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The effect of state ownership on corporate investment efficiency: evidence from listed firms in Vietnam

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Abstract

Extant literature shows that state ownership is a special type of ownership. Politicians tend to follow both social and economic goals to maintain their positions. In some cases, they may sacrifice the latter to achieve the former. Therefore, firms with high state ownership face more serious agency problems than those with low state ownership. This study investigates how state ownership affects corporate investment efficiency in Vietnam, where privatizing state-owned firms is an important economic policy. Our sample includes 4,937 observations from firms listed between 2007 and 2020. Using fixed effects, random effects, random effects Tobit, pooled OLS, and Poisson regression with fixed effects, we find that state ownership has a negative impact on corporate investment efficiency. In addition, the multinomial logistic regression results show that firms with state ownership are more likely to engage in overinvestment. State ownership weakens corporate governance and thus creates opportunities for managers to expropriate shareholders. Managers tend to increase firm size through overinvestment to strengthen their positions; therefore, firms with state ownership have lower investment efficiency.

Keywords: State ownership, Investment, Investment efficiency, Vietnam

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1. Introduction

Corporate investment efficiency is one of the most important determinants of firm performance. Corporate investment is always efficient in a perfect world since firms only make investment decisions based on available investment opportunities (Modigliani and Miller, 1958). Several market frictions make firms unable to reach their optimal investment levels. Prior research shows that state ownership causes severe agency problems (Borisova *et al.*, 2012; Gugler, 2003; Shen and Lin, 2009). Politicians pursue social and economic objectives and even sacrifice economic benefits to achieve social goals. Consequently, managers of firms with state ownership have more opportunities to overinvest in negative-NPV projects, which benefits managers at shareholder expense. In other words, state ownership leads to managers' overinvestment behavior and thus reduces investment efficiency.

The government has privatized 100% of state-owned enterprises in Vietnam for over 30 years. However, many 100% state-owned firms have not been privatized due to problems in legal and administrative procedures. Moreover, the government holds shares in many firms that are still important to the government. They provide the government with economic resources (e.g., dividend income and market power in particular industries) and help conduct social policies (Dang *et al.*, 2021). Although managers are not the final decision-makers in investment decisions in firms with state ownership, they have the most information on investment projects. They suggest projects and the board makes a choice. They intentionally take advantage of their suggestions to expropriate shareholders, and the board cannot have sufficient information to recognize what is behind the scenes. Therefore, Vietnam is a good institutional environment to analyze the impact of state ownership on corporate investment efficiency. However, the literature shows little empirical evidence on the relationship between state ownership and corporate investment performance in Vietnam. O'Toole *et al.* (2016) investigate how investment efficiency varies across different groups of state-owned and private firms. They find that corporate investment is determined by investment opportunities in private firms and firms with minority state ownership; however, they fail to find any significant difference in investment efficiency between centrally and locally controlled firms. Hung (2018) shows that central government ownership has a negative effect on investment efficiency, while the impact of local government ownership on investment efficiency is statistically insignificant. A decrease in overinvestment or an increase in underinvestment may cause an increase in corporate investment efficiency. However, the extant literature has not shown overinvestment or underinvestment as the key reasons.

This study investigates the effect of state ownership on investment efficiency and the channel through which state ownership affects investment efficiency. Tobin's Q measures investment opportunities; therefore, the coefficient of the interactive term describes how state ownership affects the reaction of corporate investment to investment opportunities (investment efficiency). The control variables include cash flow, cash holdings, asset tangibility, debt ratio, firm size, and financial distress. Our sample consists of 4,937 observations from firms listed on two stock exchanges in Vietnam. The regression results from fixed effects, random

effects, random effects Tobit, pooled OLS, and Poisson with fixed effects consistently show that state ownership negatively affects corporate investment efficiency. Moreover, we use multinomial logistic regression to examine whether an increase in state ownership leads to a higher likelihood of underinvestment or overinvestment. We find that firms with high state ownership are more likely to overinvest.

