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THE IMPACT OF CAPITAL STRUCTURE ON PERFORMANCE OF LISTED FIRMS IN VIETNAM

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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ABSTRACT

This paper analyzes the impact of financial leverage on performance of listed firms in Vietnam, where ROA, ROE and Tobin's Q are used as proxies for firm performance. Different empirical models are applied to test the relationship between capital structure and performance of non-financial firms and banks separately. In addition, this study also takes the 2008 global financial crisis into consideration when conducting empirical regressions.

Financial data of Vietnamese non-financial listed firms during the period from 2008 to 2016 is mainly employed from the database Bureau Van Dijk's ORBIS, data for bank-specific variables in the same period is extracted from official annual reports of listed banks in Vietnam. Moreover, The World Bank's database is used to collect data for Vietnamese GDP and inflation rate, which represent for macroeconomic variables.

Empirical results from panel Ordinary Least Squares (OLS) regressions reveal a negative relationship between financial leverage and performance of Vietnamese non-financial firms. Regarding banks, financial leverage has a negative impact on bank's ROA but positively affects bank's ROE. These outcomes remain unchanged when the 2008 financial crisis is taken into account.

To solve the endogeneity problem, this paper uses the two-step system generalized method of moments (GMM) estimator. The negative effect of capital structure on performance of non-financial firms in Vietnam is confirmed. However, results for listed banks become insignificant.

KEYWORDS: capital structure, financial leverage, firm performance, financial crisis, Vietnam.

1. INTRODUCTION

Capital structure and the effect of capital structure on firm performance is a matter of great concern in finance. Throughout the history of financial theories, there are various studies associated with capital structure such as the M&M theory (Modigliani & Miller, 1958), the trade-off theory (Myers, 1984), the pecking order theory (Myers and Majluf, 1984) and the agency theory (Jensen & Meckling, 1976). The M&M theory can be considered as the foundation theory in this area, which states that in a perfectly efficient market, firm's value is irrelevant to its capital structure. However the assumptions of a fully efficient market is supposed to be unrealistic. Therefore, taking the imperfection of capital market into account, the trade-off theory argues that firms can achieve an optimal debt to equity ratio to maximize its value by trading-off the advantages and disadvantages of debt financing, where advantages of debt come from the tax shield effect and the disadvantages come from financial distress. Based on information asymmetry phenomenon, the pecking order theory introduces a financial hierarchy among three sources of funds in the order of retained earnings, debt and equity. Finally, the agency theory claims that a value-maximizing capital structure can be obtained by balancing conflicts of interest among managers, shareholders and creditors. However, despite great contributions to finance sector, these theories are still based on many strict assumptions and so lack of practicality. Hence, there are plenty of empirical studies have been conducted to test the real impact of capital structure on firm performance in different markets.

1.1. Purpose of the study

Due to special features of Vietnamese economy, before the economic reforms in 1986, capital structure was not an important matter in corporation management because most of enterprises in Vietnam are owned and funded by the government. However, until the formation of the Vietnamese stock market in 2000, more and more companies start to equitize and call for capital from external sources. Therefore capital management becomes a big issue. Yet, young

corporations in Vietnam are still inexperienced in making effective capital structure decisions (World Bank, 2012), leaving a question whether there is a close relationship between capital structure and performance of Vietnamese companies. Thus, to provide an appropriate answer to this question, this paper will conduct empirical analyses to check the impact of financial leverage on profitability of non-financial listed firms in Vietnam.

In addition, financial system in Vietnam is still bank-centered, which means a very essential role of banks in Vietnamese economy. Therefore, this paper also examines the effectiveness of Vietnamese listed banks in using different sources of capital. Moreover, because study period in this paper includes the stage of the 2008 global financial crisis, the link between financial leverage and firm performance during crisis will be investigated.

In short, this paper will test the following hypotheses:

- Hypothesis 1: financial leverage significantly affects performance of non-financial listed firms in Vietnam.
- Hypothesis 2: financial leverage significantly affects performance of listed banks in Vietnam.
- Hypothesis 3: during the 2008 crisis, financial leverage significantly affects performance of non-financial listed firms in Vietnam.
- Hypothesis 4: during the 2008 crisis, financial leverage significantly affects performance of listed banks in Vietnam.

1.2. Structure of the study

The rest of this paper will be structured as follows. Chapter 2 introduces core theoretical framework related to this topic and chapter 3 discusses about literature review. Chapter 4 will mention about institutional environment in Vietnam. Data selection and methodology will be outlined in chapter 5. Chapter 6 reports empirical results and chapter 7 concludes.

2. THEORETICAL FRAMEWORK

This chapter begins with the definition of capital structure, the distinction between equity financing and debt financing, then followed by the introduction of capital structure theories including the Modigliani & Miller theory, the trade-off theory, the pecking order theory, and the agency theory.

2.1. Definition of capital structure

The capital structure of a company is generally defined as the combination of its equity and debt which are commonly shown on the right hand side of the company's balance sheet. Normally, companies finance their assets, daily operations and investment projects for future growth by equity from owners/shareholders and/or by debt borrowing from outsiders. If a firm only uses equity to cover its activities, it is recognized as an unlevered firm; conversely, a mixing of both equity and debt in the firm's capital structure determines a levered firm. Moreover, there is also another element of capital structure called hybrid securities, which consist of characteristics of both equity and debt.

Equity financing and debt financing are different in terms of the way firms receive capital and return money back to investors. To finance a firm's activities by equity, usually, there are two options: the firm can retain its earnings or issue new shares of stocks. Firm's stocks are normally categorized into two types: common stock and preferred stock. The difference between these types of stock is that in case of company liquidation and dividend distribution, preferred stock shareholders will receive assets before common stock shareholders. However, according to Quiry & Vernimmen (2005), whether preferred stock or common stock, there is no guarantee for the shareholders in general, which means that in the case of bankruptcy, shareholders are always in the bottom of the line to receive compensation and face the risk of losing all the money invested in the company. The higher priorities belong to bondholders and creditors. In return, if the firm's assets increase in value, the value of stocks

are able to surpass the initial invested amount of money. Therefore, according to Black & Scholes (1973), equity in a company can be considered like a call option. This also conforms to the risk-reward trade-off theory.

To finance a firm's activities by debt, usually, there are also two options called private debt and public debt. Firms can raise capital by borrowing from banks, financial institutions or issuing bond. In return, debt holders will receive a fixed rate of interest, thus, debt holders are independent of firm performance. Despite not having ownership rights of voting or managing, debt holders will have claim to assets over equity holders in the event of insolvency. Lender's benefits are also secured by collateral or other biding conditions. In addition, because interest expenses are often tax deductible, company's decisions to take leverage or not are worth considering.

Hybrid instrument is the last element of capital structure. There are three common types of hybrid securities including convertibles, preference shares and capital notes (Berk & DeMarzo, 2011). These instruments combine features of both equity securities and debt securities. Likewise debt securities, hybrid securities typically commit to return a fixed or floating interest rate until a certain day. Besides that, they also have equity features such as the right to be converted into equity or early terminated at the time not favorable to the holders, and the holders being ancillary to other creditors in case of liquidation.

2.2. Capital structure theories

2.2.1. Modigliani & Miller theory (M&M)

In the development of modern theories in finance, university professors and also Nobel Prize winners, Franco Modigliani and Merton Miller can be considered as the ones who lay the foundation and build framework for most of today core theories in the field of capital

structure by publishing a theory called capital structure irrelevance theory (M&M theory) in the journal *The American Economic Review* in 1958 (Faruk & Burim, 2015).

According to Pan (2012), the M&M theory very soon becomes the key theory of capital structure after its publication. The original proposition of M&M theory (1958) states that there is a perfectly efficient market in which there are no transaction costs, no bankruptcy costs and no taxation, the theory also suggests that there is plenty information at the disposal of all market participants. However, in 1963, in order to make the theory more realistic, Modigliani and Miller included also the influence of taxes in their model.

According to Breuer and Gürtler (2008), there are two important propositions of Modigliani and Miller's publications in 1958 and 1963, which build the basics of their theorem, can be extracted as below, respectively:

- Proposition I claims that a firm's capital structure does not have any impact on its total value in a perfect capital market.
- Proposition II claims that the cost of equity increases with its debt-equity ratio.

Proposition I: Irrelevance of the Capital Structure

This proposition states that in perfect conditions of capital market, firm's value is irrelevant to the capital structure of the firm. Whether a company has a low level of debt or is highly levered, it does not matter to the market value of the company. Rather, firm's market value depends on its operating profits. The assumptions of a fully efficient market in M&M theory include the following conditions:

- Transaction cost is nonexistent.
- No bankruptcy cost.
- There is a symmetry of information. All market participants have adequate knowledge and are free to access information.
- Both the firm and investors are equal when they want to borrow against securities.

- All firms have the same risk class

Besides the above mentioned conditions, taxation is a factor that plays an important role in M&M theory. Therefore, proposition I is analyzed in two situations:

- *Proposition I without the effect of taxes*

Without taxes, the M&M theory can be expressed as the following formula (Pan, 2012):

$$V_L = V_U$$

Where,

V_L: the value of a levered firm in the capital structure

V_U: the value of an unlevered firm in the capital structure

According to Brigham & Ehrhardt (2010), through this equation, Modigliani and Miller implies that there is no difference in value between two companies with different capital structure, one company uses leverage while the other does not. The way companies finance their assets and activities does not affect its market value, by assuming that the two companies generate the same cash flow. Moreover, the main factors determine the value of the company are operating profits and risk, not capital structure.

- *Proposition I with the effect of taxes*

With the effect of taxes, the M&M theory can be expressed as the formula below (Pan, 2012):

$$V_L = V_U + T_C D$$

Where,

V_L: the value of a levered firm in the capital structure

V_U: the value of an unlevered firm in the capital structure

$T_C D$: the tax ratio (TC) x value of the debt (D)

According to Alifani and Nugroho (2013), companies that take more debt in their capital structure have a higher market value than unlevered companies because of the exclusion of interest expense from tax payment, which is called the tax shield effect. In other words, due to tax policies, firms that have leverage will pay less tax than firm with no debt, therefore, levered firms are more profitable or more valuable than unlevered firms. Of course, this conclusion must rely on the assumption of no bankruptcy cost of debt.

However, despite the great contributions to modern capital structure theories, proposition I of M&M theories still meet criticism from other researchers due to its simplicity. According to Breuer & Gürtler (2008), proposition I does not take into account any hypotheses relating to the inefficiency of capital market. Also, the assumption of "same risk class" used to prove the proposition is criticized. Under the turbulences of today market, the perfect capital market assumption of M&M proposition I makes it seem unrealistic.

