

Capital structure and stock prices: Evidence from listed joint-stock companies in Vietnam Stock Exchange

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Abstract--- *This paper applied the generalized least square (GLS) method to examine the relationship between capital structure and stock price of 554 non-financial joint-stock firms listed in Vietnam Stock Exchange for the period 2013-2019. The empirical results show that capital structure negatively significant impacts on stock price. In turn, the stock price affects positively and significantly capital structure. This evidence indicates that the market timing, the signaling and the pecking order theories are suitable to explain the relationship between capital structure and stock price of listed joint-stock companies in Vietnam.*

Keywords--- *capital structure, joint-stock listed company, stock price, Vietnam.*

I. INTRODUCTION

The capital structure is a combination of debt and equity. The deciding on capital structure plays an important role in a company's financial decisions, influencing the existence and development of companies. The choice of capital structure is based on the tradeoff between risk and return. As the company increases its debt use (financial leverage), the risk of bankruptcy increases, whereas the return on equity value also increases. A number of empirical studies demonstrated the effect of capital structure on share prices and vice versa (Yang et al., 2010; Ahmad et al., 2013; Purnamawati, 2016; Subramaniam and Anandasayanan, 2018). However, the results of these studies are inconsistent. Some studies prove the opposite effect of capital structure on stock prices, others show the same direction while some indicate that capital structure has no effect on share price. In Vietnam, there are many studies on capital structure and focus mainly on the influence of factors on capital structure or the impact of capital structure on firm performance (Biger et al., 2007; Hieu and Anh, 2020). However, there are very few studies examining the two-way relationship between capital structure and stock price in the Vietnam Stock Exchange. Therefore, this paper focuses on examining the effect of capital structure on share prices and vice versa of non-financial joint stock companies listed in Vietnam Stock Exchange.

The relationship between stock prices and capital structure in both theory and reality is still inconsistent. There are studies supporting the MM theory that capital structure does not affect stock prices and vice versa. Other studies point out the effect of capital structure on stock prices according to the signaling, market timing, pecking order or trade-off theories. Therefore, a pair of research hypotheses have been formulated by the author in this paper are:

H₁: Capital structure influences stock prices

H₂: Stock prices affect capital structure

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To this end, the paper is structured as follows. Section 2 presents theoretical framework and literature reviews about capital structure and stock prices relationships. Section 3 shows data source, variables, model and the methodology. The empirical results will be analyzed in Section 4. And the Section 5 makes conclusion.

II. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Theoretical framework

Modigliani and Miller (1958) were the first to propose MM theory of capital structure. These authors say that (a) when there are no taxes, (i) a company's value is not affected by its capital structure and (ii) its cost of equity increases linearly as a function of its debt to equity ratio but when (b) there are taxes, (i) the value of a levered company is always higher than an unlevered company and (ii) cost of equity increases as a function of debt to equity ratio and tax rate.

The trade-off theory holds that capital structure reflects the trade-off between tax benefits and the expected costs of bankruptcy (Kraus and Litzenberger, 1973). This means that the optimal capital structure is established in which the profits from an additional debt are offset by the additional costs incurred. The value of the company includes the sum of all required parties: creditors and capital owners. Capital owners are all investors holding shares in a company. According to the trade-off theory, there are a number of key factors affecting the determination of a company's capital structure, including tangible assets, taxes, financial pressures, and profitability.

The pecking order theory was popularized by Myers and Majluf (1984) based on asymmetric information between companies and investors. Accordingly, managers would prefer to use internal capital to finance rather than use debt and equity. Therefore, when managers need to fund production and business activities, they will use an ordered list of priorities. The issuance of additional equity led to a decline in stock prices in the future. This theory suggests that companies should only seek outside financing when there is not enough internal financing (Graham and Harvey, 2001). In addition, when the company seeks outside funding, it will prioritize debt mobilization rather than issuing new equity.

The concept of signaling was first studied in the context of the job market and developed by Spence (1973) into the signaling theory. The content indicates that a company of good financial quality can distinguish from a company of poor financial quality by sending a reliable and quality signal to the capital market. Effective signals are those a company of poor quality cannot send similar signals to dominate investors. This is because the cost of the signal that poor quality companies pay is higher than the gain, so these companies will not give the same signal as good quality companies.

