RESEARCH ARTICLE

Impact of Ownership Structure on Capital Structure-Empirical Evidence From Listed Firms in Vietnam

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Abstract: This research examines whether and to what degree does ownership structure affect the capital structure, using a universal sample of Vietnamese listed firms from 2009 to 2015. We consider the ownership structure in two dimensions: ownership concentration and ownership types. Our paper is among the few to deploy Herfindahl index of all major shareholders, institutional shareholders, and even foreign shareholders as proxies for ownership concentration. The results depict a positive and significant impact of ownership concentration on the overall capital structure of the companies. Further tests indicate that the effect of ownership structure is stronger for short-term debt and bank debt and weaker or even not significant for long-term debt. Despite the fact that the ownership of state, institutional investors, and foreign investors do not significantly affect the capital structure ratio, we find a non-linear relationship between managerial ownership and the structure of overall debt and bank debt.

Keywords: financing decisions, capital structure, ownership structure, ownership concentration, managerial ownership.

JEL classifications: G31, G32, G34

The impact of ownership structure on different aspects of corporate finance has been the topic of interest for many researchers. Despite the fact that many studies have examined the relationship between the firm ownership structure and the capital structure of the corporation in various countries (e. g., Bajaj, 1998; Smith, 2005; Driffield, Mahambare, & Pal, 2007; King & Santor, 2007; Iturriaga & Sanz, 2012; Liu, Tian, & Wang, 2011; Le, 2015; Sun, Ding, Guo, & Li, 2015; etc.), the evidence from those literature is mixed. On the one hand, while some studies found a positive effect of ownership concentration and a variety of ownership types on firm capital structure (Driffield et al., 2007; Iturriaga & Sanz, 2012), others showed the negative relationship (Farooq, 2015). Some of the studies even argued that ownership structure has no impact on the financing decisions of the companies (Quang & Xin, 2013). On the other hand, there is a significant difference in results between developing and developed countries.

The inconsistency in the empirical evidence suggests two important existing issues when studying

the impact of ownership structure on capital structure. Firstly, there is an endogeneity problem that arise in researching this topic, namely, the simultaneous causality which is pointed out in some studies such as those of Ruan, Tian, and Ma (2011), Iturriaga and Sanz (2012), or Le (2015). Specifically, while ownership structure potentially affects capital structure, it is also likely that capital structure also has some influence on ownership structure. Secondly, the effect of ownership structure is different in countries with different policies and characteristics. While studies of the relationship between ownership structure and capital structure have been intensive in developed countries, little is known for developing countries.

In this paper, we attempt to fill this gap of knowledge by examining whether different ownership structures in Vietnamese corporations have any real impact on their financing decision. While most of the studies in this topic focus on developed countries, we provide evidence for the impact of ownership structure on a developing market with a unique socio-economic situations, Vietnam, who is in transition period from centralized market to market economy. By deploying various testing methodology, we not only show the significant impact of ownership structure (for both ownership concentration and types of ownership) on capital structure in which literature in this field gave mixed results but also solve the potential endogeneity problems faced by previous studies to some extent to give out more robust results. In the next section, we provide some review of existing literature with their mixed results on the relationship between ownership structure and financing decision which we intended to solve. Section 3 deals with the hypotheses development for our study. Section 4 introduces the methodology we use in this paper to test the hypotheses and solve the potential endogeneity issues. Results of the study are illustrated in Section 5 and Section 6 concludes.

Literature Review

The Theoretical Framework

The agency theory (Jensen, 1986; Jensen & Meckling, 1976) is the most common theory used in a large number of studies involving ownership structures and capital structure of firms. This theory stemmed from the conflicts of interest in the company,

especially the principal-agent relationship between the shareholders (principal) and managers (agent). While managers take the duty of maximizing value for the owners, in many cases, they may run the company in the way that benefits themselves rather than the principals, especially if the remuneration scheme of the manager is unrelated to the company value, resulting in agency costs. The manager will prefer internal finance from retained earnings and maintain a low-debt structure since creditors, such as banks, have mechanisms to effectively supervise the corporation as well as managerial activities.

Therefore, a dispersed ownership structure with numerous small stockholders bears larger agency cost. Small investors are less motivated and could not afford to pay the monitoring and supervision costs. Hence, concerning the ownership structure, the availability of institutional investors will enable the company to mitigate the agency cost as institutions have the resources and expertise to monitor the performance of the manager. This is also applied to different types of ownership such as state ownership or foreign ownership. The concentration level of institutional ownership, foreign ownership, and state ownership can positively influence corporate capital structure.

Another way to reduce agency cost is allowing the manager to hold shares of the company. When their benefit is related to the company value, they are motivated to maximize it. Thus, managerial ownership can have a positive influence on corporate debt (Chen, 2010).

Nevertheless, the effect of managerial ownership of the company share on the capital structure is not simply linear or monotonic but rather based on two hypotheses: incentive alignment hypothesis and management entrenchment hypothesis.

Incentive alignment hypothesis: According to Jensen and Meckling (1976), to gain investor's trust, managers tend to use leverage in the capital structure as a commitment to the company's interest. By using debt, managers voluntarily agree with the fact that creditors supervise them, and consequently, are more cautious in their decision to avoid bankruptcy costs from creditors, especially in the enterprises where the management owns many shares of the business. Thus, under the incentive alignment hypothesis, the ownership structure is positively related to the debt ratio in the capital structure.

Entrenchment hypothesis: Morck, Shleifer, and Vishny (1989) illustrated that managers tend to engage in selfish behaviors that harm the organization. Even if they have a chance to be the shareholders of the company, a conflict between the principal and principal (owners versus owners), in which, large shareholders overwhelming the small shareholders, may arise. The higher the managerial ownership, the more likely it is for managers (now major shareholders) to take advantage of the small shareholders. Consequently, the greater the managerial ownership level in the company, the smaller the debt ratio in the capital structure.

Combining these two hypotheses, Miguel, Pindado, and Torre (2004) and Zhang (2013) argued that the relationship between the managerial ownership and capital structure of the company is not exactly one-way, but rather non-linear. That is, the effect of the managerial ownership and capital structure may be consistent with both theories. When the managerial ownership level is low and gradually increasing, the conflict of interest between the principal and the agent tends to decrease. Managers at this time are more willing to use loans. Nonetheless, when the managerial ownership reaches a certain level, these managers (who have now become the major shareholders of the company) tend to act for their own benefits at the expense of small shareholders.

Empirical Evidence

Empirical studies of the effect of ownership structure on capital structure often define the ownership structure to either ownership concentration or ownership types. Ownership concentration is often defined as the holding of largest shareholders—for instance, the five biggest shareholders (Rokwaro, 2013)—or depending on the regulations of each country and each firm. The ownership types are defined based on various types of shareholders, for example, foreign, individual, institutional, and state ownership.

In terms of ownership concentration. Driffield et al. (2007) investigated the relationship between ownership concentration and capital structure of two countries, one developing country (Indonesia) and one developed country (Korea). The result indicated that in a developing country like Indonesia, the relationship between capital structure and ownership concentration is non-linear (inverted-U shaped). When the ownership concentration level is low, the more concentration level of ownership, the higher the leverage is. Nevertheless, up to a certain point of concentration (over 50%), the coefficient between the ownership concentration and the debt structure is negative and statistically significant. Zhang (2013) also found this inverse U-shaped nonlinear correlation when studying Chinese private companies. Meanwhile, the ownership concentration in Korea, according to Driffield et al. (2007), is positively correlated with the leverage ratio when Korean companies have a more dispersed ownership structure, and insignificant when the concentration level is high. Iturriaga and Sanz (2012) depicted positive and significant impact of ownership concentration and capital structure in 16 developed countries (France, Italy, Portugal, Spain, Holland, Belgium, Greece, Germany, Japan, Austria, Norway, Sweden, Finland, Australia, USA, and the UK) during the period 2000–2006. Farooq (2015) pointed out the opposite results in the Middle East and North Africa where companies have high ownership concentration level but low debt ratios.

