

**Examining the impact of state ownership on adjustment speed toward target leverage:
Evidence from a transitional economy**

Thao Nguyen^a, Leon Li^a, Greg Hou^a and Manh-Chien Vu^b

^a *School of Accounting, Finance and Economics, University of Waikato, New Zealand*

^b *Université du Québec à Trois-Rivières, Canada*

ABSTRACT

Using a quantile regression approach and 5,374 Vietnamese firm-year observations from 2000 to 2016, this paper examines the effect of state ownership on the speed of adjustment (SOA) toward target leverage across various levels of capital structure. The findings consistently show that these effects on SOA vary depending on the leverage level. The relationship is negative for low-leveraged firms, positive for high-leveraged firms, but insignificant in the central area of leverage distribution. Moreover, the negative effects are greater than the positive effects.

JEL classification: G32, O53

Keywords: Leverage, target capital structure, speed of adjustment, adjustment costs, ownership

1. Introduction

According to the trade-off theory, firms have an optimal capital structure and adjust their debt to the desired level to maximise value. However, with the presence of adjustment costs, firms rebalance their capital structure only when the benefits of adjustment outweigh its costs (Fischer, Heinkel, & Zechner, 1989; Strebulaev, 2007). Since self-interested managers may distort firm policies to maximise their own benefit rather than the wealth of shareholders, agency costs deriving from conflicts between managers and shareholders are a part of adjustment costs (Chang, Chou, & Huang, 2014).

We explore the effect of agency conflicts between managers and shareholders on the speed of adjustment (SOA) of capital structure by considering the influence of state ownership. Indeed, state-owned enterprises (SOEs) play an essential role in countries with transitional economies, moving from centrally planned to market-oriented economic systems. Due to certain factors, moreover, SOEs generally bear greater agency costs than private companies. First, supported by the government, state-controlled banks are likely to bail out state-owned firms for their losses, resulting in “soft budget” constraints. The flexibility of the budget has a negative effect on SOE managers’ incentives (Zhu, 2012). Second, there is a divergence between voting rights and cash flow rights where government shareholders have equity voting rights but not cash flow rights (Zou & Xiao, 2006). Third, the purpose of SOEs is to achieve political objectives, not to maximise shareholder wealth (Zhou & Xie, 2015). Therefore, the more state ownership characterises firms, the more severe are the agency problems they face. We employ state ownership as a proxy for the agency problem.

Although few studies have reported the influence of state ownership on SOA, we make a contribution by exploring this relationship in Vietnam, adopting a quantile regression framework. First, while the linkage between state ownership and SOA produces mixed results, according to the literature, we come up with new evidence that the effect of state ownership on

SOA is conditional on the level of leverage. Specifically, the effect is significant where there are extreme leverage values, both very high and very low, but is not significant in the central area of leverage distribution. This effect is adverse for low-leveraged firms but positive for high-leveraged firms. Second, the measure of adverse influence on SOA is greater than that of favourable influence. This contention points to the negative average impact of state ownership on the speed of leverage adjustment.

Third, while the relationship between state ownership and SOA has been studied recently in China, we examine Vietnam, which is an important transitional emerging market in Asia. Before 1986, Vietnam followed a centrally planned economic system which depended heavily on state-owned firms. However, the socialist model failed, resulting in hyperinflation and a period of fiscal crisis. Consequently, in 1986 the government implemented a reform program to transform the economy from a planned to a market system. One principal feature of this program was to convert state-owned enterprises into private firms.

Since privatisation is still ongoing, SOEs, which contribute 29% to the country's GDP, play a crucial role in the Vietnamese economy. Notably, the bad debt and inefficiency of some large SOEs has led to severe consequences for the economy. Consequently, investigating the influence of state ownership on SOA is necessary for policymakers to adjust and improve the performance of SOEs. Although SOA is essential, since any deviation away from the target is likely to reduce the firms' value and the speed of adjustment back to the optimal pertains to value recovery, all previous studies in the Vietnamese context have investigated the relationship between state ownership and debt level, whereas none have examined the effect of state ownership on SOA.

Fourth, regarding Vietnamese data sources, most studies are based on publicly listed companies on the Ho Chi Minh (HOSE) and Hanoi stock exchanges (HNX). We are the first to consider companies recorded on the unlisted public companies (UPCoM) list. This trading

system encourages unlisted firms to join the stock market. At the end of 2016, UPCoM had the largest number of listed firms among the three trading systems, and its market capitalisation accounted for 32.3% of the total capital market. Due to its crucial role and the increase in size and trading volume of UPCoM, the inclusion of this market helps to provide a comprehensive view of the Vietnamese trading system.

This paper is organized as follows. Section 2 reviews the literature and develops the research hypotheses. Section 3 explains the research method. Section 4 shows variable definition and data. Section 5 presents the empirical results. Section 6 shows the findings of the robustness tests. Finally, Section 7 summarises the study and draws some policy implications.

2. Literature review and research hypotheses

2.1. Literature review

2.1.1 The impact of state ownership on capital structure

From the perspective of agency theory, conflicts between managers and shareholders distort firm policies, resulting in the poor performance of these companies. To explain the influence of self-interested managers on finance policies, Chang et al. (2014) analyse two agency framework debt models, the disciplinary effect and the takeover defence effect. When managers consider debt as a takeover defence tool, they maintain high leverage to prevent raiders from taking over the company, whereas taking debt as a disciplinary tool, managers are likely to issue more equity than debt in order to use the benefits of free cash flow. Moreover, applying a variety of measurements for corporate governance, the relationship between corporate governance and leverage can be seen from a range of perspectives (Ahmed Sheikh & Wang, 2011)

As a proxy for corporate governance, ownership structure, reflected in monitoring costs, the threat of takeovers, and managers' risk aversion, has an evident effect on leverage level

(King & Santor, 2008). Different types of ownership structure are also discussed in the literature. For instance, Liao, Mukherjee, and Wang (2015) review institutional ownership – the percentage of a firm’s common shares owned by institutional investors – as a factor for identifying debt ratio. Specifically, the presence of institutional investors provides better monitoring of managers. Hence, the latter are likely to promote shareholders’ interests rather than their own. Besides, owning a substantial proportion of a company, large shareholders can monitor managers to ensure that they work effectively for the firm. Accordingly, leverage is closely associated with large ownership (Le & Tannous, 2016; Nhung & Okuda, 2015; Zeckhauser & Pound, 1990).

Adopting the Herfindahl index to estimate ownership concentration, Céspedes, González, and Molina (2010) maintain that shareholders with a high concentration of ownership are likely to take on debt rather than issuing equity to mitigate loss from dilution. Additionally, in the literature the effect of managerial ownership on leverage is said to be mixed. A negative relation between managerial ownership and leverage implies that managers are likely to avoid the risks of high-leveraged firms (Holderness & Sheehan, 1988) whereas a positive relation suggests that there is an incentive for managers to reinforce their control and avoid share dilution (Harris & Raviv, 1988; Kim & Sorensen, 1986).

Despite broad discussion of a range of ownership in the argument above, little attention has been paid to state ownership. State-controlled firms play an essential role in transitional economy countries, going through the process from a centrally planned system to a market economy. Generally, when SOEs are on the brink of bankruptcy, because of government support state-controlled banks are likely to bail out state-owned firms for their losses, resulting in “soft budget” constraints. This flexibility in the budget has a negative impact on SOE managers’ incentives (Zhu, 2012).

Additionally, according to Grosman, Okhmatovskiy, and Wright (2016), state control entails minimal transparency and disclosure because current or former government officials are generally appointed as board members in these firms, and they adopt a corporate governance mechanism to protect their own interests rather than those of shareholders. According to the evidence, wholly state-owned enterprises are less transparent than partially state-controlled firms (Pöyry & Maury, 2010).