Proposition II: Rate of return on equity

M&M proposition II states that the cost of equity increases with the increment of debt-equity ratio in the capital structure of a firm. This statement relates to the definition of a broad concept used in finance called weighted average cost of capital (WACC), which is denoted as below:

$$WACC = K_e * \frac{E}{V} + K_d * \frac{D}{V}$$

Where,

E: Market value of the company's equity

D: Market value of the company's debt

V: Total Market Value of the company (E + D)

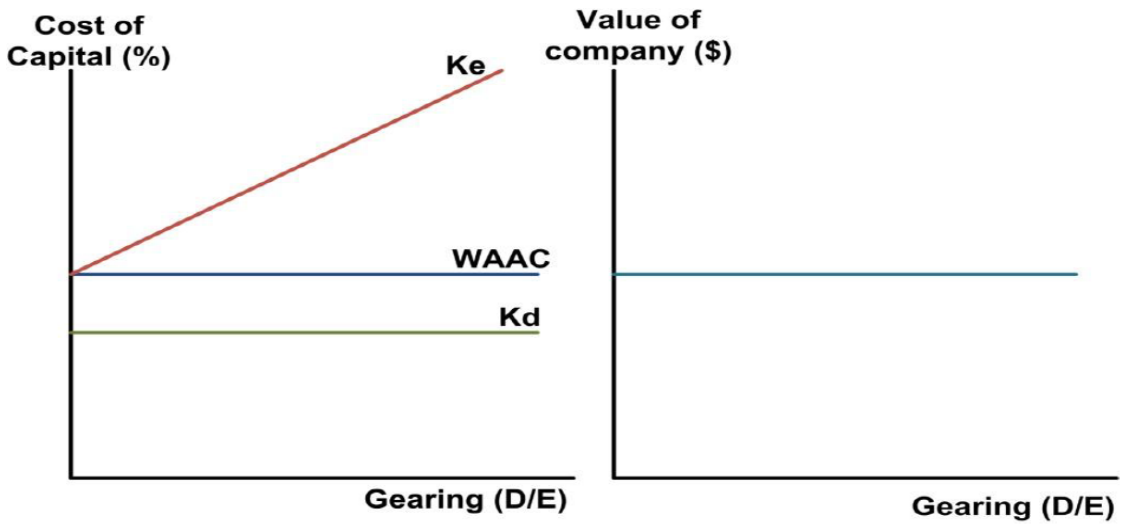
K_e: Company's cost of equity/Investor's expected return of equity

K_d : Company's cost of debt/Creditor's return of debt

According to Villamil (2000), firm's leverage does not affect firm's weighted average cost of capital, therefore M&M proposition II indicates that when there is an increase in the firm's debt to equity ratio (D/E), the firm's cost of equity (K_e) also experiences a linear increase.

- *Proposition II without the effect of taxes*

M&M proposition II explains that because investors are rational, the expected return of equity (K_e) proportionally corresponds to the increment of leverage or debt to equity ratio (gearing D/E). According to Alifani & Nugroho (2013), K_e is compensated by the benefit of cheaper debt finance, and hence, WACC remains unchanged.



(Source: Kaplan Financial Knowledge Bank, 2012)

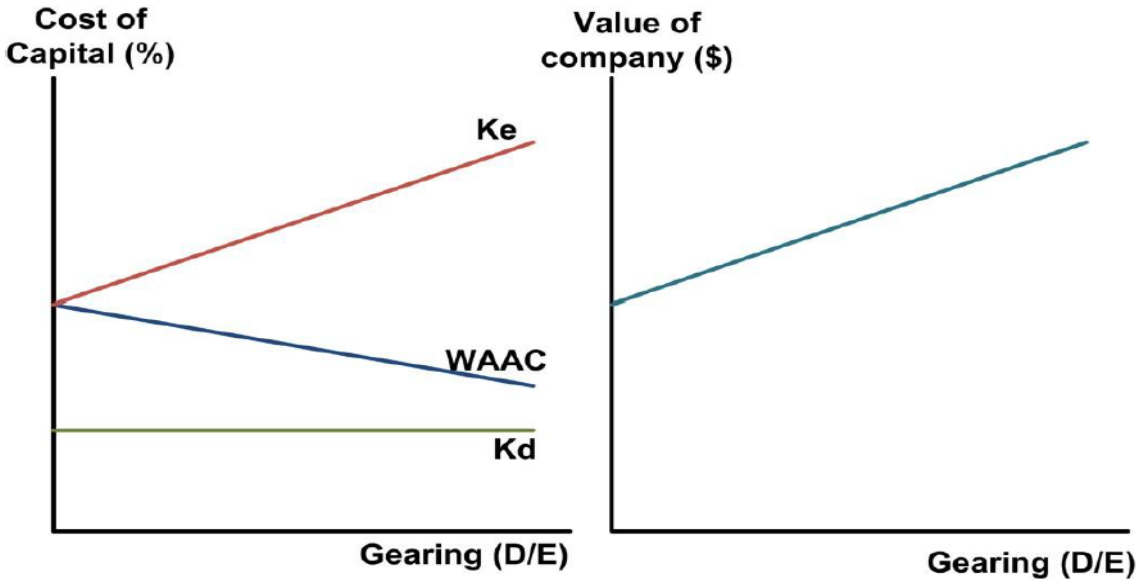
Figure 1. The cost of capital and value of the firm according to M&M theory (without taxes).

As can be seen from the above figure, Kaplan Financial Knowledge Bank (2012) shows that capital structure does not influence the weighted average cost of capital (WACC),

consequently, value of company remains unchanged. When taxes are not taken into account, any combination of equity and debt does not matter to the company's value and shareholder's equity.

- *Proposition II with the effect of taxes*

Modigliani and Miller incorporate the effect of taxes to their theories in 1963. They argue that the interest payment multiplied by the corporate tax rate is equal to the present value of savings from taxes. Hence, according to Brigham & Ehrhardt (2010), firms can reduce the weighted average cost of capital (WACC) by increasing the proportion of debt in their capital structure, because thanks to the effect of tax shield, those firms pay less tax.



(Source: Kaplan Financial Knowledge Bank, 2012)

Figure 2. The cost of capital and value of the firm according to M&M theorem (with taxes).

Figure 2 shows that when taxes are taken into account, companies can take advantage of the tax shield phenomenon. When the gearing (D/E) ratio increases or, in other words, when the percentage of debt in capital structure increases, the weighted average cost of capital (WACC) declines while value of the company goes up. It can be concluded that tax shield does have impact on firm's value through the adjustment of WACC.

It can be said that with the effect of taxes, M&M proposition I does not hold true anymore. In addition, various countries and markets have different tax policies, therefore, market conditions among countries are not the same. If a country changes the law of taxes, proposition I is not valid anymore (Breuer & Gürtler, 2008).

2.2.2. The trade-off theory

The trade-off theory is an evolution of M&M theory but taking the effect of taxes and bankruptcy costs into consideration. The trade-off theory can be considered as a base where other groups of theories are basically relating to it, in which decisions of an optimal capital structure are achieved by balancing between the benefits of leverage and other kinds of costs (Frank & Goyal, 2009).

According to Myers (1984), companies can attain an optimal, value-maximizing debt to equity ratio by trading off the merits and demerits of debt when the inefficiency of the market is taken into account. Therefore, companies will set an ideal debt ratio in their capital structure and gradually will make efforts to achieve it.

Despite the appealing advantages of tax shield when using debt, increasing debt ratio, at the other side, increases the costs of financial distress or what is usually called bankruptcy costs, because debt holders will require higher interest rates when there is an increment in debt to equity ratios, moreover, equity holders also require higher rate of equity return for taking the risk of insolvency in their investments. According to Brealey and Myers (2003), financial managers, when giving decisions of building a target capital structure, usually try to balance

the trade-off between the benefit of tax shield and the bankruptcy costs. They find out that unprofitable firms with risky, intangible assets should finance their activities mainly based on equity financing. By contrast, firms with safe, tangible assets and high enough taxable income to get advantages of tax shield effect should set a high target debt to equity ratio. The formula to calculate firm's value based on the trade-off theory is as bellow:

$$V = D + E = VF + PV – PV$$

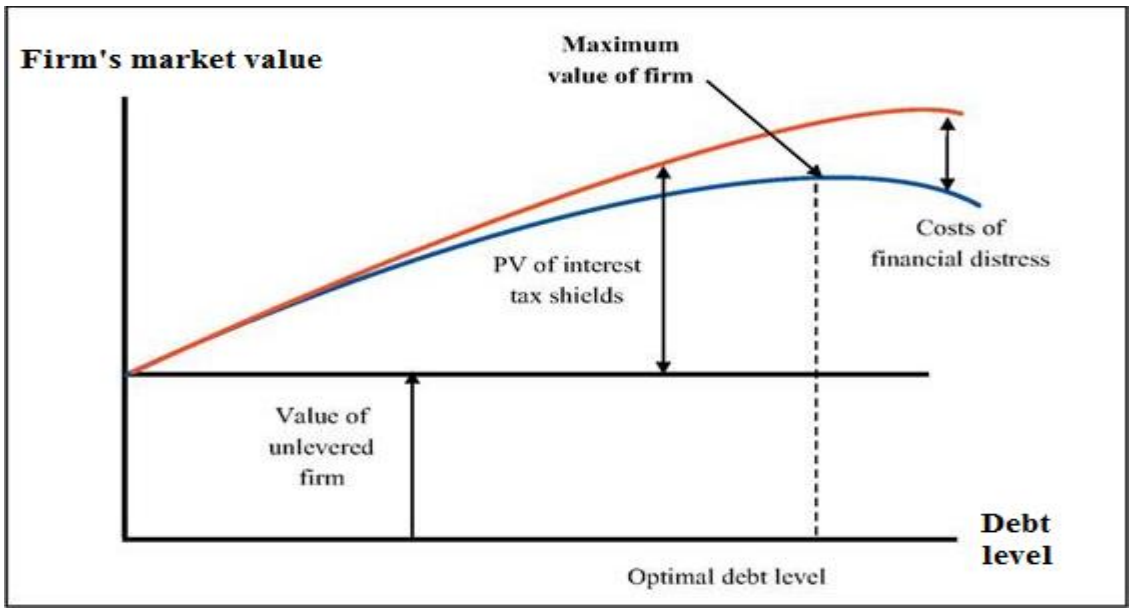
Where,
D: Market value of the company's debt
E: Market value of the company's equity
VF: value of firms with all-equity financing
PV: interest tax shield (the present value of future taxes saved due to the deduction of tax for interest rates)
PV: costs of financial distress (the present value of future costs incurred because of the default risk with high leverage)

Brealey & Myers (2003) also states that managers ought to decide the debt to equity ratio that maximize the value of their firms based on the trade-off theory. In other words, an optimal capital structure is achieved when interest tax shield is maximized and at the same time costs of financial distress associated with debt are minimized. This is always an extremely difficult decision to make for financial managers, therefore, the word "trade-off" is used to express a dilemma that when companies increase the level of debt so as to attain the maximum benefits of tax shield, they simultaneously increase the risk of a possible default.