Regarding ownership types. Liu et al. (2011) studied state enterprises and state-owned enterprises in China which illustrated a positive correlation between state ownership and debt ratios. They also found that local state company with fewer institutional investors borrowed more than the others. In addition, the ownership of large shareholders is negatively related to the debt to total capital ratio of state enterprises, but non-linear in case of private firms. Zhang (2013) and Le (2015) also confirmed the positive impact of state ownership and capital structure.

Empirical evidence does not clearly support the impact of institutional ownership on capital structure. Some studies suggest a positive effect. Ben M'Barek (2003) specified the positive or neutral effect of this ownership on the French stock market. Sun et al. (2015) also found a positive relationship between institutional ownership and capital structure for U.K. firms. Nasrum (2015) also found similar results for Indonesian stock market. Meanwhile, the results of studies by Sahut and Gharbi (2007), Al-Fayoumi and Abuzayed (2009), and Quang and Xin (2013) did not provide a link between institutional investors and capital structure of enterprises. Le (2015) showed a negative and significant relation between institutional ownership and financing decision for Vietnamese firms.

The impact of foreign ownership on capital structure, in theory, is similar to that of institutional ownership. However, the empirical evidence of foreign ownership is scarce. Le (2015) found a negative effect of foreign investors on a firm's capital structure.

King and Santor (2007) showed that Canadian family-owned firms are more leveraged than other types of companies. Al-Fayoumi and Abuzayed (2009) found a negative correlation between managerial ownership and capital structure in Jordanian companies. Ruan et al. (2011) revealed that Chinese private firms specified a non-linear relationship between the managerial ownership and leverage of the firm. However, this relationship is in inverted N-shaped. Zhang (2013), employing the data from 2007–2012, found an insignificant correlation for the managerial ownership.

Thus, from the above analyses, it can be seen that the impact of corporate ownership and capital structure, although not new in the field of empirical finance, is still a matter of concern because of the complexity and multi-dimensional nature of the relationship between the relevant factors.

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Hypothesis Development

On Ownership Concentration Level

Previous studies showed the complexity of the ownership concentration and capital structure of firms in different countries. While some research studies found a positive correlation (such as Driffield et al., 2007; Iturriaga & Sanz, 2012), others suggest a negative correlation between ownership structure and debt ratios (Farooq, 2015). Furthermore, several articles indicated a non-linear U-shape correlation between the degree of ownership structure (as measured by the ownership rate of the largest investors) and the level of leverage (Zhang, 2013). At the same time, studies on the Vietnamese market tend to specify that the level of ownership concentration does not impact the capital structure of firms (e.g., Quang & Xin, 2013; Le, 2015). Therefore, we establish two groups of hypotheses on the impact of the level of the ownership concentration and capital structure:

H1: The ownership concentration has an impact on the capital structure (debt ratio) of Vietnamese listed firms.

In which, we further develop three sub-hypotheses for the impact as follows:

H1a: The ownership concentration is positively correlated with the capital structure of Vietnamese listed firms.
H1b: The ownership concentration is negatively correlated with the capital structure of Vietnamese listed firms.
H1c: The ownership concentration has a non-linear correlation with the capital structure of Vietnamese listed firms.

On the other hand, in a frontier market with a high proportion of individual investors such as Vietnam in which the ownership is often dispersed, and individual shareholders often have trivial controlling power over firm decisions, then the impact of the ownership concentration on the capital structure of the business may not be significant. Therefore, we considered the following hypothesis:

H2: The ownership concentration level does not affect the capital structure of Vietnamese listed firms.

On the Type of Ownership

As confirmed in previous studies such as Liu et al. (2011), Zhang (2013), and Le (2015), the state ownership positively affect the capital structure of firms. Hence, the next hypothesis is as follows:

H3: State ownership is positively correlated with the debt ratio of Vietnamese listed firms.

Institutional and foreign ownership may have a similar effect. Due to the mixed results from the previous literature, it is difficult to hypothesize the effect of those types of ownership. However, as Le (2015) pointed out, for Vietnamese firms, the correlation between institutional and foreign investors and capital structure is negative. This could be because, on the one hand, institutional investors and foreign investors have the resources to supervise the manager activities directly and may choose to do so. Hence, the need for outside monitor, such as creditors, is unnecessary. On the other hand, the existence of those investors also increases the reputation of the businesses, which provides the company an opportunity to access a different source

of capital apart from debt. Therefore, we establish two hypotheses:

H4: Institutional ownership is negatively correlated with the debt ratio of Vietnamese listed firms.

H5: Foreign ownership is negatively correlated with the debt ratio of Vietnamese listed firms.

The effect of managerial ownership on the capital structure is relatively complex in literature. Some researchers found a linear relationship, for instance, King and Santor (2007) suggested a positive correlation while Al-Fayoumi and Abuzayed (2009) pointed out the negative relationship between the level of managerial ownership and the debt ratio. Meanwhile, Ruan et al. (2011) indicated a nonlinear correlation and Zhang (2013) did not find any significant correlation between the capital structure and managerial ownership. Therefore, we set up hypothetical groups as follows:

H6: Managerial ownership has an impact on the debt ratio of Vietnamese listed firms.

Hypothesis 6 is also followed by three sub-hypotheses as follows:

H6a: The managerial ownership is positively correlated with the capital structure of Vietnamese listed firms.
H6b: The managerial ownership is negatively correlated with the capital structure of Vietnamese listed firms.
H6c: The managerial ownership has a non-linear correlation with the capital structure of Vietnamese listed firms.

Finally, since some studies (such as Quang & Xin, 2013) found no significant effects of ownership types on the capital structure, we also hypothesize that:

H7: Types of ownership in the ownership structure do not affect the debt ratio of Vietnamese listed firms.

Data and Methodology

Data and Sample

The research sample used in this paper includes all non-financial companies listed on the two stock exchanges in Vietnam, namely, the Ho Chi Minh City Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX). Financial companies such as banks, securities companies, investment funds, and insurance companies with distinctive characteristics of ownership structure that are subject to special regulation and accounting treatment are not considered in this study. The research sample collected during the 7-year period from 2009 to 2015 includes 642 non-financial enterprises with a total of 4,494 observations based on panel data (company - year).

Data on the ownership rate of listed companies are mainly collected from two sources: the ownership database of listed companies of Vietstock.vn and the database of ownership of VNDIRECT Securities JSC. The databases of Vietstock.vn provide data on the volume of shares owned by the state, institutional investors, foreign investors, large shareholders, and the board of directors. The databases of stock company VNDIRECT provides data on the total number of outstanding shares of listed companies in Vietnamese stock market. Besides, we consulted and used the data on the list and ownership proportion of major shareholders from Stockbiz.vn database. Stock price data is also derived from historical price data of VNDIRECT Securities Joint Stock Company.

Financial data of enterprises listed on two stock exchanges are hand-collected from the consolidated financial statements by year from 2009 to 2015, including the data from the balance sheet, income statement, cash flow statement, and note to financial statements. These reports are downloaded from the official website of the two stock exchanges: Ho Chi Minh Stock Exchange (www.hsx.vn) and Hanoi Stock Exchange (www.hnx.vn), particularly, in the section listed companies, shares, and financial status of each stock code.

Variables

Dependent variables. The dependent variable for capital structure used in this study is the debt-to-total asset ratio, calculated as the total liabilities of the firm

divided by total assets (CS: Capital Structure). To further investigate the different types of debt capital in capital structure, we added three more dependent variables, namely short-term debt to total asset ratio (STD: short-term debt), long-term debt to total asset ratio (LTD: long-term debt), and bank loan to total asset ratio (BANKD: bank debt ratio).

Ownership structure variables (main independent variables). Based on previous studies, we employed ownership structure variables as the main explanatory variable in the regression models. These ownership variables are divided into two groups: the ownership concentration and the types of ownership structure.

The level of ownership concentration. Empirical studies in this field used the total share ownership of the five largest investors of the company (LARGEST). We also use this variable to reproduce the research results found in previous literature.