Although several investigations have been conducted to examine the linkage between state ownership and leverage, this relationship remains an empirical issue in different contexts. Carrying out the analysis for 216 firms from 1993-2000 in China, Zou and Xiao (2006) conclude that state-owned enterprises (SOEs) maintain a high debt ratio level. First, SOEs have better access to bank loans. In particular, with state backing SOEs are less likely to face bankruptcy. Therefore, creditors readily lend to SOEs.

Second, to prevent the loss of state control and to preserve their voting rights, government shareholders avoid issuing equity and increasing debt for financing needs. Third, the high level of state ownership leads to severe conflicts between shareholders and managers. Specifically, there is a complete disjunction between voting rights and cash flow rights. Government shareholders have equity voting rights but not cash flow rights because ownership belongs to the citizens and the dividends from shares are allocated to the ministry of finance (Zou & Xiao, 2006). Thus, by monitoring managers, issuing debt can reduce this problem (Jensen, 1986).

Similarly, Li, Yue, and Zhao (2009) explore private firms in China from 2000 to 2004 and also find a positive relation between state ownership and leverage. This result is consistent with that of Huang, Lin, and Huang (2011), who analyse 767 firms listed on the Chinese stock market from 2000 to 2005. They also emphasize that the effect of state ownership on capital structure is mostly seen in high-leveraged firms.

As a country with a transitional economy, Vietnam offers a prime case for examining the relationship between state ownership and leverage. Nguyen and Ramachandran (2006) conducted a survey of 558 small and medium enterprises (SMEs) in Vietnam from 1998 to 2001 and note that SOEs have a good relationship with the bank and gain considerable advantages when borrowing money. Likewise, Nguyen, Diaz-Rainey, and Gregoriou (2012) employ a panel GMM system to consider the determinants of 116 non-financial firms listed on the Ho Chi Minh (HOSE) and Hanoi stock exchanges (HNX). Owing to the high level of government ownership of commercial banks, SOEs get support from these banks to issue debt. Consequently, state ownership is highly correlated with the debt ratio. Okuda and Nhung (2012) analyse 299 firms listed on HOSE and HNX and point out the discrepancy between state-owned and private enterprises regarding the debt ratio. Furthermore, they disclose that firms listed on HOSE rely less on debt than do those listed on HNX. In recent empirical studies, Le and Tannous (2016) and Thai (2017) also argue that SOEs can issue debt at lower cost as a result of their strong relationship with the state-controlled bank and government guarantees. For these reasons, there is a positive relationship between state ownership and capital structure.

The positive relationship between state ownership and leverage is also consistent in the Russian context. Investigating 95 publicly traded firms in the Russian Trading System (RTS) during the period 2000-2004, Pöyry and Maury (2010) highlight that companies with a large proportion of shares held by the state are likely to maintain a high level of debt because of favourable borrowing conditions.

While most of researches report a positive relationship between state ownership and leverage, a few studies reveal different results. For instance, Dharwadkar, George, and Brandes (2000) investigate nine transitional economies in Europe¹ and demonstrate that most state-

¹ Of 26 countries in the process of privatization in Europe, Dharwadkar, George, and Brandes (2000) examine 9 – Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia.

controlled enterprises are generally characterised by weak corporate governance and poor transparency monitoring systems. Therefore, banks are reluctant to lend them money, wanting to avoid bad debt. As a result, there is an inverse relationship between state ownership and capital structure.

2.1.2 The influence of state ownership on the speed of adjustment of capital structure

According to trade-off theory, firms achieve optimal capital structure when the marginal costs of debt are equal to the marginal benefits of debt. The existence of a target debt level becomes a debatable topic since any deviation of the observed leverage away from its optimal level decreases firm value. Various factors have been identified to explain how quickly firms adjust to their optimal leverage. To this point, there has been rich discussion investigating the impact of state ownership on capital structure, but the literature has been silent on the effects of state ownership on the speed of adjustment of capital structure. To the best of our knowledge, only two studies have discussed the effect of state ownership on SOA, both of which examine the Chinese market.

Qian, Tian, and Wirjanto (2009) employ DPD-GMM to examine the determinants of SOA for 650 Chinese publicly listed companies from 1999 to 2004. They explain how quickly firms achieve their target deriving from transaction costs associated with debt issuance and repurchase. With favourable conditions for accessing loans and a good relationship with the state-controlled banks, SOEs can raise funds more cheaply and adjust their leverage rate more quickly than non-SOEs. Qian et al. measure the state ownership proxy as the percentage of shares held by the state (Qian et al., 2009) whereas Zhou and Xie (2015) use dummy variables to distinguish between state-controlled and private firms. Interestingly, they obtain contrasting results, whereby state-owned companies have a slower adjustment speed than private companies do. The researchers argue that SOEs are likely to pursue political objectives rather

than seek to maximise the wealth of shareholders. Therefore, state-controlled firms work less effectively than private firms and their SOA should be lower.

The fact that different leverage levels are associated with various costs of adjustment has been identified in the literature. Specifically, low-leveraged firms can readily increase debt to take advantage of tax shields, due to their low agency and bankruptcy costs, whereas firms with high financial leverage are likely to face considerable restructuring costs because of the strong probability of bankruptcy and severe conflicts between shareholders and managers. Accordingly, some studies have reported heterogeneity and asymmetry in SOA, depending on the leverage level. For instance, Leary and Roberts (2005) employ three simulation models and reveal that firms adjust their leverage when the debt ratio is relatively high or low. Using a sub-sampling approach, Komera and Jijo Lukose (2016) conclude that there is a positive correlation between leverage level and SOA, whereas Galvao and Montes-Rojas (2010), employing penalized quantile regression, indicate that there is a negative influence for this relationship. Sánchez-Vidal (2014) confirms that factors related to these costs can have varied effects on firms, depending on debt level. Due to the separation of voting rights from cash flow rights, the conflict between political objectives and shareholder interests, and the negative influence on managers' incentives from "soft budget constraints," SOEs generally suffer from substantial agency costs.

The literature also indicates a positive relationship between agency costs and leverage. Notably, as debt increases, agency costs rise because leveraged firms are less likely to follow the investment policy of maximising the benefit of shareholders (Jensen, 1986; Myers, 1977). Some researchers also provide evidence of agency costs with high debt ratios. For instance, Smith Jr and Watts (1992) document a negative relation between investment opportunities and leverage while Titman and Wessels (1988) disclose the adverse effect of leverage on research and development (R&D). Since the agency costs of debt are relatively low for low-leveraged

firms but considerable for firms with high financial leverage, we argue that the effects of state ownership on SOA are conditional on the leverage level. While most studies only investigate the overall impact of state ownership on the leverage adjustment toward the optimal level, we fill the gap by examining this effect at varying degrees of leverage using the quantile regression approach.

Although the linkage between state ownership and SOA has been highlighted in China, in the Vietnamese market this relation has remained unexplored in the literature. In fact, before 1986, Vietnam pursued a centrally-planned economic system which relied heavily on state-owned firms. However, the socialist model did not work effectively and Vietnam underwent hyperinflation and a period of fiscal crisis. As a result, in 1986 the government implemented a reform program, named *Doi Moi*, to transform the economy from a planned to a market system. As a result of this policy, Vietnam's economy has achieved significant growth and sustainable development. In the privatisation process, wholly state-owned enterprises will become partially state-owned enterprises. However, since they contribute 29% of the country's GDP, SOEs continue to play a crucial role in the economy due to the incomplete privatisation process (Thai, 2017).

Notably, the bad debt and inefficiency of some of the largest SOEs have entailed serious consequences for the economy.² Some banks have also become embroiled with these SOEs and have become insolvent. Consequently, by December 31, 2016, the Vietnam State Bank had bought three banks³ for 0 VND and appointed VietinBank and VietcomBank to help them restructure (Vu, Phan, & Le, 2018). Moreover, while most studies on SOA focus only on developed markets, the emerging Vietnamese market provides a different angle on SOA

² The Vinashin Business Group, for instance, was established in 2006, owned by the Vietnamese government. By the end of 2010, Vinashin's total unpaid debt (bad debt) totalled USD 6 billion (Vu, Phan, & Le, 2018).