Throughout the research history about the trade-off in capital structure, researchers develop their theories in many aspects, and studies lead to the two main trade-off theories that are called static trade-off theory and dynamic trade-off theory.

Static trade-off theory

According to the static trade-off theory, a company's performance influences its target debt to equity ratio, which in turn is reflected in the company's decision of issuing securities or increasing debt ratio (Hovakimian et al., 2001).



(Source: Myers, 1984)

Figure 3. Static trade-off theory.

Bradley et al. (1984) provide the standard explanation of the static trade-off theory, in which the following conclusions on their model are made:

- An increment in the bankruptcy costs reduces the optimal debt to equity ratio.
- An increment in non-debt tax shield reduces the optimal debt to equity ratio.
- An increment in the personal tax rate on equity increases the optimal debt to equity ratio.

- At the optimal capital structure, an increment in the marginal tax rate of bondholders decreases the optimal debt to equity ratio.
- The impact of risk is vague, even if uncertainty is assumed to be normally distributed. The correlation between volatility and debt is negative.

The theory also indicates that highly profitable firms commonly will have higher leverage level so that they can maximize the benefits of taxation and raise the availability of capital. According to Myers (1984), because the static trade – off theory is based on the assumption of perfect knowledge in an efficient market, the theory is both supported and criticized. Moreover, various researches have been also conducted to test whether corporations in real world follow the static trade – off theory (Sogorb and López, 2003; Hackbarth, Hennessy & Leland, 2007; Serrasqueiro & Nunes, 2010).

According to Shyam, Sunder & Myers (1999), the static trade-off assumes that companies trade the marginal present values of interest tax shield off against the bankruptcy costs to achieve optimal capital structure. This ideal capital structure is only attained when the marginal value of future taxes saved due to the deduction of tax for interest rates exactly offset the increment in present value of the bankruptcy costs associated with borrowing more debt.

The merit of debt is the tax shield rewarded for interest payments, which encourages the use of debt, however the positive effect can be less appealing with the presence of personal taxes (Miller, 1997) and non-debt tax shield (De Angelo & Masulis, 1980). The study of De Angelo & Masulis (1980) provide a theoretical optimal debt ratio where the present value of tax savings from further debt borrowing is just offset by increment in the present value of costs of financial distress. This theory is based on the assumption that there is no transaction costs for issuing or repurchasing securities (Dudley, 2007). The theory also states that because higher profitable companies would ensure higher tax saved due to the tax shield effect of debt financing, lower probability of financial distress and more promising investment

opportunities for future development of the companies, they set higher target debt to equity ratio (Niu, 2008).

Dynamic trade-off theory

Static trade-off theory argues that firms balance the risk of financial distress with the advantages of tax shield. However, according to the dynamic trade-off theory, issuing and repurchasing debt so as to attain an optimal capital structure to maximize firm's value is costly. Therefore, according to Dudley (2007), companies with the debt level is not exactly equal their target will adjust their capital structure only when the benefits from adjustment are greater than the costs of adjustment.

Also according to Dudley (2007), the dynamic trade-off theory states that companies let their debt to equity ratio vary within an optimal range. The empirical evidence in his study supports the implication of the dynamic trade-off theory, which concludes that volatility increases the optimal leverage range while interest rates and profitability decreases the leverage range. He finds that profitable companies are more beneficial than unprofitable companies when readjusting their capital structure more often to attain the tax shield benefits. Hovakimian et al. (2001) also finds that more profitable companies are more likely to use debt financing over equity financing.

2.2.3. The pecking order theory

Based on the asymmetric information phenomenon between internal managers of a firm and external investors, Myers and Majluf (1984) develops the pecking order theory, which argues that, in order to reduce the costs of asymmetry of information, especially adverse selection, business managers adopt financial policies that prefer internal financing to external financing. The pecking order theory indicates that financial managers obey the following hierarchy among the three sources of fund: retained earnings, debt financing and equity financing as a last resort. This strategy avoids a decrease in share price when issuing new

shares, it also restricts future payment of dividend for new shares so as to increase cash flow. Furthermore, by reducing as much as possible firm's exposures to debt, cost of capital can be lower. Therefore, profitable companies prefer self-financing by using retained earnings as the first choice.

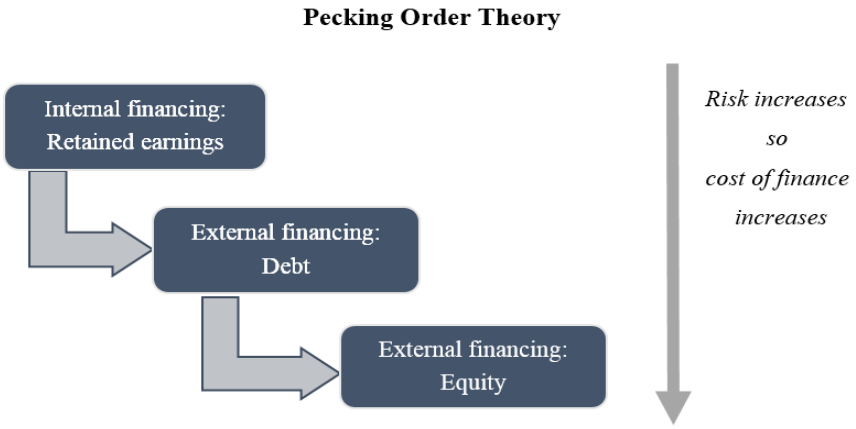


Figure 4. Financial hierarchy among three sources of funds.

Asymmetric information is the key driver explaining for the pecking order model. In management, managers are supposed to act to increase benefits for shareholders, they are fully aware of the company's intrinsic value and have enough information about opportunities as well as risks of the company's investment projects, whereas external investors are only able to receive information passively, thus they are vulnerable when information is manipulated. The asymmetry of information usually leads to adverse selection. Therefore, the pecking order theory states that companies should only issue equity as a last resort because equity issuance signals a lack of confidence that the company's share price is overvalued. This behavior can cause stock price to fall. By contrast, debt issuance often signals a confidence that current stock price is undervalued and investment is profitable. That is the reason why debt is above equity in the order.

According to Myers (2001), the pecking order theory is different from the trade-off theory that there is no optimal capital structure in the pecking order theory. It indicates a passive relation between firm's leverage and profitability that more profitable firms borrow less not because they set lower target debt to equity ratio but just because they have more available internal sources of fund. Unprofitable firms need more external sources of fund, hence they accumulate debt; it is not because they aim to attain an optimal financial structure.

2.2.4. The agency theory

Both the trade-off theory and the pecking order theory suppose that there is no conflict of interest among internal management and external investors. However, according to Jensen & Meckling (1976), firm's managers will not always behave in the best interest of stakeholders. They argue that there are two types of inevitable conflicts which cause the agency cost in companies: the first is a conflict between managers and shareholders and the second is a conflict between shareholders and creditors.

Jensen (1986) develops the free cash flow hypothesis which states that free cash flow is an available cash flow after firm spends capital funding for all positive NPV (net present value) projects. When companies have a big amount of cash available, they tend to invest more to expand the company's size, however, with the eager for rapid development, managers also have a tendency to put money in negative NPV or inefficient projects. Therefore, shareholders would like to receive dividend rather than agreeing with managers to waste their money. Debt creation might be a reasonable way to balance the problem. Using more debt will rise interest rate and increase principal payment of debt, therefore reduce available free cash flow. As a result, agency cost between managers and shareholders is minimized. Besides that, debt financing also creates an efficient pressure for managers to perform better in discipline to pay off the debt.

Nevertheless, according to Stulz (1990), payment of debt may influences shareholders both positively and negatively. The negative side causes the conflict between shareholders and

debt holders. As analyzed above, debt, on the one hand, forces managers to work harder to pay interest, thus, reducing irrational investments that waste shareholder's money. However, on the other hand, excessive debt leads to higher interest rate and spending capital paying for needless debt will restrict companies from profitable investment opportunities. Moreover, when companies face insolvency problem due to debt, shareholders will have no incentive to invest more even if there are positive NPV projects available because value generated from those projects will be distributed for debt holders first. Therefore, high level of debt may cause the rejection of value increasing investment projects.

3. LITERATURE REVIEW

Previous studies about the relationship between firm performance and capital structure can be categorized into two groups. The first group focuses on searching for determinants of capital structure, in which financial leverage is considered as the dependent variable, and firm performance is one of the independent variables. While the second group attempts to analyze factors affecting firm performance and financial leverage is considered as an independent variable. This study belongs to the second group with the purpose to find out the impact of financial leverage on firm profitability.

Many empirical researches have been conducted to test the influence of capital structure (financial leverage) on firm performance in different markets, however, results are not consistent. Some of them conclude a positive impact, some find out a negative impact while others observe mixed impact or even no impact.

3.1. Positive impact

Dessi & Robertson (2003) explore the relationship among debt, incentives and performance of companies in UK. They conclude that financial leverage has a positive effect on performance. Furthermore, they find out firms that have less growth depend more on debt financing to take benefits of estimated growth opportunity. Moreover, when they spend the borrowed money for profitable investment projects, firm performance will be improved.

Nimalathasan and Valeriu (2010) conduct their research in Srilanka, they observe that debt to equity ratio significantly positively affects all profitability ratios including operating profit, gross profit and net profit ratio.

Schonbrodt (2011) reports the influence of firm's specific variables over firm performance in US and Germany. Return on asset (ROA) is used as dependent variable to measure firm

profitability and independent variables representing for firm's characteristics include financial leverage, size, tangibility, growth and liquidity. This study focuses on the comparison between capital structure of German companies and US companies. The authors find out that debt financing has more positive impact on performance of German companies than US companies.

Umar et al. (2012) employ data on 100 listed companies in Pakistan over the period of 2006-2009 and state that there is a significant positive correlation between firm performance and financial leverage. Firm profitability is measured by ROA, Earning per share (EPS) and net profit margins, and short-term debt scaled by total asset (STD/TA), long-term debt scaled by total asset (LTD/TA) and total debt divided by total asset (TD/TA) are used as proxies to measure capital structure variables. Researchers conclude that on the basic of exponential generalized least squares approach, their results are in line with the trade-off theory.