In this paper, we use the Herfindahl index (or H-index) to measure the level of ownership concentration/dispersion. Initially, Herfindahl index is used to evaluate the level of competition in a market or industry by the formula:

$$H = \sum_{i=1}^{n} s_i^2$$

In particular, s_i is the market share of the company i in a certain markets/sectors. Herfindahl index takes the values of 0 to 1. The smaller the value of H-index, the closer the market gets to perfect competitive (as each company occupies a small market share, no dominant or monopoly company). As H-index gets closer to 1, the level of concentration in the industry is higher, indicating the existence of a monopoly.

Recently in empirical finance, H-index has widely been used to proxy for the concentration–dispersion of various areas. Hence, we construct this indicator to measure the level of concentration–dispersion of the ownership structure of listed companies. Specifically, assuming that in a listed company there are n major shareholders, with the number of shares owned by each shareholder being $share_i$, Herfindahl index for all large stockholders is computed by to the formula:

$$HHI = \frac{shares_1^2 + shares_2^2 + \cdots + shares_n^2}{(shares_1 + shares_2 + \cdots + shares_n)^2}$$

We also calculated Herfindahl index in each company for all corporation's large shareholders (HINDEX_ALL), for the five biggest investors of the company (HINDEX_LARGE), institutional investors (HINDEX_INSTI), and foreign investors (HINDEX_FOREIGN).

Types of ownership structures. We categorize the types of ownership structures into the following groups: state ownership (STATE), institutional ownership (INSTITUTION), foreign ownership (FOREIGN), and managerial ownership (MANAGER). These variables are computed according to the total share ownership percentage of each type of ownership structures in the firm.

Control variables. In addition to the main explanatory variables mentioned above, this paper also deploys other important independent variables which are commonly used in literature as control variables. Specifically, we use the size of the company (SIZE), the ratio of tangible assets (TANGIBILITY), the level of cash flow (CF_RATIO), the cash ratio (LIQUIDITY), the number of years of operation as a joint stock company of the firm (AGEINC), and the market-to-book (MB) ratio. SIZE is measured by taking the natural logarithm of the firm's total assets. TANGIBILITY is calculated as total net fixed asset value divided by total assets. CF_RATIO is the sum of the annual depreciation, amortization, and net profit to total asset. LIQUIDITY is measured by the proportion of cash and cash equivalents to total assets. Finally, MB, computed as the market value to the book value ratio, reflects the growth of the business. The MB ratio is calculated by the market capitalization (the market value of the company) divided by the book value of the share capital (book value). Large MB means that the market considers the growth prospects of the business to be good and vice versa. Companies in growing stage often have high MB ratios, while those in mature stage often have low MB.

Methodology

In this paper, we used various regression methods to examine the impact of ownership structure and capital structure and solve the endogeneity problem. Data cleansing is necessary because the outliers may affect and distort the regression results. To avoid this situation, we winsorized all main variables with two cut points at 1% and 99% level. By this way, extreme

values located at the tail of the data distribution are removed, and the results of the regression model will become robust, unbiased, and more consistent.

Fixed effect model. The paper uses panel regression which has been used in many studies, such as those by King and Santor (2007), Lee (2008), Al-Fayoumi and Abuzayed (2009), Crespi and Scellato (2010), Ruan et al. (2011), Flavin and O'Connor (2013), Zhang (2013), Sun et al. (2015), and Le (2015). Panel models include two common types: fixed effects and random effects. While some studies use fixed-effect regression models like Lee (2008), Crespi and Scellato (2010) and Zhang (2013). Several other studies use random effect regression, for example, King and Santor (2007) and Ruan et al. (2011). We conducted a Hausman test to determine whether fixed effect model or random effect model with panel data of Vietnamese stock market should be used for this study. The results of the Hausman test (not presented in the paper) indicated that the fixed-effects model is appropriate for this topic. Hence, we used fixed effect model to study the effect of ownership structure on the firm's capital structure. The fixed effect model follows the equation:

$$Y_{i,t} = \alpha_0 + \alpha_1 OWNERSHIP_{i,t} + \beta' Control_{i,t} + \gamma_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

In this model, Y_{it} is the dependent variable of the capital structure of company i in year t described above; $OWNERSHIP_{it}$ is the ownership structure variable of company i in year t regarding both to the level ownership concentration and types. $Control_{it}$ is the control variable of the company i in the year t used in the article and presented in the previous section. γ_i and μ_t represent the industry and time fixed effects respectively. ε_{it} is the residual of the model.

The results from fixed effect panel regressions confirm our GMM models. Therefore, for the sake of briefness, we only report the results of GMM models. Evidence provided by fixed effect models is available upon request.

Potential endogeneity problem. Studies on the impact of ownership structure on corporate capital structure face potential endogeneity problem due to the nature of the variables. In particular, the endogeneity problem describes the simultaneous effect of dependent and independent variables (simultaneous causality). We hypothesize that the ownership structure may affect capital structure. Capital structure, in turns, could also affect the choice of ownership structure. To solve this problem, two-stage regression with instrumental variable or IV regression is appropriate. However, as some researchers pointed out, (Farooq et al., 2007; Liang, Huang, & Lin, 2011; Vinh, 2014; and Le, 2015), it is difficult to find an instrumental variable that affects ownership structure without having some influence on capital structure. Therefore, we adopted the Generalized Method of Moment (GMM) as in Vinh (2014) or Le (2015). In particular, we added lagged variable of the dependent variable to the model in the establishing of the dynamic GMM model as follows:

$$CS_{i,t} - CS_{i,t-1} = \delta(CS_{i,t}^T - CS_{i,t-1})$$

with $0 < \delta < 1$. In this model, δ is the adjustment factor, the difference between the real capital structure and the target capital structure. The target capital structure, $CS_{i,t}^T$ of company i in year t is estimated from the following model:

$$CS_{i,t}^T = \alpha_0 + \alpha_1 OWNERSHIP_{i,t} + \beta' Control_{i,t} + \varepsilon_{i,t}$$

Thus, the dynamic GMM model for the capital structure is as follows:

$$CS_{i,t} = \delta\alpha_0 + (1 - \delta)CS_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

In which, CS_{it} is the dependent variable of the capital structure of company i in year t described above (other dependent variables STD, LTD, and BANKD follow the similar process); $OWNERSHIP_{it}$ is the ownership structure variable of company i in year t related to the level of ownership concentration and types of ownership structure. $Control_{it}$ is the control variable of the company i in year t used in this article.

The other dependent variables of the capital structure follow the same process. Generalizing, we have the equation of dynamic GMM model as follows:

$$Y_{i,t} = \delta\alpha_0 + (1 - \delta)Y_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t} \quad (2)$$

In that, Y_{it} is the dependent variable of the capital structure (STD: short-term, LTD: long-term, and BANKD: bank debt ratios) of company i in year t described above; $OWNERSHIP_{it}$ is the ownership structure variable of company i in year t related to the level of ownership concentration and types of ownership structure. $Control_{it}$ is the control variable of the company i in year t.

To test the fitness of the model, we conducted the Sargan Hansen's J test with two hypotheses: H0: the model is appropriate, H1: the model is inappropriate. With the J-statistic from the Sargan Hansen test with small Chi-squared (X^2) distribution, the model is considered as appropriately fitted and face no over-identification problem.

Other issues for regression models of the study.