The remainder of this paper is organized as follows. Section 2 analyzes prior studies to show the research gap and presents the institutional environment to develop a hypothesis. Section 3 describes the empirical models and data collection for regression analysis. Section 4 reports the main characteristics of our research sample and the regression results. Section 5 presents the conclusion and policy implications.

2. Literature review and hypothesis development

The agency relationship between corporate managers and shareholders is one of the most severe problems in corporate financial management. Corporate managers are hired to run firms on behalf of shareholders, and their mission is to maximize shareholders' wealth. However, they have high incentives to exploit corporate resources to serve their interests since they are not owners (Jensen and Meckling, 1976). According to Harford (1999) and Richardson (2006), corporate managers tend to increase firm size by overinvesting in unprofitable investment opportunities to strengthen their positions in their firms. This is called the "empire-building mechanism". In other words, overinvestment is the outcome of an agency problem between managers and shareholders.

Several prior studies have shown that state ownership results in more serious agency problems than other types of ownership. Normal shareholders only pursue economic benefits. They attempt to pressure corporate managers to maximize their interests and reduce the agency costs of equity. However, state ownership is controlled by politicians and special shareholders who nominate the government to the board of directors. Politicians follow economic and social goals (Laffont and Tirole, 1993). They may be willing to ignore economic performance to achieve social objectives, which are necessary to maintain their political positions (Borisova *et al.*, 2012). Consequently, state ownership is less effective in monitoring and controlling corporate managers. When managers are required to follow social objectives and sacrifice shareholders' benefits, they take this opportunity to serve managers' benefits. It is not easy to separate the loss of shareholders' benefits caused by social objectives from managers' opportunistic behavior. Managers have more opportunities to overinvest in unprofitable projects in firms with high state ownership. This causes these firms to perform worse. Analyzing how state ownership influences corporate investment in 506 privatized firms in 64 economies between 1981 and 2008, Chen *et al.* (2017) find a positive effect of state ownership on overinvestment. Using a sample of 7477 firm-year observations from Chinese listed firms from 2003 to 2011, He and Kyaw (2018) also document that state ownership increases overinvestment. Using data from 1,034 Chinese firms over the period 2000-2004, Gunasekarage *et al.* (2007) consistently show a negative effect of state ownership on firm profitability. Liljeblom *et al.* (2020) find that state ownership reduces firm value in Russia.

In Vietnam, no study has fully addressed the association between state ownership and corporate investment efficiency. O’Toole *et al.* (2016) compare the investment efficiency between private firms and firms with state ownership in three industries (construction, manufacturing, and service). They find that firms with minority state ownership have higher investment efficiency than private firms. However, they only reached this finding by comparing the regression coefficients of the two groups. This approach makes their findings less reliable. Recently, Ho *et al.* (2021) examined how state ownership affects the risk-taking of listed firms in Vietnam from 2007 to 2015. They document that high state ownership results in high corporate risk-taking. This implies that these firms tend to have higher levels of overinvestment. Furthermore, in Vietnam, firms with state ownership are 100% state-owned before privatization. The government still considers them an instrument in its economic and social policies. Their leaders are government officials, former government officials, or they have close relationships with the government. The government may create opportunities for managers’ expropriation through overinvestment in negative-NPV projects when following social objectives. Consequently, we hypothesize that firms with state ownership face more severe agency problems and thus have lower investment efficiency.

H1: State ownership is negatively associated with investment efficiency.