Salteh et al. (2012) inspect the impact of capital structure on performance of 28 listed firms on Tehran stock exchange in the period of 2005-2009, they find that STD/TA, LTD/TA, TD/TA positively affect firm profitability proxies measured by Return on equity (ROE) and Tobin's Q indicators.

Nikoo (2015), by using data of 17 banks in Tehran stock exchange in the period from 2009 to 2014 also sees that capital structure has significantly positive impact on performance of the analyzed banks.

3.2. Negative impact

Noting that a single metric is not sufficient to measure firm performance, Salim & Yadav (2012) use ROA, ROE, EPS and Tobin's Q as indicators to measure firm profitability. The panel data of 237 listed companies in Malaysia in the period 1995-2011 is used to analyze and the authors observe that TD/TA, LTD/TA and STD/TA significantly negatively affect

ROA, ROE, EPS and Tobin's Q. Manawaduge et al. (2011) analyze 155 firms in the emerging market of Srilanka over the period 2002-2008 and find out an inverse impact of financial leverage on firm performance. In another research, Chakraborty (2010) also observes an adverse relationship between financial leverage and firm performance in India market where performance is denoted as the relative amount of earnings before interest and taxes.

Memon et al. (2012) apply a log-linear regression model by employing data of 141 companies in Pakistan in the period of 2004-2009 to test the influence of financial leverage on ROA of those firms and document a negative relationship between TD/TA and ROA. Muritala (2012) applies the panel least square approach to conduct empirical analysis about the link between debt to equity ratio and firm performance of 10 Nigerian companies over the period 2006-2010 and also reports that TD/TA has a negative influence on ROA. Another study of Soumadi & Hayajneh (2015) claim a similar negative impact of TD/TA on ROE and Tobin's Q when analyzing data of 76 companies in Jordan over the period from 2001 to 2006.

Gansuwan and Önel (2012) investigate the influence of financial leverage of 174 listed companies in Sweden on their performance in the period from 2002 to 2011. The authors employ ordinary least squares regression to conduct this research. They use three proxies to measure performance: ROA, ROE and Return on investment (ROI) as dependent variables and TD/TA, LTD/TA and STD/TA as independent variables. The empirical results suggest that firm's financial leverage significantly negatively affects performance of Swedish companies.

Tan (2012) explores the link between financial distress and firm performance of 277 firms in eight East Asian economics during the financial crisis in the period 1997-1998. The empirical findings show that high-leverage firms are supposed to perform worse than low-leverage companies. In other words, a higher level of debt leads to a higher probability of financial distress and weak performance. In addition, the 1997-1998 crisis also strengthens the negative relation between financial leverage and firm performance.

Doğan (2013) conducts empirical analysis on listed insurance companies in Borsa Istanbul in the period of 2005-2011 to capture the relationship between firm's capital structure and its performance. Results show that financial leverage has a negative effect on ROA ratio, moreover, firm's size positively affects firm profitability while firm's age has a negative impact.

Iavorskyi (2013) tests the impact of firm's leverage on firm performance of 16,500 firms in Ukraina over the period 2001-2010. TD/TA is used as an independent variable to measure leverage and the metrics for firm performance are ROA, Return on sales (ROS), Total factor productivity (TFP). The findings of this study show that financial leverage has a negative impact on firm performance. The author claims that this result disagrees with the free cash flow and trade-off theories but supports the pecking order theory.

By using multiple regression analysis, Abdel-Jalil (2014) observes a significant inverse impact of debt ratio on ROI of companies in Jordan. Ramadan and Ramadan (2015) also test the data of 72 firms in Jordan over the period of 2008-2012 by applying the pooled ordinary least squares and report a negative impact of the capital structure variables TD/TA, LTD/TA and STD/TA on ROA.

3.3. Mixed impact

Ebrati et al. (2013) conduct a research on capital structure and firm performance by using the sample of 85 Iranian firms listed in Tehran Stock Exchange over the period of 2006-2011 and applying multiple regression analysis. The authors use four indicators to measure firm performance as dependent variables: ROA, ROE, Tobin's Q and the Market value of equity to book value of equity ratio (M/B). They also use four metrics for independent variables to measure leverage: LTD/TA, STD/TA, TD/TA and total debt to total equity. The empirical

findings are mixed that financial leverage has a positive impact with ROE, M/B and Tobin's Q, but has a negative impact with ROA

Tianyu (2013) uses a sample of more than 1200 listed firms in Germany and more than 1000 listed firms in China in period 2003-2012 to test the influence of capital structure on firm profitability in these two markets. The author uses Tobin's Q as dependent variable and total debt as an indicator for leverage. The study reports that financial leverage has a significantly negative effect on firm performance in China, whereas it has a significantly positive impact on performance of Germany firms before the 2008 crisis.

3.4. No relationship

While many studies document either a positive or negative relationship between financial leverage and firm performance, there are also some researches show that there is no such significant correlation between them.

Ebaid (2009) employs data of 64 companies listed in Egypt's capital market in the period of 1997-2005 to test the influence of debt to equity ratio on profitability of the companies, however, after conducting multiple regression analysis, the authors find from a weak to no impact.

Al-Taani (2013) also reports that there is no statistically significant correlation between debt ratios and ROA when analyzing Jordanian firms over the period of 2005-2009.

3.5. Findings in the context of Vietnam

Fu-Min Chang et al. (2014) investigate the relationship between capital structure and firm performance of Vietnamese state-owned enterprises (SOEs) during the period of 2007-2011.

Their empirical findings document that short-term debts have a significantly negative relation with accounting-based firm performance while long-term debts are positively correlated with market-based firm performance. Furthermore, according to their study, because of the socialist market economy reforms, SOEs are less dominant in firm performance. They also report that the 2008 financial crisis changes the link between capital structure and firm performance of SOEs in Vietnam. Hence, they anticipate Vietnamese firms can gain new insight in the future.

Nguyen & Nguyen (2015) examine the influence of capital structure on 147 listed firms in Ho Chi Minh City Stock Exchange (HOSE) in the period from 2006 to 2014. The authors not only test the effect of financial leverage on firm performance in general but also use short-term debt and long-term debt ratio to test the effect of debt maturity. The study finds that the relationship between leverage and firm performance is significantly negative, however, there is no difference between the impact of short-term debts and long-term debts.

Le & Phan (2017) conduct a study about the impact of capital structure on performance of non-financial listed firms in Vietnam over the period of 2007-2012. They observe that all debt ratios significantly negatively affect firm performance. They also argue that this result is consistent with most researches in this field in the context of developing markets, while it is not in line with some researches inspected in developed countries, which indicate a positive link between financial leverage and firm profitability. Moreover, they point out that the controlling role of debt is not substantial due to severe asymmetric information phenomenon and inefficient financial system in Vietnam.

4. INSTITUTIONAL ENVIRONMENT IN VIETNAM

Before the socialist-oriented market economic reforms in 1986, Vietnam adhered the central planned model of socialism which is mainly based on SOEs, agriculture and heavy industry. In the meantime, the Vietnamese economy severely suffered from hyperinflation and financial crisis. For this reason, in 1986 the Vietnamese government decided to implement a reform called "Doi Moi", to convert the central planned economy to a market economy with the purpose of attaining a developed and stable economy (Fu-Min Chang et al., 2014). In this institutional context of a typical developing country, this chapter will discuss about the Vietnamese economy and the Vietnamese financial environment - in which Vietnamese corporations are operating.

4.1. Vietnamese economy

4.1.1. Vietnamese economy in general

After the 1986 reform, Vietnam witnessed a significant improvement both in politics and economics, confirming the attempts to modernize the country. It can be said that one of the remarkable milestones for the Vietnamese economy is the successful participation in the World Trade Organization (WTO) in 2007, which makes the economic environment in Vietnam more attractive and competitive. According to World Bank (2017), the country has been recognized for its attainments in controlling inflation, strengthening external accounts and macroeconomic stability. These achievements have changed Vietnam from one of the world's poorest countries to a lower middle-income country.

Since 1990, Vietnam has been ranked as one of the economies with the highest GDP (Gross Domestic Product) per capita growth in the world, the average growth rate is about 6.4 percent a year in the 2000s (World Bank, 2017). As can be seen from figure 5, in recent years, annual GDP growth of Vietnam has overcome other countries in the same lower-middle

income class and the numbers are far above the world average. In spite of the instability of global environment, Vietnamese economy is still durable. With GDP increasing by more than 6% in 2016 the country's mid-term prospect looks promising with strong domestic demand and export oriented manufacturing.

(*Source: www.data.worldbank.org*)

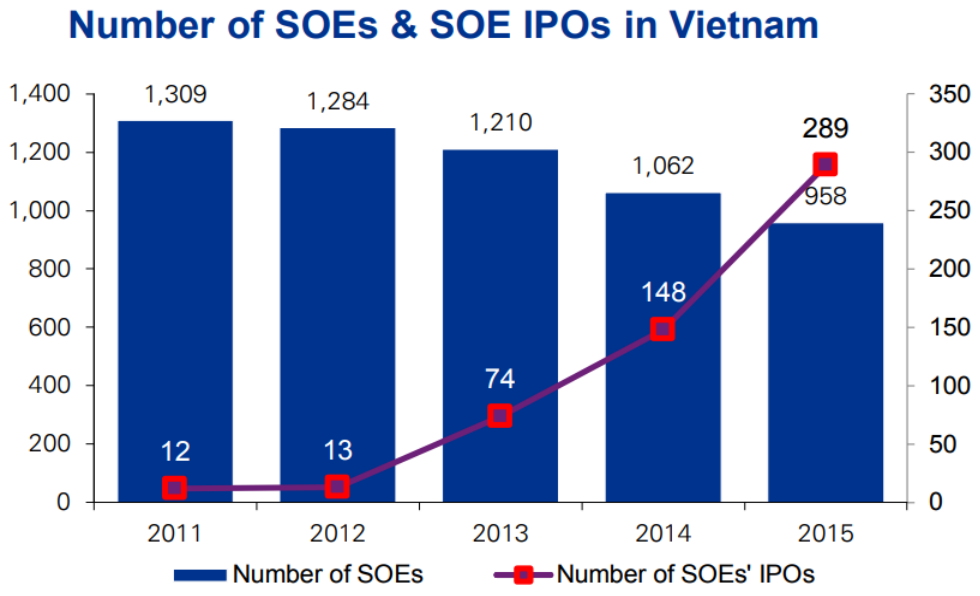
Figure 5. GPD growth (annual %) of Vietnam, other lower middle-income countries and the World Average in the period 2006-2016.