The market timing theory was first introduced by Baker and Wurgler (2002). Accordingly, the company will issue more shares when stock prices are high and repurchase stocks when its prices are low. The study examines the impact of market timing in both the short and long term. For short-term effects, the study demonstrated the effects of variables such as the tangibility of assets, profitability, firm size and market/book price ratio of the previous year to the ratio of debt on total assets. Market timing theory is a part of behavioral finance theory. This theory assumes that there is a mispricing in the market and on that basis, explains the actions of the company. However, this theory still does not explain why there are debt issuers meanwhile other companies issue new shares.

Literature review

The firm's capital structure is the manager's choice to raise debt or equity to finance the asset. The capital structure of a company is influenced by many factors. The main factors affecting the capital structure of companies include asset structure, profitability, product uniqueness, industry characteristics and profitability of firms' stock. Asset structure is measured by the ratio of fixed assets to total assets. Asset structure helps the company managers determine the need to mobilize the appropriate debt value to finance the assets. Additionally, the increase in profits will help the company to increase funding from retained earnings and reduce dependence on debt financing. Moreover, the uniqueness of the product will help the

company to sell quickly, thereby creating faster cash flow and reducing dependence on debt. On the other hand, product uniqueness is related to research costs, sales costs, etc. Therefore, it has an important influence in determining capital structure. Besides, the unique characteristics of the industry also strongly influence the capital structure in companies. Finally, the factor that has an important influence on the capital structure of companies is evidenced by many empirical studies which is stock prices. According to Bhandari (1988), share prices of firms are positively related to capital structure, while Hovakimian et al. (2004) show that capital structure changes over time as stock prices and stock returns vary. Baker and Wurgler (2002) and Welch (2004) argued that the capital structure of firms is influenced by the market value of firms. These studies have proven that companies issuing additional shares are often based on market timing (vibrant or gloomy). Welch (2004) found that the debt ratio in a company is low at times when the company's stock price is high. The reason is that the higher the stock return, the more equity and thus reduce the ratio of financing by debt capital in the company. However, these studies do not indicate the opposite effect of capital structure on firm's business performance and stock return. According to Rouwenhost (1999), firms with lower debt ratios had higher stock returns. However, Harris & Raviv (1991) pointed out that investors' positive reaction to increasing debt ratio in companies. The main reason is the investors think that companies have the potential to positively grow in the future, while if companies declare issuing common stocks to raise capital (reducing debt ratio, increasing equity), the trend of stock returns decreased. Mayer and Sussman (2004) found that the effects of equity or debt financing on stock prices are primarily due to the effect of information rather than changes in the capital structure of firms. The main reason is due to the information asymmetry of specific investors. When the company issues new shares to raise capital, investors believe that the financial managers in the company are not able to mobilize debt due to uncertainty about future earning flows. As a result, stock prices tend to fall regardless of the capital structure (Wald, 1999).

Subsequently, the paper reviews some newest or/and latest empirical studies on capital structure and stock prices in Asia. Biger et al. (2007) used data from Vietnamese enterprises census 2002-2003 to examine financing decisions by Vietnamese firms and compare with others. They found that financial leverage of Vietnamese firms increases with firm size and managerial ownership and decreases with profitability, and with non-debt tax shield. Financial leverage was negatively correlated with fixed assets and positively associated with growth opportunities, in contrary to the findings in other countries. Chakraborty (2010) applied fully modified ordinary least squares (FMOLS) and generalized method of moments (GMM) to analyse the determinants of the capital structure of 1,169 non-financial firms in India for the period 1995-2008. The author found that the pecking order and the static trade-off theories both seem to explain Indian firms' decisions. However, there is little evidence to support the agency cost theory. Ahmad et al. (2013) applied the GMM to analyze the co-determinants of capital structure and stock returns for 100 non-financial firms over the period 2006-2010 in Pakistan. The empirical results indicated that profitability negatively affects leverage and positively affects stock returns. Growth has a positive effect, while liquidity has a negative effect on leverage and stock returns. Firm size does not have any significant effect on either capital structure or stock returns.