³ The three banks are the Vietnam Construction Bank (VNCB), OceanBank and The Global Petroleum Bank (GP Bank).

because of its institutional features (financial, legal and regulatory) (Supra, Narender, Jadiyappa, & Girish, 2016). Therefore, it is necessary to investigate the effects of state ownership on SOA in Vietnam.

Regarding the Vietnamese market, most studies focus on public stock exchange markets, namely HOSE and HNX. The Unlisted Public Company Market (UPCoM) seems to be ignored in the literature, however. The UPCoM trading system, established in 2009, aims to motivate unlisted companies to join the securities market. When listed on UPCoM, stocks become visible and accessible to investors so that firms can increase their equity liquidity. A listing on UPCoM is also a useful step to enhance the transparency of corporate governance, encouraging firms to list on the HOSE and HNX exchange markets.

Since the State Securities Commission (SSC) pushes SOEs to list on UPCoM to improve their transparency, UPCoM plays an important role in monitoring SOEs. Moreover, UPCoM constitutes a new market with a legal and regulatory framework for investors. By the end of 2016, UPCoM had the largest number of listed firms among the three trading systems (414 firms compared to 320 and 375 firms listed on HOSE and HNX, respectively), and the market capital of UPCoM rose to VND 306,639 turn (USD 13.6bn), accounting for 32.3% of the total capital market. Since UPCoM plays a crucial role for firms and investors and enables the SSC to monitor SOEs, the inclusion of firms listed on UPCoM is necessary when examining the Vietnamese market.

In short, although the effects of state ownership on SOA have been identified in the literature, there are two gaps that we want to fill. First, we examine the relationship between state ownership and the adjustment speed of capital structure conditional on the level of leverage. Second, while the relationship between state ownership and SOA has recently been explored in the Chinese context, we investigate a new transitional economy and emerging market, Vietnam, with different SOE features. Additionally, in view of the increase in the size

and trading volume of UPCoM, we consider three stock exchanges, namely HOSE, HNX and UPCoM, instead of including only publicly listed stock exchanges, as most studies of the Vietnamese market do.

2.2 Research hypotheses

According to trade-off theory, firms maximise their value by adjusting their leverage to reach an optimal level where the marginal cost of debt is equal to the marginal benefits of debt. Nevertheless, adjustment costs are impediments for firms seeking to achieve their target leverage level (Fischer et al., 1989; Strebulaev, 2007). Due to the fact that self-interested managers are likely to distort firm policies and promote their own benefit rather than the wealth of shareholders, agency costs resulting from conflicts between managers and shareholders account for part of the adjustment costs (Chang et al., 2014; Liao et al., 2015).

Moreover, the agency costs of debt fluctuate according to leverage level. Specifically, with a high debt ratio, leveraged firms may be unable to follow investment policy to maximise shareholder benefit (Jensen, 1986; Myers, 1977). Similarly, Smith Jr and Watts (1992) and Titman and Wessels (1988) reaffirm the considerable agency costs of highly leveraged debt when examining the relationship between leverage, investment opportunities, and R&D. As the level of agency costs varies by degree of leverage, the impact of factors associated with agency costs can have varying effects, depending on the leverage level. Employing this argument, Sánchez-Vidal (2014) affirms that different leverage levels are related to various adjustment expenses. Therefore, factors related to these costs can have various effects on firms, depending on their debt level.

In view of the divergence of cash flow rights and voting rights, the conflict between political objectives and shareholder interests, and the negative impact of “soft budget constraints” on managers’ incentives, SOEs generally incur considerable agency costs. Since

the magnitude of agency costs depends on debt levels, we argue that the effects of state ownership on SOA are conditional on the leverage level.

We highlight the effect of agency costs on the pace of leverage adjustment by investigating the effect of state ownership. Following Chang et al. (2014), we take into consideration two models of agency debt framework, namely the disciplinary effect and the takeover defence effect. Under the takeover defence effect, debt is employed to prevent raiders from taking over the firms. In consequence, to pursue personal interests managers are likely to raise debt regardless of its adverse effect on shareholder benefits. On the other hand, to take advantage of the disciplinary effect of debt, managers maximise their personal advantage by reducing debt and increasing equity to enjoy free cash flow without considering its negative impact on the wealth of shareholders.

For low-leveraged firms, SOEs are safe from bankruptcy and insolvency problems. Therefore, to pursue political objectives and take advantage of free cash flow, managers are likely to issue equity instead of taking on debt. In other words, in this case the disciplinary effect of debt has the most influence on managers. However, according to Leary and Roberts (2005), after crossing the low boundary of debt, firms should increase their debt to take advantage of the tax shield and adjust their leverage to the optimal level. In this case, firms with a high proportion of state ownership behave differently to maintain a low debt ratio by increasing equity. For those reasons, we offer the following hypothesis:

Hypothesis 1: There is a negative relationship between state ownership and SOA in low-levered firms

For high-leveraged firms, SOEs deal with the strong probability of bankruptcy and insolvency problems. Moreover, firms with a high state ownership ratio also incur considerable agency costs. One such expense is the result of high leverage, and another derives from the agency conflicts of SOE managers and shareholders. Therefore, to reduce agency costs and the

likelihood of bankruptcy, managers are likely to reduce debt. Moreover, SOEs bad debt is a concern of government because some banks involved with these firms end in bankruptcy. Therefore, a lower debt ratio can be a good signal for the government. As SOEs have government guarantees and better access to the loan market, they can repurchase debt to alleviate bankruptcy costs and present a good image to the government. In this case, the disciplinary effect of debt is also appropriate for interpreting managers' behaviour. Therefore, we propose the following hypothesis:

Hypothesis 2: There is a positive relationship between state ownership and SOA in high-levered firms

3. Econometric models

3.1. QR model

The quantile regression developed by Koenker and Bassett Jr (1978) affords a complete overview of how explanatory variables affect the conditional distribution of the dependent variable. Moreover, while ordinary least squares (OLS) is likely to be biased and inefficient for the data with a large outlier and non-normal distribution of the disturbances, quantile regression is robust regarding the normality and skewed tails distribution (Mata & Machado, 1996). To explore QR, we can start with the following linear model:

$$y_{it} = x_{it}' \beta_{\theta} + u_{\theta it} \quad (1)$$

Where y_{it} is the dependent variable and x_{it} is the $k \times 1$ vector of explanatory variables for the firm i and in time period t . In Eq. (1), θ is the quantile value of the y_{it} variable. Specifically, θ indicates the position where an observation lies within an ordered series of y_i . It refers to a cumulative probability function (CDF) of y_{it} with a range from 0% to 100%. When $F(y)$ is the cumulative distribution of a random variable y :

$Q_{(\theta)} = \inf y: F(y) \geq \theta$ in which \inf means the infimum. In other words, the lowest value of y meets the condition.

To resolve Eq. (1), Koenker and Bassett Jr (1978) minimise the sum of absolute deviation residuals in the following equation:

$$\begin{aligned} \min & \sum_{it:u_{\theta t}>0} \theta \times |u_{\theta t}| + \sum_{it:u_{\theta t}<0} (1-\theta) \times |u_{\theta t}| \\ = & \sum_{it:y_{it}-x_{it}'\beta_{\theta}>0} \theta \times |y_{it}-x_{it}'\beta_{\theta}| + \sum_{it:y_{it}-x_{it}'\beta_{\theta}<0} (1-\theta) \times |y_{it}-x_{it}'\beta_{\theta}|. \end{aligned} \quad (2)$$

Eq. (2) shows that the estimator vector of β_{θ} changes according to θ , the quantile value of the dependent variable (i.e., the y variable). By contrasting β_{θ} estimates across various θ , we are able to examine whether the relationship between the x and y variables is non-uniform across the entire distribution of the latter. This is the crucial advantage of the QR method.

