THE IMPACT OF CAPITAL STRUCTURE ON THE ENTERPRISE VALUE: APPROACHING BY THRESHOLD REGRESSION

Dau Hoang Hung *, Hung Ngoc Dang **, Van Vu Thi Thuy ***

* Hanoi University of Industry, Hanoi, Vietnam
** *Corresponding author*, Hanoi University of Industry, Hanoi, Vietnam
Contact details: Hanoi University of Industry, No. 298, Cau Dien Street, Bac Tu Liem District, Hanoi, Vietnam
*** National Economics University, Hanoi, Vietnam

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Abstract

The paper examined the impact of capital structure (CP) on the firm value in Vietnam. The study applies the threshold regression model of Hansen (1999, 2000). We considered if there existed a threshold of CP and how CP affected the firm value at each threshold. Research data included 440 listed enterprises on the Vietnam stock market from 2011 to 2020. The findings have found that CP was inversely related to the firm value, which was determined at three different thresholds. In addition, the size of the business had a positive relationship with firm value and the growth rate of revenue had a reverse relationship at a low level to firm value. However, when testing with short-term liabilities and debt ratios, there is no threshold. This study comprehensively examined CP's impact on the value of non-financial enterprises and for each particular industry. This study was conducted in listed companies on the Vietnam stock market — an emerging economy that demonstrated the reverse impact of CP on firm value.

Keywords: Capital Structure, Firm Value, Threshold Regression

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1. INTRODUCTION

How can a business optimize its capital structure (CP)? The fundamental goal of CP optimization is to decide on the proportion of capital components, including debt and equity to maximize the firm value while minimizing the cost of using capital. In the past time, the relationship between CP and firm value has been an important and controversial issue in the financial sector. One theory gave out a positive relationship between CP and firm value while another mentioned the opposite, even one asserted that the above two variables were not statistically related (Modigliani & Miller, 1959; Modigliani & Miller, 1963; Jensen & Meckling, 1976; Myers, 1977; Myers & Majluf, 1984). This might stem from two issues: firstly, the selection of the estimation model, and secondly, the specific characteristics of each model. Based on the theories and empirical studies with inconsistent results above, we have chosen the panel threshold regression model (PTRM) by Hansen (1999, 2000) to test whether there exists an optimal debt threshold rate that businesses can maximize their firm value and determine the maximum debt ratio that businesses can be funded.

Prasad, Green, and Murinde (2001) researched CP of enterprises and concluded that most of the empirical research on CP was related to large industrial countries, but there were very few

projects implemented in developing and emerging markets. Therefore, it is necessary to conduct a recent research applying panel data techniques and using a large sample of 440 listed enterprises on the Vietnam stock market in the period 2011–2020 as an example of emerging economies in order to fill the gap and contribute to literature through a better understanding of how CP influences the enterprise value. The data research in Vietnam will be of great significance for the following reasons: 1) Vietnam is at the innovation stage from a concentrated economy to the market-oriented one; 2) The research will explore the correlation between CP and the values of listed companies on the Vietnam stock market with 10-year data.

Therefore, the research aim will be fulfilled by answering the main research questions:

RQ1: Does the CP threshold exist?

RQ2: How does CP affect firm value at each threshold?

We have discovered that when considering the overall sample, there existed a double threshold of CP influencing firm value, and the findings showed that as the ratio of total liabilities and total assets increased, the impacts on firm value were reversed. However, considering the specific characteristics of the industry, it is shown that although only five of the nine sectors existed the CP thresholds, in all cases, CP had reverse impacts on firm value.

The remainder of this paper is structured as follows. Section 2 is devoted to the literature review, Section 3 to the research methodology, Section 4 to results and discussions, and Section 5 to a conclusion.

2. LITERATURE REVIEW

The findings of CP theories have formed different perspectives on the relationship between CP and firm value.

