THE ROLE OF INDUSTRY COMPETITION IN THE LEVERAGE-PERFORMANCE RELATIONSHIP UNDER OVER-INVESTMENT CONDITION: EVIDENCE IN VIETNAM

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Abstract

Previous studies suggested that the characteristics of an industry may play a significant role in the relationship between financial decisions and firm performance through the degree of concentration or competition. Therefore, this research aims to evaluate such a role in order to clarify the effect of industry competition on the relationship between financial leverage and firm performance. Moreover, over-investment is recently considered to be one of the causes leading to bad performance because it tends to worsen the use of debt in the capital structure. As a consequence, the paper is the first one to examine the difference in the impact of industry competition on the leverage-performance relationship in companies with and without over-investment. Collected from the financial statements of listed firms on Vietnam's stock exchange, the dataset covers a wide range of 21 various industries over a seven-year period. The research methodology goes through two steps. Firstly, it calculates two alternative variables as the representatives of competition and over-investment through different sub-equations. Secondly, it adds them to the main regression model to estimate the results with the help of System-GMM technique together with two instrumental variables namely tangibility and non-debt tax shield to deal with the endogenous problem. The findings show that capital structure is positively related to firm performance and that the relationship might become stronger at the high level of industry competition. Nevertheless, the research indicates that the positive interaction between financial leverage and industry competition gets weaker in case firms carry out over-investment in their projects. Thus, these research's findings are of great importance thanks to their contribution to the existing empirical review and their policy recommendations for not only managers but also investors.

Keywords: financial leverage, industry competition, over-investment, firm performance, Vietnam.
JEL Classification: G32, L11, L25

Introduction

The leverage-performance relationship is the one that attracts much attention and raises many debates in the science community around the world. Modigliani and Miller (1958) suggests that capital structure has no role to play in firm performance under some assumptions of a perfect capital market. Subsequently, an enormous number of empirical studies have been conducted to reaffirm such a relationship in reality, and all the findings have come to the consensus that capital structure is relevant to firm performance through the trade-off effect, limited liability effect, and discipling effect (Brander & Lewis, 1986; Grossman & Hart, 1983; Jensen, 1986; Jensen & Meckling, 1976; Khan, 2012; Margaritis & Psillaki, 2010; San & Heng, 2011). However, whether its effect is positive or negative remains debatable and requires a clear question. In terms of the positive impact of financial leverage on firm performance, the trade-off between the costs and benefits of debt and equity (Jensen & Meckling, 1976), the limited liability (Brander & Lewis, 1986), and the discipling effect (Grossman & Hart, 1983; Jensen, 1986) are supposed to be typical theories. Whereas, as for the negative effect of financial leverage on firm performance, underinvestment associated with debt (Myers, 1977) and the reactions of stakeholders to financial leverage (Maksimovic & Titman, 1991; Titman, 1984) are considered as the main research domain. Furthermore, the predation theory suggests that in industries with the high level of competition, companies that use high financial leverage are more likely to be swallowed by the others operating in the same area (Bolton & Scharfstein, 1990; Chavalier & Scharfstein, 1996; Dasgupta & Titman, 1998).

The condition of industry competition should be taken into consideration when analyzing the impact of financial leverage on firm performance. In practice, empirical studies related to the role of industry competition in the relationship between financial leverage and firm performance have given much evidence, especially in the US and some developing countries (Campello, 2003, 2006; Chevalier, 1995a, 1995b; Kovenock & Phillips, 1997; Opler & Titman, 1994). Vietnam has just been added to the list of emerging countries recently with its high economic growth within the two decades, trade openness, the inflow of investment to the economy. Furthermore, until now most Vietnamese companies are still dependent on the banking system for their financing sources. Therefore, capital structure is vitally important to firm performance in Vietnam (Fu-Min, Wang, Lee, & La, 2014; Gueorguiev & Malesky, 2012; Tran, Nonneman, & Jorissen, 2015). However, the openness and privatization in various fields of the economy accidentally increase the pressure of competition among companies within a certain industry (Quy, Khuong, & WilliamSwierczek, 2014; Tran et al., 2015). In short, there is a need to identify the moderation of industry competition on the relationship between financial leverage and firm performance in Vietnam.