3. Methodology

3.1 Research design

3.1.1 The effect of state ownership on investment efficiency

Following Chen *et al.* (2017) and Tran (2020), we develop the empirical model to analyze how state ownership determines listed firms’ investment efficiency as follows:

$$\begin{aligned}
 INVEST_{i,t} = & \alpha + \beta_1 Tob_Q_{i,t-1} * Sta_own_{i,t} + \beta_2 Tob_Q_{i,t-1} + \beta_3 Sta_own_{i,t} \\
 & + \beta_4 Cash_flow_{i,t-1} + \beta_5 Cash_hold_{i,t-1} + \beta_6 Asset_tang_{i,t-1} + \beta_7 Debt_ratio_{i,t-1} \\
 & + \beta_8 Firm_size_{i,t-1} + \beta_9 Fin_distress_{i,t-1} + \varepsilon
 \end{aligned}
 \tag{1}$$

where *i* and *t* represent the firm and year, respectively; INVEST is the capital expenditure; X is an independent financial variable that includes Tob_Q, Sta_ow, Tob_Q, Sta_ow, Cash_flow, Cash_holdi, Asset_tang, Debt_ratio, Firm_size, and Fin_distress. We utilize the lagged values of the independent financial variables to avoid the endogeneity problem, which may be caused by the reverse effects of current values on capital expenditure. Tob_Q is Tobin’s Q, representing investment opportunities. Sta_ow is state ownership. In a perfect environment, corporate investment is determined only by investment opportunities (Tobin’s Q). In other words, corporate investment is efficient in frictionless environments (Modigliani and Miller, 1958). However, we hypothesize that state ownership decreases corporate investment efficiency. Therefore, we use the interaction between Tobin’Qt-1 and Sta_ownt to test this hypothesis. If the interaction coefficient (β_1) is significantly negative, higher state ownership reduces the total coefficient of Tobin’Q ($\beta_2 + \beta_1 * Sta_own_{i,t}$). This implies that the reaction

between investment expenditure and investment opportunities is lower, and corporate investment efficiency is lower. This approach has been used in many prior studies (Baker *et al.*, 2003; Chen *et al.*, 2017; Nguyen and Tran, 2022; Tran, 2020).

In addition, Cash_flow is cash flow. Firms with high cash flow have more resources for investment and thus have high investment expenditures. Cash_hold is cash holdings. When cash reserves are available, corporate managers can quickly make investment decisions to seize good investment opportunities. Hence, cash holdings positively affect corporate investment (Tran, 2020). Asset_tang is asset tangibility. Debt_ratio is the debt ratio. Firm_size is the firm size. Fin_distress is financial distress. Firms with high asset tangibility, low debt ratio, large size, and low financial distress face lower bankruptcy risk; therefore, they have better access to credit and lower external financing costs. This drives them to engage more in risk-taking and increases their investment expenditure (Du *et al.*, 2018). In other words, asset tangibility and firm size are positively associated with capital expenditure, while debt ratio and financial distress have the opposite effects. Table 1 illustrates the definitions of all variables.

From an econometric perspective, capital expenditure is a left-censored dependent variable; therefore, the standard regression approaches may be biased. Wooldridge (2010) states that Tobit regression is more effective for censored dependent variables. Besides, Brown and Dunn (2011) show that Poisson regression is theoretically and empirically strong in many circumstances. As a result, we use five regression methods, including fixed effects, random effects, random effects Tobit, pooled OLS, and Poisson with fixed effects, to estimate Equation (1) to ensure the robustness of our findings.

3.1.2 The effect of state ownership on the likelihood of overinvestment and underinvestment

Following Biddle *et al.* (2009), we continue investigating how state ownership affects the likelihood of underinvestment and overinvestment. First, we estimate the normal investment levels for the industry-year sub-samples with at least 20 observations.