Those representatives who supported this view, such as Modigliani and Miller (1959), Phillips and Sipahioglu (2004), studied the relationship between CP and the financial performance of hotel businesses in the UK. With the OLS approach, the empirical results showed that the relationship between CP and ROE of enterprises didn't exist. Similar to the findings of the study by ElKelish and Marshall (2007) on the CP and firm value of food enterprises in Saudi Arabia during the period of 1996–2000, Jiraporn and Liu (2008) studied the relationship between CP and firm value of listed companies on the stock market, i.e., NYSE, AMEX, and NASDAQ in the period of 1990–2004. In addition, El-Sayed Ebaid (2009), investigating the impact of CP on the performance of sixty-four Egyptian companies in the period 1997–2005, also indicated that CP did not affect the firm value.

Some studies supported the view of CP having a positive impact on the enterprise value. This view was proved in the following study by Modigliani and Miller (1963) and has also been verified via studies conducted by Abor (2005) studying the impact of CP on the profitability of twenty-two listed enterprises on the Ghana stock market in the period of 1998–2002. The findings showed a positive relationship between the debt ratio and ROE. Margaritis and Psillaki (2007) used a sample of 12,240 companies in New Zealand. The study's findings found that the increase in debt led to an improvement in business performance, which showed a positive relationship between CP and business performance. Mitani (2014) compiled data from 799 manufacturing companies listed on the Tokyo Stock Exchange (TSE) for research. And the findings indicated that CP had a positive relationship with the company's performance. Suyono, Yarram, and Riswan (2017) used 157 Indonesian non-financial listed firms for the 2010-2015 period and provide important implications for corporations and business practitioners with regard to the best choice in the composition of CP able to improve company performance. Aboud and Diab (2018) find that firms listed in the ESG index have higher firm values and that there is a positive association between firms' higher rankings in the index and firm value, as measured by Tobin's Q.

The view of CP having negative impacts on the enterprise value is grounded on the classification order theory of Myers and Majluf (1984). According to the classification order theory, businesses will prioritize the use of internal capital first and only issue debts when capital demand exceeds the capacity to finance with internal sources. Therefore, high-yield enterprises often use debt at a low level. The classification order theory was also accepted in studies by Booth, Aivazian, Demirguc-Kunt, and Maksimovic (2001). Talberg, Winge, Frydenberg, and Westgaard (2008) examined CP in different industries for companies listed on the New York Stock Exchange. The findings of this study discovered a negative relationship between CP and the company's performance. Khan (2012), studying 36 listed enterprises on the Pakistani stock market from 2003 to 2009, showed that CP had a negative impact on ROA and Tobin's Q. Tongkong (2012) by analyzing 39 real estate companies listed on the Stock Exchange of Thailand (SET) from 2002 to 2009, the findings showed that the relationship between CP and the business performance of the company was negative.

Besides, Hussein (2020) uses a sample of 168 Egyptian companies during 2012–2016 and applies panel data techniques. Eight hypotheses are proposed to test the influence of both the short-term debt and the long-term debt (as proxies of CP) on four performance measures (ROA, ROE, EPS, and Tobin's Q). The research results indicate that short-term debt to assets significantly negatively affects all performance measures except for Tobin's Q.

The perspective of optimal CP was demonstrated through trade-off theory or optimal CP theory (Myers, 1977). According to Myers (1977), when enterprises used debt to a certain level (threshold), the benefits of tax shields from loans would be offset with bankruptcy costs; therefore there existed the optimal CP that might maximize firm value or business performance. The empirical findings of Lin (2010) analyzed the impact of CP on the firm value of 272 listed companies in the Taiwan stock market from 1997 to 2005. Tobin's Q index being used as a representative variable for the firm value, the findings of this study showed that there were two thresholds between debt ratio and firm value of 48.92% and 49.55%. In order to ensure and enhance the firm value, the optimal range of debt ratios should be in the span of 48.92% and 49.55%. Nieh, Yau, and Liu (2008) applied the threshold regression

