firm value. Similarly, W. Ruland, et al. (2005) [22] contend that financial leverage enhances the performance of firms involved in diversification, particularly small firms linked to higher agency costs.

Regarding empirical research on Vietnamese firms, D.N. Phuc (2014) [24] concluded that short-term debt and total debt adversely affect the performance of equitised firms, whereas long-term debt exerts a positive influence on profits. Additionally, N.T. Duc (2020) [25] investigated 31 firms in the oil and gas industry, revealing that total debt ratio and short-term debt ratio have a negative impact on business performance, while the long-term debt ratio exhibits a positive relationship. Notably, V.M. Long (2018) [26] suggests the existence of a capital structure threshold to maximise firm value for firms listed on the Ho Chi Minh City Stock Exchange. Besides, both short-term and long-term debt positively impact firm value, but firms can only increase their debt ratio to a certain threshold, beyond which firm value begins to decline. A recent study by N.M. Ngoc, et al. (2021) [27] indicates that capital structure negatively affects business performance, prompting property firms to carefully consider leveraging. When employing leverage, businesses confront financial exhaustion costs along with tax shield benefits from interest. Consequently, companies must strategically use financial leverage while determining an optimal debt threshold to capitalise on these benefits.

In sum, the relationship between capital structure and firm value is a longstanding issue in both theoretical and empirical domains. F. Modigliani, et al. (1963) [2] capital structure theory suggests that the more debt a firm utilises, the greater its benefits. Conversely, the trade-off theory and pecking order theory posit that if a firm increases its debt ratio to the point where the cost of financial distress exceeds the benefits from tax shields, firm value will decline. Empirically, disparities

emerge in research findings, influenced by factors such as (i) variations in research environments, including diverse business sectors and countries; (ii) temporal disparities; and (iii) differing methodologies employed to gauge capital structure and firm value. In the case of Vietnamese property firms, which face substantial capital requirements, empirical studies corroborate the necessity of ascertaining an optimal capital structure to enhance firm value while mitigating risks.

Thus, we hypothesise that whenever there is an increase in the debt ratio or a decrease in the debt ratio, the firm's value will be impacted. Consequently, it is worth postulating that the relationship between capital structure and firm value is not linear but instead follows an ascending trajectory up to a specific optimal level, after which it declines. In this context, levels below the optimum suggest a positive impact of the debt ratio on firm value, while levels exceeding the optimum indicate a decline in firm value. Therefore, the principal hypothesis to be examined in this article is that the relationship between capital structure and firm value is quadratic, implying the presence of an optimal level of capital structure.

3. Research design

3.1. Models and variables

In this analysis, we have formulated a model following the approaches of M.A. Farooq, et al. (2016) [28] and V.M. Long (2018) [26] to test the hypothesis outlined in the previous section:

$$FV_{i,t} = \beta_0 + \beta_1 CS_{i,t} + \beta_2 CS_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 SALE_{i,t} + \beta_5 AS_{i,t} + \beta_6 CR_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $FV_{i,t}$ is the value of firm i in period t; $CS_{i,t}$ is capital structure of firm i in period t, $SIZE_{i,t}$ is scale of firm i in period t, $SALE_{i,t}$ is sale growth of firm i in period t, $AS_{i,t}$ is asset structure of firm i in period t, $CR_{i,t}$ is liquidity of firm i in period t, β is the estimated coefficient corresponding to the variables, and $\varepsilon_{i,t}$ is the error term.

Given that capital structure is fundamentally the combination of debt and equity, we gauge capital structure through the debt ratio, encompassing total debt ratio (DA), short-term debt ratio (SDA), and long-term debt ratio (LDA). Further details regarding the measurement of variables are presented in Table 1.