Besides the market competition, overinvestment is considered to be another problem that worsens the impact of financial leverage on firm performance. According to Agency Theory, the discrepancies in interests between managers and shareholders costs a firm a huge amount of expenditures to solve the conflicts from both two sides (Gaver & Gaver, 1993; Jensen, 1986; Jensen & Meckling, 1976). Exposed to the excess in free cash flow, managers are willing to harness firm resources to achieve personal gains. One way they often choose is to enlarge sources under their control by carrying out as many investment projects as possible or even worse investing in projects with negative

net present value. In this situation, it is apparent that overinvestment is a signal of a serious agency problem, making firm operations inefficient. Debt is considered as a useful tool in helping reduce the discretionary funds available to managers, putting them under the pressure of fulfilling their financial obligations, and drawing other stakeholders in the market to the monitoring process of managers' behaviors (Easterbrook, 1984). Based on these theoretical and empirical studies, financial leverage, industry competition, and overinvestment seem to be interrelated to one another and together determine firm profitability.

The study aims at analyzing the role of industry competition on the leverage-performance relationship and how this relationship changes when a firm is experiencing overinvestment, which raises two questions: (1) Does financial leverage have a constraining effect on how competitive a market is? and (2) Does overinvestment play a role in adjusting the relationship on a negative way? In answering these two questions, the study hopes to contribute a part to the academic and practical world. For one thing, it provides empirical evidence in an emerging market after the 2008 financial crisis and on the role of industry competition and overinvestment. For another thing, it helps investors set up a suitable investment portfolio and the government make appropriate policies in order to promote the freedom of the market as well as heighten Vietnam's industry competition.

The original data includes 699 companies listed on Vietnam's two stock market exchanges namely HOSE and HNX in the period of 2010 – 2016. However, after the data processing and missing removal, the final dataset covers 208 companies in a wide range of 21 industries from Thompson Reuters source. Overinvestment is measured by taking the estimated value of residual from the sub-equation model. Competition is calculated in two ways through the opposite HHI Index and the absolute value of coefficients of the sub-equation model (BI Index). Using System Generalized Method of Moments (SGMM) to handle the endogenous problem caused by the dynamic function, the study indicates the positive relationship between financial leverage and firm performance. Moreover, the negative effect of two alternative variables for competition will be lessened through the use of debt. The result implies a constraining effect of financial leverage over the competition level. Nevertheless, when a firm suffers from the problem of overinvestment, or high agency costs, such the constraining effect of this two-variable interaction tends to be weaker. Besides checking the robustness of the estimation by two different proxies of competition, various representatives of firm performance are also taken into consideration. Surprisingly, all results remain consistent both in size and in significance level, supporting the consistency and robustness of the regression model.

The paper is divided into 5 sections. Section 2 presents the empirical reviews together with hypothesis development. Research methodology and estimation are explained in Section 4 and 5, respectively. The study ends with the conclusion in Section 6.

Literature review and hypothesis development:
Financial leverage and firm performance:
The relationship between financial leverage and firm performance has raised much debates among various studies in corporate finance. Based on some assumptions of a perfect capital market without taxes, transaction costs, and asymmetric

information, Modigliani and Miller (1958) propose Capital Structure Irrelevance Theory, supporting the idea that capital structure is irrelevant to how effective a firm operates. On the other hand, rarely does the capital market have no imperfections. When relaxing the assumption of a market without taxes, Modigliani and Miller (1963) demonstrate the beneficial effects of debt through debt tax shields, that is, the use of financial leverage can help firms obtain the benefits of tax deduction. As comforting the assumption of a market without asymmetric information, Jensen and Meckling (1976) introduce Agency Theory showing the conflicts of interests among managers, shareholders, and creditors. Due to the problem of asymmetric information, managers are often more informed of business activities than shareholders are. If the free cash flow within a company is abundant, managers are inclined to act in favor of their benefits through seeking higher perquisites and larger control over the company. The alignment of the interests between managers and shareholders require a certain amount of agency costs. In this case, financial leverage can aid companies with agency problems in reducing these costs when it not only lowers the excessive free cash flow but also exposes firms to different monitoring partners on the capital market with various disciplines and covenants (Grossman & Hart, 1983; Harris & Raviv, 1990; Jensen, 1986). As a result, the research proposes the first hypothesis for the relationship between financial leverage and firm performance.