In OLS, the mean is the key to minimise the sum of squared residuals, whereas in least absolute deviation (LAD), the median is the answer to solve the question of minimising the sum of absolute residuals. Obviously, quantile regression does not employ the OLS method but the LAD to find the solution. Additionally, LAD, a special case of quantile regression under the restriction of $\theta = 50\%$, employs the same weight on positive and negative errors. In QR, there is a different weight for the positive and negative errors (i.e., θ for positive errors and $(1-\theta)$ for negative errors).

3.2. Empirical models

In the first stage, the target leverage is defined by a function of the firm's characteristics. These factors are identified by the trade-off theory and some empirical studies as the main determinants of the optimal capital structure (Antoniou, Guney, & Paudyal, 2008; Hovakimian & Li, 2011; Liao et al., 2015)

$$LEV_{i,t+1}^* = \beta X_{i,t} \quad (3)$$

where LEV^* refers to a firm's target leverage, and X is a set of explanatory variables, including firm size ($SIZE$), asset tangibility ($TANG$), depreciation and amortisation (DEP), and operating income before depreciation ($PROFIT$).

In the second stage, to estimate how quickly a firm moves its current leverage to the optimal level, we employ the partial adjustment model (Chang et al., 2014; Fama & French, 2002; Kayhan & Titman, 2007). According to the trade-off theory, firms should fully adjust to their target leverage to maximise their value. However, due to adjustment costs, they can only partially adjust their leverage.

$$LEV_{i,t+1} - LEV_{i,t} = \alpha + \delta(LEV_{i,t+1}^* - LEV_{i,t}) + \varepsilon_{i,t} \quad (4)$$

Where LEV and LEV^* represents the observed leverage and the firm's achieved target leverage levels respectively, and δ is the SOA of leverage at its optimal level. The value of $SOA = 1$ implies that firms fully adjust to the optimal level, whereas $SOA < 1$ indicates the presence of adjustment costs.⁴ Following the literature (Flannery & Rangan, 2006; Hovakimian & Li, 2011), we merge equations (3) and (4) to achieve a reduced-form partial adjustment leverage model:

$$LEV_{i,t+1} = \alpha + \beta\delta X_{i,t} + (1 - \delta) LEV_{i,t} + \varepsilon_{i,t+1} \quad (5)$$

According to Öztekin and Flannery (2012), the firm's characteristics obviously influence both target leverage and the adjustment speed of capital structure. Hence, we apply the same control variables in the regression to examine the effect of state ownership on SOA:

$$\delta_{i,t} = \partial_0 + \partial_1 SO_{i,t} + \partial_2 X_{i,t} \quad (6)$$

Where $SO_{i,t}$ is the state ownership of firm i at time t , $X_{i,t}$ is a vector of control variables, including firm size ($SIZE$), asset tangibility ($TANG$), depreciation, amortisation, and operating income before depreciation ($PROFIT$).

⁴ The adjustment costs may come from financial distress and other costs of debt (Hovakimian & Li, 2011)

Now, we merge Eq. (6) with Eq. (5) to obtain the following model:

$$LEV_{i,t+1} = \alpha + \beta\delta X_{i,t} + [1 - (\partial_0 + \partial_1 SO_{i,t} + \partial_2 X_{i,t})] LEV_{i,t} + \varepsilon_{i,t+1} \quad (7)$$

Partly multiplying Eq. (7) out, we obtain:

$$LEV_{i,t+1} = \alpha + \partial'_1(SO_{i,t} * LEV_{i,t}) + \partial'_2(X_{i,t} * LEV_{i,t}) + (1 - \partial_0)LEV_{i,t} + \beta\delta X_{i,t} + \varepsilon_{i,t+1} \quad (8)$$

Where $\partial'_1 = -\partial_1$, $\partial'_2 = -\partial_2$. In Eq. (8), the effect of state ownership on SOA is represented in the interaction terms of state ownership and the leverage, with the same magnitude but with the opposite sign. We apply quantile regression for Eq. (8) to examine the effects of state ownership on the conditional distribution of the leverage (Liao et al., 2015).

4. Variable definition and data

4.1. Variable definition

4.1.1. Leverage ratio

Empirical studies have applied both market and book values to investigate leverage (Chang et al., 2014; Cook & Tang, 2010; Dang, Kim, & Shin, 2015; Hovakimian & Li, 2011). Nevertheless, according to Flannery and Rangan (2006), the book values are likely to be far from the market values for small firms. Chang et al. (2014) also affirm that market values play a more important role than book values in finance theory. Therefore, we will adopt market values first and use book values for the robustness test. Accordingly, our market leverage ratio is:

$$MLEV_{i,t} = \frac{D_{i,t}}{D_{i,t} + S_{i,t}P_{i,t}} \quad (9)$$

$D_{i,t}$ denotes the book value of firm i 's interest-bearing debt at time t , $S_{i,t}$ is the number of common shares outstanding of the firm at time t , and $P_{i,t}$ denotes the stock price per share at time t . For the book leverage ratio, we use:

$$BLEV_{i,t} = \frac{D_{i,t}}{TA_{i,t}} \quad (10)$$

$D_{i,t}$ is the sum of short-term debt and the long-term debt book value of interest-bearing.

$TA_{i,t}$ denotes the book value total assets of firm i at time t .

4.1.2. State ownership

State ownership is a typical feature of firms in transition from a planned to a market economy, and China and Vietnam are prominent examples. Some studies employ dummy variables to distinguish between state and private ownership (Nhung & Okuda, 2015; Zhou & Xie, 2015). However, since our purpose is to examine the relationship between the level of state ownership and the SOA, we follow most studies and measure state ownership as the percentage of shares held by the state (Huang, 2006; Le & Tannous, 2016; Li et al., 2009; Zou & Xiao, 2006).

4.1.3. Firm characteristics

As the adjustment costs are likely to be different from firm to firm, firm characteristics are important factors for determining the target leverage as well as SOA. We follow the literature in applying the key factors to identify the choice of capital structure.

Large firms are likely to have more debt as their assets are less volatile. These firms, moreover, have easy access to public loan markets. We follow Rajan and Zingales (1995), Hovakimian and Li (2011) and Chang et al. (2014) in measuring firm size (*SIZE*) as the natural logarithm of total assets.

Firms with considerable assets generally face little risk of bankruptcy and have a good credit rating. Thus, they can readily increase debt. We estimate asset tangibility (*TANG*) as fixed assets, consisting of property, plant and equipment (Rajan & Zingales, 1995; Titman & Wessels, 1988).

With a high percentage of depreciation, firms can save money from taxation and are therefore less likely to take advantage of debt as a tax shield. Depreciation (*DEP*) is measured as the ratio of depreciation to total assets (Chang et al., 2014; Hovakimian & Li, 2011).

Due to their high retention of earnings, firms with large profits can reduce the need to issue debt. We follow Fama and French (2002) and Hovakimian and Li (2011) to measure profit (*PROFIT*) as operating income before depreciation.

4.2 Data

We obtain data from three stock exchange markets, namely the Ho Chi Minh stock exchange (HOSE), the Hanoi stock exchange (HOSE) and the Unlisted Public Company Market (UPCoM) from 2000 to 2016. We start from 2000 because the Ho Chi Minh stock exchange was established in that year.⁵ The sample ends in 2016 owing to the availability of the data at the time when the study starts. Tai Viet Corporation (Vietstock), a leading financial information service provider in Vietnam, provided all the financial and ownership data.

Following standard practice, firms in the finance industries (SIC codes 6000-6999) and regulated utilities (SIC codes 4900-4999) are excluded from our analyses (Bauer, Frijns, Otten, & Tourani-Rad, 2008; Dittmar & Mahrt-Smith, 2007; Laing & Weir, 1999; Ukaegbu & Oino, 2014). Each sample firm must have at least two consecutive years of data. We also restrict our data by dropping firms if large amounts of basic data were missing and if observations include an extreme value.⁶ Finally, our sample consists of 662 firms with 5,374 firm-year observations.

Table 1 represents summary statistics for the main variables in our model.