Nonlinear relationships. Previous research studies have found a nonlinear relationship between the level of ownership concentration as well as managerial ownership and the corporate capital structure. Thus, in some regression equations, we added the variables to the power of 2 and 3 of the ownership structure. The fixed effect regression model and GMM with the squared and cubic level of ownership concentration and managerial ownership are as follows:

$$CS_{i,t} = \alpha_0 + \alpha_1 OWNERSHIP_{i,t} + \tag{3}$$
$$\alpha_2 OWNERSHIP_{i,t}^2 + \beta' Control_{i,t} + \gamma_i$$
$$+ \mu_t + \varepsilon_{i,t}$$

$$CS_{i,t} = \alpha_0 + \alpha_1 OWNERSHIP_{i,t} + \tag{4}$$
$$\alpha_2 OWNERSHIP_{i,t}^2 + \alpha_3 OWNERSHIP_{i,t}^3 +$$
$$\beta' Control_{i,t} + \gamma_i + \mu_t + \varepsilon_{i,t}$$

$$CS_{i,t} = \delta\alpha_0 + (1 - \delta)Y_{i,t-1} + \tag{5}$$
$$\delta\alpha_1 OWNERSHIP_{i,t} + \delta\alpha_2 OWNERSHIP_{i,t}^2$$
$$+ \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

$$CS_{i,t} = \delta\alpha_0 + (1 - \delta)Y_{i,t-1} + \tag{6}$$
$$\delta\alpha_1 OWNERSHIP_{i,t} + \delta\alpha_2 OWNERSHIP_{i,t}^2$$
$$+ \delta\alpha_3 OWNERSHIP_{i,t}^3 + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

In that, CS_{it} is the dependent variable of the capital structure of company i in year t; $OWNERSHIP_{it}$ is the variable describing the level of ownership concentration and managerial ownership of company i in year t.

Heteroscedasticity and autocorrelation. For panel data in the article, two additional issues need to be examined when implementing regression equations. Firstly, the residuals of the regression model may appear heteroscedasticity. This problem does not change the coefficients (α and β values in the equation) of the regression model but affects the statistical significance of the coefficients by a bias of standard error when performing t-test. If the t-test is biased, it can cause situations where the coefficients from the model are statistically significant while, in fact, they are not and vice versa. Secondly, because the panel data includes cross-sectional and time series data, the standard deviation is more biased if the residual of the model auto-correlates from time to time.

To avoid the situation that these phenomena affect the statistically significant test results of the paper, we used robust standard errors following the methods such as heteroscedasticity robust of Hubert-White (2003) and clustered robust of Petersen (2009). These robust methods adjust the heteroscedasticity and the autocorrelation of the residuals, enabling the test statistics to be more accurately calculated. In the absence of heteroscedasticity and the autocorrelation, the standard error result is equivalent to the standard error with the assumption of homoscedasticity.

Results and Analysis

Descriptive Statistics

Table 1 presents the summary statistics of all the variables used in this paper—642 non-financial companies listed on two Stock Exchanges: Ho Chi Minh City Stock Exchange and Hanoi Stock Exchange between 2009 and 2015. The number of observations of the ownership structure of listed firms is not as much as those of the characteristics of the business. Among them, the most observations are the ownership of institutional investors and foreign investors (3,828 observations). The observation for Herfindahl index is smaller (the lowest is 3,754 for foreign investors H-index and the highest is 3,768 for the total number of major investors) since we can only calculate H-index

Table 1. *Descriptive Statistics*

Variables	Number of observations	Mean	Median	Standard Deviation	Maximum	Minimum
Corporate ownership structure						
STATE	3,827	0.2196	0.1104	0.2445	0.7956	0.0000
INSTITUTION	3,828	0.3819	0.4087	0.2605	0.9603	0.0000
FOREIGN	3,828	0.0895	0.0000	0.1637	0.4900	0.0000
MANAGER	3,827	0.0570	0.0062	0.1098	0.5550	0.0000
LARGEST	3,827	0.4669	0.5095	0.2268	0.9672	0.0000
HINDEX_ALL	3,768	0.3718	0.3068	0.2434	0.9999	0.0000
HINDEX_LARGE	3,761	0.4525	0.3834	0.2200	0.9999	0.0000
HINDEX_INSTI	3,761	0.5940	0.5741	0.3120	1.0000	0.0000
HINDEX_FOREIGN	3,754	0.2964	0.0000	0.3729	1.0000	0.0000
Firm characteristics						
CS	4,257	0.5080	0.5315	0.2226	0.9417	0.0419
STD	4,258	0.4042	0.3947	0.2109	0.9013	0.0291
LTD	4,260	0.1050	0.0365	0.1462	0.6388	0.0000
BANKD	4,260	0.1673	0.1186	0.1739	0.6772	0.0000
INVEST	4,259	0.0551	0.0254	0.0784	0.4292	0.0000
PAYOUT	4,494	0.6987	1.0000	0.4589	1.0000	0.0000
POR	3,405	0.2102	0.1752	0.2075	0.9911	0.0000
DPS	4,046	1076	800	1343	21000	0.0000
ROA	4,260	0.0654	0.0481	0.0750	0.3611	-0.1374
ROE	4,256	0.1333	0.1210	0.1401	0.6867	-0.3569
TOBINQ	4,258	0.9504	0.8878	0.4666	3.3192	0.1021
SIZE	4,261	26.8282	26.7534	1.4547	30.7261	23.5302
TANGIBILITY	4,261	0.2128	0.1425	0.2072	0.8707	0.0003
CF_RATIO	4,258	0.1017	0.0783	0.1045	0.6285	-0.1122
AGEINC	4,449	9.0967	9.0000	4.1373	26.0000	1.0000
MB	3,604	1.0253	0.8246	0.7726	4.4765	0.1186
LIQUIDITY	4,261	0.1030	0.0596	0.1170	0.5852	0.0007

if there is sufficient data on the ownership of major shareholders of listed companies in the two markets. Not all companies have their shares owned by foreign investors; therefore, the number of observations on H-index of foreign investors is lower.

In terms of value, the average state ownership in the entire sample was 21.96% (median only 11.04%), the largest was 79.56%, which indicates that state ownership in listed companies is not high. Institutional investors tend to hold a higher proportion, at an average of 38.19% (with a median value of 40.87%) and the maximum is over 96%. Ownership by foreign investors

during the period 2009–2015 is relatively low, with the mean of only 8.95% and the maximum of 49%. This is in line with the government's regulations during this time on the limits of the ownership of foreign investors in domestic firms. From 1st September 2015, Decree 60/2015/ND-CP officially came into effect which extends the limit of ownership for foreign investors to 100%. However, the data shows that at the end of 2015, the market and foreign investors have not yet made any adjustments under the new regulation of Decree 60, and the level of foreign ownership in listed firms stayed at 49%. The average managerial ownership rate is only

5.7%, indicating that providing managers shares to align the interest between managers and shareholders is still uncommon. However, some companies allow their managers to own up to 55.5% shares.

Regarding the concentration ownership level, the average ownership of the five biggest investors was 46.69% with the median level of 50.95% and the highest value of 96.72%. This shows that, in many companies, stock ownership is concentrated in the hands of the largest investors. Herfindahl index (H-index) data describe a clearer picture of the level of ownership concentration. The H-index of all major shareholders has an average of less than 0.5, showing that the share ownership in Vietnamese firms on average is not too concentrated but not really dispersed. The value of the H-index of institutional investors at 0.594 indicates that institutional investors are more likely to be concentrated in the hands of large institutional investors. Meanwhile, the low value of H-indexes of foreign investors (0.2964) illustrates that the allocation of ownership among foreign investors is more equal.

For firm characteristics, the debt ratio of listed companies in Vietnam tends to be relatively high (over 50% for mean and median values, and maximum of over 90%). Debt consists of mainly short-term debt with a short-term debt to total assets ratio of approximately 40%. Meanwhile, the long-term debt to total assets ratio on average is 10.50%. Although there are companies with a high bank loan ratio of over 67%, most of the listed firms only have a bank loan to total asset ratio of over 16.73%. This means that listed companies in Vietnam can access other sources of debt (for example, from bond issuance) and are not too dependent on bank loans.

On average, Vietnamese listed firms have nine years of operation as joint stock companies. The average Tobin's q and MB ratios at approximately 1 indicate show that companies listed on the two stick exchanges of Vietnam are mature firms (market value is close to book value). Other variables also confirm that argument as the rate of cash holdings is low (average 10.30% with a median of approximately 6%); the probability of paying an average dividend is high (69.87%); average investment rate is low (5.51%); average asset size is 448 billion VND or approximately 20 million USD (natural logarithm of 26.8282) with the highest level of 22 trillion VND (or 1 billion USD).