Hypothesis 1: financial leverage is positively related to firm performance
Financial leverage, industry competition, and overinvestment:

Financial leverage is demonstrated to be associated with the competition level among companies operating in different industries. With the limited liability, a leveraged firm's aggression in competition will allow it to lessen agency problems accompanied by the use of debt in the capital structure (Brander & Lewis, 1986). Such an aggressive behavior is controlled not only by the level of competition but also by the characteristics of the products in the industry (Wanzenried, 2003). Moreover, in a market following the assumptions of Cournot, it is the limited liability that makes firm profitability substantially decrease.

Predation theories suggest that firms with high financial leverage are more likely to be disadvantageous in terms of competitiveness compared to those with low debt in their capital structure. Fudenberg and Tirole (1986) show that the predation theories are even more obvious in markets with a high level of concentration. Long-existing companies in the industry are inclined to predate newcomers. The predation process implies the possibility of lower profitability and more gloomy prospects of these entrant companies. If they choose to be financially constrained by borrowing more loans, the use of debt causes themselves to be vulnerable to the risk of predation from other rivals in the market. Supporting this idea, Bolton and Scharfstein (1990) explains rival predation through debt covenants employed to reach the alignment between managers and debtholders. The restrictions of these debt contracts will push firms to the verge of liquidation and eventually leave the market if they cannot satisfy their obligations. Conversely, in a perfectly competitive market where every company only contributes a small part to the whole market's production, the rivalry predation tends to be negligible. (Chevalier, 1995a) suggests that when incumbent companies in some industry employ high financial leverage, it facilitates entrant firms to enter and expand their activities in

the market. Leverage, as a consequence, makes the product market more competitive. In his extensive analysis, Chevalier (1995b) proves that in a market with both highly and lowly leveraged companies, the former is forced to charge higher prices than the later conditional on high concentration level, making these firms sensitive to the likelihood of predation by their rivals with lower financial leverage.

Chavalier and Scharfstein (1996) explain the leverage-competition in another respect using the switching cost models. They argue that during a certain recession when most firms' competitiveness turns out to be less competitive, firms with financial leverage are considered to be much inferior because they have to charge higher prices than their counterparts, less leveraged firms. Thus, a firm's disadvantage will move in the reverse direction with the product market's competitiveness. Previously, (Opler & Titman, 1994) support this view by demonstrating that the concentration in the market resulted from industry downturns motivates less leveraged firms to deprive market shares from highly leveraged ones. In addition, economic downturns are proven to be highly correlated with less competitive markets. Therefore, during a recession, financial leverage is negatively related to firm performance (Campello, 2003, 2006). Agency problems are attributed to the concentration of the market, and the characteristics of a competitive market can strengthen the discipling effect of financial leverage, reducing agency problems existing within a business (Aghion, Dewatripont, & Rey, 1997; Grossman & Hart, 1983).

According to Agency Theory, the interests between managers and shareholders are separated (Jensen & Meckling, 1976). Due to asymmetric information between these two sides, managers often take advantage of the managing rights to bring themselves personal gains. In doing so, they try their best to expand as much assets under their control as possible to achieve their higher perquisites, secure their positions, and build up their own empire in the company (Brealey, Myers, & Allen, 2008; Hail, Tahoun, & Wang, 2014; Myers, 1984). This leads them to carry out much investment or even invest in unprofitable projects, exacerbating the problem of overinvestment. Hence, overinvestment is supposed to raise agency problems to the high level and force firms to incur more agency costs (Fu, 2010; Liu & Bredin, 2010; Titman, Wei, & Xie, 2004; Yang, 2005). Such an effect means that the leverage-competition conditional on overinvestment tends to worsen firm effectiveness. The research, in the end, comes to the second and third hypothesis.

Hypothesis 2: financial leverage constrains the negative effect of industry competition on firm performance

Hypothesis 3: under the condition of overinvestment, the moderating role of financial leverage over industry competition seems to be weaker.