$$INVEST_{i,t} = \alpha + \beta_1 Tob_Q_{i,t-1} + \varepsilon . \quad (2)$$

We then compute the residual using the difference between the real and estimated normal investments. Based on the investment residual, we group the observations into quartiles as follows. Those in the two middle quartiles are considered normal investments. Those at the bottom are considered underinvestment since they are much lower than normal. Those at the top are defined as overinvestment since they are much higher than normal. This quartiles-based classification has been used in many prior studies like Biddle *et al.* (2009), Ha and Feng (2021), and Lai *et al.* (2014). Using the following model, we use multinomial logit regression to estimate the likelihood of underinvestment or overinvestment instead of normal investment:

$$LIK_INV_{i,t} = \alpha + \beta_1 Sta_own_{i,t} + \beta_2 Cash_flow_{i,t-1} + \beta_3 Cash_hold_{i,t-1} + \beta_4 Asset_tang_{i,t-1} + \beta_5 Debt_ratio_{i,t-1} + \beta_6 Firm_size_{i,t-1} + \beta_7 Fin_distress_{i,t-1} + \varepsilon \quad (3)$$

where LIK_INV is the likelihood of underinvestment or overinvestment as opposed to normal investment.

Table 1. Variable definitions

Variables	Variable names	Definitions
INVEST _t	Investment	$\frac{\text{Capital expenditure in year } t}{\text{Total assets in year } t-1}$
Sta_own _t	State ownership	Percentage of shares held by government agencies in year t
Tob_Q _{t-1}	Tobin's Q	$\frac{\text{Market value of equity plus book value of debt in year } t-1}{\text{Total assets in year } t-1}$
Cash_flow _{t-1}	Cash flow	$\frac{\text{Operating cash flow in year } t-1}{\text{Total assets in year } t-1}$
Cash_hold _{t-1}	Cash holdings	$\frac{\text{Cash, cash equivalents, and short-term investment in year } t-1}{\text{Total assets in year } t-1}$
Asset_tang _{t-1}	Asset tangibility	$\frac{\text{Total net fixed assets in year } t-1}{\text{Total assets in year } t-1}$
Debt_ratio _{t-1}	Debt ratio	$\frac{\text{Total liabilities in year } t-1}{\text{Total assets in year } t-1}$
Firm_size _{t-1}	Firm size	Natural logarithm of total assets in year t-1
Fin_distress _{t-1}	Financial distress	Z-score for emerging markets in year t-1 proposed by Altman <i>et al.</i> (1995)

Source: Authors' compilation

3.2 Data

We use the Fiipro database which includes all firms listed on both Vietnamese stock exchanges. Following prior studies, based on the Industry Classification Benchmark (ICB), we eliminate firms in the financial sector because their accounting information differs from others and their operations are strictly regulated (Chen *et al.*, 2017; Nguyen and Tran, 2022; Tran, 2020). We then remove observations with missing information for the subsequent analysis. Our final sample includes 4,937 observations for the period 2009-2020. Moreover, we use the winsorization approach to eliminate the effects of outliers. All variables are winsorized at 1%. We have also used 3% and 5% winsorization but our key findings remain unchanged. This implies the robustness of our winsorization.

4. Empirical results

4.1 Data description

Table 2 summarizes the research sample. Descriptive statistics are presented in Panel A. Capital expenditure accounts for about 6% of total assets. Its minimum and maximum levels are 0 and 51% of total assets, respectively. Tobin's Q varies from 0.39 to 4.01. On average, Tobin's Q is

1.13, which is slightly higher than the 0.99 of Tran (2020). State ownership ranges from 0% to 80% with a mean of 26%. This reflects privatization in Vietnam. One hundred percent of state-owned firms are requested to reduce the percentage of state ownership and be listed on stock exchanges. Panel B shows the sample distribution by year. The number of firms increased considerably from 109 to 491 from 2007 to 2020. This is consistent with the development of the Vietnamese stock market. From 2007 to 2009, the number rose sharply due to the booming period of 2006-2007 and then increased slightly in the subsequent periods. Panel C presents the number of observations by industry. Industrials are the largest, with 2,102 observations, while Oil & Gas has only 49 observations. This unbalanced distribution is present in most studies. Therefore, we use industry dummies in our regression models to avoid industry effects.