To mitigate multicollinearity which is likely arising from the high correlation between the total debt ratio variable and the short-term and long-term debt ratios, we split model (1) into two distinct models. The final specifications of the models to be estimated are as follows:

$$FV_{i,t} = \beta_0 + \beta_1 DA_{i,t} + \beta_2 DA_{i,t}^2 + \beta_3 SIZE_{i,t} + \beta_4 SALE_{i,t} + \beta_5 AS_{i,t} + \beta_6 CR_{i,t} + \varepsilon_{i,t} \quad (1.1)$$

$$FV_{i,t} = \beta_0 + \beta_1 SDA_{i,t} + \beta_2 SDA_{i,t}^2 + \beta_3 LDA_{i,t} + \beta_4 LDA_{i,t}^2 + \beta_5 SIZE_{i,t} + \beta_6 SALE_{i,t} + \quad (1.2)$$

As discussed in the previous section, the relationship between capital structure and firm value is not linear but exhibits an ascending trajectory up to a specific optimal level, beyond which it declines. This optimal level is reflected in Models (1.1) and (1.2) through the inclusion of the capital structure variable and its square term.

Consequently, upon estimating the models, if we differentiate the firm value variable with respect to the capital structure variable, we obtain the following:

From Model (1.1): $\frac{\partial FV_{i,t}}{\partial DA_{i,t}} = \beta_1 + 2\beta_2 DA_{i,t}$

From Model (1.2): $\frac{\partial FV_{i,t}}{\partial SDA_{i,t}} = \beta_1 + 2\beta_2 SDA_{i,t}$; $\frac{\partial FV_{i,t}}{\partial LDA_{i,t}} = \beta_3 + 2\beta_4 LDA_{i,t}$

Subsequently, by equating the first derivative to zero and solving for the capital structure variables, we obtain the following:

From Model (1.1): $DA_{i,t} = -\frac{\beta_1}{2\beta_2}$

From Model (1.2): $SDA_{i,t} = -\frac{\beta_1}{2\beta_2}$; $LDA_{i,t} = -\frac{\beta_3}{2\beta_4}$

To achieve a maximum in the above equation, it is imperative that β_2 and β_4 possess negative signs. Additionally, since the optimal capital structure level derived from the equation must be positive, β_1 and β_3 should be positive. Consequently, our main hypothesis will be substantiated if these coefficients exhibit the expected signs when estimating Eqs. (1.1) and (1.2).

Control variables *SIZE*, *SALE*, *AS*, and *CR* were included in Models (1.1) and (1.2). J. Obradovich, et al. (2013) [8] demonstrated a positive relationship between firm scale and firm value. Larger firms tend to enjoy a competitive edge in the market owing to their substantial capital, ample human and material resources

for expanding their operational network, diversifying their consumer markets, and reaching various customer segments. Hence, we anticipate a positive association between scale and firm value. According to R. Zeitun, et al. (2014) [9], firms with high sales growth rates often achieve better business performance and secure stronger market positions. Increased revenue serves as the driving force behind profit escalation. Consequently, we expect a positive relationship between sales growth and firm value. Asset structure is contingent on business characteristics. As posited by R. Zeitun, et al. (2014) [9], asset structure significantly impacts business performance. A high asset structure ratio indicates a firm's abundant collateral assets, thereby enhancing its borrowing capacity. Hence, we anticipate a positive relationship between asset structure and firm value. Managers generally believe that firms perform well when their current ratio is high. However, excessively high current ratios may signify that a company holds an excessive quantity of short-term assets, potentially implying ineffective utilisation of these assets and indirectly causing a decline in business performance. Thus, we predict a negative relationship between liquidity and firm value. The method to measure the variables is presented in Table 1.

Table 1. Measurement variables.

Variables	Measurement	References
FV	Tobin's Q = (Equity market value/Equity book value)	M.A. Farooq, et al. (2016) [28], D. Ater (2017) [29]
DA	Total debt/Total assets	S. Fosu (2013) [6], F.A. Duais (2016) [5], K.O. Asante, et al. (2022) [11]
SDA	Short-term debt/ Total assets	R. Zeitun, et al. (2014) [9], F.A. Duais (2016) [5], K.O. Asante, et al. (2022) [11]
LDA	Long-term debt/ Total assets	R. Zeitun, et al. (2014) [9], F.A. Duais (2016) [5], K.O. Asante, et al. (2022) [11]
SIZE	Logarithm(Total assets)	J. Obradovich, et al. (2013) [8], S. Fosu (2013) [6], V.M. Long (2018) [26]
SALE	(Current period sales/ Prior period sales) - 1	V.M. Long (2018) [26], R. Zeitun, et al. (2014) [9]
AS	Fixed assets/ Total assets	V.M. Long (2018) [26], R. Zeitun, et al. (2014) [9]
CR	Current assets/Current liabilities	M.A. Farooq, et al. (2016) [28], V.M. Long (2018) [26]