Data and methodology

Research methodology:

To test these three hypotheses, the study applies the following empirical model

$$FirmPerformance_{it} = \alpha + \beta_1 FirmPerformance_{it-1} + \beta_2 \text{LEV}_{it} + \beta_3 \text{COM}_{jt} + \beta_4 \text{LEV}_{it} \text{x COM}_{jt} + \beta_5 \text{LEV}_{it} \text{x COM}_{jt} \text{ x Over} - \text{Investment}_{it} + \psi' \text{x}_{it} + \varepsilon_{it} \textbf{ (1)}$$

where ROA_{it} is the return on assets of firm i at time t; α is the constant; LEV_{it} is the ratio of total debt over total assets of firm i at time t; COM_{jt} is the proxy for the level of competition in industry j at time t, namely Herfindahl–Hirschman Index (HHI) and Boone Index (BI); $Over - Investment_{it}$ is estimated by the error-term extracted from equation (4); x_{it} is a set of control variables described in the variable definition; ε_{it} is the error-term.

The representative for firm performance is return on assets (ROA) and return on equity, which are the earning before interests and tax (EBIT), earning before tax (EBT), earning after tax (EAT) divided by total assets and equity respectively. Although these variables are thought to be affected by different accounting standards because its calculation is based on a firm's accounting books, compared to Tobin's Q, such a variable is considered to be a better representative for the research. Demsetz and Lehn (1985) suppose that ROA and ROE reflect the present situation, while Tobin's Q shows a firm's future development. Demsetz and Villalonga (2001) emphasize that Tobin's Q is often affected by tangible assets whose depreciation is different from the real economic depreciation. Tobin's Q depends on the effects of psychology. What's more, the use of ROA and ROE help mitigate the differences in firm size among companies in various industries. Financial leverage is measured by the ratio of total debt over total assets.

The research adds some control variables related to firm performance to the regression model including sale growth, firm size, and average return on assets. Sale growth (SGRO), the representative for growth opportunities (King & Santor, 2008; Maury, 2006), is measured by the differences between sale of firm i at time t and its sale at time t-1 divided by sale at time t-1. Firm size (Size) is the logarithm of total assets. According to Ghosh (2008), average return on assets (MROA) are the moving average of ROA in two consecutive years. The instrumental variables used to handle the endogenous problem in the regression model are tangibility (TANG) and non-debt tax shield (NDTS). TANG is the ratio of tangible assets over total assets. This variable plays a decisive role in a firm's access to financing capital (Booth, Aivazian, Demirguc-Kunt, & Maksimovic, 2001; Campello, 2006), especially in developing countries where the regulations to protect lenders and carry out loan contracts are loosely controlled. NDTS is the sum of research and development funds (R&D) and depreciation divided by total assets.

To examine the role of industry competition in the relationship between financial leverage and firm performance, the research has to identify the proxies for industry competition. In fact, there are two ways to measure industry competition: structural and non-structural (Lawton, 1999). Structural approach evaluates market concentration using Herfindahl–Hirschman Index (HHI) (Campello, 2006) or the level of concentration within four or five largest companies in a certain industry (CR4 or CR5) (Campello, 2003; Chevalier, 1995a, 1995b; Kovenock & Phillips, 1997; Opler & Titman, 1994). The degree of concentration (high HHI, CR4, or CR5) often accompanies lower competition and vice versa. Meanwhile, non-structural approach measures the level of competition from the market's behaviors. This measurement is appreciated more highly than structural approach because a high level of concentration does not imply lower competition in the market (Guzmán, Gutiérrez, Cortes, & Ramírez, 2012). In fact, the hypothesis on the relationship between market structure and the effectiveness shows that high concentration is simply the results of the market's effectiveness (Demsetz, 1973). Some

companies that are operating effectively can quickly expand their market shares, while those which are ineffective are smaller and smaller in size (Jan Boone, Griffith, & Harrison, 2004). Moreover, high concentration sometimes comes from the fierce competition of various companies in the market, leading to the fact that effective companies force ineffective ones to exit the market (Jan Boone, 2008a). Thus, the level of concentration cannot correctly predict the level of competition in the market. To deal with such problems emerged from structural approach, Jan Boone (2000) uses a new index to measure market competition, Boone Index (BI). The index measures the sensitivity of firm profitability to the ineffectiveness of the market. Because in a competitive market companies often have to suffer a big loss when they perform ineffectively, firm profitability will increase with how effective a firm performs, and such an increase will be higher in a competitive market (Jan Boone, 2008b).