Another important indicator to prove the impressive growth of Vietnamese economy is FDI (Foreign Direct Investment). According to Oxford Business Group (2017), Vietnam's accession to WTO in 2007 has promoted FDI growth, with average annual inflows increase from $2.5 billion in the period 2000-2005 to $8.4 billion in the period 2008-2014. Until November 2016, the total FDI stock was $293 billion with the contribution of investors from 114 countries running 22,280 projects in Vietnam.

4.1.2. Vietnamese corporate context

As a part of the "Doi Moi" reform, since 1992 the Vietnamese government has applied equitization and privatization policies to transform many SOEs to joint-stock or private companies. The purpose of these polices is to mobilize capital from investors both inside and outside Vietnam, to increase financial capacity and remodel management methods and modernize technology to enhance competitiveness and effectiveness of the Vietnamese economy.

According to KPMG (2017), the number of SOEs in Vietnam declined significantly over the period of 2011-2015. In these five years, nearly 600 SOEs were equitized and 96% of the target was reached. The Vietnamese government plans to hold 100% stake of only 103 SOEs in the period 2016-2020, whereas continue equitizing 137 companies more.

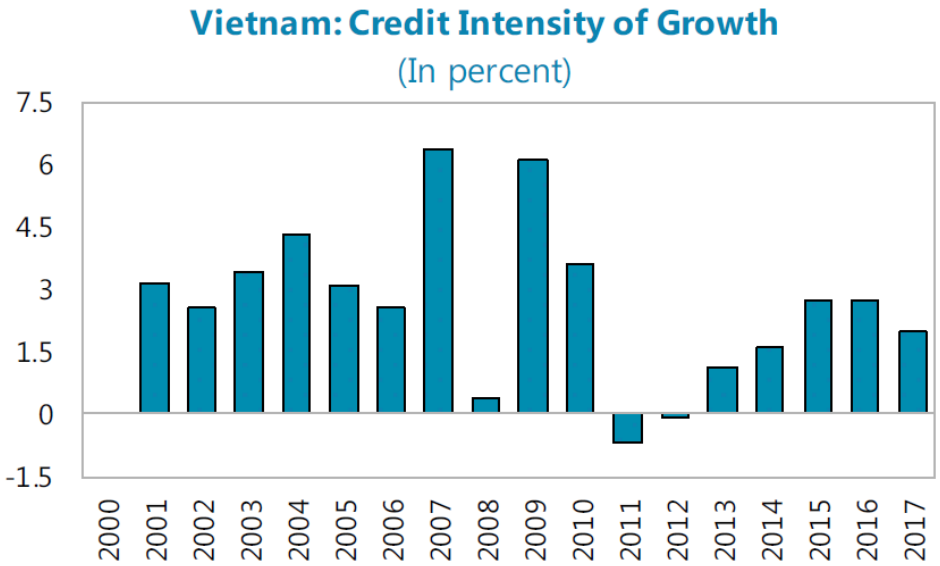


(*Source: KPMG, 2017*)

Figure 6. Number of SOEs & SOE IPOs in Vietnam in the period 2011-2015.

4.2. Vietnamese financial environment

According to the country report of IMF (2017), due to bouts of uncertainty, Vietnam's accelerated financial growth since the early 2000s has been terminated. The financial system is still controlled by the state and remains bank-centered, credit has grown fast, however, the output efficiency of credit has decreased, rate of return to investment has fallen. Figure 7 shows that the credit intensity of growth has risen in recent years. IMF reports that actual credit growing is nearly three time faster than real GDP. Inappropriate credit growing targets by bank and by sector of activity are still in effect, which cause the inefficiency in capital allocation across business areas and enterprises.



(*Source: Vietnamese authorities and IMF staff estimates)*

Figure 7. Vietnam: Credit Intensity of Growth.

IMF (2017) suggests that large ranging bank reforms are necessary to build a level playing field for access to credit, increase the efficiency and level of investment as well as financial sector resilience. Moreover, more professional financial markets and institutions are also seriously needed to finance investment and infrastructure.

5. DATA AND METHODOLOGY

5.1. Data Selection

The dataset used for empirical analysis in this paper is obtained from Bureau Van Dijk's ORBIS database and official annual reports of listed firms in Vietnam. Financial information of publicly listed firms in two stock exchanges in Vietnam, including Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX), is collected in the 9-year period from 2008 to 2016, which builds a panel data. These firms will be categorized into two different sectors, non-financial firms and banks. Unlevered firms and firms with insufficient financial data will be eliminated from the sample. Moreover, data for macroeconomic variables is obtained from the World Bank's Database. Because the analyzed period comprises the period of the global financial crisis in 2008, data for this stage will be studied appropriately by using dummy variables.

5.2. Methodology

According to Fama & French (1992), the meaning of capital structure in financial and non-financial firms is different. While high leverage of non-financial firms more likely indicates financial distress, this leverage level is probably normal for financial firms. Flannery (1994) also reports that banks are affected by debt level as the same way as other firms, however, they operate unusually high leverage. Therefore this paper tests the impact of capital structure on performance of non-financial firms separately by eliminating data of financial firms (those with a one-digit standard industrial classification (SIC) code of six). Nevertheless, because of the special role of banks in the traditional bank-centered financial system in Vietnam, this paper will also use independent models to investigate the effect of financial leverage on performance of listed banks in Vietnam.

Moreover, data used in this paper includes the period of one of the worst global financial crises in 2008, which has a large contagion all over the World and Vietnam is no exception.

According to Nguyen et al. (2011), the financial crisis unfolded in 2008 causes the World economy into Great Recession, the contagious effects of the crisis spread over all continents. Most countries suffered from financial distress and high unemployment rate. Until 2010, Greece and Ireland are considered as the latest victims of the 2008 crisis. In this global context, Vietnamese economy experienced sharp downturn due to the spillover effect of the crisis. Industrial production in the fourth quarter of 2008 declined to 15.6% in comparison with 17.4% in 2007. This period also witnessed a dramatic decrease in Vietnamese GDP. For this reason, this paper also explores the influence of capital structure on performance of Vietnamese listed firms during the downturn period from 2008 to 2010.

5.2.1. Capital structure and performance of non-financial firms

- *Measure of firm performance*

According to Short et al. (2007), ROA, ROE and Tobin's Q are often used as indicators measuring firm performance. While ROA and ROE are employed to present firm's accounting performance, Tobin's Q captures firm's market performance. ROA is determined as the ratio of earnings after interest and tax divided by total assets, ROE is determined as the ratio of earnings after interest and tax divided by total equity and Tobin's Q is calculated by dividing total market value of firm (market capitalization + market value of debt) into total asset value of firm (King & Santor, 2008).

- *Measure of capital structure*

Capital structure is captured by using firm's financial leverage. Based on the study of King & Santor (2008), leverage ratio (LEV) is calculated by dividing total debt into total equity.

- *Measure of control variables*

According to Saurabh & Anil (2015), high sales growth has a direct effect on profitability of a firm because growth firms can generate more value from investment opportunities. More tangible firms are able to avail more debts due to their collateral value, therefore, tangibility has an impact on firm performance. Size and age are also important factors affecting firm

performance because large size and older firms can take advantage of greater credibility and economies of scale, better capabilities and diversification benefits, which may influence profitability.

Based on the study of Le & Phan (2017), high profitable firms are more efficient and thus expected to have higher performance. Moreover, firms with high level of cash are able to alleviate financial distress problems, more capable of supporting their new projects and paying dividends. Hence, liquidity is assumed to positively correlate with firm performance.

Table 1 provides details of control variables and their measures.

Table 1. Control variables of non-financial firms.

Variables	Measures
Growth (GRO)	The percentage change in sales over year
Tangibility (TAN)	The ratio between fixed assets and total assets
Size (SIZ)	Natural logarithm of total assets
Age (AGE)	The number of years since incorporation date
Profitability (PRO)	The ratio of earnings before interest and taxes to total sales
Liquidity (LIQ)	The ratio of cash and cash equivalent to total assets

- *Empirical models*

By using the measures of variables above, regression equations for firm performance are formulated as below:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$Tobin'Q_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (3)$$

Where β_0 is the intercept of the equations; $\beta_1, \beta_2, \dots, \beta_7$ are coefficients of independent variables; i, t specify firm *i* at time *t* and $\varepsilon_{i,t}$ is the error term.

5.2.2. Capital structure and performance of banks

To investigate the impact of capital structure on performance of listed banks in Vietnam, the leverage ratio (*LEV*) is still used to measure capital structure. However, because most of the banks in Vietnam launch the initial public offering (IPO) after 2008, data of market capitalization to calculate Tobin's Q during the whole period 2008-2016 is lacked. Therefore, only ROA and ROE are used to measure performance of listed banks. Moreover, due to the difference in nature of operation, asset structure and capital structure of banks and non-financial firms; as well as the special role of banks in Vietnamese economy and the mutual impact between banks and macroeconomics, control variables are re-determined.

Based on the study of Siddik et al. (2017), control variables for banks can be categorized into two types: bank-specific variables and macroeconomic variables. This paper also uses growth, size and liquidity as bank-specific control variables, while GDP and inflation factors are considered as macroeconomic variables. The importance of growth, size and liquidity to bank performance is similar to non-financial firms.

Regarding economic factors, Athanasoglou et al. (2008) indicate that during economic downturns, demand for loans may decrease, and thus lower bank profitability. By contrast, during economic booms, when most industries are in good prospects and there are plenty of promising investment projects, demand for loans may increase, which leads to an increase in interest rate and improve bank performance. Therefore, GDP is used as a proxy to measure the impact of economics on bank performance. Inflation also plays a vital role in banking industry. By taking estimated inflation into consideration, banks will adjust their nominal interest rate so that their revenue can override the cost to keep high profits (Siddik et al., 2017).

Measures of bank control variables are described in table 2.

Table 2. Control variables of banks.

