GOVERNMENT OWNERSHIP IN STOCK EXCHANGE LISTED CORPORATE FIRMS: AN EMPIRICAL STUDY OF THE UNITED ARAB EMIRATES

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Abstract

Government ownership in stock exchange listed corporate firms can be found in many countries, but it is widespread in some countries such as Singapore, Malaysia, China, Turkey, India, Jordan, and United Arab Emirates (UAE), as documented by different researchers. It is found that the government ownership generally has a negative effect on the corporate performance of all countries but the UAE. In this country, the corporate firms that have a government shareholding record superior financial results comparing to that of other firms. In this regard, researchers assumed that a causal relationship between the government shareholding and corporate performance may exist due to the agency problems or government supports of firms. However, they did not examine the underlying reasons why government wants to retain a corporate ownership, and factors affecting the government shareholding. This study fills this gap by investigating these issues in the context of UAE, where the government holds ownership in 48% of all exchange listed firms. The study finds that government shareholding in firms evolves through economic transition of a country, and the probability of government share retention in firms depends on their strategic importance, ability to earn profit, and valuations in financial market. Additionally, it is found that the strategic importance and market valuation of firms play main role in determining the probability of government taking control of firms by holding a majority ownership, whilst the firms' ability to earn profit affects the decision of government to relinquish control of firms to the private management by retaining a minority ownership**.

Keywords: Government Ownership, Corporate Firms

JEL Classification: G32, G32, 53

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1 Introduction

Earlier studies have found that governments of many countries hold ownership in the stock exchange listed corporate firms (henceforth refer to corporate firms), but the phenomenon is highly prevalent in transitional or emerging economies such as Singapore (Ang and Ding , 2006; Feng et al., 2004), Malaysia (Najid and Rahman, 2011), China (Tian and Estrin, 2008; Sun and Tong, 2002), Turkey (Gursory and Aydogan, 2002), India (Gupta, 2005), Jordon (Zeitun, and Titan, 2007), and the United Arab Emirates (Uddin *et. al*, 2014)[13]. In addition, Dewenter and Malatesta (2001) report existence of the government corporate ownership in many of the 500 largest international companies ranked by *Fortune* magazine. The above studies generally show that government shareholding has a negative effect on the corporate financial performance in all countries except the United Arab Emirates (UAE). Despite the firms having a government ownership have weak financial results, they generally do well according to market performance in all countries – except China and the UAE. In these two countries, market performance of the firms having government shareholding improves if the level of ownership goes beyond a certain level.

The above studies assume various reasons to have a relationship between government shareholding and corporate performance, which are broadly related to agency problems and government supports to the

[13] These countries are defined as transitional or emerging economies since their names are included in the lists of transitional and emerging countries provided by wikipedia (http://en.wikipedia.org/wiki/Transition_economy and http://en.wikipedia.org/wiki/Emerging_markets.

firms[14]. As a whole, findings of these studies could not resolve the economic question whether government ownership necssarily curbs firm performance and efficiency, or it helps achieving better performance by imporving efficiency. Moreover, the studies did not address the possibility of reverse cuasality as the performance of firms may also influence government decsion to hold an ownership. They mostly examined the effect of government ownership on firm performance, assuming the ownership is an exogenous variable. None of these studies deeply looked into the underlying reasons or motivations of government to hold corporate ownership. Therefore, the dynamics of relationship between the firm performance and government ownership is yet to be clear. This paper fills this gap by providing evidence on the underlying factors determining the probality of government corporate ownership.

Motivation of identifying the factors determining the government ownership emerges because the government is mandated for managing the economy, but the degree to which the government should engage in the economic management is yet unresolved. In the centrally-planned economies, the governments own and manage all business enterprises. Whilst in the market economies, governments provide legal, policy, and other supports but the businesses are normally owned and managed by the private entrepreneures. Over the years, the centrally-planned economies of Central and Eastern Europe as well as China have been transforming into market economies and privatizating most government-owned firms. Countries in the other regions also reformed over the years, resulting in relenquishement of government control on the business ownerships and management. Therefore, most economies are currently mixed of both systems with the governments controlling some aspects and private sector controlling others. Importantly, the governments in most countries retain a percentage of ownerships in firms that are privatized and listed on the stock exchange. These firms are managed professionally to compete with other firms. Earlier studies investigated the effect of government ownership on the financial and market performance of such firms, but the results are not consistent across the markets. Therefore, the reasons of the government share ownership in corporate firms are not yet clear.

The present study is conducted in the UAE, because the government has a share ownership in 48% of all firms listed in the Dubai Financial Market (DFM) and Abu Dhabi Exchange (ADX) - as reported by Uddin *et. al* (2014). Based on the documented evidence, the highest proportion of government shareholding in the stock market listed firms is found in the UAE. Therefore, there is a motivation to look at this market in which government retains ownership in nearly half of all listed firms. The government ownership in corporate firms is common in most markets, but the intensity is very high in the UAE that also justifies looking at this market in more details. The UAE is in the forefront of global business promotion, and thus has been elected to host the World Expo 2020. Over the years, the UAE has become the second largest economy in the Middle East and North African (MENA) region, with a GDP of US$360 billion in 2011. The country became a major economic hub of the region due to its openness towards international business, trade, and investments. The total foreign direct investment reached US$860 billion in 2011 (*The National* 18 April, 2012). Although the UAE has enjoyed rapid economic growth over the several previous decades, the local corporate sector has been flourishing since 2000 when the DFM and ADX began operations. A total of 130 firms have been listed on these two stock markets over the last decade, and the market capital of these firms reached US$93.77 billion in 2010. In a study, Uddin *et. al* (2014) identify that government became the main player in the local corporate sector by holding share ownership in the major firms listed on the two stock exchanges[15]. However, the evidence of the relationship between the government ownership and corporate performance in the UAE is inconsistent with that of other countries studied, which is also interesting. Hence, the present study helps to understand the exception in this market, and the policymakers of emerging and/or transitional countries can determine the role of government in developing their corporate sectors and capital markets.

By reviewing the literature, study finds that the government ownership in corporate firms evolves through the transition of an economy, and

[14] The agency hypothesis holds that in the absence of an effective monitoring system, government ownership in the firms aggravates agency problems due to multi-dimensional conflicts of interests arising between the government and public, the government and management board, the government and private shareholders, and the management board and shareholders. Therefore, the corporate performance deteriorates if government holds an ownership in the firms. On the other hand, the support hypothesis postulates that government ownership is beneficial for the firms for various reasons. Such as, the firms can secure low-cost finance because the government provides a risk guarantee; the government monitors activities of the firms in the absence of strong institutional investors – as it is usually an issue in the transitional or emerging economies; and government ownership helps the firms to operate in a competitive market environment with strong market power because of the government suport.

[15] Some of these UAE registered firms in which government has a controlling ownership are now internationally renowned. For example, Emirates Airlines ranked as the 3rd largest in the world based on capacity, and it contributes over US$1.2 billion to the Indian economy and US$1.3 billion to the Australian economy (see http://centreforaviation.com and http://www.arabianbusiness.com, June 02, 2011). Etisalat Telecom ranked as the 140th in the *Financial Times* top 500 companies. This telecom firm has invested in 18 countries across the Middle East, Africa and Asia, contributing 25% of the UAE federal annual budget (*AMEInfo.com* May 02, 2012 and *The Gulf News* October 14, 2009). In addition, Abu Dhabi National Energy, Dana Gas, EMAAR Properties and Abu Dhabi Commercial Bank are the regional market leaders in their respective industries.

hypothesized that the probability of government taking ownership in a corporate firm mainly depends on (i) its strategic importance for the economy, (ii) ability to earn profits, and (iii) valuation in financial market. These hypotheses have been confirmed by an empirical investigation based on 120 UAE firms listed on DFM and ADX and seven years' data over the period 2006 to 2012. The study additionally finds that, of the three factors, the strategic importance and market valuation of firm play main role in determining the probability of government taking control of firm by holding majority ownership, whilst the profitability of firm is the main factor of consideration if government wants relinquishing the control of firm to the private management by retaining a minority ownership. The rest of the paper is organized as follows: in the next section, relevant literature is reviewed to identify determinants of the government shareholding and test hypotheses. In the subsequent sections, the research methodology, sample characteristics and empirical findings are described. Finally, conclusions are provided in the last section.

2 Literature review and hypotheses

The degree to which a government should engage in economic management is a debatable issue. One view is that the role of government in an economy must be "hands off" beyond policy and legal supports. The other view is that the government should have its hands in everything, including the businesses. The ideal role of a government in a free economy was discussed by Friedman (1962). In reality, however, a balance is maintained while deciding on the level of government involvement in business activities. The historical documents archived in http://www.grazian-archive.com show that the United States government had involvement in business promotion since its earliest days. As of 1956, the US government was actively engaged in different commercial and industrial entities representing about USD119 billion of capital assets. The documents indicate that most Western Europe and Latin American governments played a direct role in development of the corporate sector during the transition of their economies by directly participating in production and commercial activities. This is because national capital was formed through massive public sector investments during the initial stage of economic development. Japan also has similar history. After the Meiji restoration in 1868, the Japanese government embarked on massive industrialization programs by engaging in production activities until 1880. Since then, the government-led industrialization policy has been shifted towards the development of the private sector, yet the government continues to control the strategically important businesses like arsenals, railways, and communications, building and public works, and the central bank. While the private sector was flourishing in Japan, the government also maintained an indirect ownership relationship with the industrial conglomerates in the private sector known as zaibatsu firms (Rosovsky, 1959).