Hence, BI is the proxy that is preferred in studies on industry competition and firm performance (Jan Boone, van Ours, & van der Wiel, 2013). However, to raise the reliability, the research will in turn employ these two alternatives to find out their impact on the relationship between financial leverage and firm performance. According to Beiner, Schmid, and Wanzenried (2011), HHI is measured as the total market shares of each firm in a certain industry.

$$HHI_{jt} = \sum_{i=1}^{Nj} (\frac{Sales_{ijt}}{\sum_{i=1}^{Nj} Sales_{ijt}})^2 \ (2)$$

In the formula, HHI_{jt} is HHI of industry j at time t; $Sales_{ijt}$ indicates the sales of firm i in industry j at time t. The higher HHI is the higher market concentration becomes (lower market competition).

BI is considered to be the index that helps directly evaluate the level of competition in the market. The index is based on the hypothesis of competition and effectiveness with the assumption that in a competitive market, if a firm does not operate effectively, it will incur losses (Jan Boone, 2008b; J Boone, Griffith, & Harrison, 2005; Jan Boone, Van Ours, & Wiel, 2007). Therefore, an industry with high competition is expected to have a sharp decrease in variable profits due to the increase in the marginal costs. Then, BI is estimated through the following regression model:

$$VROA_{it} = \alpha + \beta_t lnMC_{ij} + \mu_{i,t} \ (3)$$

where $VROA_{it}$ is the variable profits calculated by subjecting costs of goods from sales of firm i in industry j divided by total assets; $lnMC_{ij}$ is the logarithm of marginal costs which is costs of goods over sales of firm in in industry j; β_t is the coefficient of the model that is changing overtime. Its absolute value measures the degree of competition. The coefficient sign is expected to be negative. The higher the absolute value is he higher market competition is. Therefore, BI is the absolute value of β_t.

As pointed out in the hypothesis development, market competition is an important factor in analyzing the effect of financial leverage on firm performance. In order to catch such an impact, the interaction between financial leverage and industry competition is added to the regression model. Besides, the research also takes into account the problem of endogeneity in the model which are originated from three major reasons: simultaneity, measurement errors, and omitted variables. To mitigate the simultaneous effect between LEV and ROA, the study uses the lag of LEV due to the fact that financial leverage in the past often affects profits at present but the reserve relationship is impossible. However, in addition to simultaneity, the estimated results

are partly affected by omitted variables and measurement errors. Therefore, GMM two-stage least square is used to deal with such a problem. Having the doubt that LEV is endogenous, the research decides to take TANG and NDTS as its instrumental variables.

These two instrumental variables are basically considered to be suitable. First, TANG is what the institutions use to evaluate the possibility of their customers' paying loans back so that they can make right decisions on lending capital (Booth et al., 2001; Campello, 2006). Thus, the effect of this variable on firm performance is mainly through the financing capital to companies, showing that TANG is an appropriate instrumental variable for LEV (Campello, 2006). Second, firms with higher non-debt tax shield are expected to have higher financial leverage (DeAngelo & Masulis, 1980), and non-debt tax shield is not supposed to have the direct impact on earnings before tax and depreciation. This fact suggests that NDTS is an effective instrumental variable for financial leverage. Actually, Fama and French (2002) support the empirical evidence for the reverse relationship between non-debt tax shield and financial leverage. In short, the study uses both factors as instrumental variables.

Finally, overinvestment is measured through equation (4) using the fixed-effect technique. The estimated equation is generalized based on the ideas from previous studies (Bokpin & Onumah, 2009; Carpenter & Guariglia, 2008; Connelly, 2016; Li & Zhang, 2010; Malm, Adhikari, Krolikowski, & Sah, 2016; Nair, 2011; Richardson, 2006; Ruiz-Porras & Lopez-Mateo, 2011). The explicit form of Equation (1) is as follows:

$$NewInvestment_{i,t} = \alpha_0 + \alpha_1 CashFlow_{i,t} + \alpha_2 TobinQ_{i,t} + \alpha_3 FixCapitalIntensity_{i,t} + \alpha_4 FirmSize_{i,t}$$
$$+ \alpha_5 RevenueGrowth_{i,t} + \alpha_6 BusinessRisk_{i,t} + \alpha_7 Leverage_{i,t} + \omega_{i,t}$$