The Impact of Ownership Structure on Capital Structure

In this part, we conducted regressions based on both fixed effect panel regression and GMM. Since the fixed effect regression also confirms the results of GMM and fixed effect could not resolve the potential endogeneity problem in our paper, we do not report the results here. Evidence of fixed effect panel regression of ownership structure and capital structure is available upon request.

As can be seen from Table 2, except for the level of the ownership concentration by foreign shareholders, the company's debt ratio has a positive and significant correlation with all remaining indicators (at least 5%). Specification (1), (3), (4), and (5) confirm that there is an impact of ownership concentration on firms' overall capital structure. The coefficients of ownership concentration variables are positive and significant at least at 5% level. This result is consistent with the H1a hypothesis as well as the findings by Driffield et al. (2007) or Iturriaga and Sanz (2012). In the model (2), we did not find non-linear correlations as in fixed effects regression models of the ownership rate of the largest shareholders after using GMM to solve the simultaneous causality between ownership and debt ratio. In specification (6), the coefficient of H-index for the foreign investor is negative but not statistically significant.

The Sargan Hansen's J test specified that the p-values of J-statistics are large, even up to 0.9622 in model (1). Therefore, the models in this section are appropriate. All the coefficients of control variables are reasonable as expected.

The results of the GMM model with short- and long-term debt structure are presented in Table 3 and Table 4, respectively. The result of GMM regression for short-term debt is similar to the overall debt structure and no non-linear relationship is found between the level of ownership concentration and corporate debt structure. Regarding long-term debt, all coefficients of ownership concentration are not statistically significant. This means that the level of the ownership concentration does not affect the company's long-term debt ratio. All of the J test results expresses that the models are fitted.

Table 2. *The Ownership Concentration and the Capital Structure - GMM*

Dependent variable: CS	Generalized Method of Moment					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Constant	-0.0374	-0.0397	-0.0530	-0.0486	-0.1308*	-0.0570
	(-0.62)	(-0.62)	(-0.88)	(-0.81)	(-1.95)	(-0.93)
CS_{t-1}	0.7436***	0.7431***	0.7476***	0.7455***	0.7403***	0.7545***
	(31.99)	(31.24)	(31.62)	(31.31)	(29.83)	(33.37)
LARGEST	0.0501**	0.0608				
	(2.24)	(0.70)				
$LARGEST^2$		-0.0124				
		(-0.12)				
HINDEX_ALL			0.0301**			
			(2.22)			
HINDEX_LARGE				0.0364**		
				(2.36)		
HINDEX_INSTI					0.0368***	
					(2.93)	
HINDEX_FOREIGN						-0.0078
						(-1.04)
SIZE	0.0076***	0.0077***	0.0083***	0.0080***	0.0108***	0.0088***
	(3.08)	(3.06)	(3.39)	(3.27)	(4.05)	(3.53)
TANGIBILITY	-0.0563**	-0.0558**	-0.0503**	-0.0506**	-0.0500**	-0.0457*
	(-2.11)	(-2.03)	(-1.96)	(-1.96)	(-1.99)	(-1.80)
CF_RATIO	-0.1391	-0.1405	-0.1277	-0.1277	-0.1211	-0.1027
	(-1.21)	(-1.19)	(-1.07)	(-1.07)	(-1.02)	(-0.86)
LIQUIDITY	-0.0977	-0.0973	-0.0849	-0.0885	-0.0776	-0.0740
	(-1.57)	(-1.56)	(-1.37)	(-1.43)	(-1.28)	(-1.21)
AGE_INC	-0.0008	-0.0008	-0.0005	-0.0004	-0.0005	-0.0006
	(-0.97)	(-0.97)	(-0.58)	(-0.49)	(-0.59)	(-0.77)
MB	-0.0183*	-0.0181*	-0.0166	-0.0169	-0.0162	-0.0202*
	(-1.86)	(-1.79)	(-1.58)	(-1.61)	(-1.54)	(-1.91)
Control for:						
Observation	3259	3259	3180	3173	3169	3169
Sargan Hansen J Chi-squared	0.0022	0.0023	0.5958	0.7317	0.6107	0.7781
p-value	0.9622	0.9619	0.4402	0.3923	0.4345	0.3777

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$CS_{i,t} = \delta\alpha_0 + (1-\delta)CS_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

*of which, CS_{it} is the ratio of total debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership concentration of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 3. *The Ownership Concentration and Short-Term Debt Ratio – GMM*

Dependent variable: STD	Generalized Method of Moment					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Constant	0.0931	0.0922	0.0727	0.0779	-0.2478***	0.0653
	(1.48)	(1.41)	(1.18)	(1.25)	(-3.99)	(1.06)
STD_{t-1}	0.7521***	0.7519***	0.7560***	0.7546***	0.6167***	0.7593***
	(35.88)	(35.59)	(36.34)	(35.99)	(27.38)	(38.00)
LARGEST	0.0509**	0.0565				
	(2.43)	(0.69)				
$LARGEST^2$		-0.0063				
		(-0.06)				
HINDEX _ALL			0.0302**			
			(2.33)			
HINDEX _LARGE				0.0315**		
				(2.13)		
HINDEX _INSTI					0.0383***	
					(3.26)	
HINDEX _FOREIGN						-0.0052
						(-0.66)
SIZE	0.0018	0.0018	0.0027	0.0024	0.0048**	0.0034
	(0.74)	(0.74)	(1.13)	(1.01)	(2.00)	(1.45)
TANGIBILITY	-0.0660**	-0.0660**	-0.0663**	-0.0669**	-0.0678**	-0.0600**
	(-2.43)	(-2.39)	(-2.47)	(-2.48)	(-2.56)	(-2.33)
CF_RATIO	-0.0803	-0.0804	-0.0396	-0.0354	-0.0397	-0.0234
	(-0.85)	(-0.83)	(-0.40)	(-0.36)	(-0.41)	(-0.24)
LIQUIDITY	-0.0887	-0.0886	-0.0857	-0.0892	-0.0751	-0.0792
	(-1.55)	(-1.54)	(-1.46)	(-1.52)	(-1.31)	(-1.37)
AGE_INC	-0.0012	-0.0012	-0.0010	-0.0009	-0.0010	-0.0012
	(-1.50)	(-1.50)	(-1.26)	(-1.19)	(-1.31)	(-1.49)
MB	-0.0230**	-0.0230**	-0.0212**	-0.0220**	-0.0201**	-0.0242**
	(-2.42)	(-2.37)	(-2.10)	(-2.19)	(-2.01)	(-2.43)
Control for:						
Observations	3261	3261	3182	3175	3171	3171
Sargan Hansen's J Chi_squared	0.8518	0.8567	1.4027	1.1808	1.38947	0.8685
p-value	0.3560	0.3547	0.2363	0.2772	0.2385	0.3514

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$STD_{i,t} = \delta\alpha_0 + (1-\delta)STD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

of which, STD_{it} is the ratio of short-term debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership concentration of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.