As an economy passes through transition, the government gradually implements policy reforms that result in privatization of many government-owned firms. The privatized firms are often listed on the stock exchanges, which helps the growth of capital markets in different countries (Boutchkova and Megginson, 2000; Torre, et al., 2007). However, the privatization of government firms involves socio-political and economic issues related to the delivery of employment, social services, and public utilities. Hence, the government normally relinquishes control of the firms operating under the non-strategic sectors if private entrepreneurships are adequately developed, but retains ownership control of those firms that are strategically important (Obadan, 2008; Mattilin, 2009; and Boubakri, *et al.* 2009). It is noted that the government, being the custodian of economy, has a responsibility to closely monitor and support the development of the firms that are strategically important for achieving the priority economic, social, political goals of the country. Therefore, maintaining an ownership of government in these firms can be a mechanism of firms control and support. Hence, the following hypothesis is framed:

Hypothesis 1: The probability of government shareholding will be high if a firm is strategically important for the country.

The government usually engages in business activities during the early stage of economic transition, but often fails due to the pursuit of political objectives and lack of market monitoring in a competitive business environment (Sheshinski and Lopez-Calva, 2003). Therefore, government owned firms are usually privatized, because the private ownership helps increase the performance of firms after privatization. Once the ownership structure of a privatized firm is changed, the decision making process is also changed due to the removal of government control and political influence, and the new managers are able to work more independently and make decisions for the best interests of the shareholders that helps performance increase (Kay and Thompson, 1986; World Bank (1996), Shleifer and Vishny, 1996; Vickers and Yarrow, 1989; Perotti and Guney, 1993, Sun and Tong, 2003, and Huang and Xiao, 2012). There are plenty of case studies and empirical researches based on country specific and cross-country data, which suggest that privatization improves productive efficiency, profitability, and stakeholders' benefits (for example, Megginson *et al*, 1994; D'souza and Megginson, 1999; Wei *et al*, 2003; LaPorta and Lopez-De-Silanes, 1999; Smith *et al*, 1997; Boubakari and Cosset, 1998; Mathur and Banchuevijit (2007); and Naceur *et al*, 2007). Therefore, it is established that privatization has a

positive effect[16] on the firm profitability and operating efficiency.

The government relinquishes control of non-strategic firms through privatization, but often retains a minimum percentage of ownership in the privatized firms. If these firms earn more profits due to efficiency increase, the government is economically benefitted directly from the additional taxes and dividend payments and indirectly from the savings of subsidies for loss-making government enterprises.[17] Therefore, there are economic reasons for a government to retain a share ownership in a privatized firm. Since privatization is implemented under an economic restructuring program, the control of privatized firms becomes an important issue due to political reasons such as the loss of employment, occurrence of social instability, and reduction of the government's ability to control the economy. It is also noted that privatization sales generate funds for the government, but it is not a normal budgetary revenue collection (Sheshinski and Lopez-Calva, 2003; Mackenzie, 1997). Hence, the funds can be allocated for other priority areas of society. Therefore, the government has both economic and political objectives for retaining a share ownership in the privatized firms. In this regard, the prior evidence shows that governments of the countries belong to the Organization for Economic and Cooperation and Development (OECD) retain ownership control in 62.4% of the privatized firms by either holding a significant ownership position or by golden share retention (Bortolotti, 2009).

Given the economic and political objectives of a government to retain a share in the privatized corporate firms, it is important to know in what kinds of firms the government holds a share ownership. A recent study by Li and Yamada (2013) finds that the government usually retains controlling ownership in a privatized firm if the firm makes profit as well as provides employment to a large number of workers. However, the government relinquishes control of a firm by selling off the majority shares through initial public offers or other means if the firm makes a loss and receives budgetary subsidies. Hence, the evidence indicates that both economic and political objectives are better achieved if the government retains a share in the profitable corporate firms. Given the evidence that the firms under private management are more productive and efficient, government shareholding in these firms also provides additional benefits such as (i) the ownership linkage with the government provides a greater ease in securing low cost finance for the firm, (ii) government can play a monitoring role in the absence of strong institutional investors in transitional or emerging economies, and (iii) government ownership linkage allows a firm to operate in competitive environment with a greater market power (Uddin *et al.*, 2014; Ang and Ding, 2006; Ajifri and Moustafa, 2007). Therefore, leaving aside other factors affecting the performance, a corporate firm having a government shareholding is likely to be an efficiently managed profitable business entity. Hence, the following is framed:

Hypothesis 2: The higher the profitability of a firm, the higher will be the probability of government shareholding.

The economic restructuring programs in transitional or emerging countries are importantly aimed at developing the private sector and market competition. A functional and efficient capital market plays an important role in achieving the goals of restructuring programs, because the corporate firms can raise bulk funds at a competitive cost to support their business growth. A number of prior studies find that privatized firms that are listed on stock exchanges have a significant impact on the growth of global capital markets based on the share valuation, trading volume, and security issuance because the political risk is resolved and firms' profitability is improved (Boutchkova and Megginson, 2000; De La Torre *et al.*, 2007; Perotti and Oijen, 2001). In addition, the government often invests in listed firms to support the capital market growth. Evidence shows that the governments of Singapore, Malaysia, China, Turkey, India, Jordon, and the UAE have investments in the 24% to 48% of the stock exchange listed firms of the respective countries (Ang and Ding, 2006; Feng *et al.*, 2004; Najid and Rahman, 2011; Tian and Estrin, 2008; Sun and Tong, 2002; Gursory and Aydogan, 2002; Zeitun, and Titan, 2007; Uddin *et al*., 2014). It is analyzed earlier that a government better achieves its economic and political objectives of holding a corporate share ownership by investing in efficiently managed and profitable firms, and it is expected that the profitable firms will valued highly if market is efficient. Hence, the following hypothesis is framed:

Hypothesis 3: The higher the valuation of a firm, the higher will be the probability of government shareholding.

3 Sample characteristics

The study includes 120 firms listed on the DFM and ADX as of December 2012. The study data of these firms are collected from different secondary sources that includes OSIRIS database and relevant reports published by the stock markets, securities authority, and government. The study period covers seven years from 2006 to 2012, resulting in a total of 765 observations after removing outliers. The details of samples distribution and characteristics are presented in Table 1.

[16] Some studies find that privatization has a negative effect on firm profitability and efficiency in the Czech Republic and Vietnam (Harper, 2002; Pham and Carlin, 2008).

[17] Other stakeholders, such as consumers, employees, and society, are also benefitted. If the firms can improve their efficiency, the consumers can buy the quality products and services at a low cost, the employees can earn high wages in the long run due to the improvement of their productivity, and society is benefitted because government can re-allocate the resources to the priority areas of a society.

Table 1. Classifications and characteristics of the sample firms (2006 - 2012)

Panel A: Distribution of firms and government ownership (%) across industries and exchanges

Industries/ Exchange	GLC								Non-GLC	Total Sample	
		Average government ownership (%) in different industries over seven years (2006-2012)									
	Number of Firms	2006	2007	2008	2009	2010	2011	2012	Number of Firms	Number of Firms	Data Observations
Banks	20	0.32	0.34	0.33	0.33	0.33	0.31	0.32	7	27	165
Insurance	8	0.33	0.33	0.40	0.33	0.32	0.32	0.33	21	29	189
Investments	3	0.36	0.36	0.36	0.36	0.36	0.36	0.38	5	8	48
Real Estate	10	0.25	0.23	0.25	0.24	0.26	0.27	0.27	3	13	83
Transportation	6	0.54	0.54	0.54	0.55	0.55	0.56	0.56	2	8	45
Manufacturing	15	0.35	0.33	0.33	0.33	0.34	0.33	0.32	14	29	192
Services	4	0.30	0.30	0.30	0.30	0.30	0.30	0.33	2	6	43
DFM	23	0.28	0.29	0.30	0.29	0.29	0.30	0.30	30	53	328
ADX	43	0.35	0.35	0.36	0.35	0.36	0.36	0.37	24	67	437
Total	66	0.33	0.33	0.34	0.33	0.33	0.34	0.34	54	120	765

Panel B: Distribution of government ownership (%) across different ranges

Ownership Range	% > 50%	50-40	40-30	30-20	20-10	10-2	% < 2%
No of Firms	21	4	8	10	11	12	54

Panel C: Fundamental characteristics of sample firms

	non-GLC	GLC	All Firms
Total Firms	54	66	120
Total Assets (Million AED)	3,877	25,319	15,733
Asset to Equity Ratio	2.48	3.63	3.12
Total Revenue (Million AED)	645	2872	1,876
Total Operating Income (Million AED)	163	1,152	710
Age of Firms (Years)	27.76	23.60	25.57
Employee Numbers	1,106	2,281	1817
Board Size (Number of directors)	7.48	8.02	7.84
CEO Duality (Yes = Y; No = N)	Y 30 N 24	Y 15 N 51	Y 45 N 75

Note: GLC means government-linked company. A firm is classified as GLC if the government holds at least 2% of the total shares. The non-GLCs are those firms in which government has no shareholding. CEO duality identifies if the firm CEO simultaneously holds the Chairman position. The Panel C reports the mean values of total assets, total revenue, total operating income, age, employee numbers, and boar size.