(4)

In the equation, $NewInvestment_{i,t}$ represents for the investment decision; $CashFlow_{i,t}$ reflects the cash available in a company after subtracting capital expenditures; $TobinQ_{i,t}$ is the representative of growth opportunity and market performance; $FixCapitalIntensity_{i,t}$ evaluates the ability to generate fixed assets through sales; $RevenueGrowth_{i,t}$ demonstrates the growth of the firm; $FirmSize_{i,t}$ shows a company's financial constraints; $BusinessRisk_{i,t}$ indicates the volatility of firm profitability; $Leverage_{i,t}$ is the capital structure of the company. The estimated error-term $\hat{\omega}_{i,t}$ taken from the above model is considered as the abnormalities in the investment decision. If the error term's value is positive, or $\hat{\omega}_{i,t} > 0$, $\hat{\omega}_{i,t}$ of firm ith and year tth is denoted as $Over - Investment_{i,t}$. This method of calculating overinvestment has been recently adopted by He and Kyaw (2018).

Research data:

The research data is collected from Vietnamese listed companies in HOSE and HNX from 2010 to 2016. Based on the classification standard on Vietnam's Stock Exchange, the sample is classified into 21 different industries including durable goods, consumer goods, real estates, printing (except the Internet), transportation support, mining, professional contractors, electricity, basic metals, textiles, plastics an rubber, beverages and tobacco, paper, chemicals, non-metal minerals, food, electronic equipment,

cultivation, sea transportation, heavy industry and civil construction, houses and buildings. Our data and correlation coefficients are summarized as table 1 and 2 below:

Table 1: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
EAT/TA	1,384	0.060576	0.054632	-0.041441	0.239514
EBT/TA	1,384	0.074129	0.065519	-0.041777	0.291967
EBIT/TA	1,384	0.094697	0.060779	-0.016461	0.303093
EAT/Equity	1,384	0.123358	0.090448	-0.128181	0.375616
EBT/Equity	1,384	0.151656	0.107330	-0.125376	0.447676
EBIT/Equity	1,384	0.219343	0.122889	-0.041824	0.561071
MROA	921.0	0.315095	0.232828	0.045080	1.109090
Size	1,384	27.08540	1.293908	23.95720	30.18850
Growth	1,384	0.108733	0.265465	-0.492889	1.131610
Leverage	1,383	0.512923	0.205921	0.103515	0.849271
Competition1	1,388	-0.259280	0.083718	-0.670789	-0.135970
Competition2	1,394	0.475526	0.496635	0.171184	2.278290

Source: Author's calculation

Table 2: Matrix correlation

	MROA	*Size*	*Growth*	*Leverage*	*Competition1*	*Competition2*
MROA	**1.0000**	-0.0876 (0.0095)	-0.0261 (0.4396)	-0.1467 (0.0000)	0.1452 (0.0000)	-0.0595 (0.0773)
Size	-0.0876 (0.0095)	**1.0000**	0.0993 (0.0003)	0.2130 (0.0000)	-0.1827 (0.0000)	0.1329 (0.0000)
Growth	-0.0261 (0.4396)	0.0993 (0.0003)	**1.0000**	0.0649 (0.0184)	-0.0021 (0.9399)	0.029 (0.2918)
Leverage	-0.1467 (0.0000)	0.2130 (0.0000)	0.0649 (0.0184)	**1.0000**	-0.0475 (0.0850)	0.1292 (0.0000)
Competition1	0.1452 (0.0000)	-0.1827 (0.0000)	-0.0021 (0.9399)	-0.0475 (0.0850)	**1.0000**	0.2479 (0.0000)
Competition2	-0.0595 (0.0773)	0.1329 (0.0000)	0.029 (0.2918)	0.1292 (0.0000)	0.2479 (0.0000)	**1.0000**

P-Values are given in the parentheses   *Source: Author's calculation*

Results and discussion

Table 3 presents the estimation results of equation (1). The SGMM method is used with the ratios of tangible assets to total assets and non-debt tax shield to total assets as instruments for leverage. The first six columns use the HHI index, which measures the level of market concentration and represents the level of competition. Meanwhile, the last six columns use the BI index, which measures market competitiveness, also representing the level of competition. Specifically, the lower the HHI, the lower the competition, while BI is in the opposite direction. Therefore, we generate Competition 1

= (-HHI) and Competition 2 = BI in order for interpreting the impact of these two indicators on performance is in the same directions.