Variables		Measures
Bank-specific	Growth (GRO)	The percentage change in sales over year
	Size (SIZ)	Natural logarithm of total assets
	Liquidity (LIQ)	The ratio of cash and cash equivalent to total assets
Macroeconomic	Gross Domestic Product (GDP)	Natural logarithm of GDP
	Inflation (INF)	The annual inflation rate

The models to capture the impact of capital structure on bank performance are denoted as below:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \varepsilon_{i,t} \quad (5)$$

5.2.3. Capital structure and firm performance during financial crisis

To investigate the impact of the financial crisis on the relationship between capital structure and firm performance, a dummy variable - CRI is added to the models (1)-(5) above. CRI takes the value of 1 for crisis period from 2008 to 2010 and 0 for the post-crisis period from 2011 to 2016. New regression models are denoted as the following:

- *For non-financial firms*

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (6)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (7)$$

$$Tobin'Q_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (8)$$

- *For banks*

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \beta_7 CRI + \varepsilon_{i,t} \quad (9)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \beta_7 CRI + \varepsilon_{i,t} \quad (10)$$

6. EMPIRICAL RESULTS

6.1. Descriptive statistics

Descriptive statistics of all variables as measures of capital structure, control variables and performance of non-financial firms are described in table 3. As can be seen from the table, the leverage ratio (LEV) of non-financial firms in Vietnam is relatively high, the mean and median values are 1.43 and 1.13 respectively, which are higher than 1, mean that debt financing predominates equity financing. The number also indicates that in comparison with other countries, Vietnamese firms are overleveraged. Specifically, the leverage ratio is just about 0.28 for companies in France throughout the period 1998-2009 (De La Bruslerie & Latrous, 2012) and 0.5 for companies from 22 Western European and East Asian countries during the period 1996-2008 (Lin et al., 2011).

Firm performance proxies are described by ROA, ROE and Tobin's Q. The average return on assets (ROA) of non-financial firms in Vietnam is 6.27%, while the corresponding number for return on equity (ROE) is 12.04%. The mean value of Tobin's Q is 1.05. Table 3 also reveals that value of Tobin's Q ranges from 0.19 to 6.44. Values of the other two indicators of firm performance ROA and ROE also have a large spread. ROA varies from -64.55% to 45.28% while ROE varies from -186.7% to 95.09%. This suggests that there is a significant divergence in performance of non-financial listed firms in Vietnam during the period from 2008 to 2016.

In terms of control variables, the mean value of growth (GRO) is 0.13 (13%), ranges from -0.88 (88%) to 11.34 (1134%), this implies a very big gap in growth of non-financial firms in Vietnam, some companies have significantly high growth rate. The average value of tangibility (TAN) and size (SIZ) are 0.42 and 10.97 respectively. Firm age (AGE) varies from 4 years to 108 years with mean age is 27. Profitability (PRO) and liquidity (LIQ) have mean values of 9.6% and 10.5% respectively.

Table 3. Descriptive Statistics – Non-financial firms.

The table provides descriptive statistics of all variables. Financial leverage (LEV) is the ratio between total debt and total equity. Growth (GRO) is measured as the percentage change in sales over year. Tangibility (TAN) is the ratio between fixed assets and total assets. Firm size (SIZ) is measured as the natural logarithm of total assets. Firm age (AGE) is the number of years since incorporation date. Profitability (PRO) is the ratio of earnings before interest and taxes to total sales. The ratio of cash and cash equivalent to total assets is used to measure liquidity (LIQ). Firm performance is measured by return on asset (ROA), return on equity (ROE) and Tobin's Q. ROA is calculated as the ratio of earnings after interest and tax divided by total assets. ROE is calculated as the ratio of earnings after interest and tax divided by total equity. Tobin's Q is calculated as the ratio of total market value of firm divided by total assets.

	ROA (%)	**ROE (%)**	**TOBIN'S Q**	**LEV**	**GRO**	**TAN**	**SIZ**	**AGE**	**PRO**	**LIQ**
Mean	6.266	12.037	1.048	1.430	0.132	0.419	10.972	27.172	0.096	0.105
Median	4.848	11.279	0.929	1.133	0.078	0.388	10.894	25	0.073	0.072
Maximum	45.278	95.094	6.443	6.850	11.341	0.975	14.683	108	0.758	0.532
Minimum	-64.551	-186.697	0.190	0.006	-0.875	0.025	8.139	4	-6.091	0.000
Std. Dev.	7.321	13.933	0.518	1.249	0.574	0.211	1.221	15.394	0.269	0.101
Skewness	-0.136	-3.683	4.604	1.725	11.094	0.519	0.460	1.677	-16.618	1.620
Kurtosis	17.334	61.637	37.200	6.644	203.996	2.524	3.030	8.922	385.966	5.638
Jarque-Bera	6243.382	106085.6	38104.18	764.929	1242083.	39.633	25.772	1407.146	4488437.	530.046
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sum	4567.860	8775.009	763.896	1042.531	96.453	305.232	7998.318	19809.00	70.100	76.858
Sum Sq. Dev.	39021.54	141326.4	195.336	1136.010	239.785	32.382	1086.215	172526.2	52.670	7.403
Observations	729	729	729	729	729	729	729	729	729	729

Table 4. Descriptive Statistics – Banks.

The table provides descriptive statistics of all variables. Financial leverage (LEV) is the ratio between total debt and total equity. Bank-specific variables include growth, size and liquidity. Growth (GRO) is measured as the percentage change in sales over year. Bank size (SIZ) is measured as the natural logarithm of total assets. The ratio of cash and cash equivalent to total assets is used to measure liquidity (LIQ). Macroeconomic variables include gross domestic product and inflation rate. Gross domestic product (GDP) is measured as the natural logarithm of annual GDP and inflation (INF) is measured as the annual inflation rate. Bank performance is measured by return on asset (ROA) and return on equity (ROE). ROA is calculated as the ratio of earnings after interest and tax divided by total assets. ROE is calculated as the ratio of earnings after interest and tax divided by total equity.

	ROA (%)	**ROE (%)**	**LEV**	**GRO**	**SIZ**	**LIQ**	**GDP**	**INF**
Mean	0.843	10.479	11.607	0.326	18.638	0.021	21.827	0.090
Median	0.830	10.442	11.187	0.134	18.805	0.012	21.899	0.071
Maximum	2.099	28.464	22.498	2.270	20.670	0.124	22.265	0.231
Minimum	0.010	0.068	2.756	-0.450	16.073	0.001	21.273	0.006
Std. Dev.	0.470	6.441	3.586	0.521	1.008	0.025	0.338	0.070
Skewness	0.028	0.449	0.323	1.281	-0.384	2.242	-0.335	0.911
Kurtosis	2.444	2.888	3.413	4.381	2.898	7.328	1.711	2.636
Jarque-Bera	1.171	3.065	2.201	31.755	2.253	145.626	7.919	12.933
Probability	0.557	0.216	0.333	0.000	0.324	0.000	0.019	0.002
Sum	75.915	943.109	1044.595	29.295	1677.437	1.901	1964.474	8.078
Sum Sq. Dev.	19.681	3692.423	1144.626	24.179	90.345	0.057	10.198	0.437
Observations	90	90	90	90	90	90	90	90

Table 4 reports the summary statistics of financial leverage, bank-specific control variables, macroeconomic control variables and performance of listed banks in Vietnam during the period 2008-2016. As expected, financial leverage (LEV) ratios of banks are much higher than those of non-financial firms with mean and median values of 11.61 and 11.19, respectively. Because of the special features of bank's operation in comparison with other industries, the unusually high leverage ratio is understandable (Flannery, 1994). However, the spread in values of financial leverage of Vietnamese listed banks is still high, ranging from 2.76 to 22.5.

Bank performance is described by ROA and ROE. Mean values of the two indicators are 0.84% and 10.48% respectively. These numbers are relatively low compared to non-financial firms. However the spread between min and max values of ROA and ROE is also lower, bank ROA ranges from 0.01% to 2.1% while bank ROE ranges from 0.07% to 28.46%.

Regarding bank-specific control variables, mean value of bank growth (GRO) is 32.6% but the median value is just 13.4%, whereas minimum value is -45% and maximum value jumps up to 227%. This suggests that the growth levels of listed banks in Vietnam are uneven. Average bank size (SIZ) is 18.64, which is also higher than non-financial firms. Yet, liquidity of Vietnamese banks is relatively low with a mean value of 2.1%, minimum value is close to 0% means that some banks do not even have cash and cash equivalent in their asset structure. Regarding macroeconomic variables, the average value of natural logarithm of Vietnam's GDP in this period is 21.83 and inflation rate is 9%.

It should be noted that due to the small number of listed banks in Vietnam as well as the lack of financial data, the number of observations is only 90. As a result, some variables have high skewness (more than 1) and kurtosis is lower than 3, which might lead to a violation of normality assumption, which can cause bias or inefficient regression models. However, this paper still conducts regressions for the models indicating the relationship between capital structure and performance of listed banks in Vietnam and the empirical results can be considered just for reference.

6.2. Correlation analysis

Table 5 represents the correlation coefficients between all variables used in the regression models of non-financial firms. Correlations among all independent variables are small. However, correlation between ROA and ROE is relatively high (0.86). This is explainable because both ROA and ROE ratios use earnings after interest and tax as the numerators and both aim for accounting profitability. Furthermore, ROA and ROE are used as dependent variables in two separate models, therefore high correlation will not affect regression results of each model.

Likewise, correlation coefficients of all variables used in the regression models of banks are shown in table 6. Correlation between ROA and ROE has a similar pattern as non-financial firms with the coefficient is 0.83. Correlations among independent variables are small except the pair of growth (GRO) and inflation (INF) with the coefficient is 0.72.

In the next part, multicollinearity test will be run to check if the correlation among variables is a serious concern affecting the results.

6.3. Test of multicollinearity

The Variance Inflation Factor (VIF) test is conducted to investigate whether multicollinearity exists among independent variables. According to Siddik et al. (2017), VIF <10 is acceptable. Table 7 and table 8 show the multicollinearity test using VIF for independent variables in different regression models of non-financial firms and banks respectively.

The values of VIF for all variables in table 7 are very small, just above 1, therefore there is a very low level of multicollinearity in three models which use ROA, ROE and Tobin's Q as dependent variables. According to table 8, the highest VIF for bank variables is 3.09 for inflation variable (INF), which is still far lower than 10. Hence, multicollinearity is not considered to be a serious issue in this study.

Table 5. Correlation matrix – Nonfinancial firms.

	ROA	ROE	TOBIN'S Q	LEV	GRO	TAN	SIZ	AGE	PRO	LIQ
ROA	1.000									
ROE	0.857	1.000								
TOBIN'S Q	0.570	0.437	1.000							
LEV	-0.372	-0.114	-0.095	1.000						
GRO	0.094	0.116	0.050	0.057	1.000					
TAN	-0.075	-0.116	-0.047	-0.078	-0.050	1.000				
SIZ	0.075	0.085	0.308	0.137	0.060	0.312	1.000			
AGE	0.187	0.106	0.121	-0.058	-0.064	-0.062	-0.146	1.000		
PRO	0.324	0.286	0.155	-0.129	0.088	0.191	0.106	0.044	1.000	
LIQ	0.362	0.273	0.147	-0.171	-0.012	-0.283	0.019	0.131	0.076	1.000

Table 6. Correlation matrix – Banks.