[Please insert Table 1 here]

Our results for firm variables are similar to those of other studies of the Vietnamese market (Le & Tannous, 2016; Nhung & Okuda, 2015). The highest percentage of ownership reported in this paper is greater than that reported in other studies because our database covers

⁵The Hanoi stock exchange (HOSE) was established in 2005, whereas the Unlisted Company Market first appeared in 2009.

⁶For instance, observations with a leverage ratio above 1 or below 0 are excluded from our database.

an extended period (17 years) and we also consider the listed stock exchanges as well as the Unlisted Public Company Market. To check for multicollinearity, we disclose the correlation coefficients in Table 2.

[Please insert Table 2 here]

It can be seen from Table 2 that these variables are not highly correlated. Therefore, we do not take into consideration multicollinearity problems.

5. Empirical results

5.1 Ordinary Least Square (OLS) and Least Absolute Deviation (LAD) estimates

Table 3 below provides the results of our estimations for regression equation (8) in which leverage is the dependent variable. Also, this paper represents the OLS and LAD estimates in comparison with QR estimates. Since we concentrate primarily on the influence of state ownership on the rate at which firms meet their target, we illustrate the estimation results of the negative sign of the interaction coefficient (*- leverage * state ownership*) in Table 3.

[Please insert Table 3 here]

As can be seen from the data in Table 3, the OLS and LAD methods show negative estimates, implying an inverse relationship between state ownership and SOA. This result is consistent with Qian et al. (2009), who investigate the Chinese market from 1999 to 2004. Although OLS and LAD give the same signal, the magnitude of coefficients is different in that OLS coefficients are found to be ten times larger than those in LAD. Moreover, at the 5% level of significance, the OLS result remains significant, whereas the LAD estimate is insignificant. Therefore, we can determine the key findings based on OLS but not on a LAD estimate.

Furthermore, it is particularly noteworthy that both OLS and LAD concentrate mainly on the central area of the leverage distribution. Specifically, in OLS the mean is the key to

minimise the sum of squared residuals whereas in LAD, the median is applied to resolve the question of minimising the sum of absolute residuals. Accordingly, these methods can examine the linkage between state ownership and SOA in the non-central area (i.e., in the left or right tail of the leverage distribution). To deal with this problem, therefore, we adopt quantile regression to review the effects of state ownership on SOA, conditional on the leverage distribution.

5.2 QR estimates

While estimating QR, we begin with a 5% quantile of leverage, and then repeat estimations by increments of 5% in each quantile, ending with the 95% quantile. In Table 3, the estimate of the opposite sign of the interaction coefficient (*leverage * state ownership*) changes substantially regarding the sign, magnitude and significance. At a low quantile level, the coefficients $\hat{\theta}_1$ are negatively significant. The degree of impact becomes weaker as the leverage increases (i.e., 0.198 at the 5% quantile and 0.043 at the 35% quantile). Between 40% and 65% of quantile leverage, the interaction terms become insignificant. From this point, the effects of state ownership turns out to be significant and positive with the increasing magnitude of the effects (i.e., 0.014 at the 70% quantile and 0.029 at the 95% quantile).

[Please insert Table 4 here]

Table 4 illustrates the F tests of the equality-of-slope of the interaction estimate (*leverage * state ownership*) across various quantiles of leverage. The differences between the slope estimates at the θ and $(1-\theta)$ quantiles of the interaction terms are highlighted. Interestingly, the outcomes of the comparison are significant at 1% for all quantiles.

[Please insert Figure 1 here]

Figure 1 presents a picture of the QR estimates of the interaction coefficient (*- leverage * state ownership*) with 95% confidence intervals. For purposes of comparison, OLS estimates

are also given in the figure. As discussed above, OLS outcomes only indicate the effects of state ownership on SOA conditional on the mean of leverage but cannot capture these effects across the various levels of leverage.

It is apparent from Figure 1 that in the central quantile region with 95% confidence, the interaction coefficients are insignificant, whereas they are significant at the tail ends on the right and the left of the leverage distributions. Notably, while the effects of state ownership on SOA change from negative to positive, the adverse effects are greater than the favourable ones (i.e., 0.198 at the 5% quantile and 0.029 at the 95% quantile).

5.3 Implications

Since there are mixed results in the literature concerning the relationship between state ownership and the adjustment speed of capital structure, we offer a new approach to examine this association at varying leverage levels. Firms with low financial leverage show an adverse correlation between state ownership and SOA whereas this connection becomes positive for high-leveraged firms. Although the impact is substantial for the extreme values of leverage – both very high and very low – the evidence indicates that adverse effects are much greater than favourable ones.

The negative effect at the low quantile of leverage supports the arguments of Zhou and Xie (2015), who justify their assessment of adjustment speed based on agency costs. In particular, due to the separation of voting rights from cash flow rights, SOEs are likely to focus on political objectives rather than on maximising the benefit for shareholders. Moreover, “soft budget constraints” have an adverse effect on managers’ motivations. Consequently, SOEs bear considerable agency costs, which prevent firms from adjusting leverage to the optimal level.

Furthermore, this linkage can be interpreted by the disciplinary effect of debt. In this case, managers maximise their interests by increasing equity and reducing debt to take advantage of free cash flow. While most studies imply that SOEs have better access to the loan

market, our results emphasise that SOEs with low debt levels also obtain favourable conditions for obtaining equity in the Vietnamese market. There are two reasons for this phenomenon. First, SOEs have a strong relationship with state-controlled firms and state-run commercial banks. The government allows these firms and banks to make investments by purchasing equity. Second, low levels of debt earn a firm a good reputation and this entails low financial distress costs. Furthermore, SOEs are guaranteed by the state, so their stock is likely to be attractive to investors.

On the other hand, a positive correlation between state ownership and SOA for higher leveraged SOEs is consistent with the viewpoint of Qian et al. (2009), who analyse SOA based on transaction costs. Specifically, SOEs not only maintain a strong relationship with the state-controlled banks but enjoy government guarantees against bankruptcy and insolvency. Consequently, they can borrow at lower cost, resulting in a faster leverage adjustment speed than that of private firms. The positive linkage between state ownership and SOA is also consistent with the disciplinary effect of debt. In Vietnam, the members of SOE boards of directors are generally government officials or former government officials. Since a high debt ratio often results in bankruptcy, insolvency, non-performing loans and therefore a bad reputation, managers in SOEs try to reduce debt levels to avoid losing their jobs and seek to impress the government with better performance.

Finally, although the effects of state ownership on SOA can be positive or negative depending on the debt level, the negative effects are reported to be greater than the positive ones. This implies that low-leveraged SOEs find it easier than high-leveraged SOEs to issue equity to repurchase debt. As discussed above, the stock of low-leveraged SOEs is attractive to investors. On the other hand, even though high-leveraged SOEs can access debt more easily than private firms, banks provide less favourable conditions than previously for SOEs after some state-controlled banks became insolvent and were bought out by the State Bank.

6. Robustness tests

6.1 *Alternative measure of leverage*

In order to determine whether the results outlined in Section 5 are robust, we carried out additional tests. The first was to apply an alternative measure of leverage. The results in Section 5 are based on market-value measures of leverage: total debt leverage (total debt/ (total debt + market value of equity)). To verify the robustness of the estimates, we use the book-value measure of leverages – total debt leverage (total debt/book value of total assets) – and re-run the QR approach. The empirical results are presented in Table 5 and Figure 2.

[Please insert Table 5 here]

[Please insert Figure 2 here]

The results obtained from Table 5 and Figure 2 are consistent with those using the book value of leverage. In particular, the effects of state ownership on SOA are only significant for extreme values of leverage, both very high and very low. Moreover, the adverse effects in the lower quantile of leverage outweigh those in the top quantile.

6.2 *Non-zero debt issuance firms*

According to Cook, Kieschnick, and McCullough (2008), the issues on the equivalent question between debt-equity choice and how much debt firms want to incur can be more serious when studies include zero leverage and non-zero leverage firms in the same test. Additionally, in view of the different incentives for zero leverage and non-zero leverage firms, the financial constraints on firms, their financial flexibility and need for external financing (Devos, Dhillon, Jagannathan, & Krishnamurthy, 2012; Huang, Li, & Gao, 2017), the outcomes of the sample with and without zero leverage can be different. Consequently, to check the robustness of the tests presented in Section 5, we run the data for non-zero debt issuance firms again. The results are shown in Table 6 and Figure 3.