model to study the target CP for 143 listed electronic companies on the Taiwan stock market from 1999 to 2004. The findings indicated that there was a single threshold effect of debt ratio on firm value when the return on equity (ROE) was adopted to represent the firm value. Moreover, based on the combined results of ROE and earnings per share (EPS), the study revealed that the debt ratio appropriate for electronic companies listed on the Taiwan stock market should not be greater than 51.57% nor lower than 12.37%. To ensure and enhance the firm value, the optimal range of debt ratios should be in the span of 12.37% and 28.70%. Cheng, Liu, and Chien (2010) applied the threshold regression model to study the impact of CP on the firm value of 650 listed companies on the China stock market in the period 2001–2006. In this study, ROE was adopted to represent firm value; debt ratio was measured by the rate of total liabilities and total assets representing the company's CP. Findings discovered that the three-threshold effect existed between the debt ratio and firm value. Accordingly, the coefficient was positive when the debt ratio was lower than 53.97%, which meant that in this range, loans could make a contribution to the improvement of the firm value. The coefficient was still positive but started to decrease when the debt ratio was in the range of 53.97 and 70.48%. The coefficient would be negative and tended to decrease when the debt ratio was in the range of 70.48 and 75.26% or greater than 75.26%, which implied that within this range, a further increase in loans would reduce the firm value. The research showed that to ensure and enhance the value of the company, the optimal range of debt ratios of listed companies on the China stock market should be lower than 70.48%. Halim and Abdullah (2013) applied the threshold regression model to study the impact of CP on firm values of 467 listed companies on the Malaysian stock market in the period 2005–2009. The study also adopted ROE to represent firm value, debt ratio measured by the rate of total liabilities, and total assets representing the CP of the company. Findings discovered that a single threshold effect existed between the debt ratio and firm value. Accordingly, to ensure and enhance the value of the company, the optimal range of debt ratio of listed companies on the Malaysian stock market should be lower than 64.33%.

In Vietnam, during the past few years, a number of authors have conducted the issue of studying the relationship between CP and firm value. For example, Cuong (2014) developed and tested the regression model of the CP impact on the value of seafood processing enterprises in South Central in the period 2005–2011. Findings revealed that the optimal threshold was 57.39%. Đức and Luân (2014) studied the optimal debt limit of 191 listed companies on the Vietnam stock market from 2005 to 2012. With the threshold regression method, the results of empirical research showed that the two-threshold effect of debt level had an impact on the profitability of the enterprise. Accordingly, the coefficient was positive when the debt ratio was lower than 56.67%. The coefficient was negative and tended to decrease when the debt ratio was in the range of 56.67% and 69.72% or greater than 69.72%, which implied that within this range, a further increase in loans would decrease the profitability of the company.

3. METHODOLOGY

Applying the threshold regression model of Hansen (1999, 2000) and referring to previous studies by Nieh et al. (2008), Cheng et al. (2010), and Lin (2010) together assuming that the debt ratio thresholds did not change over time, this study proposed a single threshold regression model to study the impact of debt structure on firm value with the following shortened form:

Model 1

$$EV_{it} = \mu_i + \theta h_{it} + \beta_1 d_{it} I(d_{it} \le \gamma) + \beta_2 d_{it} I(d_{it} > \gamma) + \varepsilon_{it} \quad (1)$$

where,
$\theta = (\theta_1, \theta_2)_t$ and $h_{it} = (SIZE_{it}, GROWT_{it})_t$;
EV_{it}: representing the firm value;
d_{it}: debt ratio, acting as a threshold variable;
h_{it}: control variable;
γ: typical estimated threshold value;
β_1: estimated coefficient of d_{it} in case of threshold variable smaller than or equal to the threshold value;
β_2: estimated coefficient of d_{it} in case of threshold variable greater than a threshold value;
μ_i: fixed impacts, representing the heterogeneity of enterprises under different operating conditions;
ε_{it}: error, this study assumed that the error ε_{it} is independent and uniformly distributed with the mean of 0 and the finite variance of σ^2;
i: order index of companies in the sample;
t: time index.

According to Hansen (1999), if a two-threshold effect existed, the regression model would be defined in a shortened form as follows, assuming $\gamma_1 < \gamma_2$.