The estimated results from the regression indicates that financial leverage is positively associated with firm performance. Meanwhile, two representative variables for the industry competition are negative related to firm performance. These findings are suitable with the disciplining effect and Agency Theory (Berger & Di Patti, 2006; Grossman & Hart, 1983; Jensen, 1986; Jensen & Meckling, 1976; Weill, 2008). Additionally, the significantly positive impact of the two-variable interaction term between financial leverage and market competition is clearly shown in the estimation. This result demonstrates the constraining effect of financial leverage toward the harmful impact of industry competition on firm performance. In order word, those who are operating in highly competitive industries are more likely to enjoy higher benefits of using debt than those who are in lowly competitive industries. Such a finding seems to be consistent with our latest research (Chau Van Thuong, Tran Le Khang, & Nguyen Cong Thanh, 2017). Interestingly, the aforementioned influence of the two-variable interaction is considered to be weaker under the condition of over-investment. This evidence supports our hypothesis that the impact of capital structure on firm performance is subject to industry competition and conditional on over-investment.

The regression estimation's robustness is tested using alternative representatives for not only industry competition but also firm performance. Industry competition is alternatively measured by the residual estimated from the sub-equation and Herfindahl-Hirschman Index (HHI). Furthermore, earnings before interests and taxes (EBIT), earnings before taxes (EBT), and earnings after taxes (EAT) over total assets are respectively employed to represented for firm profitability. Consequently, the estimated coefficients of all different proxies reach the consistency in term of both sign and significance level. Moreover, all the relevant tests of System Generalized Method of Moments (SGMM) estimations appear to be comfortable in every single regression model in the research.

Table 3: Regression result

SGMM Estimations	Competition 1 = (-HHI)						Competition 2 = BI					
	EAT/TA	*EBT/TA*	*EBIT/TA*	*EAT/Equity*	*EBT/Equity*	*EBIT/Equity*	*EAT/TA*	*EBT/TA*	*EBIT/TA*	*EAT/Equity*	*EBT/Equity*	*EBIT/Equity*
Lag _ Performance	0.565***	0.583***	0.680***	0.256**	0.439***	0.559***	0.601***	0.685***	0.787***	0.431***	0.532***	0.532***
	(0.0887)	(0.0982)	(0.0776)	(0.121)	(0.0721)	(0.0615)	(0.0701)	(0.0777)	(0.0832)	(0.0502)	(0.0611)	(0.0686)
MROA	0.0143	0.0147	0.0195	0.0762*	0.0822***	0.0608*	0.0538***	0.0651***	0.0506**	0.104***	0.128***	0.110**
	(0.0194)	(0.0239)	(0.0154)	(0.0448)	(0.0290)	(0.0330)	(0.0177)	(0.0210)	(0.0219)	(0.0307)	(0.0407)	(0.0513)
Size	-0.00339	-0.00482	-0.00340	-0.0133	-0.00436	-0.0127**	-0.00358*	-0.00473**	-0.00623***	-0.00611**	-0.0101**	-0.0130***
	(0.00272)	(0.00341)	(0.00220)	(0.00939)	(0.00506)	(0.00598)	(0.00186)	(0.00218)	(0.00222)	(0.00281)	(0.00432)	(0.00500)
Growth	0.00518	0.00526	0.00841	0.00144	0.0112	0.0237*	0.00777**	0.00837**	0.00955**	0.0182**	0.0215***	0.0130***
	(0.00508)	(0.00588)	(0.00555)	(0.0139)	(0.0117)	(0.0136)	(0.00316)	(0.00347)	(0.00378)	(0.00714)	(0.00786)	(0.00419)
Leverage (Lev)	**0.243***	**0.329***	**0.248****	**0.897***	**0.419***	**0.851****	**0.184****	**0.235****	**0.314****	**0.377****	**0.582****	**0.738****
	(0.142)	**(0.175)**	**(0.112)**	**(0.462)**	**(0.250)**	**(0.298)**	**(0.0884)**	**(0.103)**	**(0.103)**	**(0.134)**	**(0.204)**	**(0.226)**
Competition1 (Com1)	-0.645**	-0.819***	-0.483**	-1.439*	-0.649	-1.066*						
	(0.264)	(0.310)	(0.228)	(0.837)	(0.473)	(0.593)						
*Lev*Com1*	1.480***	1.848***	1.136**	3.512**	1.842**	2.316**						
	(0.538)	(0.621)	(0.449)	(1.557)	(0.886)	(1.125)						
*Lev*Com1*Over-Investment*	-0.300*	-0.339*	-0.209	-1.073*	-0.589*	-0.208						
	(0.172)	(0.203)	(0.145)	(0.615)	(0.322)	(0.421)						
Competition2 (Com2)							-0.173**	-0.192**	-0.217**	-0.308**	-0.441**	-0.540**
							(0.0871)	(0.0952)	(0.0996)	(0.138)	(0.196)	(0.240)
*Lev*Com2*							0.392**	0.435**	0.470***	0.730***	1.029***	1.096***
							(0.153)	(0.167)	(0.177)	(0.250)	(0.356)	(0.420)
*Lev*Com2*Over-Investment*							-0.182**	-0.194**	-0.162*	-0.281**	-0.346*	-0.319**
							(0.0740)	(0.0882)	(0.0854)	(0.136)	(0.183)	(0.158)
Observations	761	761	761	517	645	645	761	761	761	761	761	517
Number of instruments	22	22	30	23	32	30	26	26	26	32	26	24
Number of groups	164	164	164	160	163	163	164	164	164	164	164	160
F-Statistics	51.24	54.92	219.55	16.32	70.76	151.9	38.85	45.44	70.38	66.82	55.71	60.31