Panel A of Table 1 shows that a total of 66 firms are classified as government-linked company (GLC), and the remaining 54 firms as non-GLCs. A firm is classified as GLC if the federal or state government holds at least 2% of the total shares. The non-GLCs are those firms in which government has no shareholding. The industry distribution shows that most firms belong to the sectors like bank, insurance, manufacturing, and real estate. The GLCs are mostly belonging to the bank, manufacturing and real estate sectors, while the non-GLCs are mostly concentrated in the insurance and manufacturing industries. The

highest percentage of government ownership is found in the transportation sector and the lowest in the real estate. In addition, majority GLCs are listed on ADX with higher percentage of government ownership relative to those listed on DFM. The average government ownership percentage across different industries was around 33 to 34 percents over the sample period. No significant variation of government ownership is observed over the study period. The Panel B shows that 21 firms have more than 50 government ownership and 33 firms have less than 30 percent government ownership. Panel C shows that average total assets, total revenue, and operating income of the sample firms are respectively AED 15,733 millions, 1,876 millions and 710 millions. A comparison reveals that the GLCs are significantly larger than the non-GLCs based on these firm characteristics. Based on the asset to equity ratio and CEO duality, it is found that the GLCs are more levered and managed mostly by the external CEOs.

4 Methodology and data

4.1 Variables definition

The review of the literature shows that government shareholding in a corporate firm depends broadly on the (i) strategic importance, (ii) profitability, and (iii) market valuation of the firm. Therefore, three explanatory variables are defined for conducting empirical tests. In order to determine the strategically important sectors of the economy, the relevant policy documents[18] of the UAE are examined. In which, it reveals that the government of UAE desires utilization of the accumulated oil revenues to achieve sustainable economic growth through a rapid development of the physical infrastructure, including energy, housing, transport, and information and communication technology (ICT). The UAE, being a transitional economy, does not yet have private capital that is adequate for investment in the building of such basic infrastructure, and government investment in this area is necessary. The rapid implementation of large infrastructure projects using government funds eventually fuels the economic activities in the country and helps the accumulation of private capital in the long run.

The Abu Dhabi Economic Vision 2030 shows that an efficient financial infrastructure, including the banking and financial services, also needs to be developed rapidly besides the development of physical infrastructures. This is required to facilitate increased economic activities and investment of the accumulated financial capital in the private and public sectors. Similarly, the government of Dubai, the second largest state in the UAE, has also invested heavily in transport, telecommunications, energy, real estate and industrial infrastructure over the last few decades. Besides, local financial sectors have also developed largely due to government initiatives and investments. Other states of the UAE also follow similar economic policies. In this regard, the UAE Federal Government policy is also to achieve a competitive and resilient economy by subsidizing the country's infrastructure building through state governments. Given the above economic circumstance of the UAE, the industrial sectors such as Banking and Investment, Real Estate and Housing, Oil and Petrochemical, Aviation and Mass Transportation, and Telecommunications are considered to be strategically important for the country. Therefore, the following variable is defined to test hypothesis # 1.

STRATEGIC: is a dichotomous variable: STRATEGIC = 1 if the sample firm has businesses in the strategically important sectors such as Banking and Investment, Real Estate and Housing, Oil and Petrochemical, Aviation and Mass Transportation, and Telecommunications. Otherwise STRATEGIC = 0.

The profitability of sample firms resulting from managerial efficiency can be examined by using different variables such as return on equity (ROE), return on assets (ROA), net profit margin (NPM), total assets turnover (TAT), and leverage (EM). While different variables provide different information, according to the famous DuPont identity, ROE reflects the combined effect of the firm's (i) ability to extract profit from the sales dollar that is measured by NPM, (ii) efficiency in utilization of the total assets (recourses) that can be known from TAT, and (iii) utilization of the borrowed funds known from financial leverage measured in terms of the equity multiplier (EM). Therefore, ROE is included in the model as 'all-in-one' variable to test hypothesis #2. The market valuation of firms can be measured in absolute term by estimating the total market capitalization of firms. The other measures such as price earnings ratio (PER) and price to book ratio (PBR) provide the relative market valuation of firms. The PER indicates how much investors are willing to pay per dollar of current earnings, whilst the PBR relates the firm's market value per share to its book value per share. Since a firm's book value reflects historical cost accounting, PBR indicates management's success in creating value for its stockholders. This ratio is used by the investors to identify the undervalued and overvalued stocks. Since the study wants to know whether the government retains shares in the highly valued firms or not, the PBR is an appropriate variable for the testing hypothesis #3. The ROE and PBR variables are defined as follows

[18] Sections 1, 2 and 3 of the Abu Dhabi Economic Vision 2030 provide details of the areas of economic priorities and the engines of future growth. The Business Environment, Enterprise Performance and the Development in Dubai – Policy Report 2011 (published by the Dubai Economic Council) provides an idea of the economic priorities of the Government of Dubai. The UAE Vision 2021 (http://www.vision2021.ae) provides the general overview of national economic and social policies.

ROE: is return on equity that is calculated as the net income divided by the total equity reported in the audited balance sheet.

PBR: is price to book ratio that is calculated as average market price per share for current year divided by the book value per share reported in the balance sheet of the last financial year.

The selected variables (STRATEGIC, ROE, and PBR) may determine the probability of government's corporate ownership if they reflect the effect of three main underlying reasons discussed earlier. However, the sample characteristics reported in Table 1 show that the firms having a government shareholding are different from the firms without a government shareholding in various parameters. For example, based on the total assets and total revenues, the firms having a government shareholding are significantly larger than the other firms. The capital structures of the firms with a government shareholding are more levered than other firms. CEO duality is less prevalent in the firms having a government shareholding. However, there is no prior knowledge whether the total assets, total revenue, leverage, and CEO duality influence the government decision to retain ownership in a corporate firm. It is also not known from literature whether government ownership may influence the total assets, revenues, leverage, and CEO duality. Therefore, these are not included as control variables in the main regression models - yet the findings are rechecked by controlling for these factors to confirm robustness.

The study tests whether the variables defined above have effect on the probability of government ownership in the corporate firms. Based on the percentage of government share in total firm ownerships, samples are classified as government-linked company (GLC) or non-government-linked company (non-GLC). The stock exchange listed companies of the UAE disclose information about the persons and institutions holding a minimum 2% of total ownerships. Therefore, a firm is classified as GLC if the UAE federal or state governments hold a minimum 2% of the total outstanding shares. It is normally understood that the government shows interest in a firm by holding a minimum 2% of its outstanding shares. The non-GLCs are those firms in which government has no ownership or voting right. Since the percentage of shareholdings can be majority or minority. The study also examines whether STRATEGIC, ROE, and PBR determine the probability of holding a controlling or non-controlling government ownership. Hence, GLCs are reclassified as controlling-GLCs and non-controlling-GLCs, and the following dependent variables are defined.

GLC: GLC = 1 if government shareholding (GS) is more than or equal to 2% of the total outstanding shares, and 0 otherwise.

GLC_*control*: GLC_*control* = 1 if government is the largest shareholder[19], and 0 otherwise.

GLC_*non-control*: GLC_*non-control* = 1 if government is not the largest shareholder, and 0 otherwise.

4.2 Test model

The generic form of the multiple regression models is stated as:

$$\mathbf{Y}i = \beta' \mathbf{X}i + \varepsilon i \quad (1)$$

Where, Y is the dependent variable vector (n x1) having either 0 or 1 value for each observation: Y = 1, if a sample firm has government shareholding or 0 otherwise. X is a vector (n x k) of the explanatory variables as identified above plus a constant. The εi is the error term vector complying with the required assumptions. Since the dependent variables defined above are dichotomous (0, 1), the ordinary least square (OLS) method cannot be applied; instead, a linear probability model needs to be estimated. Therefore, probit regression models are estimated. This study tests the probability of government shareholding at three levels, such as (i) whether the government holds any ownership in the corporate firms, (ii) whether the government holds a controlling ownership, and (iii) whether the government holds a non-controlling ownership. Therefore, three probit regressions are estimated as follows:

$$\Pr(\text{GLC}i=1 \mid \mathbf{X}\boldsymbol{i}) = \beta' \mathbf{X}i + ui \quad (2)$$

$$\Pr(\text{GLC\_}controli=1 \mid \mathbf{X}\boldsymbol{i}) = \beta' \mathbf{X}\boldsymbol{i} + ui \quad (3)$$

$$\Pr(\text{GLC\_}non{-}controli=1 \mid \mathbf{X}\boldsymbol{i}) = \beta' \mathbf{X}\boldsymbol{i} + ui \quad (4)$$

Where, subscript *i* represent the firm level observation of the variables. **X** is a vector of the regressors (STRATEGIC, ROE, and PBR) as defined above plus a constant. In equation 2, Pr(GLCit = 1 | **X*i***) refers to the dependent variable vector. In equation 3, Pr(GLC_*controli* = 1 | **X*i***) means the dependent variable vector. Similarly, Pr(GLC_*non-controli* = 1 | **X*i***) is the dependent variable vector in equation 4. The above probit models are mainly estimated using the firm-level seven years' mean data of 120 firms. Although pooling of cross-sectional and time series data increases the number of observations, the results are less reliable because of the variations in observations over the sample period. The use of firm level seven-year mean data is meaningful in this study, because government ownership in a firm does not usually change on yearly basis. Nonetheless, the time-

[19] The ownership structure of stock exchange listed firms are usually diffused. Therefore, the largest shareholder may be able to maintain effective control over the firm. More details on ownership control transfer can be found in the studies of Chen et al. (2008) and Rousseau and Xiao (2008).

fixed pooled data regressions are also estimated for checking the consistency of firm level results. In addition, the regressions # 3 and 4 are re-estimated based on a restricted-sample. This is because the question of holding a controlling or non-controlling share arises when the government first decides to take ownership in a corporate firm. Therefore, a restricted-sample is created by removing the firms having no government shareholding following Heckman 2-step procedure.