Model 2

$$EV_{it} = \mu_i + \theta h_{it} + \beta_1 d_{it} I(d_{it} \le \gamma_1) + \beta_2 d_{it} I(\gamma_1 < d_{it} \le \gamma_2) + \beta_3 d_{it} I(d_{it} > \gamma_2) + \varepsilon_{it} \quad (2)$$

From this model, the research method could be easily expanded for higher threshold models. To test whether the threshold value is of statistical significance, according to equation (1), the following hypothesis should be verified:

$$H_0: \beta_1 = \beta_2 \quad (3)$$

$$H_1: \beta_1 \neq \beta_2 \quad (4)$$

If the null hypothesis (H_0) is not rejected, it can be concluded that the threshold effect between d_{it} and EV_{it} of equation (1) does not exist.

To test the existence of the threshold effect, Hansen (1999) applied the bootstrap method of the likelihood ratio. The bootstrap method estimated the model of (and calculation of the bootstrap value) the likelihood ratio statistics. This process is repeated a sufficient number of times (the study was conducted 300 times) to estimate the p-value for F1 under the H_0. The H_0 is rejected if the p-value is smaller than the critical value.

According to Model 2, there might not exist a single or two thresholds. In a single threshold

regression model, F1 statistics were used to check if a threshold effect didn't exist or whether there was a single threshold effect. The bootstrap method was applied to estimate the p-value for F1. Based on the statistical value F1, if we reject the non-threshold hypothesis, we carry on checking whether there exist a single or two thresholds. This can be determined in the second estimation period based on the least-squares error and estimated variance. If the statistical value F2 is large, it is assumed that the threshold doesn't exist or a single threshold is rejected, which means that a double threshold will exist.

Based on the research overview, we measured the variables in the model and the research hypothesis is presented in Table 1 below.

Table 1. Summary of measuring variables and hypotheses in the research model

Variable	*Type of variable*	*Variable code*	*Method of measurement*	*Effect direction*	*Author*
Enterprise value	Dependent	*EV, TobinQ*	*EV = Log(Market capitalization value + Long-term debt subject to interest rate)*		Modigliani and Johnson (1980), Ogbulu and Emeni (2012), Dang, Vu, Ngo, and Hoang (2019)
Capital structure	Independent	*LV*	*Liability / Assets*	Thresholds exited	Abor (2005), Dwilaksono (2010), Nieh et al. (2008), Cheng et al. (2010)
		SDEPT	*Current liability / Assets*	Thresholds exited	
		DEPT	*Liability / Equity*	Thresholds exited	
Enterprise size	Control	*SIZE*	*Log(Total assets)*	+	Cheng et al. (2010), Lin (2010), Abor (2005)
Growth	Control	*GROWT*	*(Revenue of period$_t$ – Revenue of period$_{t-1}$) / Revenue of period$_t$*	–	Abor (2005), Nieh et al. (2008), Cheng et al. (2010)

Source: Constructed by the authors.

Research data were collected from audited financial statements of listed companies on the Vietnam stock market. Selected businesses were enterprises with complete research data from 2011 to 2020 (except for banks, securities, and insurance companies). This study used a data set of 444 enterprises, forming balanced panel data with 4440 observations (Table 2).

Table 2. Survey data

Industry	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*Total*
Real estate and construction	171	171	171	171	171	171	171	171	171	171	**1,710**
Technology	12	12	12	12	12	12	12	12	12	12	**120**
Industry	50	50	50	50	50	50	50	50	50	50	**500**
Service	53	53	53	53	53	53	53	53	53	53	**530**
Consumer goods	34	34	34	34	34	34	34	34	34	34	**340**
Energy	39	39	39	39	39	39	39	39	39	39	**390**
Agriculture	33	33	33	33	33	33	33	33	33	33	**330**
Materials	38	38	38	38	38	38	38	38	38	38	**380**
Medica	14	14	14	14	14	14	14	14	14	14	**140**
Total	**444**	**444**	**444**	**444**	**444**	**444**	**444**	**444**	**444**	**444**	**4,440**

4. RESULTS

Statistical data (Table 3) shows that the firm value has an average logarithm of 26,021, in which the lowest is 21,03, the highest is 33,549 and the standard deviation is 1,657. At the surveyed enterprises, their financial structures (total liabilities on total assets — *LV*) of enterprises, on average, are 50.8%, of which the lowest is 5.7% and the highest is 90.4%. The short-term debt ratio (*SDEBT*) accounts for 40.83%, and the debt structure (*DEPT*) has an average index of 1.746. The size of the business is measured in logarithms of the average total assets of 27,042 and the revenue growth rate is 17.7%.