[Please insert Table 6 here]

[Please insert Figure 3 here]

As can be seen from Table 6 and Figure 3, the influence of state ownership on SOA is conditional on the leverage level. Specifically, the effects are negative at the tails on the left, positive on the right and insignificant in the central area of leverage distributions. Adverse effects are greater than positive effects. These results are similar when applied to both zero and non-zero leverage firms in the same test.

7. Conclusions

In the literature, the effects of state ownership on the adjustment speed of capital structure are reported to be mixed. These effects can be positive when researchers focus on transaction costs (Qian et al., 2009) but become negative when agency costs are applied to explain. Using a quantile regression approach, our study is the first to address this issue. This model helps us to examine the relationship between state ownership and SOA conditional on the distribution of leverage and leads to some interesting findings. The influence of state ownership on SOA is negative for low-levered firms, positive for high-levered firms and insignificant for mid-levered firms. Notably, the adverse effects are greater than the favourable effects.

Moreover, while information concerning the association between state ownership and SOA is restricted in China, we explore the new transitional economy of Vietnam. Vietnam is still going through the privatisation process, in which wholly state-owned enterprises are transformed into partially state-owned enterprises. Additionally, privatisation is complete only when all state-owned enterprises become private companies. Since the process is not complete, SOEs still play an essential role in the economy. Our findings suggest some policies for the government. First, the government should speed up the privatisation process to ensure that SOEs cannot be the cause of negative consequences for the economy. Second, since low-leveraged SOEs can readily issue equity, policies should be implemented to limit this practice,

and other state-controlled firms and banks should be restricted from buying SOEs' equity. Third, since high-leveraged SOEs enjoy favourable conditions when repurchasing debt or increasing equity to lower their leverage, the government should impose policies to monitor SOEs when their leverage is relatively high.

References

- Ahmed Sheikh, N., & Wang, Z. (2011). Determinants of capital structure. *Managerial Finance*, 37(2), 117-133. 10.1108/030743511111103668
- Antoniou, A., Guney, Y., & Paudyal, K. (2008). The Determinants of Capital Structure: Capital Market-Oriented versus Bank-Oriented Institutions. *Journal of Financial and Quantitative Analysis*, 43(1), 59-92. 10.1017/S0022109000002751
- Bauer, R., Frijns, B., Otten, R., & Tourani-Rad, A. (2008). The impact of corporate governance on corporate performance: Evidence from Japan. *Pacific-Basin Finance Journal*, 16(3), 236-251. 10.1016/j.pacfin.2007.05.001
- Céspedes, J., González, M., & Molina, C. A. (2010). Ownership and capital structure in Latin America. *Journal of Business Research*, 63(3), 248-254. 10.1016/j.jbusres.2009.03.010
- Chang, Y.-K., Chou, R. K., & Huang, T.-H. (2014). Corporate governance and the dynamics of capital structure: New evidence. *Journal of Banking and Finance*, 48, 374-385. 10.1016/j.jbankfin.2014.04.026
- Cook, D. O., Kieschnick, R., & McCullough, B. D. (2008). Regression analysis of proportions in finance with self selection. *Journal of empirical finance*, 15(5), 860-867.
- Cook, D. O., & Tang, T. (2010). Macroeconomic conditions and capital structure adjustment speed. *Journal of Corporate Finance*, 16(1), 73-87. 10.1016/j.jcorpfin.2009.02.003
- Dang, V. A., Kim, M., & Shin, Y. (2015). In search of robust methods for dynamic panel data models in empirical corporate finance. *Journal of Banking & Finance*, 53, 84-98.
- Devos, E., Dhillon, U., Jagannathan, M., & Krishnamurthy, S. (2012). Why are firms unlevered? *Journal of corporate finance*, 18(3), 664-682.
- Dharwadkar, B., George, G., & Brandes, P. (2000). Privatization in emerging economies: An agency theory perspective. *Academy of management review*, 25(3), 650-669.
- Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, 83(3), 599-634. 10.1016/j.jfineco.2005.12.006
- Fama, E. F., & French, K. R. (2002). Testing Trade-Off and Pecking Order Predictions about Dividends and Debt. *The Review of Financial Studies*, 15(1), 1-33. 10.1093/rfs/15.1.1
- Fischer, E. O., Heinkel, R., & Zechner, J. (1989). Dynamic Capital Structure Choice: Theory and Tests. *Journal of Finance*, 44(1), 19-40. 10.1111/j.1540-6261.1989.tb02402.x
- Flannery, M. J., & Rangan, K. P. (2006). Partial adjustment toward target capital structures. *Journal of Financial Economics*, 79(3), 469-506. 10.1016/j.jfineco.2005.03.004
- Galvao, A. F., & Montes-Rojas, G. V. (2010). Penalized quantile regression for dynamic panel data. *Journal of Statistical Planning and Inference*, 140(11), 3476-3497.
- Grosman, A., Okhmatovskiy, I., & Wright, M. (2016). State control and corporate governance in transition economies: 25 years on from 1989. *Corporate Governance: An International Review*, 24(3), 200-221.
- Harris, M., & Raviv, A. (1988). Corporate control contests and capital structure. *Journal of financial Economics*, 20, 55-86.
- Holderness, C. G., & Sheehan, D. P. (1988). The role of majority shareholders in publicly held corporations: An exploratory analysis. *Journal of financial economics*, 20, 317-346.
- Hovakimian, A., & Li, G. (2011). In search of conclusive evidence: How to test for adjustment to target capital structure. *Journal of Corporate Finance*, 17(1), 33-44. 10.1016/j.jcorpfin.2010.07.004
- Huang, B.-Y., Lin, C.-M., & Huang, C.-M. (2011). The influences of ownership structure: Evidence from China. *The Journal of Developing Areas*, 209-227.
- Huang, G. (2006). The determinants of capital structure: Evidence from China. *China economic review*, 17(1), 14-36.
- Huang, Z., Li, W., & Gao, W. (2017). Why do firms choose zero-leverage policy? Evidence from China. *Applied Economics*, 49(28), 2736-2748.
- Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 76(2), 323-329.
- Kayhan, A., & Titman, S. (2007). Firms' histories and their capital structures. *Journal of Financial Economics*, 83(1), 1-32. 10.1016/j.jfineco.2005.10.007