4.3 Endogeneity correction

Endogeneity is a major challenge in econometric analysis particularly when a study aims at identification of causal determinants. This study selects three variables such as STRATEGIC, ROE, and PBR that can determine the probability of government ownership in the UAE corporate firms. Before estimating the above probit models, existence of endogeneity problem is checked and correction measures are taken so that the parameter estimates are unbiased and consistent. This is important for this study because the prior research works reviewed show that corporate ownership of government affects the profitability of firms in many countries including the UAE. Such as, Uddin *et. al* (2014) found that government ownership in the UAE firms has generally[20] a positive effect on the return on equity. In this regard, researchers argued that the government ownership of firms may aggravate their agency problems, or support them in gaining the market power to face competitions. Therefore, the profitability of firms may be affected due to the government share ownership. Hence, ROE may be an endogenous regressor in this study due to the possibility of simultaneity or reverse causality. In addition, the earlier studies such as Ang and Ding (2006) and Najid and Rahman (2011) find that GLCs exhibit a superior market performance in Singapore and Malaysia. However, Sun and Tong (2002), Zhang (2004), Tian and Estrin (2008), and Uddin *et. al* (2014) find a non linear relationship between the government ownership and the market valuation of firms. Particularly, firms are overvalued in the UAE market if the government ownership is more than 50% of the total outstanding shares. Therefore, without a test, it is inappropriate to assume that PBR is an exogenous regressor. This is because investors may consider that cash flow may be affected if the government ownership has an effect on the firms' profitability. Finally, STRATEGIC variable is assumed to be an exogenous regressor, because the economic and social importance of an industry does not depend on the ownership of firms, instead the circumstance of an economy determines the importance of a particular industry.

Therefore, based on prior knowledge, a number of instrumental variables (IV) are selected that may significantly affect the endogenous variables (ROE and PBR) - whilst the IVs are independent of the government shareholding. It is known from DuPont identity that ROE is determined by NPM, TAT and EM. From the correlations analyses, it is found that NPM and TAT have no significant relationship with the government shareholding percentage but have significant relationship with ROE. Therefore, these variables can be used as instruments to capture the exogenous variations in ROE. EM is not used as instrument as it has insignificant correlation ROE. However, identification of appropriate instruments to capture exogenous variation in PBR is not simple, because an important bottom line driver of the price to book ratio is the ROE that is also a covariate with PBR in the probit regressions defined above. Therefore, the appropriate instrument capturing the variation in PBR should be uncorrelated with other variables in the models defined above. PBR is used by the investors to identify the undervalued and overvalued stocks in the financial market, whilst Tobin's Q ratio (TBQ) compares the total market value of firm (equity and debt values) with the replacement costs of firm assets. Therefore, PBR and TBQ should have a high correlation. It is found that TBQ has significantly high correlation with PBR (rho = 0.42; *p* value = 0.00), but it is insignificantly related to the government ownership and other variables used in the study. Therefore, TBQ can be used as an instrument to capture the exogenous variation in PBR variable. Finally, the operating cost to total assets ratio (OCTA) is nominated as another instrument that has impact on the firm profitability and market valuation. The OCTA determines the cost efficiency in managing shareholders' investments in the firm assets. A cost-efficient firm achieves sustainable growth in competitive markets, and the shares of such company may be valued highly. In this regard, it is assumed that managers work professionally to maximize the value of firm - instead of serving the purpose of themselves or any particular stakeholder. The summary of instruments that capture the exogenous variations in ROE and PBR are given below:

NPM: is net income divided by total revenue reported in the audited balance sheet.

TAT: is total assets divided by total revenue reported in the audited balance sheet.

TBQ: is Tobin's Q ratio that is calculated as the market value of the equity plus the book value of debts divided by the book value of total assets.

OCTA: is total operating cost divided by the total assets reported in the audited balance sheet.

Using the above instrumental variables, the following 1st stage regressions (Models # 5 and 6 below) are estimated to determine the predicted values of ROE and PBR that can be then used as exogenous

[20] The positive effect of government ownership is not monotonic, which means the return on equity does not increase further if the level of government ownership is higher than a certain level.

regressors in the probit models defined above as Models # 2, 3, and 4, which are estimated in the 2nd stage regressions analysis.

$$ROEi = \gamma' \boldsymbol{Zi} + vi \quad (5)$$

$$PBRi = \delta' \boldsymbol{Zi} + vi \quad (6)$$

In Models 5 and 6, subscript *i* represent the firm level observation of the variables. **Z** is a vector of the instrumental variables (NPM, TAT, TBQ and OCTA) and the exogenous regressor (STRATEGIC) in the probit models (equations 2-4) plus a constant. Having defined the 1st and 2nd stage regressions, Newey's (1987) two-step efficient estimation technique is applied to obtain the parameters of the 2nd stage instrumental variable probit models (IVPROBIT), and results are presented in the following section. The 1st stage regression results are reported in the Appendix 1 that provides information about the significance and validity of the instruments used in estimating IVPROBIT models in the 2nd stage. The 1st stage and 2nd stage regressions are tested using the seven years' data of 120 firms listed on the DFM and ADX. The statistical properties of data are reported in Table 2. An overview shows that the distributions of majority pooled data sets are positively skewed and leptokurtic. The data normality are tested at both pooled data level and firm-wise mean level. The Jarque-Bera test for pooled data shows that all *p-values* are equal to zero, except that of the BRD - suggesting that one but all data series deviate from the normality assumption. Therefore, outliers are removed and Jarque-Bera tests are conducted again for seven years' firm-wise mean data. The new results show that *p-values* of ROE, TAT, PBR, OCTA data are greater than 0.05 – suggesting these data become normal if the firm-wise mean values are used and outliers are removed. Hence, the firm-level fixed regressions results based on the seven years' mean data may produce reliable estimates of parameters.

Table 2. Descriptive statistics of data set

Variables	Mean	Median	Std Dev	Quartile 1	Quartile 3	Skewness	Kurtosis	Jarque - Bera *p-value*
ROE	0.09	0.10	0.15	0.03	0.16	-1.22	8.98	0.06
NPM	0.26	0.16	1.11	0.06	0.37	0.37	39.58	0.04
TAT	0.30	0.23	0.31	0.6	0.44	1.98	5.79	0.07
PBR	1.29	0.90	1.18	0.53	1.60	2.40	7.80	0.05
TBQ	1.31	1.07	0,96	0.88	1.45	3.99	21.82	0.04
OCTA	0.32	0.20	0.34	0.05	0.40	2.39	7.37	0.06
STRATEGIC	0.47	0.00	0.50	0.00	1.00	0.10	-1.99	0.00
GLC	0.55	1.00	0.50	0.00	1.00	-0.21	-1.96	0.00
GLC_control	0.21	0.00	0.41	0.00	0.00	1.42	0.03	0.00
GLC_non-control	0.34	0.00	0.47	0.00	0.00	0.67	-1.56	0.00
CEO*dual*	0.38	0.00	0.48	0.00	1.00	0.52	-1.74	0.00
LnASSET	7.68	7.54	1.88	6.26	9.01	0.23	-0.18	0.03
LnREVN	5.98	6.12	1.95	5.07	7.14	-1.09	2.90	0.04
BOARD	7.84	7.12	1.98	7.00	9.00	0.56	2.36	0.31

Note: Table reports the descriptive statistics of pooled data over seven years (2006-2012). Therefore, the original distribution of the data set can be observed. However, Jarque-Bera (JB) *p values* testing normality are produced based on the firm-wise mean data after removing the outlier observations. This is because the test results based on the firm-level mean data are mainly used for empirical analyses.