Table 3. Descriptive statistics

Variable	*Observation*	*Mean*	*Standard deviation*	*Min*	*Max*
EV	4,440	26.021	1.657	21.031	33.549
LV	4,440	0.508	0.215	0.057	0.904
SDEBT	4,440	0.408	0.209	0.003	0.963
DEBT	4,440	1.746	3.015	0.006	1.400
SIZE	4,440	27.042	1.467	21.370	33.294
GROWT	4,440	0.177	0.557	-0.730	3.670

Source: Calculated by the author from Stata 14.0.

Indeed, the threshold regression model by Hansen (1999) is an extension of the OLS estimation method. The model required that all variables considered in the model had to be stationary to avoid spurious regression. In this study, in order to have accurate conclusions, we applied two criteria by Levin, Lin, and Chu (2002) and Hadri (2000) to test the stationarity of variables in the model regarding panel data. The results of the stationary test of variables used in the model are presented in Table 4.

Table 4. The unit root test result of the variable data table

Variable	Levin-Lin-Chu (2002)		Hadri (2000)	
	t-statistic	p-value	z-statistic	p-value
EV	-3.70E + 02	0.0000***	81.0079	0.0000***
LV	-26.5741	0.0000***	-9.0724	0.0000***
SDEBT	-25.5340	0.0000***	-14.9492	0.0000***
DEBT	-33.1006	0.0000***	-31.2313	0.0000***
SIZE	-17.5773	0.0000***	79.0196	0.0000***
GROWT	-6.20E + 02	0.0000***	5.7631	0.0000***

Source: Calculated by the authors from Stata 14.0.

Three tests were conducted on the data set corresponding to three cases: 1) One threshold impact exists (F1); 2) Two-threshold impact exists (F2), and 3) Three-threshold impact exists (F3). Each test is performed by the "bootstrap" method 300 times with a reliability of 95. The F-statistic values and p-values of the tests are calculated in Table 5 below.

Table 5. The test result of threshold existence (with the independent variable *LV*)

Hypothesis	Threshold	RSS	MSE	F-statistic	Prob.	Crit10	Crit5	Crit1
F1	Single	195.0648	0.044	135.530	0.000	18.769	22.692	33.946
F2	Double	191.8443	0.043	74.370	0.000	16.833	20.361	25.891
F3	Triple	190.9782	0.043	20.090	0.580	37.649	42.048	48.066

Source: Calculated by the author from Stata 14.0.

The F1 value is 135,530 and the p-value is 0.000, indicating that the hypothesis of the existence of a single threshold impact is acceptable at the significant level of 1%. The F2 value of 74.370 and p-value of 0.000 indicate that the hypothesis of the existence of a two-threshold impact is acceptable at the significance level of 1%. The value of F3 is 20,090 and the p-value is 0.580. This test is not of statistical significance. Therefore, it is impossible to reject the null hypothesis.

Table 6. Ratio determination of each CP threshold

Model	Threshold	Lower	Upper
Th-1	0.759	0.755	0.761
Th-21	0.759	0.755	0.762
Th-22	0.632	0.627	0.633

Source: Calculated by the authors from Stata 14.0.

The above analysis results indicated that there exists a two-threshold effect. The estimated value for the two thresholds is shown in Table 4, $\gamma_1 = 0.632$ and $\gamma_2 = 0.759$, respectively. Therefore, sample data can be divided into three groups with debt ratios in the range of [0; 63.2%], [63.2%; 75.9%], and greater than 75.9%.

Table 7. Coefficients in a threshold regression model

Variable	Coef.	Std. Err.	t	P > t	[95% Conf.	interval]
SIZE	0.8998917	0.0084912	105.98	0.000	0.8832442	0.9165392
GROWT	-0.0403303	0.0063788	-6.32	0.000	-0.0528363	-0.0278244
_cat#c.*LV*						
0	-1.476645	0.0456178	-32.37	0.000	-1.566082	-1.387209
1	-1.642321	0.0394874	-41.59	0.000	-1.719738	-1.564903
2	-1.854544	0.0389093	-47.66	0.000	-1.930828	-1.77826
_cons	2.506141	0.2254763	11.11	0.000	2.064081	2.9482
N	4400					
R-squared	0.7339					

Source: Calculated by the authors from Stata 14.0.