Table 4. *The Ownership Structure and Long-Term Debt Ratio – GMM*

Dependent variable: LTD	Generalized Method of Moment					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Constant	-0.1908***	-0.1897***	-0.1796***	-0.1832***	-0.1762***	-0.1815***
	(-3.80)	(-3.78)	(-3.54)	(-3.60)	(-3.36)	(-3.55)
LTD_{t-1}	0.6768***	0.6768***	0.6862***	0.6835***	0.6895***	0.6869***
	(21.13)	(21.11)	(21.58)	(21.39)	(21.76)	(21.63)
LARGEST	-0.0007	-0.0048				
	(-0.05)	(-0.08)				
$LARGEST^2$		0.0046				
		(0.06)				
HINDEX _ALL			0.0022			
			(0.23)			
HINDEX_LARGE				0.0066		
				(0.62)		
HINDEX_INSTI					-0.0043	
					(-0.58)	
HINDEX_FOREIGN						-0.0016
						(-0.27)
SIZE	0.0082***	0.0082***	0.0076***	0.0076***	0.0076***	0.0077***
	(4.16)	(4.16)	(3.80)	(3.79)	(3.77)	(3.83)
TANGIBILITY	0.0214	0.0215	0.0324	0.0330	0.0310	0.0314
	(0.89)	(0.87)	(1.42)	(1.44)	(1.35)	(1.33)
CF_RATIO	-0.1300	-0.1307	-0.1602*	-0.1622*	-0.1472*	-0.1533*
	(-1.55)	(-1.54)	(-1.90)	(-1.92)	(-1.75)	(-1.79)
LIQUIDITY	-0.0397	-0.0396	-0.0290	-0.0290	-0.0320	-0.0296
	(-0.95)	(-0.94)	(-0.71)	(-0.71)	(-0.78)	(-0.73)
AGE_INC	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006
	(0.74)	(0.73)	(0.90)	(0.93)	(0.89)	(0.88)
MB	0.0109	0.0110	0.0127	0.0130	0.0114	0.0122
	(1.32)	(1.29)	(1.52)	(1.55)	(1.37)	(1.45)
Control for						
Observations	3261	3261	3182	3175	3171	3171
Sargan Hansen's J Chi_squared	1.0298	1.0367	2.5271	2.5317	2.4597	2.5662
p-value	0.3102	0.3086	0.1119	0.1116	0.1168	0.1092

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$LTD_{i,t} = \delta\alpha_0 + (1 - \delta)LTD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

*of which, LTD_{it} is the ratio of long-term debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership concentration of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 5. *The Ownership Concentration and Bank–Debt Ratio - GMM*

Dependent variable: BANKD	Generalized Method of Moment					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Constant	-0.1814***	-0.2225***	-0.1988***	-0.1945***	-0.2478***	-0.1953***
	(-3.16)	(-3.82)	(-3.43)	(-3.35)	(-3.99)	(-3.33)
$BANKD_{t-1}$	0.6244***	0.6191***	0.6208***	0.6202***	0.6167***	0.6204***
	(28.53)	(28.17)	(28.23)	(28.14)	(27.38)	(28.29)
LARGEST	-0.0012	0.1864**				
	(-0.06)	(2.55)				
$LARGEST^2$		-0.2171**				
		(-2.56)				
HINDEX_ALL			0.0044			
			(0.39)			
HINDEX_LARGE				0.0101		
				(0.79)		
HINDEX_INSTI					0.0231**	
					(2.42)	
HINDEX_FOREIGN						0.0006
						(0.07)
SIZE	0.0108***	0.0111***	0.0113***	0.0110***	0.0126***	0.0112***
	(4.82)	(4.99)	(5.03)	(4.88)	(5.38)	(4.90)
TANGIBILITY	-0.0249	-0.0176	-0.0173	-0.0188	-0.0220	-0.0157
	(-1.07)	(-0.74)	(-0.75)	(-0.81)	(-0.96)	(-0.68)
CF_RATIO	0.0572	0.0462	0.0376	0.0379	0.0488	0.0362
	(0.71)	(0.56)	(0.45)	(0.45)	(0.59)	(0.43)
LIQUIDITY	-0.1747***	-0.1675***	-0.1694***	-0.1731***	-0.1697***	-0.1681***
	(-3.74)	(-3.57)	(-3.68)	(-3.77)	(-3.73)	(-3.70)
AGE_INC	-0.0014*	-0.0013*	-0.0013*	-0.0012	-0.0012	-0.0013*
	(-1.92)	(-1.71)	(-1.69)	(-1.59)	(-1.52)	(-1.76)
MB	-0.0101	-0.0087	-0.0089	-0.0089	-0.0081	-0.0093
	(-1.13)	(-0.96)	(-0.98)	(-0.97)	(-0.90)	(-1.02)
Control for						
Observations	3261	3261	3182	3175	3171	3171
Sargan Hansen J Chi-squared	0.6253	0.8159	0.3093	0.3117	0.5127	0.2422
p-value	0.4291	0.3664	0.5781	0.5766	0.4740	0.6226

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$BANKD_{i,t} = \delta\alpha_0 + (1-\delta)BANKD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

of which, $BANKD_{it}$ is the ratio of bank debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership concentration of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.

The results of GMM models for bank loan ratios are significant in Table 5. The level of ownership concentration of institutional investors has a positive and statistically significant (at 5%) impact on the bank loans of listed companies. In addition, the effect of the ownership of the company's largest shareholders on a bank loan is also non-linear. This is correspondent with the view that major shareholders are moving from efficient corporate supervising status to entrenched status and tend to reduce bank loans (to minimize the external supervision of banks) to take advantage of small stockholders when the ownership rate of large shareholders reached a certain level. This result is expressed even when adjusted to address the endogeneity problem in the GMM model.

In summary, the results from the fixed effects model and the GMM models indicate that the ownership concentration of Vietnamese listed companies has a positive effect on the capital decisions, especially the ratios of overall debt, short-term debt, and bank loans. This is consistent with the *H1a hypothesis*. The study also specifies that regarding the largest shareholders, the influence of the ownership concentration has a non-linear relationship with the firm's bank debt ratio with the inverted U model (consistent with *H1c*). Hypotheses *H1b* and *H2* are rejected. When the level of ownership concentration is low, large shareholders support the company to employ debt and increase the bank loan ratio and welcome banks as external supervisors for the activities of the firm. However, as the level of ownership concentration reaches a high level, the largest shareholders tend to reduce the use of bank debt and begin to conduct activities that are unbeneficial to small shareholders. This is consistent with the previous studies of Chen (2010) and Zhang (2013).

Types of Ownership Structure and Capital Structure

We repeat our baseline regressions but replace the main explanatory variables with different types of ownership such as state ownership (STATE), institutional ownership (INSTITUTION), ownership by foreign investor (FOREIGN), and ownership by firm executive managers (MANAGER). The results are displayed in Table 6 to Table 9.

GMM models in Table 6 indicate that, after controlling for the endogeneity problem, ownership types such as state ownership and foreign ownership that are significantly correlated in the fixed effect model, no longer have a significant impact. Institutional ownership is positively correlated and statistically significant with the firm's debt ratio. However, when we add to the model the other forms of ownership, institutional ownership is no longer statistically significant. We did not find an N-shape non-linear impact of managerial ownership of on listed firms (because the third order regression coefficient was not statistically significant), but found an inverted-U non-linear relationships in the second-order regression.

As can be seen in Tables 7 and 8, the impact of different types of ownership structure on the short-term and long-term debt of the business is insignificant. The regression coefficients of the type of ownership structure such as state ownership and foreign ownership are not statistically significant in both short-term debt and long-term debt model. The institutional ownership is statistically significant at 1% level when considered separately in the specification (2), but it is insignificant when including other ownership types in the model.

Regarding the managerial ownership rate, we found no significant correlation when using the dependent variable as the ratio of short-term and long-term debt. The first order coefficient in model (7) is significant at 10%, but both the second and third order of the managerial ownership are not. Therefore, it cannot be asserted that there is any relationship between the managerial ownership rate and the structure of short-term and long-term debt. Meanwhile, the control variables still depict the expected results.

All of the Sargan Hansen's J tests specify that p-value is greater than 10%, expressing that all models are consistent with the sample. This result shows that the types of ownership structure and debt ratio are indeed simultaneous causalities, and the results in the panel regression models are due to this mutual relationship. After controlling the simultaneous causality, in fact, some types of ownership structures do not have significant impacts on corporate debt ratio.