Tahmoorespour et al. (2015) examined the relationship between capital structure ratios and returns of firms in the following countries and territories in the Asia Pacific region including Australia, China, Hong Kong, Japan, Korea, Malaysia, Singapore, and Taiwan from 1990 to 2012. The empirical evidence showed that the effect of capital structure depends on the nature of industry as well as market. In Australia, China, and Korea, return of companies had negative relationship with debt to common equity. Long term debt to common equity positively affected the return of firms in Australia and Korea. Huyn et al. (2015) used dynamic partial adjustment model to investigate the relationship between the capital structure and the economic conditions of non-financial firms listed in the Korean Stock Exchange. They supported the arguments that

firms tend to adjust faster their leverage toward target level in economic expansion. Thus, their findings support to the pecking order and market timing theories.

Purnamawati (2016) investigated the manufacturing sector company listed in Indonesia Stock Exchange for the period 2010-2013. The author used path analysis to measure the direct and indirect influence of independent variables on the dependent variable. The empirical results indicated that the capital structure and profitability affect the share price; the capital structure had positive influence on the share price; the profitability positively affected the share price; and the capital structure positively effected on the profitability.

Subramaniam and Anandasayanan (2018) analyzes the relationship between share price and capital structure by employing panel least square method approach in Sri Lanka. They found that there is a positive relationship between debt to equity and share prices, being statistically significant at 1%. The results indicate adding debt to overall capital positively effects on the share prices.

Dang et al. (2019) examined the effect of stock liquidity on corporate capital structure decision and whether this effect varies according to country level institutional environments. The authors used a comprehensive international dataset of 19,939 firms across 41 countries in the period 2000-2010 and found two new points: first, firms with higher stock market liquidity tend to have lower leverage; second, countries with strong institutional environments are more likely to have a weaker relationship between stock market liquidity and leverage.

Kayode and Adewoye (2020) used random effects (RE) model to analyze the data of 15 financial institutions and 15 manufacturing firms quoted on the Nigerian Stock Exchange from 2008 to 2017. The authors found that there exists a uni-directional causality from stock price to earnings per share and a bi-directional causality between stock price and dividend per share. The paper recommends that firm managers pay particular attention to equity in the capital structure which shows negative effect on stock price, earnings and dividend per share which have some causal relationships with stock prices.

Hieu and Anh (2020) applied the generalized least square (GLS) method to explore the impact of capital structure on firm performance of 488 non-financial listed companies on the Vietnam stock market from 2013 to 2018. The empirical results showed that capital structure has a statistically significant negative effect on the firm performance. The result also indicated that this effect is stronger in state-owned enterprises than non-state enterprises in Vietnam.

III. METHODOLOGY

Data

The dataset is 554 joint stock companies listed in Vietnam Stock Exchange from 2013 to 2019. Financial data (debt ratio, company size, profitability ratio on equity, profitability ratio on total assets) was collected by the author from audited financial statements of listed companies. The stock price data is the closing price for the sessions of the day and collected on 2 websites of Hochiminh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX). Some differential, incomplete or non-representative observations were excluded in the sample.

Variables and model

According to Bhalla (1997), capital structure is a combination of debt and equity to achieve the goal of maximizing company value or capital structure is a combination of debt and equity to minimize capitalization of the entire company. Therefore, some authors use debt ratio (LEV) to measure the capital structure of the company (Fama and French, 2002; Frank and Goyal, 2003; Lemmon and Zender, 2010). Stock prices are collected at two specific times. To consider the effect of capital structure on share prices, the paper uses the average price of 5 days after the date of financial statements of listed companies (P_A). In addition, to demonstrate the impact of the stock price on the listed company's capital structure, the stock price is calculated as the annual average value (P_B). Besides, the empirical models include some other factors that may affect

capital structure and stock price are firm size (SIZE) and profitability (ROA), previous year's capital structure (Haugen and Baker, 1996; Bevan and Danbolt, 2002; Gallizo and Salvador, 2006).