Table 2. Data description

Panel A. Firm-specific data					
Variables	N	Mean	SD	Min	Max
INVEST _t	4,937	0.06	0.09	0.00	0.51
Tob_Q _{t-1}	4,937	1.13	0.58	0.39	4.01
Sta_own _t	4,937	0.26	0.25	0.00	0.80
Cash_flow _{t-1}	4,937	0.07	0.13	-0.28	0.50
Cash_hold _{t-1}	4,937	0.15	0.15	0.00	0.71
Asset_tang _{t-1}	4,937	0.22	0.20	0.00	0.86
Debt_ratio _{t-1}	4,937	0.48	0.22	0.04	0.90
Firm_size _{t-1}	4,937	27.02	1.50	23.73	31.03
Fin_distress _{t-1}	4,937	7.92	4.84	2.35	32.01
Panel B. Annual number of firms					
Year	N	Year	N	Year	N
2007	109	2012	363	2017	451
2008	152	2013	381	2018	491
2009	204	2014	386	2019	492
2010	244	2015	410	2020	491
2011	341	2016	422		
Panel C. Industry distribution					
Industry	N	Percent	Industry	N	Percent
Industrials	2,102	42.58	Consumer services	472	9.56
Technology	161	3.26	Consumer goods	812	16.45
Health care	185	3.75	Basic materials	773	15.66
Oil & Gas	49	0.99	Utilities	383	7.76

Source: Authors' calculation

4.2 The effect of state ownership on corporate investment efficiency

Table 3. The effect of state ownership on corporate investment efficiency

Variables	Fixed effects	Random effects	Random effects Tobit	Pooled OLS	Poisson with fixed effects
Intercept	0.660*** (7.26)	-0.022 (-0.59)	-0.052 (-1.16)	-0.071*** (-2.78)	
Tob_Q _{t-1} *Sta_own _t	-0.025** (-2.21)	-0.030*** (-3.11)	-0.032*** (-3.12)	-0.031*** (-3.41)	-0.326*** (-2.63)
Tob_Q _{t-1}	0.030*** (7.00)	0.026*** (6.89)	0.030*** (7.33)	0.023*** (6.27)	0.400* (1.94)
Sta_own _t	0.026 (1.45)	0.018 (1.36)	0.028* (1.93)	0.009 (0.79)	0.440 (0.50)
Cash_flow _{t-1}	-0.001 (-0.14)	0.017* (1.71)	0.014 (1.37)	0.042*** (3.97)	0.020 (0.04)
Cash_hold _{t-1}	0.036*** (2.64)	0.023** (2.05)	0.031** (2.53)	0.008 (0.83)	0.646 (0.88)
Asset_tang _{t-1}	-0.186*** (-14.78)	-0.008 (-0.92)	-0.041*** (-3.44)	0.066*** (9.27)	-1.780*** (-3.13)
Debt_ratio _{t-1}	-0.038** (-2.37)	-0.026** (-2.17)	-0.034** (-2.54)	-0.005 (-0.49)	-0.684 (-0.78)
Firm_size _{t-1}	-0.022*** (-6.32)	0.002 (1.48)	0.003* (1.91)	0.003*** (3.28)	-0.184 (-1.02)
Fin_distress _{t-1}	-0.001 (-1.42)	-0.001 (-1.45)	-0.001* (-1.79)	0.000 (-0.95)	-0.015 (-0.45)
Industry dummies	No	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
F statistics	34.47***			22.07***	
Wald chi-squared		365.42***	398.82***		47.02***
Number of observations	4,937	4,937	4,937	4,937	4,937

Notes: t-statistics are in parentheses. *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Source: Authors' calculation

Table 3 shows the regression results to examine how state ownership drives corporate investment efficiency of listed firms in Vietnam. The interaction between Tobin's Q and state ownership has negative coefficients in all estimation results². These findings imply that an

² We fail to compare which estimation results are better as their key findings are consistent.