	ROA	ROE	LEV	GRO	SIZ	LIQ	GDP	INF
ROA	1.000							
ROE	0.832	1.000						
LEV	-0.097	0.402	1.000					
GRO	0.365	0.250	-0.080	1.000				
SIZ	0.154	0.351	0.430	-0.348	1.000			
LIQ	0.488	0.225	-0.284	0.202	-0.088	1.000		
GDP	-0.543	-0.451	0.107	-0.552	0.454	-0.398	1.000	
INF	0.433	0.326	-0.180	0.718	-0.352	0.309	-0.716	1.000

Table 7. Multicollinearity test using variance inflation factor (VIF) – Non-financial firms.

	ROA		ROE		Tobin's Q	
Variable	**Coefficient Variance**	**Centered VIF**	**Coefficient Variance**	**Centered VIF**	**Coefficient Variance**	**Centered VIF**
C	4.519	NA	20.395	NA	0.028	NA
LEV	0.035	1.106	0.156	1.106	0.000	1.106
GRO	0.152	1.026	0.687	1.026	0.001	1.026
TAN	1.451	1.322	6.549	1.322	0.009	1.322
SIZ	0.039	1.204	0.178	1.204	0.000	1.204
AGE	0.000	1.047	0.001	1.047	1.340	1.047
PRO	0.732	1.085	3.306	1.085	0.005	1.085
LIQ	5.743	1.196	25.918	1.196	0.036	1.196

Table 8. Multicollinearity test using variance inflation factor (VIF) – Banks.

	ROA		ROE	
Variable	**Coefficient Variance**	**Centered VIF**	**Coefficient Variance**	**Centered VIF**
C	10.393	NA	1808.453	NA
LEV	0.000	1.470	0.020	1.470
GRO	0.008	2.158	1.415	2.158
SIZ	0.002	1.713	0.301	1.713
LIQ	2.179	1.373	379.203	1.373
GDP	0.024	2.685	4.174	2.685
INF	0.645	3.094	112.294	3.094

6.4. The impact of capital structure on firm performance

Table 9. The impact of capital structure on performance of non-financial firms.

The table shows the results of examining the impact of capital structure on performance of non-financial firms, which are estimated by panel OLS regressions. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on firm performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and firm performance measured by return on equity (ROE). Model 3 reports the link between financial leverage (LEV) and firm performance measured by Tobin's Q. There are six control variables: firm growth (GRO), tangibility (TAN), firm size (SIZ), firm age (AGE), profitability (PRO) and liquidity (LIQ). Regressions are estimated using the models:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$Tobin'Q_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \varepsilon_{i,t} \quad (3)$$

* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**		**Dependent variable Tobin's Q (3)**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
C	-2.996	0.159	-3.387	0.454	-0.685***	0.000
LEV	-1.896***	0.000	-0.841**	0.034	-0.055***	0.000
GRO	1.125***	0.004	2.176***	0.009	0.022	0.476
TAN	-3.945***	0.001	-9.714***	0.000	-0.447***	0.000
SIZ	0.832***	0.000	1.315***	0.002	0.166***	0.000
AGE	0.069***	0.000	0.071**	0.023	0.005***	0.000
PRO	7.022***	0.000	13.826***	0.000	0.232***	0.001
LIQ	16.990***	0.000	25.803***	0.000	0.188	0.319
Adjusted R-squared	0.337		0.174		0.177	
F-statistic	53.806	0.000	22.838	0.000	23.379	0.000

Table 10. The impact of capital structure on performance of banks.

The table shows the results of examining the impact of capital structure on performance of banks, which are estimated by panel OLS regressions. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on bank performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and bank performance measured by return on equity (ROE). There are three bank-specific control variables: firm growth (GRO), firm size (SIZ), and liquidity (LIQ); two macroeconomic control variables include gross domestic product (GDP) and inflation (INF). Regressions are estimated using the models:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \varepsilon_{i,t} \quad (5)$$

* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**	
	Coefficient	p-value	Coefficient	p-value
C	15.717***	0.000	204.190***	0.000
LEV	-0.031***	0.006	0.453***	0.002
GRO	0.194**	0.034	0.905	0.449
SIZ	0.289***	0.000	3.722***	0.000
LIQ	3.590**	0.017	15.826	0.419
GDP	-0.916***	0.000	-12.338***	0.000
INF	-0.520	0.519	3.731	0.726
Adjusted R-squared	0.588		0.618	
F-statistic	22.168	0.000	24.983	0.000

This part employs the panel ordinary least squares (OLS) regression to test the impact of financial leverage on performance of listed firms in Vietnam. Table 9 and table 10 demonstrate the empirical results for non-financial firms and banks respectively.

As can be seen from table 9, model 1 presents the relationship between financial leverage and return on assets (ROA), which is used to measure firm performance. The empirical results show that financial leverage has a negative impact on firm performance. In other words, the negative coefficient of the variable LEV implies that the higher level of debt is, the lower ROA is. The value of the coefficient of LEV is -1.896, suggesting that when the ratio between total debt and total equity increases by 1, the ROA will fall about 1.9%, holding all other variables constant. The t-statistic of the variable LEV is very high (-10.19) and p-value is 0.00, meaning that this impact is strong and statistically significant at the 1% level. Model 2 shows a similar result for ROE, coefficient of the variable LEV is -0.841 which means that when financial leverage rises 1 unit, ROE will decrease about 0.84%, all else unchanged. However, this relationship is weaker compared to ROA because the result is just significant at the 5% level. The outcome in model 3 reveals a small impact of capital structure on Tobin's Q, although the link between financial leverage and Tobin's Q is significant at the 1% level, the coefficient of the variable LEV is relatively low (-0.055), indicating that when financial leverage increases 1 unit, Tobin's Q will decline about 0.055%, all other things being equal.

Regarding control variables, table 9 presents that firm growth significantly positively affect ROA and ROE at the 1% level, however, the effect is not significant for Tobin's Q. All three models point out a reverse relationship between tangibility and firm performance, which are significant at the 1% level. This result implies that a higher percent of fixed assets in asset structure of companies in Vietnam does not necessarily lead to higher profitability. As anticipated, firm size, firm age, profitability and liquidity factors all positively affect firm performance, all coefficients are significant at the 1% and 5% levels, except the relationship between liquidity and Tobin's Q in model 3 is insignificant.

Another significant point is that all F-statistic tests have p-values of 0.00, which are lower than 1%, indicating a good fitness of the regression models. Additionally, adjusted R-squared values are also acceptable, which range from 0.174 in model 2 to 0.177 in model 3 and the ROA regression in model 1 has the highest adjusted R-squared value of 0.337. Overall, it can

be inferred from the empirical models that financial leverage or the level of debt negatively affects performance of non-financial listed firms in Vietnam, where performance is measured by ROA, ROE and Tobin's Q. Moreover, regression results for most control variables in the relationship with firm performance are also significant.

The impact of capital structure on performance of listed banks in Vietnam are described in table 10, with ROA (model 1) and ROE (model 2) are used as dependent variables in regression models. As shown from the table, unlike non-financial firms, the impact of financial leverage on ROA and ROE are not consistent. Model 1 presents that the coefficient of the variable LEV is -0.031 and significant at the 1% level, implying that if the ratio between total debt and total equity of the banks increases by 1, return on assets will fall by 0.03%, all else held equal. In comparison with the decrease of 1.9% in ROA of non-financial firms in table 9, the negative effect of capital structure on performance of listed banks is weaker. It comes as a surprise that empirical results in model 2 point out a positive relationship between financial leverage and ROE, which is significant at the 1% level. The coefficient of the variable LEV is 0.453, suggesting that an increase of 1 in the ratio of total debt to total equity also leads to an increase of 0.45% in ROE of Vietnamese listed banks, holding all other variables constant. The positive influence of financial leverage on bank's ROE is explainable. While a high level of debt ratio in non-financial firms might lead to insolvency problems, financial firms need a sufficiently high leverage level to operate (Fama & French, 1992). Therefore, it is reasonable to see that debt financing actively contributes to an efficient use of capital of banks in Vietnam, which results in higher performance.

In terms of bank control variables, model 1 of table 10 shows that all bank-specific factors including growth (GRO), size (SIZ) and liquidity (LIQ) have positive impacts on bank's ROA, the coefficients are significant at the 1% and 5% levels. Regarding macroeconomic variables, GDP, however, negatively affects bank's ROA and the impact is strong at 1% significance level. This negative effect can be explained by the fact that growth of GDP or expansion of the economy is partly due to the increase in competitions among companies within a certain industry and general competition can lower returns of an individual firm,

banking sector is no exception. The coefficient of inflation variable (INF) in model 1 is insignificant. Results for control variables in model 2, which uses ROE as dependent variable, are weaker, only coefficients of size and GDP variables are significant (both are at 1% significance level and have the same sign as in model 1).

All F-tests in table 10 have p-values lower than 1% and the values of adjusted R-squared are relatively high, 0.588 in model 1 and 0.618 in model 2. The numbers imply that the models explain more than 50% of the variations in ROA and ROE of the banks.

6.5. The impact of capital structure on firm performance during financial crisis

Table 11 reports the impact of capital structure on performance of non-financial listed firms in Vietnam, where the 2008 financial crisis is taken into account. Compared to table 9, the presence of the dummy variable CRI does not change the results much. The impact of financial leverage on ROA, ROE and Tobin's Q remains negative with similar magnitude and at the same significance level. Most of other control variables also have the same effect on performance when dummy variable is introduced into the models. It is notable that the variable for financial crisis shows a significantly positive relationship with all performance variables. In other words, non-financial companies in Vietnam still did a good job, even in the crisis period from 2008 to 2010.

Table 12 shows a different story for banks. When taking financial crisis into consideration, the influence of capital structure on bank performance is still similar compared to results in table 10. However, the crisis dummy variable CRI presents a significantly negative relationship with two dependent variables, which proves that banks are more affected by the 2008 global crisis than non-financial firms. It is understandable to say that financial institutions are more sensitive to financial crisis. Another thing is that, while the inflation variable is insignificant in table 10, it statistically has impact on bank performance with the presence of crisis factor, this can be explained by the high correlation between financial crisis and inflation level, which both affect bank profitability.

Table 11. The impact of capital structure on performance of non-financial firms during financial crisis.