Prob.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(1)	-1.510	-1.600	-1.760	-2.590	-1.400	-1.520	-1.630	-1.690	-1.820	-1.530	-1.620	-1.780
Prob.	0.130	0.110	0.078	0.010	0.161	0.129	0.102	0.091	0.069	0.126	0.106	0.076
Arellano-Bond test for AR(2)	1.140	0.920	-0.080	0.950	1.080	1.320	0.350	-1.010	-0.770	1.090	1.120	0.480
Prob.	0.256	0.356	0.939	0.340	0.280	0.188	0.729	0.312	0.441	0.275	0.262	0.632
Hansen test of over-identification	14.3	13.3	19.65	13.94	29.02	25.9	15.62	16.22	14.12	31.81	25.98	15.77
Prob.	0.428	0.503	0.605	0.53	0.219	0.256	0.619	0.577	0.721	0.132	0.1	0.469

Standard errors in parentheses

Source: Author's calculation

*** p<0.01, ** p<0.05, * p<0.1

Conclusions and policy implications

Unlike the proposition of Modigliani and Miller (1958) on the irrelevance of capital structure to firm value, a wide variety of studies have been introduced to demonstrate the relevance of financial leverage (Khan, 2012; Margaritis & Psillaki, 2010; San & Heng, 2011). Recently, the relationship between financial leverage and firm performance is supposed to be moderate by both industry competition and overinvestment. The agency problems associated with the characteristics of industry and managers' behaviors in making investment decisions. The reality has proved the interdependence of these three variables on one another and their interaction impacts on firm performance. With the use of System Generalized Method of Moments (SGMM), the research aims at evaluating the role of industry competition in the leverage-performance relationship under the condition of overinvestment. The paper clarifies that Vietnamese listed firms tend to be positively affected by financial leverage. Furthermore, the positive effect of using debt comes into sight to be stronger in highly competitive industries, meaning that companies in such industries can enjoy higher benefits from financial leverage. Put another way, the use of debt can help attenuate the harmful effect caused by competition. However, the constraints of financial leverage conditional on overinvestment appear to be weaker in the research.

Based on the estimated results, some recommendations are given to both the government and corporate companies. The government should heighten the level of competition through higher economic growth, better market regulations, and more transparent legal practices. Companies should limit the problem of overinvestment or mitigate agency problems by compensating managers with more benefits to increase their commitments toward acting in favor of shareholders' interests.

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