5 Results and discussion

5.1 General findings

Table 3 presents two sets of IVPROVIT regression results. In which, Panel A reports the results based on the firm-level mean data, and Panel B presents time-fixed results based on the pooled data. The firm-level results in Panel A show that STRATEGIC, ROE, and PBR have significantly positive effect on the probability of government ownership in corporate firms [Pr(GLCit = 1 | **X*i***)]. The coefficients of STRATEGIC and PBR are statistically significant at one percent level, but that of ROE is significant at five percent level. The Wald $\chi 2$ value of the test model is 202.55, which is statistically significant at one percent level. This rejects the null hypothesis that the three coefficients are jointly equal to zero. Therefore, the firm-level regression results provide evidence that the probability of government ownership in a corporate firm is high if the firm is considered strategically important for the economy, able to earn high return on

equity, and valued highly in the financial market. The time-fixed results based on pooled data reported in Panel B also show similar results. As a whole, three hypotheses developed from the literature review are confirmed based on the results of both firm-level mean data and time-fixed pooled data.

Table 3. Instrumental variable probit (IVPROBIT) regressions results

Panel A: Firm-level fixed results based on seven years' mean data (N=120).

Explanatory Variables	Dependent Variables		
	$\Pr(\text{GLC}_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}control_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}non-control_i = 1 \mid \mathbf{X}_i)$
Constant	-0.69 (-3.67)***	-1.75 (-8.90)***	-0.56 (-3.26)**
STRATEGIC	1.60 (12.44)***	1.07 (7.52)***	0.76 (6.44)***
ROE	0.32 (2.41)**	-1.13 (-1.15)	1.08 (2.45)**
PBR	0.10 (2.84)***	0.35 (2.89)***	-0.27 (-1.36)
Model Summary	Wald $\chi^2 = 202.55^{***}$	Wald $\chi^2 = 63.97^{***}$	Wald $\chi^2 = 78.88^{***}$
	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.00$
Wald Test of Exogeneity	$\chi^2 = 22.53^{***}$	$\chi^2 = 9.02^{**}$	$\chi^2 = 8.17^{**}$
	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.011$	Prob.> $\chi^2 = 0.019$

Panel B: Time-fixed results based on pooled data (N=765)

Explanatory Variables	Dependent Variables		
	$\Pr(\text{GLC}_{it} = 1 \mid \mathbf{X}_{it})$	$\Pr(\text{GLC\_}control_{it} = 1 \mid \mathbf{X}_{it})$	$\Pr(\text{GLC\_}non-control_{it} = 1 \mid \mathbf{X}_i t)$
Constant	-0.68 (-2.17)***	-1.91 (-5.78)***	-0.39 (-1.34)
STRATEGIC	1.60 (12.50)***	1.06 (7.54)***	0.76 (6.52)***
ROE	0.29 (1.87)*	-1.05 (-0.98)	0.92 (2.17)**
PBR	0.10 (2.11)**	0.36 (2.79)***	-0.28 (-1.04)
Yr2012	-0.04 (-0.16)	0.17 (0.69)	-0.18 (-83)
Yr2011	0.02 (0.11)	0.14 (0.53)	-0.16 (-0.70)
Yr2010	0.13 (1.11)	0.14 (0.55)	0.15 (0.66)
Yr2009	-0.07 (-0.55)	0.12 (0.49)	-0.13 (-0.57)
Yr2008	0.15 (0.83)	0.21 (0.89)	0.15 (0.70)
Yr2007	0.17 (0.32)	0.24 (1.01)	-0.39 (-0.66)
Model Summary	Wald $\chi^2 = 202.92^{***}$	Wald $\chi^2 = 64.23^{***}$	Wald $\chi^2 = 79.40^{***}$
	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.00$
Wald Test of Exogeneity	$\chi^2 = 24.11^{***}$	$\chi^2 = 10.13^{***}$	$\chi^2 = 7.99^{**}$
	Prob.> $\chi^2 = 0.00$	Prob.> $\chi^2 = 0.01$	Prob.> $\chi^2 = 0.03$

Note: The parameters of IVPROBIT regressions are based on Newey's (1987) two-stage estimation technique. STRATEGIC is an exogenous dichotomous regressor: STRATEGIC = 1 if the firm is a strategically important. ROE and PBR are endogenous regressors, which are instrumented by a set other variables namely NPM, TAT, TBQ and OCTA. The 1st stage regressions results are reported in Panel A of Appendix 1. GLC means the government-linked company, and GLC = 1, if the government holds at least 2% of the total outstanding shares. GLC_control = 1, if the government is the largest shareholder of the company. GLC_non-control = 1, if the government is not the largest shareholder. The details of variables definitions and their measurements are discussed in the methodology section. The digits in parentheses are the *z statistics* of the model parameters. In Panel B regressions, six dummy variables for seven years (YR2012, YR2011, YR2010, YR2009, YR2008, YR2007) are included along with other explanatory variables. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

It is discussed earlier that a major challenge in identifying the causal determinants through regression analysis is how to address the endogeneity problem in the test models. At the bottom of the Panel A and B in Table 3, the Wald-test of exogeneity results are reported. In which, it is found that the test statistics (□2) are significant for all regression models. Therefore, there is sufficient information in the sample to reject the null hypothesis that there is no endogeneity. In this regard, it is discussed earlier that ROE and PBR may potentially cause endogeneity problem due to the existence of simultaneity or reverse causality in the models. Therefore, based on literature and prior knowledge, the endogeneity problem is addressed by using a set of instrumental variables such as NPM, TAT, TBQ, and OCTA in the regression analyses. Using these instrumental variables, the 1st stage regressions are estimated to

determine the predicted values of ROE and PBR that are used as exogenous regressors in the 2nd stage IVPROVIT regressions. The detail results of the 1st stage regressions are reported in Panel A of APENDIX 1. In which, it is found that the above instrumental variables significantly determine the level of ROE and PBR. Therefore, the IVPROBIT results reported in Table 3 are likely to be free from endogeneity bias, and hence they are acceptable to firmly conclude that the probability of government ownership in a corporate firm is high if the firm is strategically important for the economy, able to earn high return on equity, and valued highly in the financial market.

Since the degree of government share ownership varies in firms, in the next stage, the study explores why government holds a controlling or non-controlling ownership in a corporate firm. In particular, the study examines which of the three factors determine(s) the probability of holding a controlling or non-controlling ownership in a corporate firm. It is assumed that government can effectively control a firm by retaining the largest shareholding. If government is not the largest shareholder then it is considered as non-controlling ownership. Based on the both firm-level and time-fixed pooled regression results reported within the middle column of Table 3, it is found that only STRATEGIC and PBR have significantly positive effect on the probability of holding a controlling ownership by the government [Pr(GLC_*controli* = 1 | **X*i***)]. This finding generally suggests that profit earnings of a firm may be less important to the government if the firm serves major strategic interests of the country, and also plays important role in the capital market. This analysis is consistent with the additional results reported within the last column of the Table 3, which show that the probability of non-controlling ownership of the government [Pr(GLC_*non-controli* = 1 | **X*i***)] significantly depends on the STRATEGIC and ROE only. Therefore, it can be suggested that profitability of a firm becomes an important issue if the government wants to relinquish the control of firm to the private sector, yet a minority ownership is retained by the government provided that the firm still has strategic importance according to the priorities of economic development.

5.2 Firm characteristics effects

The results reported above as a whole confirm that the probability of government ownership in a corporate firm increases if the firm is strategically important for the economy, able to earn high return on equity, and valued highly in the financial market. The results also confirm that the profitability of a firm is an important factor if the government relinquishes its control on the firm. However, if the government wants to control a firm by retaining the largest part of ownership, the strategic importance and market valuation of the firm are more important. Next, it is examined whether the above findings sustain if the effects of important firm characteristics are included in the regressions analyses. In this regard, suitable prior studies are not found that can guide selection of firm characteristics that may affect the probability of government ownership. However, the characteristics of samples reported in Table 1 show that the firms having a government shareholding are different from the firms without a government shareholding in various parameters. For example, based on the total assets and total revenues, the firms having a government shareholding are significantly larger than the other firms. CEO duality is less prevalent in firms having a government shareholding, the board size of GLCs are marginally bigger than that of non-GLCs. Difference between the GLCs and non-GLCs can also be found with respect to the asset-equity ratio, operating income, capital structure, age of the firms, and number of employees. After checking whether the addition of new variables aggravates the endogeneity and other statistical problems in parameter estimations, a total of four firm characteristic such as total assets (LnASSET), total revenue (LnRENV), duality of CEO (CEO*dual*) and size of the board (BOARD) are added as control variables,. The new IVPROBIT results are reported in Table 4.

In Panel A of Table 4, the full sample results after controlling the effects of firm characteristics show that, as before, the STRATEGIC, ROE, and PBR variables have significantly positive effect on the probability of government ownership. Therefore, it is further confirmed that the probability of government ownership in a corporate firm increases if the firm is strategically important for the economy, able to earn high return on equity, and valued highly in the financial market. These findings are not subject to the size of firms measured in terms of total assets and total revenues and governance mechanism measured based on the duality of CEO and board size. It is, however, noted that the duality of CEO has significant effect on the probability of government ownership, but it does not alter the results of STRATEGIC, ROE, and PBR. The full sample results in Panel A of Table 4 also show that inclusion of the control variables do not alter the effects of STRATEGIC, ROE, and PBR on the probability of holding controlling or non-controlling ownership by the government. The time-fixed pooled data results presented in Panel B of Table 4 also show that the effect of STRATEGIC, ROE, and PBR on the probability of government ownership remain as before after controlling for the firm characteristics.