Table 6. *Types of Ownership Structure and Capital Structure - GMM*

Dependent variable: CS	Generalized Method of Moment						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Constant	-0.0482	-0.0277	0.0214	0.0341	-0.0496	-0.0861	-0.1002
	(-0.79)	(-0.46)	(0.26)	(0.42)	(-0.81)	(-1.37)	(-1.59)
CS_{t-1}	0.7434***	0.7426***	0.7808***	0.7747***	0.7467***	0.7440***	0.7404***
	(31.42)	(31.65)	(22.21)	(22.46)	(32.27)	(31.87)	(31.50)
STATE	0.0212			0.0556			
	(1.56)			(0.90)			
INSTITUTION		0.0479***		-0.0099			
		(2.83)		(-0.16)			
FOREIGN			0.6179	0.6337			
			(1.16)	(1.09)			
MANAGER					-0.0352	0.3254*	0.8461**
					(-0.67)	(1.94)	(2.08)
$MANAGER^2$						-0.8885*	-4.4678
						(-1.90)	(-1.51)
$MANAGER^3$							5.1131
							(1.12)
SIZE	0.0087***	0.0076***	0.0059*	0.0053*	0.0088***	0.0100***	0.0105***
	(3.50)	(3.09)	(1.80)	(1.71)	(3.55)	(3.92)	(4.09)
TANGIBILITY	-0.0550**	-0.0602**	-0.1262*	-0.1370*	-0.0523**	-0.0482*	-0.0451*
	(-2.07)	(-2.21)	(-1.71)	(-1.72)	(-1.98)	(-1.81)	(-1.67)
CF_RATIO	-0.1365	-0.1449	0.1385	0.1076	-0.1207	-0.1273	-0.1332
	(-1.16)	(-1.25)	(0.51)	(0.39)	(-1.04)	(-1.10)	(-1.15)
LIQUIDITY	-0.0894	-0.1098*	-0.1039	-0.1205	-0.0871	-0.0873	-0.0842
	(-1.46)	(-1.72)	(-1.46)	(-1.64)	(-1.40)	(-1.41)	(-1.35)
AGE_INC	-0.0008	-0.0007	-0.0066	-0.0065	-0.0007	-0.0009	-0.0012
	(-0.94)	(-0.92)	(-1.40)	(-1.30)	(-0.83)	(-1.09)	(-1.47)
MB	-0.0178*	-0.0176*	-0.0368	-0.0339	-0.0189*	-0.0168	-0.0166
	(-1.75)	(-1.79)	(-1.48)	(-1.39)	(-1.86)	(-1.64)	(-1.63)
Control for							
Observations	3259	3260	3260	3259	3259	3259	3259
Sargan Hansen J Chi_squared	0.0093	0.0092	0.3384	0.4202	0.0042	0.0289	0.1013
p-value	0.9232	0.9238	0.5608	0.5168	0.9486	0.8650	0.7503

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$CS_{i,t} = \delta\alpha_0 + (1 - \delta)CS_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

*of which, CS_{it} is the ratio of total debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership type of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 7. *Types of Ownership Structures and Short-Term Debt Ratio –GMM*

Dependent variable: STD	*Generalized Method of Moment*						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Constant	0.0819	0.1032	0.1281	0.1486*	0.0781	0.0558	0.0426
	(1.32)	(1.64)	(1.64)	(1.84)	(1.25)	(0.89)	(0.68)
Y_{t-1}	0.7569***	0.7575***	0.7567***	0.7525***	0.7584***	0.7549***	0.7517***
	(36.67)	(36.94)	(34.14)	(33.07)	(37.04)	(36.30)	(36.25)
STATE	0.0202			0.0627			
	(1.52)			(1.21)			
INSTITUTION		0.0485***		-0.0119			
		(3.00)		(-0.24)			
FOREIGN			0.6476	0.7080			
			(1.51)	(1.52)			
MANAGER					-0.0231	0.2117	0.7863*
					(-0.44)	(1.32)	(1.93)
MANAGER^2						-0.5849	-4.6250
						(-1.33)	(-1.54)
MANAGER^3							5.8622
							(1.27)
SIZE	0.0027	0.0015	0.0018	0.0009	0.0030	0.0037	0.0042*
	(1.15)	(0.63)	(0.66)	(0.31)	(1.27)	(1.57)	(1.77)
TANGIBILITY	-0.0606**	-0.0656**	-0.1376**	-0.1562**	-0.0573**	-0.0563**	-0.0552**
	(-2.23)	(-2.37)	(-2.21)	(-2.29)	(-2.13)	(-2.10)	(-2.05)
CF_RATIO	-0.0626	-0.0710	0.1875	0.1711	-0.0496	-0.0511	-0.0499
	(-0.64)	(-0.74)	(0.91)	(0.81)	(-0.51)	(-0.53)	(-0.52)
LIQUIDITY	-0.0831	-0.1027*	-0.1180*	-0.1363*	-0.0798	-0.0820	-0.0783
	(-1.43)	(-1.71)	(-1.71)	(-1.90)	(-1.35)	(-1.39)	(-1.32)
AGE_INC	-0.0012	-0.0011	-0.0073*	-0.0076*	-0.0011	-0.0013	-0.0016**
	(-1.47)	(-1.41)	(-1.86)	(-1.83)	(-1.44)	(-1.64)	(-1.98)
MB	-0.0219**	-0.0216**	-0.0435**	-0.0418*	-0.0230**	-0.0220**	-0.0226**
	(-2.24)	(-2.25)	(-1.96)	(-1.88)	(-2.36)	(-2.25)	(-2.30)
Control for							
Observations	3261	3262	3262	3261	3261	3261	3261
Sargen Hansen J chi_squared	2.5691	2.6898	0.1956	0.1409	2.5442	2.2603	1.7906
p-value	0.1090	0.1010	0.6583	0.7074	0.1107	0.1327	0.1808

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$STD_{i,t} = \delta\alpha_0 + (1-\delta)STD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta'Control_{i,t} + \varepsilon_{i,t}$$

*of which, STD_{it} is the ratio of short-term debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership type of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression model, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 8. *Types of Ownership Structures and Long-Term Debt Ratio –GMM*

Dependent variable: LTD	Generalized Method of Moment						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Constant	-0.1891***	-0.1885***	-0.1767***	-0.1774***	-0.1897***	-0.2006***	-0.1984***
	(-3.73)	(-3.78)	(-2.64)	(-2.68)	(-3.70)	(-3.90)	(-3.83)
Y_{t-1}	0.6757***	0.6759***	0.6813***	0.6799***	0.6766***	0.6784***	0.6787***
	(21.19)	(21.07)	(14.78)	(14.06)	(21.26)	(21.27)	(21.31)
STATE	0.0068			0.0141			
	(0.67)			(0.38)			
INSTITUTION		0.0050		-0.0073			
		(0.44)		(-0.21)			
FOREIGN			0.0641	0.0617			
			(0.23)	(0.19)			
MANAGER					-0.0065	0.1165	0.0401
					(-0.17)	(0.97)	(0.14)
MANAGER^2						-0.3021	0.2479
						(-0.94)	(0.11)
MANAGER^3							-0.8129
							(-0.24)
SIZE	0.0081***	0.0081***	0.0077***	0.0077***	0.0082***	0.0085***	0.0084***
	(4.04)	(4.11)	(3.14)	(3.29)	(4.06)	(4.22)	(4.16)
TANGIBILITY	0.0203	0.0207	0.0137	0.0129	0.0212	0.0217	0.0214
	(0.85)	(0.86)	(0.26)	(0.22)	(0.88)	(0.90)	(0.90)
CF_RATIO	-0.1350	-0.1336	-0.1137	-0.1196	-0.1307	-0.1304	-0.1309
	(-1.59)	(-1.59)	(-0.78)	(-0.79)	(-1.56)	(-1.55)	(-1.56)
LIQUIDITY	-0.0423	-0.0428	-0.0408	-0.0416	-0.0410	-0.0406	-0.0414
	(-1.02)	(-1.02)	(-0.94)	(-0.97)	(-0.97)	(-0.96)	(-0.97)
AGE_INC	0.0005	0.0005	-0.0003	-0.0002	0.0005	0.0004	0.0005
	(0.80)	(0.77)	(-0.10)	(-0.07)	(0.78)	(0.67)	(0.71)
MB	0.0114	0.0111	0.0104	0.0112	0.0110	0.0117	0.0118
	(1.36)	(1.34)	(0.78)	(0.84)	(1.32)	(1.38)	(1.39)
Control for							
Observations	3261	3262	3262	3261	3261	3261	3261
Sargen Hansen J chi_squared	1.0179	1.0340	1.4581	1.4696	1.0229	1.0562	1.0221
p-value	0.3130	0.3092	0.2272	0.2254	0.3118	0.3041	0.3120