3.2. Data and method

For the empirical analysis, the author has collected data from the Fiinpro system of FiinGroup Company and constructed a balanced panel dataset of 51 property firms listed on the Ho Chi Minh City Stock Exchange during the period from 2017 to 2022, resulting in a total of 306 firm-year observations (51x6). The dataset encompasses financial statements and the market value of the company's shares.

To commence, we assess the stationarity of the panel data series. If the data exhibit stationarity at the original level, we proceed to consider suitable estimation methods for panel data. Three estimation procedures are applicable for panel data analysis: pooled Ordinary Least Squares (pooled OLS) estimation, random effect (RE) estimation, or fixed effect (FE) estimation. Nonetheless, the use of OLS models can yield biased and inconsistent results in the presence of unobserved heterogeneity (unobserved individual-specific effects among firms). To mitigate this bias, FE or RE estimators are commonly employed [30, 31]. Subsequently, we employ the Hausman test to select the appropriate method. We also examine multicollinearity through the Variance Inflation Factor (VIF) test and conduct additional tests related to the reliability of the regression model. If the model demonstrates heteroskedasticity, we finalise the regression results using the Generalised Least Squares (GLS) estimation.

4. Results and discussion

4.1. Descriptive statistics of variables

Table 2 presents the descriptive statistics of the variables utilised in this section. It is evident that most of the variables exhibit significant variation across firms, as indicated by their relatively large standard deviations compared to their means. The measurement of firm value, denoted by Tobin's Q coefficient, has an average value of 1.3741. However, some firms have Q coefficients less than 1. Property firms predominantly favour short-term debt over long-term debt in their capital structure, with some firms abstaining from the use of long-term debt.

Table 2. Descriptive statistics.

Variables	Mean	Std.	Min	Max	Obs.
FV	1.3741	1.1175	0.0444	7.4132	306
DA	0.5293	0.1883	0.0244	0.923	306
SDA	0.3642	0.1749	0.0091	0.861	306
LDA	0.1651	0.1462	0.0000	0.6116	306
SIZE	29.1016	1.5223	25.7873	33.9896	306
SALE	0.2775	2.2880	-24.1617	24.6755	306
AS	0.0553	0.0939	0.0001	0.6286	306
CR	2.3984	2.2517	0.2268	20.5502	306

Source: Analysis results from STATA.

4.2. Testing stationarity of data series

The test results in Table 3 indicate that all data series for each variable are stationary and statistically significant.

Table 3. Results of testing the stationarity of variables at I(0).

Variables	LLC (Levin - Lin - Chu, 2002)		Results
	t-statistic	*p_value*	
FV	-5.9013	0.0000	Stationary
DA	-9.5631	0.0000	Stationary
SDA	-11.4249	0.0000	Stationary
LDA	-1.3e+02	0.0000	Stationary
SIZE	-12.9675	0.0000	Stationary
SALE	-30.9864	0.0000	Stationary
AS	-1.2e+04	0.0000	Stationary
CR	-43.1567	0.0000	Stationary

Source: Analysis results from STATA.

4.3. Testing correlation coefficients

Table 4 reveals that the correlation coefficient between pairs of independent variables is less than 0.8, indicating limited potential for multicollinearity in the model [32].

Table 4. Correlation coefficient matrix between used variables.

	DA	SDA	LDA	SIZE	SALE	AS
DA	1.0000					
SDA	0.6691***	1.0000				
LDA	0.4838***	-0.3267***	1.0000			
SIZE	0.2520***	0.0426	0.2703***	1.0000		
SALE	0.0457	0.0445	0.0058	-0.0206	1.0000	
AS	-0.0621	-01246**	0.0679	-0.0409	-0.0062	1.0000
CR	-0.4385***	-0.5654***	0.1082*	-0.1247**	-0.0168	-0.0638

The notations ***, **, * denote the significance levels of 1%, 5%, and 10%. Source: Analysis results from STATA.