Table 4. IVPROBIT regressions with controlling for the firm characteristics effects

Panel A: Firm-level fixed results based on seven years' mean data (N=120).

Explanatory Variables	Dependent Variables		
	$\Pr(\text{GLC}_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}control_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}non-control_i = 1 \mid \mathbf{X}_i)$
Constant	-0.54 (-1.36)*	-2.90 (-6.37)***	0.33 (0.93)
STRATEGIC	1.74 (10.28)***	0.69 (4.03)***	0.97 (7.08)***
ROE	0.52 (1.98)**	-0.99 (-0.97)	0.96 (1.81)*
PBR	0.09 (1.88)*	0.42 (3.07)**	-0.39 (-1.14)
LnASSET	-0.10 (-1.43)	0.09 (1.57)	-0.10 (-1.97)**
LnREVN	0.03 (0.40)	0.09 (2.32)**	-0.05 (-1.68)*
CEO*dual*	-0.82 (-6.69)***	-0.81 (-5.33)***	0.27 (1.39)
BOARD	-0.01 (-0.41)	-0.02 (-0.57)	0.01 (0.31)
Model Summary	Wald χ^2 =119.41***	Wald χ^2 = 67.35***	Wald χ^2 = 93.25***
	Prob.> χ^2 = 0.00	Prob.> χ^2 = 0.00	Prob.> χ^2 = 0.00
Wald Test of Exogeneity	χ^2 = 10.11***	χ^2 = 5.45*	χ^2 = 6.88*
	Prob.> χ^2 = 0.01	Prob.> χ^2 = 0.07	Prob.> χ^2 = 0.07

Panel B: Time-fixed results based on pooled data (N=765)

Explanatory Variables	Dependent Variables		
	$\Pr(\text{GLC}_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}control_{it} = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}non-control_{it} = 1 \mid \mathbf{X}_i)$
Constant	-0.38 (0.77)	-2.97 (-5.54)***	0.50 (1.17)
STRATEGIC	1.75 (10.33)***	0.70 (4.07)***	0.97 (7.09)***
ROE	0.83 (2.12)**	-1.14 (-1.00)	0.75 (2.92)***
PBR	0.10 (1.69)*	0.42 (2.88)***	-0.41 (-1.11)
LnASSET	-0.11 (-1.60)	0.09 (1.50)	-0.10 (-1.99)**
LnREVN	0.04 (0.57)	0.09 (2.29)**	-0.08 (-1.54)
CEO*dual*	-0.83 (-6.73)***	-0.81 (-5.31)***	0.28 (2.42)**
BOARD	-0.01 (-0.38)	-0.02 (-0.58)	0.01 (0.31)
Yr2012	-0.15 (-0.62)	0.08 (0.29)	-0.19 (-0.80)
Yr2011	0.17 (0.67)	0.06 (0.18)	-0.17 (-0.73)
Yr2010	0.14 (0.59)	0.11 (0.40)	0.19 (0.80)
Yr2009	-0.11 (-0.43)	0.06 (0.21)	-0.16 (-0.67)
Yr2008	-0.05 (-0.19)	0.13 (0.50)	0.16 (0.72)
Yr2007	0.09 (0.35)	0.20 (0.80_	-0.14 (-0.65)
Model Summary	Wald χ^2 = 118.21***	Wald χ^2 =99.54***	Wald χ^2 = 63.56***
	Prob. > χ^2 = 0	Prob. > χ^2 = 0	Prob.> χ^2 = 0.00
Wald Test of Erogeneity	χ^2 = 10.12*	χ^2 = 5.65*	χ^2 = 11.14*
	Prob.> χ^2 = 0.01	Prob.> χ^2 = 0.06	Prob.> χ^2 = 0.01

Note: The parameters of above IVPROBIT regressions are based on Newey's (1987) two-stage technique. The variables are as defined earlier. The digits in parentheses are the *z statistics* of the model parameters. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Table 4 results as a whole show that STRATEGIC has a positive effect on the government holding of both controlling and non-controlling ownership, but an inconsistency is found in PBR and ROE results. The PBR has positive effect on the government ownership control, while it has negative effect (insignificant) on the non-controlling ownership. On the other hand, the ROE has positive effect on the non-controlling ownership of government but has negative effect (insignificant) on the government ownership control. These findings suggest the low profitable firms with government control get high market valuation, whilst high profitable firms without government control receive low valuation. This may indicate inefficiency of the UAE market, or investors consider firms with government control are less risky because the probability of bankruptcy and liquidation is low (Uddin et al, 2014). Nonetheless, after controlling the effect of firm characteristics, the results tend to indicate that strategic importance and market valuation of firms are the main factors of consideration for the government while taking control of a firm. On the other hand, the profitability increase is the primary factor of consideration while

transferring the ownership control to the private sector.

5.3 Restricted sample analyses

A restricted sample test is conducted because the government decision of taking controlling or non-controlling ownership in a firm may be a secondary decision after the initial decision of retaining ownership in a corporate firm. Therefore, the above findings on the factors affecting the probability of government taking a controlling or non-controlling ownership needs to be reexamined by using a sample that includes only the firms having government ownership. This reexamination is also required because, in the earlier regressions, the dependent variable for testing the controlling government shareholding is defined as GLC_*control* = 1 if government is the largest shareholder, otherwise 0. Hence, the sample taking 0 (zero) value includes both non-GLCs and GLCs with government as a minority shareholder. To get a clear idea about whether the government wants to retain a controlling or non-controlling ownership after the first decision to hold a shareholding in particular firm, a restricted sample is generated following Heckman 2-step procedure that censors the firms in which government has no shareholding by estimating the first stage selection models. The results of the second stage outcome models along with the details of Heckman 2-step implementation are presented in Table 5.

The firm-level results in Panel A of Table 4 show that STRATEGIC and PBR have significantly positive effect on the probability of controlling government ownership. The time-fixed results based on the pooled data that are reported in Panel B also display similar phenomenon. Therefore, restricted sample results suggest that government considers the profitability of firm is relatively a less important factor if the firm is serving strategically important economic and social interests of the country, and also playing significant role in the capital market. In addition, which factors determine the probability of non-controlling government ownership is also checked. The results based on the firm-level mean data and time-fixed pooled data reported in Table 5 show that STRATEGIC and PBR have significantly negative effect, whilst the coefficient of ROE has no significant effect. Therefore, the findings generally imply that government does not control a firm unless it serves the strategically important economic and social interests of the country, and also valued highly in the market. However, the profitability of a firm is not so important to decide whether a firm should be under government control or not.

5.4 Robustness check

5.4.1 Government ownership changes

The earlier regressions confirm that strategic importance, profitability, and market valuation of firm affect the probability of government ownership. It is also important to examine how the level of government ownership changes due to these factors. Therefore, additional regressions are tested by using government ownership percentage as the continuous variable instead of dummy variable. The detail results are presented in Appendix II. The full sample 2-SLS regression results based on both the firm-wise mean and time-fixed pooled data show that STRATEGIC, ROE, and PBR have significantly positive effect on the level of government ownership percentage. The results suggest that government owns more shares if a firm belongs to strategically important sectors, earns more profits, attracts high valuation in financial market. The restricted sample analyses based on Heckman 2-step procedure show that only the strategic importance and market valuation of firms determine the level of ownership percentage once the government has decided to retain share in a firm. The firm profitability does not play a significant role in determining the level of government ownership. Instead, it plays role in the first stage when government selects firms for shareholding. Findings do not change if firm characteristics (LnASSET, LnREV, CEO*Dual*, and BOARD) are included as control variables in the regressions. As a whole, results based on government ownership percentage as continuous variable support the results reported earlier.

5.4.2 Variables exclusions

This study examines three main explanatory variables such as STRATEGIC, ROE, and PBR. Of these, ROE and PBR are considered endogenous regressors that are instrumented by NPM, TAT, TBQ, and OCTA while estimating the models defined in equations #2-4. In these equations, STRATEGIC, ROE, and PBR are used as main regressors because they have direct effect on the probability of government ownership according to literature. The instrumental variables are not included as main regressors, because they have no direct effect on the government ownership. Instead, they determine the endogenous regressors affecting government ownership. The strength of selected instrumentals has been determined based on the results of the 1st stage regressions that are available in APPENDIX 1. However, it needs to be confirmed that the excluded (out-of-model) variables that are used as instruments have no direct effect on the probability of government ownership. Therefore, a set of alternative models are tested using PROBIT regressions.