From Table 6 and Table 7, the threshold regression model reveals the relationship between CP (*LV*) and firm value can be presented as follows in equation (3):

$$EV_{it} = \begin{cases} 2.5 + 0.899SIZE_{it} - 0.0403GROWT_{it} - 1.476LV_{it} & LV_{it} \le 0.632 \\ 2.5 + 0.899SIZE_{it} - 0.0403GROWT_{it} - 1.642LV_{it} & 0.632 > LV_{it} \le 0.759 \\ 2.5 + 0.899SIZE_{it} - 0.0403GROWT_{it} - 1.854LV_{it} & LV_{it} > 0.759 \end{cases} \quad (5)$$

Looking into the above two models, both models could give the same result which is that the relationship between CP and firm value is nonlinear. This result showed that for enterprises, the higher the ratio of liabilities to total assets is, the lower the coefficient of firm value estimation will be.

We consider the independent variables as *SDEBT* and *DEPT*, to see if there exists a threshold or not. At a single threshold, the p-value test results presented in Table 8 and Table 9 show that all p-values are greater than 0.05, so there is no threshold, so we do not perform threshold regressions.

Table 8. The test result of threshold existence (with the independent variable *SDEBT*)

Threshold	*RSS*	*MSE*	*F-statistic*	*Prob.*	*Crit10*	*Crit5*	*Crit1*
Single	2,613,602	0.059	15.18	0.1567	170,487	196,554	262,670
Double	2,609,414	0.0589	7.11	0.5933	162,333	185,782	230,444
Triple	2,606,771	0.0588	4.49	0.8067	117,926	144,746	175,683

Table 9. The test result of threshold existence (with the independent variable *DEBT*)

Threshold	*RSS*	*MSE*	*F-statistic*	*Prob.*	*Crit10*	*Crit5*	*Crit1*
Single	2,940,342	0.0664	196.85	0.1245	271,113	35.1194	47.7113
Double	2,811,422	0.0635	203.14	0.4567	233,648	27.8675	34.8417
Triple	2,721,360	0.0614	146.61	0.8433	2,374,881	252.1727	274.85

We carried on studying the impact of CP on the firm value. According to the classification of the level 1 industry code, there were nine sectors (not including finance). Testing methods and the method of "bootstrap" were conducted 300 times with a reliability of 95. F-statistic values and p-value of the tests were calculated in Table 10 showing that there were five out of nine industries with the existence of a CP threshold, including real estate and construction (double threshold), and four industries with single thresholds which were technology, industry, energy, and agriculture. According to test results, there were four industries that did not exist within the threshold, including service, consumer goods, materials, and health care.

In summary, by examining the threshold impact of CP on firm value in the Vietnam stock market, the relationship between CP and the firm value is nonlinear. This result is consistent with CP trade-off theory (Myers, 1977) but incompatible with the empirical results of Nieh et al. (2008) and Cheng et al. (2010). On the other hand, the research showed that CP is various in businesses in different industries. For control variables, firm size is positively related to firm value, which is consistent with the findings of Cuong (2014), Dang, Pham, and Vu (2018), Ha, Dang, Tran, Van Vu, and Trung (2019).

The estimated coefficient of firm growth had a value of –0.0403 and is statistically significant at the significance level of 1%. Thus, the business growth rate had an inverse relationship with the firm value. This conclusion is incompatible with the findings of the studies by Abor (2005), Nieh et al. (2008), and Cheng et al. (2010).