- Kim, W. S., & Sorensen, E. H. (1986). Evidence on the impact of the agency costs of debt on corporate debt policy. *Journal of Financial and quantitative analysis*, 21(2), 131-144.
- King, M. R., & Santor, E. (2008). Family values: Ownership structure, performance and capital structure of Canadian firms. *Journal of Banking & Finance*, 32(11), 2423-2432.
- Koenker, R., & Bassett Jr, G. (1978). Regression quantiles. *Econometrica: journal of the Econometric Society*, 33-50.
- Komera, S., & Jijo Lukose, P. (2016). Heterogeneity and Asymmetry in Speed of Leverage Adjustment: The Indian Experience. *Review of Pacific Basin Financial Markets and Policies*, 19(03), 1650019.
- Laing, D., & Weir, C. M. (1999). Governance structures, size and corporate performance in UK firms. *Management Decision*, 37(8-6s), 457.
- Le, T. P. V., & Tannous, K. (2016). Ownership structure and capital structure: A study of Vietnamese listed firms. *Australian Economic Papers*, 55(4), 319-344.
- Leary, M. T., & Roberts, M. R. (2005). Do Firms Rebalance Their Capital Structures? *The Journal of Finance*, 60(6), 2575-2619. 10.1111/j.1540-6261.2005.00811.x
- Li, K., Yue, H., & Zhao, L. (2009). Ownership, institutions, and capital structure: Evidence from China. *Journal of comparative economics*, 37(3), 471-490.
- Liao, L.-K. C., Mukherjee, T., & Wang, W. (2015). Corporate governance and capital structure dynamics: an empirical study *Journal of Financial Research*, 38(2), 169-192. 10.1111/jfir.12057
- Mata, J., & Machado, J. A. (1996). Firm start-up size: A conditional quantile approach. *European Economic Review*, 40(6), 1305-1323.
- Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), 147-175. 10.1016/0304-405X(77)90015-0
- Nguyen, D., Diaz-Rainey, I., & Gregoriou, A. (2012). Financial development and the determinants of capital structure in Vietnam.
- Nguyen, T. D. K., & Ramachandran, N. (2006). Capital structure in small and medium-sized enterprises: the case of Vietnam. *ASEAN Economic bulletin*, 23(2), 192-211.
- Nhung, L. T. P., & Okuda, H. (2015). Effects of state ownership on companies' capital structure and profitability: Estimation analysis before and after the Lehman shock. *Journal of Asian Economics*, 38, 64-78.
- Okuda, H., & Nhung, L. T. P. (2012). Capital structure and investment behavior of listed companies in Vietnam: An estimation of the influence of government ownership. *International Journal of Business and Information*, 7(2)
- Öztekin, Ö., & Flannery, M. J. (2012). Institutional determinants of capital structure adjustment speeds. *Journal of Financial Economics*, 103(1), 88-112. 10.1016/j.jfineco.2011.08.014
- Pöyry, S., & Maury, B. (2010). Influential ownership and capital structure. *Managerial and Decision Economics*, 31(5), 311-324.
- Qian, Y., Tian, Y., & Wirjanto, T. S. (2009). Do Chinese publicly listed companies adjust their capital structure toward a target level? *China Economic Review*, 20(4), 662-676.
- Rajan, R. G., & Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, 50(5), 1421-1460. 10.1111/j.1540-6261.1995.tb05184.x
- Sánchez-Vidal, F. J. (2014). High debt companies' leverage determinants in Spain: A quantile regression approach. *Economic Modelling*, 36, 455-465.
- Smith Jr, C. W., & Watts, R. L. (1992). The investment opportunity set and corporate financing, dividend, and compensation policies. *Journal of financial Economics*, 32(3), 263-292.
- Strebulaev, I. A. (2007). Do Tests of Capital Structure Theory Mean What They Say? *Journal of Finance*, 62(4), 1747-1787. 10.1111/j.1540-6261.2007.01256.x
- Supra, B., Narender, V., Jadiyahappa, N., & Girish, G. (2016). Speed of adjustment of capital structure in emerging markets. *Theoretical Economics Letters*, 6(03), 534.
- Thai, A. (2017). Ownership and Capital Structure of Vietnamese Listed Firms. *International Journal of Business and Information*, 12(3), 243-286.
- Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice. *The Journal of Finance*, 43(1), 1.

- Ukaegbu, B., & Oino, I. (2014). The determinants of capital structure: A comparison of financial and non-financial firms in a regulated developing country - Nigeria. *African Journal of Economic and Management Studies*, 5(3), 341.
- Vu, M.-C., Phan, T. T., & Le, N. T. (2018). Relationship between board ownership structure and firm financial performance in transitional economy: The case of Vietnam. *Research in International Business and Finance*, 45, 512-528.
- Zeckhauser, R. J., & Pound, J. (1990). Are large shareholders effective monitors? An investigation of share ownership and corporate performance *Asymmetric information, corporate finance, and investment* (pp. 149-180): University of Chicago Press.
- Zhou, T., & Xie, J. (2015). Ultimate Ownership and Adjustment Speed Toward Target Capital Structures: Evidence from China. *Emerging Markets Finance and Trade*, 1-10. 10.1080/1540496X.2015.1062311
- Zhu, X. J. J. o. E. P. (2012). Understanding China's growth: Past, present, and future. 26(4), 103-124.
- Zou, H., & Xiao, J. Z. (2006). The financing behaviour of listed Chinese firms. *The British Accounting Review*, 38(3), 239-258.

Table 1
Descriptive statistics of variables

Variable	N	Mean	SD	Min	Max
Leverage (LEV)	5,374	0.535	0.267	0.000	1.000
Firm size (SIZE)	5,374	15.286	1.470	11.667	21.314
Tangibility (TANG)	5,374	0.196	0.196	0.000	0.976
Depreciation (DEP)	5,374	0.220	0.274	0.000	5.308
Profitability (PROFIT)	5,374	0.058	0.119	-3.842	0.993
State ownership (SO)	5,374	0.213	0.244	0.000	0.967

This table presents the number of observations, mean, standard deviation, minimum and maximum of the variables (2000-2016). All firm variables are collected from the Ho Chi Minh stock exchange (HOSE), the Hanoi stock exchange (HNX) and the Unlisted Public Company Market (UPCoM). Information concerning state ownership is taken from the annual report.

Table 2
Correlation among variables

Variable	LEV	SIZE	TANG	DEP	PROFIT	SO
LEV	1.000					
SIZE	0.224	1.000				
TANG	-0.006	0.008	1.000			
DEP	-0.115	-0.193	0.434	1.000		
PROFIT	-0.481	-0.009	-0.021	0.018	1.000	
SO	0.045	0.061	0.149	0.213	0.106	1.000

Table 3
The effect of state ownership on SOA across various leverage quantiles

$$LEV_{i,t+1} = \alpha + \partial'_1(SO_{i,t} * LEV_{i,t}) + \partial'_2(X_{i,t} * LEV_{i,t}) + (1 - \partial_0)LEV_{i,t} + \beta\delta X_{i,t} + \varepsilon_{i,t+1}$$

Quantile	Estimate	P-value	Quantile	Estimate	P-value
0.05	-0.198	(0.00)**	0.55	0.007	(0.37)
0.10	-0.157	(0.00)**	0.60	0.008	(0.23)
0.15	-0.115	(0.00)**	0.65	0.008	(0.22)
0.20	-0.087	(0.00)**	0.70	0.014	(0.04)*
0.25	-0.073	(0.00)**	0.75	0.018	(0.01)**
0.30	-0.043	(0.01)**	0.80	0.018	(0.04)*
0.35	-0.038	(0.01)**	0.85	0.019	(0.00)**
0.40	-0.017	(0.12)	0.90	0.023	(0.04)*
0.45	-0.010	(0.39)	0.95	0.029	(0.00)**
0.50 (LAD)	-0.004	(0.69)	OLS	-0.040	(0.00)**

Note: * Significant at the 5% level, ** Significant at the 1% level. Results are taken from equation (8) when we apply quantile regression to find the different values of ∂'_1 throughout the distribution of the leverage. With each value of ∂'_1 , we find the effect of state ownership on SOA: $\partial'_1 = -\partial_1$. We provide the estimate for ∂_1 in the table. To compare the results of the quantile approach with LAD/OLS, we also show the coefficient of the interaction terms under the LAD and OLS methods. While quantile regression shows the effect of state ownership on different degrees of leverage, the LAD/OLS method just shows one effect conditional on the mean or the median of leverage over time.