increase in state ownership leads to a reduction in investment efficiency. In other words, firms with high state ownership are more efficient at seizing investment opportunities. Our results are consistent with the agency theory proposed by Jensen and Meckling (1976) and many empirical studies conducted by Chen *et al.* (2017), Gunasekarage *et al.* (2007), He and Kyaw (2018), Ho *et al.* (2021), Liljeblom *et al.* (2020). In Vietnam, firms with state ownership are not only the government’s economic resources but also tools of social policies. According to Resolution 12-NQ/TW issued by the Central Committee of the Communist Party of Vietnam on 03 June 2017 on restructuring, reforming state-owned enterprises, and improving their performance as an important force of the state economic sector, state-owned enterprises make contributions to economic development, social progress, and equality. When these firms follow both economic and social goals as the government expects, economic efficiency may sometimes be sacrificed for social purposes. Therefore, effective monitoring of managers based on economic performance is not accessible. These opportunities allow managers to expropriate shareholders through overinvestment in unprofitable projects. Consequently, firms with high state ownership face lower levels of investment efficiency.

Furthermore, Tobin’s Q is positively related to capital expenditure. This is consistent with the investment theory of Modigliani and Miller (1958). Firms make investment decisions based on their investment opportunities. Besides, cash holdings also positively affect corporate investment. Firms with high cash levels can react quickly to catch investment opportunities; therefore, they have higher investments. Moreover, the debt ratio is negatively correlated with investment expenditure. Highly leveraged firms incur higher costs when using external funds; therefore, they are less likely to invest. Other control variables have mixed effects on corporate investment across estimation results.

4.3 The effect of state ownership on the likelihood of overinvestment and underinvestment

Table 4 shows the results of the multinomial logit regression to examine the likelihood of underinvestment or overinvestment, as opposed to normal investment. We find that the coefficient of state ownership is significantly positive for overinvestment versus normal investment. This finding is consistent with the results presented in Table 3. State ownership increases the likelihood of overinvestment rather than of normal investment. In firms with high state ownership, managers have many chances to use firms’ resources for overinvestment due to weak corporate governance.

Table 4. The effect of state ownership on the likelihood of overinvestment and underinvestment

Variables	Underinvestment vs. Normal investment	Overinvestment vs. Normal investment
Intercept	5.221*** (6.47)	-2.846*** (-3.58)
Sta_own _t	0.236 (1.50)	0.781*** (4.87)

Table 4. The effect of state ownership on the likelihood of overinvestment and underinvestment (*continued*)

Variables	Underinvestment vs. Normal investment	Overinvestment vs. Normal investment
Cash_flow _{t-1}	-0.450 (-1.43)	1.120*** (3.57)
Cash_hold _{t-1}	-0.060 (-0.21)	-0.099 (-0.31)
Asset_tang _{t-1}	-0.763*** (-3.22)	1.578*** (7.72)
Debt_ratio _{t-1}	1.455*** (4.88)	0.053 (0.17)
Firm_size _{t-1}	-0.245*** (-8.22)	0.051* (1.79)
Fin_distress _{t-1}	0.066*** (5.16)	0.014 (0.96)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
LR chi-squared		487.77***
Number of observations	4,937	4,937

Notes: t-statistics are in parentheses. *, **, *** indicate statistical significance at 10%, 5%, and 1%, respectively.

Source: Authors' calculation

5. Conclusion

Although Vietnam is a good institutional environment to study how state ownership determines firms' investment efficiency, prior studies have not fully addressed this relationship for listed firms. Using 4,937 observations from 587 listed firms, we find that state ownership has a negative impact on corporate investment efficiency. Additionally, firms with state ownership are more likely to overinvest. In other words, state ownership is an obstacle for firms to maximize their economic efficiency; thus, a privatization policy is appropriate. These understandings help investors make appropriate decisions when valuing listed firms. Policymakers should accelerate the privatization process to improve the investment efficiency of 100% state-owned firms and reduce state ownership in firms that are not politically or socially important to increase national economic efficiency.

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