Table 10. The test result of threshold existence by industry

Industry	*Threshod*	*RSS*	*MSE*	*F-stat.*	*Prob.*	*Crit10*	*Crit5*	*Crit1*	*Conclusion*	*Threshold value*
Real estate and construction	Single	81.75	0.0481	86.18	0.000	17.50	20.31	27.32	**Positive**	**0.763**
	Double	80.53	0.0474	25.82	0.0133	16.87	20.03	28.66	**Positive**	**0.818**
	Triple	79.30	0.0466	26.28	0.3567	42.21	50.12	59.56	Negative	
Technology	Single	4.33	0.0394	21.18	0.0233	15.06	18.83	23.79	**Positive**	**0.244**
	Double	3.95	0.0359	10.67	0.26	15.87	19.84	25.83	Negative	
Industry	Single	18.57	0.0379	31.25	0.0067	17.35	20.97	29.58	**Positive**	**0.699**
	Double	18.43	0.0376	3.9	0.9067	14.93	17.47	19.93	Negative	
Service	Single	12.06	0.0232	18.57	0.1033	18.58	22.20	33.14	Negative	
Consumer goods	Single	16.05	0.0486	9.86	0.4	16.36	19.64	23.08	Negative	
	Double	15.41	0.0467	13.73	0.0933	13.55	15.56	18.56	Negative	
Energy	Single	14.31	0.0377	27.95	0.0167	17.69	19.94	33.98	**Positive**	**0.741**
	Double	13.85	0.0364	12.71	0.23	17.15	20.49	29.78	Negative	
Agriculture	Single	20.83	0.0651	37.38	0.0033	19.85	23.15	32.07	**Positive**	**0.671**
	Double	20.22	0.0632	9.71	0.3833	17.55	20.50	30.14	Negative	
Materials	Single	9.70	0.0262	12.03	0.2567	17.00	20.29	26.63	Negative	
Medical	Single	6.62	0.0509	8.83	0.2933	14.34	17.69	23.82	Negative	

Source: Calculated by the author from Stata 14.0.

To check the robustness of the research model, we consider the industry variable and the time variable. With the robust test, the results show that short-term liabilities and short-term liabilities have a negative effect on the enterprise value. Meanwhile, the debt ratio (*DEBT*) has no effect on the firm value.

Table 11. Robust regression results, adding control variables for industry and year

Variable	*Coef.*		
LV	-1.682***		
SDEBT		-1.152***	
DEBT			-0.0166
SIZE	0.814***	0.683***	0.658***
GROWT	-0.0300***	-0.0315***	-0.0443***
Industry	0.0721***	0.0876***	0.0997***
Year	0.0212***	0.0354***	0.0375***
_cons	-58.79***	-84.29***	-88.35***
N	4440	4440	4440
R-squared	0.737	0.6996	0.6433

5. CONCLUSION

This paper explored the relationship between CP and the firm value of 440 listed enterprises on the Vietnam stock market from 2011 to 2020. The results found that CP has a negative relationship with firm value, which is determined at three different thresholds. When enterprises use debt at less than 63.2%, from 63.2%–75.9% and more than 75.9%, the estimated coefficients are -1,476, -1,642, -1,854, respectively, with a statistical significance of 1%. However, only 5 out of 9 industries have a CP threshold. In addition, enterprise size has a positive relationship with enterprise value and the revenue growth rate has a low negative relationship with enterprise value. This conclusion once again confirmed the modern CP Modigliani–Miller theorem in the case of taxation when it was assumed that CP had an impact on firm value and that no CP was considered to be completely optimal for businesses in Vietnam.

The findings demonstrated that CP had a great influence on the value of listed companies. Therefore, corporate governors are required to pay much attention to proper debt management. The findings also indicated that there was no optimal CP that can be applied to all companies, depending on the characteristics of the business, the particularity of each company that the finance director can offer the CP that maximizes the firm value of his own company. However, it is also necessary to consider the burden of interests, risks of interest rate, and liquidity to limit the cost of financial exhaustion that may arise when using too much debt ratio.

The study mainly uses micro factors in the model without mentioning macro factors and investor behavior. Besides, this study has not examined the effect of CP on business performance. In the future, we will continue to study the effect of CP on business performance, and consider whether there exists an optimal CP threshold in enterprises in Vietnam. Furthermore, we will further clarify the CP decision in the practice of corporate managers through in-depth interviews or surveys by questionnaire, from which we can add some variables related to business behavior. Besides, the author will add macro factors to the model for testing.

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