Model 1: Impact of capital structure on stock prices after 5-day publication of annual financial statements

$$P_{A,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 ROE_{i,t} + \varepsilon_{i,t} \quad (1)$$

Model 2: Impact of the annual average stock price on capital structure

$$LEV_{i,t} = \beta_0 + \beta_1 P_{B,t} + \beta_2 SIZE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 ROE_{i,t} + \beta_5 LEV_{i,t-1} + \varepsilon_{i,t} \quad (2)$$

Table 1: Variables description

Variables	Signed	Formulation
Stock price (5-day average after publication of annual financial statements)	P_A	$(P_1 + P_2 + P_3 + P_4 + P_5) / 5$
Stock price (annual average)	P_B	$(P_1 + P_2 + \dots + P_{12}) / 12$
Leverage	LEV	Total debt at year t / Total assets at year t
Size of company	SIZE	Total assets at year t
Return on asset	ROA	Earnings at year t / Total assets at year t
Return on equity	ROE	Earnings at year t / Equity at year t

Source: Author's compilation

Methodology

The generalized least squares (GLS) estimator of the coefficients of a linear regression is a generalization of the ordinary least squares (OLS) estimator. It is used to deal with situations in which the OLS estimator is not BLUE (best linear unbiased estimator) because one of the main assumptions of the Gauss-Markov theorem, namely that of homoscedasticity and absence of serial correlation, is violated. In such situations, provided that the other assumptions of the Gauss-Markov theorem are satisfied, the GLS estimator is BLUE.

IV. EMPIRICAL RESULTS

Table 2: Statistics description

Variables	Observations	Mean	Std.Deviation	Min	Max
LEV	3,780	0.498	0.235	0.000	0.990
SIZE	3,780	13.520	1.659	9.510	20.880
ROA	3,780	0.053	0.086	-1.799	0.784
ROE	3,780	0.074	0.920	-45.363	0.982
P_A	3,780	20.633	23.283	0.500	246.800
P_B	3,780	20.636	22.282	0.797	208.633

Source: Author's estimation

As shown in Table 2, the average debt ratio of joint stock companies listed on Vietnam's stock market is 49.8%. The average stock price 5 days after the announcement of the annual financial statements of 3,780 observations averaged 20,633 Vietnamdong (VND) per share and the average value of stocks in the year of the companies was 20,636 VND per share. The average return on asset (ROA) and return on capital (ROE) of 3,780 observations were 5.3% and 7.4%, respectively.

Table 3: Test of multicollinearity

Variables	Dependent variable: LEV		Dependent variable: P _A	
	VIF	Tolerance	VIF	Tolerance
LEV			1.13	0.7835
SIZE	1.03	0.9390	1.08	0.8629
ROA	1.18	0.7202	1.09	0.8426
ROE	1.04	0.9293	1.04	0.9306
P _B	1.16	0.7370		

Source: Author's estimation

The paper conducted the fitness tests of the model. The results are performed in Table 3 and Table 4. Table 3 indicates that the variance inflation factor (VIF) of the variables in both models is less than 2 and the Tolerance factor is greater than 0.1, so there is no multicollinearity phenomena in the model. The four-phase Durbin-Wu-Hausman test results in Table 4 show that both models with LEV and P_A dependent variables have no endogenous phenomena in the model because of a Sig coefficient greater than 5%. Table 4 also indicates both models with LEV and P_A variables are autocorrelation and endogeneity. Therefore, the paper uses GLS linear estimation method and the empirical results are presented in Table 5.

Table 4: The tests of fitness model

Tests	Dependent variable: LEV	Dependent variable: P _A
Hausman	Prob>chi2=0.0000	Prob>chi2=0.0000
	Used Fixed Effect Estimation (FE)	
Autocorrelation	Prob>F=0.0000	Prob>F=0.0000
	Autocorrelation phenomena exists	
Heteroscedasticity	Prob>chi2=0.0000	Prob>chi2=0.0000
	Heteroscedasticity phenomena exists	
Durbin-Wu-Hausman	Durbin (score) chi2(1) = 0.041651 (p= 0.8383)	Durbin (score) chi2(1) = 2.60497 (p= 0.1065)
	Wu-Hausman F(1,3781) = 0.041574 (p = 0.8384)	Wu-Hausman F(1,3782) = 2.60361 (p = 0.1067)
	No endogeneity	