The table shows the results of examining the impact of capital structure on performance of non-financial firms during financial crisis, which are estimated by panel OLS regressions. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on firm performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and firm performance measured by return on equity (ROE). Model 3 reports the link between financial leverage (LEV) and firm performance measured by Tobin's Q. There are six control variables: firm growth (GRO), tangibility (TAN), firm size (SIZ), firm age (AGE), profitability (PRO) and liquidity (LIQ). A dummy variable CRI takes the value of 1 for crisis period from 2008 to 2010 and 0 for the post-crisis period from 2011 to 2016. Regressions are estimated using the models:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (6)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (7)$$

$$Tobin'Q_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 TAN_{i,t} + \beta_4 SIZ_{i,t} + \beta_5 AGE_{i,t} + \beta_6 PRO_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 CRI + \varepsilon_{i,t} \quad (8)$$

* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**		**Dependent variable Tobin's Q (3)**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
C	-5.493**	0.011	-9.211**	0.043	-0.884***	0.000
LEV	-1.909***	0.000	-0.871**	0.025	-0.056***	0.000
GRO	1.017***	0.008	1.924**	0.018	0.013	0.660
TAN	-4.517***	0.000	-11.048***	0.000	-0.492***	0.000
SIZ	0.991***	0.000	1.686***	0.000	0.178***	0.000
AGE	0.081***	0.000	0.099***	0.002	0.006***	0.000
PRO	6.567***	0.000	12.766***	0.000	0.196***	0.003
LIQ	16.448***	0.000	24.540***	0.000	0.145	0.435
CRI	2.414***	0.000	5.629***	0.000	0.192***	0.000
Adjusted R-squared	0.359		0.207		0.205	
F-statistic	51.930	0.000	24.745	0.000	24.479	0.000

Table 12. The impact of capital structure on performance of banks during financial crisis.

The table shows the results of examining the impact of capital structure on performance of banks during financial crisis, which are estimated by panel OLS regressions. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on bank performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and bank performance measured by return on equity (ROE). There are three bank-specific control variables: firm growth (GRO), firm size (SIZ), and liquidity (LIQ); two macroeconomic control variables include gross domestic product (GDP) and inflation (INF). A dummy variable CRI takes the value of 1 for crisis period from 2008 to 2010 and 0 for the post-crisis period from 2011 to 2016. Regressions are estimated using the models:

$$ROA_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \beta_7 CRI + \varepsilon_{i,t} \quad (9)$$

$$ROE_{i,t} = \beta_0 + \beta_1 LEV_{i,t} + \beta_2 GRO_{i,t} + \beta_3 SIZ_{i,t} + \beta_4 LIQ_{i,t} + \beta_5 GDP_{i,t} + \beta_6 INF_{i,t} + \beta_7 CRI + \varepsilon_{i,t} \quad (10)$$

* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**	
	Coefficient	p-value	Coefficient	p-value
C	41.175***	0.000	559.090***	0.000
LEV	-0.028***	0.010	0.493***	0.001
GRO	0.358***	0.001	3.198**	0.028
SIZ	0.292***	0.000	3.770***	0.000
LIQ	3.816***	0.009	18.979	0.316
GDP	-2.067***	0.000	-28.382***	0.000
INF	-3.473**	0.015	-37.433**	0.044
CRI	-0.682**	0.012	-9.500***	0.008
Adjusted R-squared	0.614		0.645	
F-statistic	21.186	0.000	24.091	0.000

6.6. Test of endogeneity

Regarding the link between financial leverage and firm performance, there is a suspicion of endogeneity problem that traditional methods like ordinary least squares (OLS) cannot detect. Endogeneity problem is caused by the uncertainty about whether there is a reverse causality relationship existing between capital structure and firm performance (i.e. firm performance also has impact on capital structure decisions). Severe endogenous issues can cause biased and inconsistent results. Therefore, to solve this problem, this paper uses the generalized method of moments on panel (GMM), which are introduced by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998). All the above models will be re-estimated by the two-step system GMM estimator.

Table 13 reports results of the two-step system GMM test for the impact of financial leverage on performance of non-financial firms. The outcomes once again confirm the negative relationship between financial leverage and firm performance in three models. The coefficients of the variable LEV are all significant at the 1% level. Empirical results also show that the signs of most control variables are consistent with OLS regression but there is slight differences in magnitude and significance level. In the specification tests of the models, AR(1) tests the first-order serial correlation and AR(2) tests the second-order serial correlation, while Hansen test analyzes the overidentifying restrictions. As table 13 reveals, all p-values of AR(2) tests are higher than 10%. This suggests that the null hypothesis of no second-order serial correlation cannot be rejected. Likewise, p-values of Hansen tests are also higher than 10% in model 1 and model 2, showing the null hypothesis that instrument variables are valid cannot be rejected. However, the null hypothesis of valid instrument variables is rejected in the Tobin's Q equation.

It is not surprising that empirical results of two-step system GMM in table 14 reveal insignificant relationships between the independent variables and bank performance measuring by ROA and ROE. The small sample of listed banks in Vietnam might lead to the inconsistency in results between GMM and OLS estimators.

Table 13. The impact of capital structure on performance of non-financial firms – Two-step system GMM estimator.

The table shows the results of examining the impact of capital structure on performance of non-financial firms, which are estimated by the two-step system GMM estimator. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on firm performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and firm performance measured by return on equity (ROE). Model 3 reports the link between financial leverage (LEV) and firm performance measured by Tobin's Q. There are six control variables: firm growth (GRO), tangibility (TAN), firm size (SIZ), firm age (AGE), profitability (PRO) and liquidity (LIQ). A dummy variable CRI takes the value of 1 for crisis period from 2008 to 2010 and 0 for the post-crisis period from 2011 to 2016.
Instrument: (LEV) delayed t-2, the rest of the explanatory variables are exogenous.
* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**		**Dependent variable Tobin's Q (3)**	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
C	-1.662	0.585	-5.868	0.352	-0.101	0.158
LEV	-2.514***	0.000	-4.865***	0.000	-0.041***	0.000
GRO	0.850***	0.000	1.218*	0.062	-0.008	0.419
TAN	-3.996***	0.003	-16.654***	0.000	-0.198***	0.000
SIZ	0.676**	0.018	2.125***	0.000	0.039***	0.000
AGE	0.076***	0.000	0.1486***	0.000	0.002***	0.001
PRO	3.837**	0.037	7.835**	0.014	-0.006	0.765
LIQ	6.945***	0.001	8.009**	0.037	-0.040	0.708
CRI	1.608***	0.000	3.914***	0.000	0.044***	0.000
L.ROA	0.276***	0.000				
L.ROE			0.121***	0.000		
L.TOBIN'Q					0.757***	0.000
AR(1)	-1.57	0.115	-1.61	0.108	-2.50	0.012
AR(2)	-0.87	0.386	0.80	0.426	-1.42	0.155
Hansen test	29.39	0.293	28.41	0.339	65.51	0.000

Table 14. The impact of capital structure on performance of banks – Two-step system GMM estimator.

The table shows the results of examining the impact of capital structure on performance of banks, which are estimated by the two-step system GMM estimator. Statistics are based on annual data during the period 2008-2016. Model 1 reports the effect of financial leverage (LEV) on bank performance measured by return on assets (ROA). Model 2 describes the relationship between financial leverage (LEV) and bank performance measured by return on equity (ROE). There are three bank-specific control variables: firm growth (GRO), firm size (SIZ), and liquidity (LIQ); two macroeconomic control variables include gross domestic product (GDP) and inflation (INF). A dummy variable CRI takes the value of 1 for crisis period from 2008 to 2010 and 0 for the post-crisis period from 2011 to 2016.

Instrument: (LEV) delayed t-2, the rest of the explanatory variables are exogenous.

* significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level

Variable	**Dependent variable ROA (1)**		**Dependent variable ROE (2)**	
	Coefficient	p-value	Coefficient	p-value
C	46.556	0.296	587.152**	0.032
LEV	-0.037	0.515	0.168	0.897
GRO	0.296	0.538	2.307	0.587
SIZ	0.509*	0.085	17.234	0.521
LIQ	10.827	0.400	277.303	0.647
GDP	-2.472	0.248	-41.021	0.196
INF	-0.840	0.876	-1.874	0.939
CRI	-0.565	0.536	-7.218	0.143
L.ROA	-0.901	0.280		
L.ROE			-0.737	0.511
AR(1)	0.20	0.839	0.28	0.782
AR(2)	-0.70	0.485	-0.50	0.615
Hansen test	0.96	1.000	2.67	1.000

7. CONCLUSION

This paper investigates the influence of capital structure on performance of listed firms in Vietnam during the period 2008-2016, where capital structure is measured by the ratio of total debt to total equity and ROA, ROE and Tobin's Q are used as indicators for firm performance. Additionally, due to the large difference in operation and the use of debt between non-financial and financial firms, this study splits data of these two sectors and runs empirical regressions for non-financial firms separately. However, because of the prominent role of banking industry in Vietnamese economy, this study also tests the efficiency of using debt of listed banks in Vietnam.

As reported in empirical part, the results of panel OLS regressions show a negative relationship between financial leverage and all performance indicators of non-financial firms. This finding provides a warning for Vietnamese listed companies in making capital structure decisions that a high level of debt can reduce profitability. Moreover, other control variables including firm growth, tangibility, firm size, firm age, profitability and liquidity also have effects on firm performance. By taking the 2008 global financial crisis into consideration, the negative impact of capital structure on performance of non-financial firms remains unchanged and empirical results also reveal that the crisis did not seriously affect performance of those firms.

Panel OLS regressions also present a negative effect of financial leverage on ROA of listed banks. However the relationship between financial leverage and bank's ROE is positive, indicating an efficient use of debt. Regarding the impact of macroeconomic factors on bank performance, GDP negatively affects both ROA and ROE, which is justified by the increase in competition when economy grows. Moreover, when the dummy variable of the 2008 financial crisis is introduced into the models, empirical results report a similar relationship between capital structure and bank performance. However, unlike non-financial firms, banks are more influenced by the crisis.

To cope with the problem of endogeneity, this paper uses the two-step system GMM estimator to test all the models again. According to empirical outcomes, the negative impact of financial leverage on performance of non-financial firms is confirmed. Especially, the effect of capital structure on ROA and ROE is very strong. However, the link between financial leverage and bank performance becomes insignificant in GMM tests. This might be due to the small sample of listed banks in Vietnam, which leads to insufficient data for analysis.

Finally, this paper still has some limitations. In addition to the ratio of total debt to total equity, other factors like short-term debt and long-term debt can be used to determine proxies for capital structure. To strengthen the results of empirical models, other control variables such as tax, risk, dividend or cash flow can be added. Moreover, due to the lack of financial data, research results are still limited. A larger sample can be employed to test the relationship between capital structure and firm performance in Vietnam again.

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