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$LTD_{i,t} = \delta\alpha_0 + (1-\delta)LTD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

*of which, LTD_{it} is the ratio of long-term debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership type of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 9. *Types of Ownership Structure and Bank Loans – GMM Regression*

Dependent variable: BANKD	GMM regression						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*
Constant	-0.1777***	-0.1875***	-0.2025***	-0.2050***	-0.1847***	-0.1956***	-0.2186***
	(-3.06)	(-3.30)	(-3.31)	(-3.44)	(-3.14)	(-3.22)	(-3.55)
CS_{t-1}	0.6246***	0.6233***	0.6192***	0.6193***	0.6236***	0.6226***	0.6175***
	(28.50)	(28.56)	(22.28)	(22.66)	(28.58)	(28.69)	(28.58)
STATE	0.0105			0.0207			
	(0.83)			(0.59)			
INSTITUTION		-0.0103		-0.0221			
		(-0.72)		(-0.67)			
FOREIGN			-0.0870	-0.0545			
			(-0.32)	(-0.18)			
MANAGER					0.0242	0.1284	0.9653**
					(0.48)	(0.77)	(2.37)
MANAGER^2						-0.2589	-6.0653**
						(-0.57)	(-1.99)
MANAGER^3							8.3518*
							(1.77)
SIZE	0.0106***	0.0111***	0.0115***	0.0118***	0.0109***	0.0112***	0.0119***
	(4.67)	(5.04)	(5.02)	(5.28)	(4.79)	(4.85)	(5.07)
TANGIBILITY	-0.0274	-0.0227	-0.0162	-0.0196	-0.0240	-0.0225	-0.0168
	(-1.20)	(-0.97)	(-0.39)	(-0.44)	(-1.04)	(-0.97)	(-0.73)
CF_RATIO	0.0513	0.0609	0.0378	0.0434	0.0582	0.0565	0.0522
	(0.62)	(0.75)	(0.29)	(0.32)	(0.72)	(0.70)	(0.64)
LIQUIDITY	-0.1787***	-0.1695***	-0.1728***	-0.1686***	-0.1713***	-0.1711***	-0.1636***
	(-3.84)	(-3.62)	(-3.69)	(-3.57)	(-3.66)	(-3.67)	(-3.49)
AGE_INC	-0.0014*	-0.0015*	-0.0005	-0.0007	-0.0016**	-0.0016**	-0.0021***
	(-1.84)	(-1.96)	(-0.19)	(-0.27)	(-2.07)	(-2.19)	(-2.65)
MB	-0.0095	-0.0104	-0.0102	-0.0104	-0.0103	-0.0097	-0.0098
	(-1.06)	(-1.16)	(-0.79)	(-0.82)	(-1.14)	(-1.08)	(-1.09)
Control for:							
Observation	3261	3262	3262	3261	3261	3261	3261
Sargan Hansen J Chi_squared	0.6502	0.6105	1.1278	1.0362	0.6070	0.5738	0.2849
p-value	0.4201	0.4346	0.2883	0.3087	0.4359	0.4488	0.5935

Note: This table presents the GMM regression of the effect of different types of ownership on the capital structure. Regression is performed by the equation:

$$BANKD_{i,t} = \delta\alpha_0 + (1-\delta)BANKD_{i,t-1} + \delta\alpha_1 OWNERSHIP_{i,t} + \delta\beta' Control_{i,t} + \varepsilon_{i,t}$$

*of which, $BANKD_{it}$ is the ratio of bank debt to total assets of company i in year t; $OWNERSHIP_{it}$ is the variable that indicates the ownership type of the company i in year t. $Control_{it}$ is the vector of control variable of the company i in year t.. In all regression models, t-statistics are computed based on heteroscedasticity-robust (White, 1980) and sample clustering robust standard errors (Petersen, 2009). The sample period is 2009-2015. *, ** and *** represent significance at 10%, 5% and 1% level, respectively.*

Table 9 reports the results for the regressions of bank debt to total assets ratio on different ownership types. For variables such as STATE, INSTITUTION, and FOREIGN, the GMM regression coefficients do not show any significant results. Meanwhile, the N-shape correlation is found in model (7) regarding the managerial ownership rate. This indicates that the impact of managerial ownership on the capital structure as non-linear effects.

Hence, the overall result from the study of types of ownership structures expresses that, in GMM models, the effect of different ownership types is not significant. As a result, the overall evidence of the types of state ownership, institutional ownership, and foreign ownership is consistent with *hypothesis H7*: The ownership types do not affect the firm decision on capital structure (*H3, H4* and *H5*, therefore, are rejected). On the other hand, the results from GMMs specify that there is a non-linear correlation between the managerial ownership and the overall debt ratio (inverted-U – second order correlation) and bank loan ratios (N-shape – third order correlation). This is consistent with only the *hypothesis H6c* that managerial ownership has a non-linear effect on the capital structure of firms listed in Vietnam (not simply positive as *H6a* or negative as *H6b*).

Conclusions

In this paper, we attempted to examine whether the ownership structure has any impact on the capital structure of listed firms in Vietnam. Toward this end, we considered the ownership structure under two dimensions: ownership concentration and ownership types.

For ownership concentration, we used a new variable to measure the concentration of share ownership, the Herfindahl index. For ownership types, we considered each type of shareholder in the firm, namely, the state, institutional investors, foreign investors, and managers. We used GMM method to solve the potential endogeneity problem of simultaneous causality, and the panel fixed effect regressions as a robustness check for our main results. Unlike our previous literature which only used the debt to equity or debt to assets ratio, we went further by considering short-term, long-term debt, as well as bank debt ratio to see which types of debt take the most effect from ownership structure.

The evidence from this paper indicates that there is a significant impact of ownership structure on capital structure. Specifically, we found a positive and significant effect of ownership concentration on the debt ratio, especially for short-term and bank debt. The non-linear models also suggested an inverted U-shaped nonlinear relation between ownership concentration and bank loan ratio. Although most of the shareholder types (STATE, INSTITUTION, FOREIGN) have no significant impact on firm capital structure, we did find a non-linear inverted U-shaped relationship between managerial ownership and debt ratio and an N-shaped relationship between managerial ownership and bank debt structure, which is consistent with the findings of Ruan et al. (2011) for Chinese companies.

Our paper contributes to the literature on the impact of ownership structure on corporate financial decisions in several ways. First, while most of the studies regarding this topic only use fixed effect panel regression (King & Santor, 2007; Liu et al., 2011; Sun et al., 2015) which could not resolve the potential endogeneity problem. We can relieve the problem to some extent by deploying GMM.

Second, we use a new method to measure the ownership concentration which is not commonly used in the previous literature on this topic, namely, the Herfindahl index (H-index). We construct the H-index for all the major shareholders, five largest shareholders, institutional shareholders as well as foreign shareholders. To the best of our knowledge, our paper is the earliest to construct a full set of H-index thanks to the comprehensive hand-collected dataset.

Third, not only do we consider the overall capital structure (by total debt to total assets ratio) like previous literature, but we also expand our study further to different types of debt such as short-term debt ratio, long-term debt ratio as well as bank loan ratio. Therefore, our findings are more comprehensive.

Last but not least, the results of this study provide an interesting view of a country with a unique economic-socio structure such as Vietnam, who is in a transition from industrial policies to a market economy. The evidence from this paper may help the managers of listed companies in Vietnam to consider an appropriate ownership structure. For policymakers, they can view the results in the decision-making process, especially when Vietnam government is conducting restructuring and equitization of state-owned enterprises.

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