4.4. Research findings

The estimation results of Models (1.1) and (1.2) are presented in Table 6. Before discussing the results, it is important to highlight some key points.

While correlation coefficients provide initial insights and signs of potential multicollinearity, they are insufficient evidence to conclusively determine the presence of multicollinearity in the model. To ensure that multicollinearity is not severe, we proceed to check the Variance Inflation Factor (VIF) values. As shown in Table 5, all variables have VIF values less than 10, indicating no evidence of serious multicollinearity in the research model [29]. Additionally, the Hausman test in Table 6 demonstrates that fixed effect (FE) estimation is more suitable for both Models (1.1) and (1.2). Furthermore, the Wald statistics in Table 7 for heteroskedasticity diagnostic tests are highly statistically significant at the one percent level, indicating significant heteroskedasticity across firms. However, the Wooldridge test suggests that the model is not affected by serial correlation. Consequently, we address heteroskedasticity through GLS regression and base our final results on this estimation method.

Table 5. VIF factors.

Variables	Model (1.1) VIF	Variables	Model (1.2) VIF
DA	1.32	SDA	1.71
CR	1.25	CR	1.54
SIZE	1.07	LDA	1.24
AS	1.02	SIZE	1.12
SALE	1.00	AS	1.05
		SALE	1.00

Source: Analysis results from STATA.

Table 6. Regression results with the GLS method for Models (1.1). and (1.2).

Variables	Regression coefficient	
	(I) Model (1.1)	*(II) Model (1.2)*
DA	4.0401*** (0.7644)	
DA^2	-3.7544*** (0.7517)	
SDA		0.8464*** (0.8477)
SDA^2		-1.2913*** (0.9624)
LDA		2.1358*** (0.7395)
LDA^2		-1.4445*** (1.3522)
SIZE	0.2008*** (0.0304)	0.1637*** (0.0335)
SALE	0.0047 (0.0203)	0.0015 (0.0211)
AS	0.7129* (0.4188)	0.3036* (0.4435)
CR	0.0154 (0.0127)	-0.0184 (0.0165)
Cons	-5.6316*** (0.8329)	-3.8745*** (0.9165)
Wald chi2	107.38***	100.92***
Obs	306	306

The notations ***, * denote the significance levels of 1% and 10%. Source: Analysis results from STATA.

Table 7. Hausman test and Wald test.

Hausman test	Chi2	Prob>chi2	Results
Model (1.1)	35.34	0.000	FEM
Model (1.2)	19.58	0.012	FEM
Wald Test	Chi2	Prob>chi2	Results
Model (1.1)	1.2e+05	0.000	Heteroskedasticity
Model (1.2)	76382.81	0.000	Heteroskedasticity

Source: Analysis results from STATA.

The obtained results confirm our main hypothesis. As shown in column I of Table 7, β_1 is positive, and β_2 is negative, with both coefficients being statistically significant. In column II of Table 7, β_1 and β_3 are positive, while β_2 and β_4 are negative, and again, all coefficients are statistically significant. These findings suggest that the relationship between capital structure and firm value is quadratic rather than linear. In other words, a marginal increase in total debt, short-term debt, and long-term debt has a positive impact on shareholder wealth as long as the optimal debt level has not been surpassed. This threshold marks the beginning of a decline in firm value. Table 8 presents the optimal threshold of debt of firms in this study.

Table 8. The impact of capital structure on firm value.