Source: Author's estimation

Table 5 below show that share prices are affected by capital structure at the statistical significance level of 5%. The effect of the capital structure (LEV) on the stock price is in the opposite direction or when the debt ratio increases by 1 unit (times), then the stock price decreases by 5.49792 units (VND 1,000). This result is appropriate in both theoretical and empirical. First, when companies increase the debt ratio, it means signaling the increased financial risks that the company faces. This information negatively impacts on the psychology of investors on the company's stocks and leads to the downward trend of stock prices. Second, companies tend to issue more shares when stock prices are high and repurchase when stock prices are low, which increases or decreases the debt ratio in companies. The additional issuance or redemption of company stocks affecting the stock supply in the market, thereby reducing or increasing the company's stock price.

Finally, according to the trade-off theory, the use of debt is a trade-off between benefits and expected bankruptcy costs. When companies tend to increase debt usage, financial pressures and bankruptcy costs are expected to increase. As a result, stock prices have a downward trend.

Table 5: The regression results

Independent variables	Dependent variable: LEV	Dependent variable: P _A
LEV _{t-1}	0.90077*** (0.0089041)	
SIZE	0.007063*** (0.00125)	3.03210*** (0.2528761)
ROA	-0.24074*** (0.025121)	124.21700*** (4.938527)
ROE	-0.00284 (0.0019291)	0.74249* (0.4389141)
P _B	0.00020** (0.0000943)	
LEV		-5.49792** (1.876029)
Constant	-0.03933* (0.0157879)	-24.10005*** (3.228431)
Wald chi2(5)	13,554.27	905.65
Prob > chi2	0.0000	0.0000
Observations	3,780	3,780
A number of companies	554	554

Note: The asterisks *, ** and *** denote the statistical significance at 10, 5 and 1 percent, respectively. Parentheses () are standard error.

Source: Author's estimation

The study shows that the capital structure is affected by the share price at the 5% significance level and the impact of the stock price on capital structure is a positive effect with a regression coefficient of 0.0002. According to signaling theory, due to the information asymmetry between managers and investors, the signal of high debt ratio will show an optimistic future. Therefore, companies with high average stock prices during the year tend to use more debt in capital structure. Besides, according to the pecking order theory, companies will prefer to use debt instead of issuing additional equity. The issuance of additional equity will lead to a decline in stock prices in the future, so companies with high average stock prices during the year often prefer to use debt instead of issuing new equity.

Table 5 shows that both H₁ and H₂ hypotheses are accepted at the 5% significance level. The capital structure has a significant impact on the stock price and in contrast the stock price influences on deciding the capital structure of joint stock companies listed in Vietnam Stock Exchange. On the other hand, the stock price and capital structure of the company are also affected by other factors as firm size, profitability ratio, capital structure of the previous year.

V. CONCLUSION

Based on a sample of 554 non-financial listed joint-stock companies with 3,780 observations, the study demonstrated the impact of stock prices on the capital structure decisions of companies and conversely the effect of capital structure on

stock prices. The empirical results indicate that the debt ratio negatively impacts on the stock price or when the company announces an increase in debt ratio that negatively influence on the average stock price in the 5 days after the announcement date. However, the average stock price during the year has a positive effect on the company's capital structure decisions during the year. Companies with high stock prices often maintain a higher debt ratio than those with low stock prices. The empirical results show that the signaling, pecking order and market timing theories can be applied to explain the changes in capital structure as well as the effect of capital structure on stocks prices of non-financial joint stock companies listed in Vietnam Stock Exchange. Although the two-way impact of stock prices and capital structure has been demonstrated, the paper, similar to others, has some limitations as the data have not been divided to examine the industry's differentiated influence on share price and capital structure. Besides, the paper does not prove how the company decides whether to issue more equity or raise more debt, affecting stock prices. The paper strongly believes that future studies may overcome these shortcomings to better explain investor and manager decisions.

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