Table 4
Statics tests of the equality of slope estimates across leverage quantiles

Quantile	F-statistic	P-value
0.05 vs. 0.95	26.61	(0.00)**
0.10 vs. 0.90	53.36	(0.00)**
0.15 vs. 0.85	27.05	(0.00)**
0.20 vs. 0.80	17.26	(0.00)**
0.25 vs. 0.75	21.34	(0.00)**
0.30 vs. 0.70	11.12	(0.00)**
0.35 vs. 0.65	12.38	(0.00)**
0.40 vs. 0.60	7.64	(0.00)**
0.45 vs. 0.55	7.79	(0.00)**

Note: * Significant at the 5% level, ** Significant at the 1% level

Table 5**The effect of state ownership on SOA across various book values of leverage quantiles**

Quantile	Estimate	P-value	Quantile	Estimate	P-value
0.05	-0.196	(0.00)**	0.55	0.003	(0.58)
0.10	-0.158	(0.00)**	0.60	0.007	(0.30)
0.15	-0.121	(0.00)**	0.65	0.006	(0.41)
0.20	-0.093	(0.00)**	0.70	0.014	(0.04)*
0.25	-0.077	(0.00)**	0.75	0.016	(0.05)*
0.30	-0.053	(0.00)**	0.80	0.019	(0.04)*
0.35	-0.041	(0.00)**	0.85	0.022	(0.02)*
0.40	-0.023	(0.01)	0.90	0.023	(0.05)*
0.45	-0.014	(0.14)	0.95	0.029	(0.04)*
0.50 (LAD)	-0.007	(0.40)	OLS	-0.040	(0.00)**

Note: * Significant at the 5% level, ** Significant at the 1% level. Results derive from equation (8) when we apply quantile regression to find the different values of ∂'_1 throughout the distribution of the leverage. With each value of ∂'_1 , we find the effect of state ownership on SOA: $\partial'_1 = -\partial_1$. We provide an estimate of ∂_1 in the table. To compare the results of the quantile approach with that of LAD/OLS, we also show the coefficient of the interaction terms using the LAD/OLS method. While quantile regression shows the effect of state ownership on varying degrees of leverage, the LAD/OLS method shows only one effect conditional on the mean or the median of leverage over time.

Table 6
The effect of state ownership on SOA across various leverage quantiles
for non-zero debt issuance firms

$$LEV_{i,t+1} = \alpha + \partial'_1(SO_{i,t} * LEV_{i,t}) + \partial'_2(X_{i,t} * LEV_{i,t}) + (1 - \partial_0)LEV_{i,t} + \beta\delta X_{i,t} + \varepsilon_{i,t+1}$$

Quantile	Estimate	P-value	Quantile	Estimate	P-value
0.05	-0.189	(0.00)**	0.55	0.008	(0.23)
0.10	-0.148	(0.00)**	0.60	0.009	(0.18)
0.15	-0.115	(0.00)**	0.65	0.009	(0.22)
0.20	-0.085	(0.00)**	0.70	0.015	(0.27)
0.25	-0.071	(0.00)**	0.75	0.017	(0.01)**
0.30	-0.042	(0.00)**	0.80	0.019	(0.02)*
0.35	-0.036	(0.01)**	0.85	0.019	(0.02)**
0.40	-0.017	(0.09)	0.90	0.023	(0.04)*
0.45	-0.009	(0.41)	0.95	0.029	(0.01)**
0.50 (LAD)	-0.004	(0.64)	OLS	-0.037	(0.00)**

Note: * Significant at the 5% level, ** Significant at the 1% level. Results derive from equation (8) when we apply quantile regression to find the different values of ∂'_1 throughout the distribution of the leverage. With each value of ∂'_1 , we find the effect of state ownership on SOA : $\partial'_1 = -\partial_1$. We provide an estimate of ∂_1 in the table. To compare the results of the quantile approach with that of LAD/OLS, we also show the coefficient of the interaction terms under the LAD/OLS method. While quantile regression shows the effect of state ownership on different degrees of leverage, the LAD/OLS method shows only one effect conditional on the mean or the median of leverage over time.

Figure 1. The impact of state ownership on SOA across leverage quantiles: QR estimates with 95% confidence level vs. OLS estimates

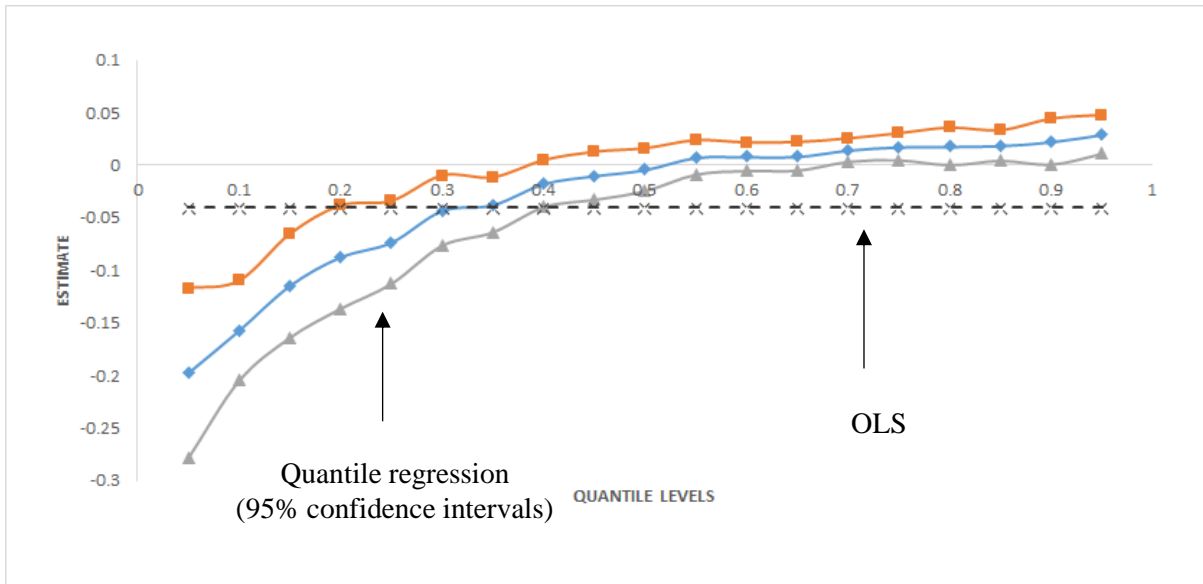


Figure 2. The impact of state ownership on SOA across the book value of leverage quantiles: QR estimates with 95% confidence level vs. OLS estimates

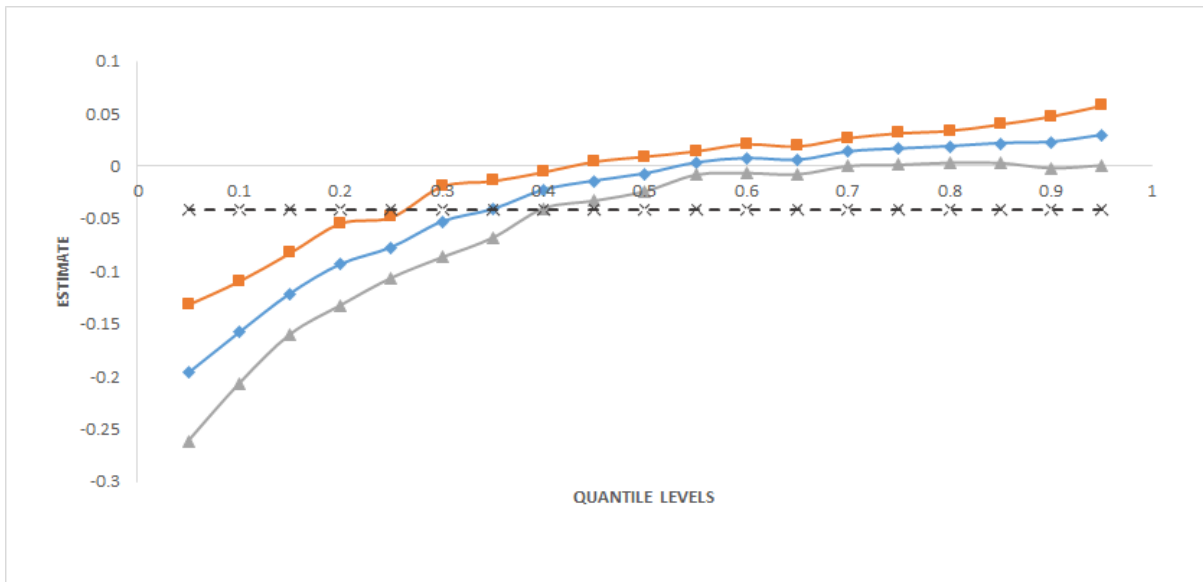


Figure 3. The impact of state ownership on SOA across various leverage quantiles for non-zero debt issuance firms