Variables	The optimal level (Threshold value)	
	Model (1.1)	***Model (1.2)***
DA	53.8049%	
SDA		32.7732%
LDA		73.9287%

4.5. Discussion

4.5.1. Debt ratio

The research results in Model (1.1) reveal that when a firm increases its debt ratio, its value will rise. However, DA only increases up to 53.8049%, beyond which the firm's value begins to decline. This suggests that when a firm's debt ratio exceeds 53.8049%, property firms may become overly passive in their capital utilisation. They face an increased risk of being unable to meet their debt obligations and may encounter limitations in securing additional financing through debt. Consequently, firms must accept a higher cost of capital, among other factors. In such a scenario, the benefits from tax shields become lower than the cost of financial distress, implying that the effectiveness of using debt is inferior to using equity. This, in turn, leads to a reduction in business performance and firm value. Our findings support the research of D. Ater (2017) [29] and V.M. Long (2018) [26].

4.5.2. Short-term debt ratio

The research results in Model (1.2) indicate that when a firm increases its short-term debt ratio, its value will increase, but SDA only increases to 32.7732%, beyond which the firm's value starts to decrease. This suggests that firms that rely too heavily on short-term debt and exceed the 32.7732% threshold face a higher risk of being unable to repay their debt. In such cases, firms must divert their attention towards debt repayment, possibly by issuing more shares or selling assets, and they may neglect their production activities. This inefficiency in production indirectly diminishes firm value.

4.5.3. Long-term debt ratio

The research results in Model (1.2) demonstrate that when a firm increases its long-term debt ratio, its value will increase, but LDA only increases to 73.9287%, beyond which the firm's value declines. Notably, the long-term debt threshold is higher than the short-term debt threshold. This discrepancy can be explained by the fact that property firms still maintain a relatively low long-term debt ratio, indicating an underutilisation of this stable funding source. Moreover, long-term debt is often employed to finance long-term assets such as the acquisition of fixed assets and investments in property projects. Therefore, an excessively low long-term debt ratio fails to support the modernisation of machinery and equipment or the execution of substantial projects required to enhance competitiveness in the market. However, it's crucial to bear in mind that long-term debt entails higher costs compared to short-term debt, and it also carries higher risks. Therefore, if the long-term debt ratio surpasses 73.9287%, firm value will decrease.

Consistent with our expectations, the SALE and AS variables have a positive influence on firm value at the one and ten percent statistical significance levels. This can be attributed to the fact that larger firms often enjoy strong brand recognition and reputations in the market, which leads to lower agency costs. Additionally, their market competitiveness is high, making it easier for them to secure capital or sell products. These factors contribute to improved business performance and overall firm value. Furthermore, increasing the proportion of fixed assets also enhances firm value. According to the authors, this provides firms with the opportunity to modernise machinery and equipment, ultimately increasing labour

productivity and competitiveness in the market. These research findings underscore the importance of financial managers selecting the appropriate type of fixed assets for investment to enhance firm competitiveness and long-term value.

5. Conclusions

This article has tested the main hypothesis that the relationship between capital structure and firm value is quadratic, implying the existence of an optimal capital structure. Levels below this optimum align with Modigliani & Miller's theory (1963), while higher levels support the trade-off theory and pecking order theory.

The results confirm the quadratic relationship between capital structure and firm value. For property companies, a general optimal capital structure exists, as well as specific optimal structures concerning different terms of debt. Specifically: (1) Firm value increases as debt ratio rises, but this increase only extends to 53.8049% and (2) Firm value increases with higher short-term and long-term debt ratios, but these ratios reach their respective optimal levels at 32.7732% and 73.9287%. Beyond these thresholds, firm value begins to decline.

These results highlight a preference among property firms for relying on short-term debt rather than long-term debt to finance their operations. Consequently, firms have various avenues to access short-term debt, including interest-paying finance through credit institutions and non-interest-paying finance via deferred payment purchase policies or deposits from customers. However, it is also advisable for firms to consider utilising long-term debt more extensively. Statistical findings indicate that the long-term debt ratio remains relatively low. This type of capital source typically features an extended repayment term, making it well-suited for investments in fixed assets that align with higher operational standards, meeting the escalating demands of customers and enhancing the competitive positioning of firms in the market. Furthermore, such investments can lead to shortened production cycles, cost savings, and ultimately contribute to improved business performance and firm value.

COMPETING INTERESTS

The author declares that there is no conflict of interest regarding the publication of this article.

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