Table 5. Restricted sample regressions with Heckman 2-step approach

Panel A: Firm-level fixed results based on seven years' mean data
N=120; Censored N = 54; Uncensored N = 66

Explanatory Variables in outcome models	Dependent Variables in outcome equation	
	$\Pr(\text{GLC\_}control_i = 1 \mid \mathbf{X}_i)$	$\Pr(\text{GLC\_}non-control_i = 1 \mid \mathbf{X}_i)$
Constant	0.21 (1.71)*	-0.16 (-1.42)
STRATEGIC	0.59 (5.04)***	-0.56 (-5.50)***
ROE	-0.09 (-0.22)	0.06 (0.14)
PBR	0.38 (6.04)***	-0.38 (-6.27)***
Model Summary	Wald $\chi^2 = 70.00^{***}$ Prob.> $\chi^2 = 0.00$	Wald $\chi^2 = 72.31^{***}$ Prob.> $\chi^2 = 0.01$
Rho (ρ)	0.79	0.76
LR Test for $\rho = 0$	$\chi^2 = 33.46^{***}$; Prob.> $\chi^2 = 0.00$	$\chi^2 = 33.71^{***}$; Prob.> $\chi^2 = 0.00$

Panel B: Time-fixed results based on pooled data
N= 765; Censored N = 342; Uncensored N = 423

Explanatory Variables in outcome models	Dependent Variables	
	$\Pr(\text{GLC\_}control_{it} = 1 \mid \mathbf{X}_{it})$	$\Pr(\text{GLC\_}non-control_{it} = 1 \mid \mathbf{X}_i t)$
Constant	0.08 (0.18)	-0.08 (-0.60)
STRATEGIC	0.57 (6.82)***	-0.57 (-5.42)***
ROE	0.12 (0.30)	-0.12 (-0.28)
PBR	0.40 (6.70)***	-0.39 (-6.66)**
Yr2012	0.07 (0.30)	-0.07 (-0.44)
Yr2011	0.08 (0.42)	-0.08 (-0.67)
Yr2010	0.09 (0.74)	-0.09 (-0.58)
Yr2009	0.09 (0.22)	-0.10 (-0.76)
Yr2008	0.10 (0.55)	-0.10 (-0.67)
Yr2007	0.05 (0.14)	-0.05 (-0.39)
Model Summary	Wald $\chi^2 = 75.47^{***}$ Prob.> $\chi^2 = 0.00$	Wald $\chi^2 = 74.34^{***}$ Prob.> $\chi^2 = 0.00$
Rho (ρ)	0.74	0.75
LR Test for $\rho = 0$	$\chi^2 = 33.51^{***}$; Prob.> $\chi^2 = 0.00$	$\chi^2 = 33.15^{*}$; Prob.> $\chi^2 = 0.00$

Note: The restricted samples include those firms in which government has a share ownership of at least 2%. In order to overcome the sample selection bias, Heckman procedure is implement by estimating two simultaneous models: (i) selection model in the first stage and (ii) outcome model in the second stage. Study estimates two outcome models; in which, the dependent variables are respectively Pr(GLC_$controlit$=1 | $\mathbf{X}i$) and Pr(GLC_$non{-}controlit$=1 | $\mathbf{X}i$). These variables are observed conditional on Pr(GLCi=1 | $\mathbf{X}i$), which is the depenedent variable of the selection models. The explanatory variables of the outcome models include STRATEGIC, ROE, and PBR. However, the explanatory variables of the selection models includes STRATEGIC, ROE, PBR, LnASSET, LnREVN, CEO*dual*, and BOARD. Since the dependent variables in both outcome and selection models are dichotomous, probit models with sample selection are estimated. It is noted that the ROE and PBR are endogenous regressors. Hence, their predicted values are first estimated based on four instruments (NPM, TAT, TBQ, and OCTA) and bootstrapped the standard errors before applying them in the probit models with sample selection. The digits in parentheses are the *z statistics* of the model parameters. In the pooled data regressions, six dummy variables for seven years are included along with other explanatory variables. Due to space limitation, the results of only the outcome models are presented in this table. The first stage selection model results are given in Panel B of Appendix 1. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

In APPENDIX 3, Test A1 that includes three main variables and four 'out-of-model' variables together shows that only STRATEGIC is highly significant and other variables including ROE and PBR are insignificant. Importantly, TEST A1 shows that variance inflation factor (VIF) of all variables except STRATEGIC are more than 5.0, suggesting that this model suffers multicolinearity problem. Test

B1 that excludes two endogenous regressors (ROE and PBR) shows that STRATEGIC is significant as before while the four 'out-of-model' variables still remain insignificant. The VIFs of all variables in this model are lower than 5.0. Therefore, it confirms that the 'out-of-model' variables such as NPM, TAT, TBQ, and OCTA have no direct effect on the probability of government ownership. Test C1 that includes only STRATEGIC, ROE, and PBR as the explanatory variables shows that the coefficients of these three variables are significantly positive and their VIFs are lower than 5.0. Therefore, alternative tests confirm that inclusion of STRATEGIC, ROE and PBR in the equations #2-4 as main variables is appropriate in the context of this study. However, these results cannot be used for confirmation of hypotheses because of endogeneity biasness. As a whole, the results in APPENDIX 3 confirm that exclusion of NPM, TAT, TBQ and OCTA from main models is appropriate. Lastly, the inclusion of control variables in TEST A2, TEST B2, and TEST C2 does not affect the significance of main regressors.

6 Conclusions

Government ownership in corporate firms can be found in many countries, although it is widespread in the transitional and emerging countries. Several studies examine the effect of government ownership on corporate performance, but findings are not consistent in all markets. Hence, it is not yet settled whether government ownership necessarily inhibits firm performance, or it helps improvement of performance by increasing firm efficiency. Therefore, the reasons why government retains ownership in corporate firms are not clear. This study addresses this issue by conducting an investigation on the factors affecting the probability of government ownership in the context of the UAE. In this country, the government has ownership in 48% of all stock exchange firms that is perhaps the highest record as far as documented by different studies. By reviewing literature, study argues that the government ownership in corporate firms evolves through the economic transition of a country, and three reasons motivate the government to hold ownership. Firstly, government usually takes ownership in a firm if it is strategically important for the economy. Secondly, government generally retains share in profitable firms for economic and political reasons. The economic reason is to supplement the national revenue by additional income from the dividends, capital gains, and corporate taxes. The political reasons are mainly related to employment, social stability and the power of managing the economy. Thirdly, government invests in firms in order to play a role in development of capital market. The validity of these arguments are tested by estimating several IVPROBIT regressions based on a sample of 120 firms listed on the two stock markets of the UAE. The sample covers about 88% of the UAE capital market, and data are collected over a period of seven years from 2006 to 2012.

The regression tests show that probability of government shareholding is generally high if a firm is strategically important for the economy, able to earn high return on equity, and valued highly in the financial market. As a whole, findings lead a general conclusion that, subject to strategic importance of a firm, the quality of firm could be a decision factor of government ownership in the UAE. Since the degree of government ownership varies in firms, the study also explores why the government of a country holds either a controlling or a non-controlling ownership in corporate firms. On this question, it is found that the strategic importance and market valuation influence the government decision to take control over the firms, whilst the profitability of firms is the main factor that influences the government decision to relinquish the control of firms to the private sector management by retaining only a minority ownership. Therefore, study enhances the knowledge of corporate ownerships by documenting the evidence of the factors affecting the probability of government corporate shareholding. However, readers should be cautious because the sample size is relatively small since the UAE is a small market comparing to major international markets. Nonetheless, the findings may be useful for the policy makers of the transitional and emerging countries to review the role of government in developing corporate business and capital market. They can assess success and failure of the privatization programs by setting benchmark parameters across the dimensions such as firms' strategic importance, profitability, and contribution in capital market. Although the present study provides useful findings based on the stock exchange listed firms, yet it is unknown which factors affects government ownership in the non-exchange-listed firms because study could not test it due to the non-availability of data. Finally, it can be examined further whether the governments of other countries also consider same or different factors if they intend to hold ownership in corporate firms.

References

1. Aljifri, K. and Moustafa, M. (2007), "The Impact of Corporate Governance Mechanisms on the Performance of UAE Firms: An Empirical Analysis", *Journal of Economics & Administrative Sciences*, Vol. 23 No. 2, pp. 71-93.
2. Ang, J. S. and Ding, D. K. (2006), "Government Ownership and the Performance of Government Linked Companies: The Case of Singapore", *Journal of Multinational Financial Management*, Vol. 16, pp. 64-88.
3. Bortolotti, B. (2009), "Government Control of Privatized Firms", *Review of Financial Studies*, Vol. 22 No. 8, pp. 2907-2939.
4. Boubakri, N., Cosset, J. C. (1998), "The Financial and Operating Performance of Newly Privatized Firms:

Evidence from Developing Countries", *The Journal of Finance*, Vol. 53 No. 3, pp. 1081-1110.
5. Boutchkova, M. and Megginson, W. L. (2000), "Privatization and the Rise of Global Capital Markets", *Financial Management*, Vol. 29 No. 4, pp. 31-75.
6. Boubakri, N., Cosset, J. C., and Geudhami, O. (2009), "From the State to Private Ownership: Issues from Strategic Industries", *Journal of Banking & Finance*, Vol. 33, No. 2, pp. 357-379.
7. Boutchkova, M. K. and Megginson, W. L. (2000), "Privatization and the Rise of Global Capital Markets", *Financial Management*, Vol. 29, No. 4, pp. 31-75.
8. Chen, G., Firth, M., Xin, Y., and Xu, L. (2008), "Control Transfers, Privatization, and Corporate Performance: Efficiency Gains in China's Listed Companies", *Journal of Financial and Quantitative Analysis*, Vol. 43, No. 1, pp. 161-190.
9. De La Torre, A., Gozzi, J. C., and Schmukler, S. L. (2007), "Stock Market Development under Globalization: Whither the Gains from Reforms?", *Journal of Banking & Finance*, Vol. 31 No. 6, pp. 1731-1754.
10. D'souza J. and Megginson, L. (1999), "The Financial and Operating Performance of Privatized Firms During the 1990s", The Journal of Finance, Vol. 54, No. 4, pp. 1397-1438.
11. Dewenter, K. L. and Malatesta, P. H. (2001), "State-owned and Privately-owned Firms: An Empirical Analysis of Profitability, Leverage, and Labor Intensity", *American Economic Review*, Vol. 91 No. 1, pp. 320-334.
12. Feng, F., Sun, Q, and Tong, W. H. S. (2004), "Do Government-Linked Companies Underperform?", *Journal of Banking & Finance*, Vol. 28, pp. 2461-2492.
13. Friedman, M. (1962), *Capitalism and Freedom*, University of Chicago Press, Chicago.
14. Gupta, N. (2005), "Partial Privatization and Firm Performance", *Journal of Finance*, Vol. 60 No. 2, pp. 987-1015.
15. Gursory, G. and Aydogan, K. (2002), "Equity Ownership Structure, Risk Taking, and Performance", *Emerging Market Finance & Trade*, Vol. 38 No. 6, pp. 6-20.
16. Harper, J. T. (2002), "The Performance of Privatized Firms in the Czech Republic", *Journal of Banking & Finance*, Vol. 26 No. 4, pp. 621-649.
17. Huang, L. and Xiao, S. (2012), "How Does Government Ownership Affect Firm Performance? A Simple Model of Privatization Transition Economies", *Economics Letters*, Vol. 116, No. 3, pp. 480-482.
18. Kay, A. and Thompson, D. (1986), "Privatization: A Policy in Search of a Rationale", *Economic Journal*, Vol. 96, pp. 18-38.
19. LaPorta, R. and Lopez-De- Silanes, F. (1999), "The Benefits of Privatization: Evidence from Mexico", *Quarterly Journal of Economics*, Vol. 114 No. 4, pp. 1193-1242.
20. Li, Z. and Yamada, T. (2013), "Partial Privatization, Firm Performance and Employment: Political and Economic Objectives of Government", Working paper available at SSRN: http://ssrn.com/abstract =2016091 or http://dx.doi.org/10.2139/ssrn.2016091
21. Mackenzie, G. A. (1997), "The Macroeconomic Impact of Privatization", a *Paper on Policy Analysis and Assessment of the International Monetary Fund* (PPAA/97/9).
22. Mathur, I. and Banchuevijit, W. (2007), "The Effects of Privatization on the Performance of Newly Privatized Firms in Emerging Markets", *Emerging Market Review*, Vol. 8 No. 2, pp. 134-146.
23. Mattlin, M. (2009), "Chinese Strategic State-Owned Enterprises and Ownership Control", *BICCS Asia Paper*, Vol. 4, No. 6. pp. 1-28.
24. Megginson, W. L., Nash, R. C., and Rendenborgh, M. V. (1994), "The Financial and Operating Performance of Newly Privatized Firms: An International Empirical Analysis", The Journal of Finance, Vol. 49, No. 2, pp. 403-452.
25. Najid, N. A. and Rahman, R. A. (2011), "Government Ownership and Performance of Malaysian Government-Linked Companies", *International Research Journal of Finance and Economics*, Iss. 61, pp. 42-56.
26. Naceur, S. B., Ghazouani, S., Omran, M. (2007), "The Performance of Newly Privatized Firms in Selected MENA Countries: The Role of Ownership Structure, Governance, and Liberalization Policies", *International Review of Financial Analysis*, Vol. 16 No. 4, pp. 332-353.
27. Newey, W. K. (1987), "Efficient estimation of limited dependent variable models with endogenous explanatory variables", Journal *of Econometrics*, Vol. 36, pp. 231-250
28. Obadan, M. I. (2008), *The Economic and Social Impact of Privatization of State Owned Enterprises in Africa*, CODESRIA, Dakar.
29. Pham, C. D. and Carlin, T. M. (2008), "Financial Performance of Privatized State-Owned Enterprises (SOEs) in Vietnam", *Journal of International Business Research*, Vol. 7 No 3 (Special Issue), pp. 105-125.
30. Perotti, E. C. and Guney, S. (1993), "The Structure of Privatization Plans", *Financial Management*, Vol. 22 No. 1, pp. 84-98.
31. Perotti, E. C. and Oijen, P. V. (2001), "Privatization, Political Risk and Stock Market Development in Emerging Economies", *Journal of International Money & Finance*, Vol. 20 No. 1, pp. 43-69.
32. Razak, N. H. A., Ahmed, R., and Joher, A. (2011), "Does Government Linked Companies (GLCs) Perform Better than non-GLCs? Evidence from Malaysian Listed Companies", *Journal of Applied Finance & Banking*, Vol. 1 No. 1, pp. 213-240
33. Rosovsky, H. (1959), "The Japanese Capital Formation: Role of the Public Sector", *The Journal of Economic History*, Vol. 19 No. 3, pp. 350-375.
34. Rousseau, P. L. and Xiao, S. (2008), "Change of control and the success of China's share issue privatization", *China Economic Review*, Vol. 19, No. 4, pp. 605-613.
35. Sheshinkski, E. and Lopez-Calva, L. F. (2003), "Privatization and Its Benefits: Theory and Evidence", *CESifo Economics Studies*, Vol. 49 No. 3, pp. 429-459.
36. Shleifer, A. and Vishny, R. (1994), "Politicians and Firms", *The Quarterly Journal of Economics*, Vol. 46 No. 4, pp. 995-1025.
37. Smith, S. C., Cin, B. C., and Vodopivek, M. (1997), "Privatization Incidence, Ownership Forms, and Firm Performance: Evidence from Slovenia", *Journal of Comparative Economics*, Vol. 25 No. 2, pp. 158-179.

38. Sun, Q. and Tong, W. H. S. (2002), "How Does Government Ownership Affect Firm Performance? Evidence from China's Privatization Experience", *Journal of Business Finance and Accounting*, Vol. 29 No. 1-2, pp. 1-27.
39. Sun, Q. and Tong, W. H. S. (2003), "China share issue privatization: the extent of its success", Journal of Financial Economics", Vol. 70, No. 2, pp. 183-222.
40. Tian, L. and Estrin, S. (2008), "Retained State Shareholding in Chinese PLCs: Does Government Ownership always Reduce Corporate Value?", *Journal of Comparative Economics*, Vol. 36, pp. 74-89.
41. Torre, Augusto D. L., Gozzi, J. C., and Schmukler, S. (2007), "Stock Market Development under Globalization: Whither the Gains from Reforms?", *Journal of Banking & Finance*, Vol. 31, No. 6, pp. 1731-1754.
42. Uddin, M. H.; Halbuni, S.; and Raj, M. (2014), "Performance of Government-Linked Companies Listed on the Two Stock Exchanges of United Arab Emirates – An Empirical Study", *Emerging Markets Finance and Trade*, Vol. 50 No. S1, pp. 212-236.
43. Vickers, J. and Yarrow, G. (1989), *Privatization: An Economic Analysis*, MIT Press.
44. World Bank (1996), *Bureaucrats in Business*, Oxford University Press.
45. Wei, Z., Oscar, V., Juliet, D. and Hassan, M. K. (1999), "The Financial and Operating Performance of China's Newly Privatized firms", *Financial Management*, Vol. 32 No. 2, pp. 107-126.
46. Zhang, Le-Yin. (2004), "The Roles of Corporatization and Stock Market Listing in Reforming China's State Industry", *World Development*, Vol. 32 No. 12, pp. 2031-2047.
47. Zeitun, R. and Tian, G. (2007), "Does Ownership Affect a Firm's Performance and Default Risk in Jordan?", *Corporate Governance*, Vol. 7 No. 1, pp. 66-82.

Appendix 1. The first stage regressions for IVPROBIT models and Heckman sample selections

Panel A; The 1st stage regressions for full sample IVPROBIT estimations presented in Table 3

Explanatory Variables	Dependent Variables: ROE		PBR	
	Firm-fixed regressions using firm-level mean data (N = 120)	Time-fixed regressions using pooled data (N = 765)	Firm-fixed regressions using firm-level mean data (N = 120)	Time-fixed regressions using pooled data (N = 765)
Constant	0.02 (1.52)	0.06 (3.58)***	0.51 (5.20)***	0.91 (5.99)***
NPM	0.01 (4.19)***	0.01 (3.35)***	0.00 (0.17)	0.00 (0.01)
TAT	0.77 (14.66)***	0.73 (14.06)***	-0.03 (-0.09)	-0.26 (-0.57)
TBQ	0.01 (1.37)	-0.01 (-0.69)	0.56 (11.43)***	0.52 (10.28)***
OCTA	-0.77 (-6.18)***	-0.72 (-5.81)***	-0.55 (-2.17)**	-0.83 (-2.72)***
STRATEGIC	0.05 (4.31)***	0.05 (4.70)***	1.17 (1.76)*	0.06 (1.81)*
Yr2012		0.05 (2.70)***		0.49 (3.23)***
Yr2011		-0.07 (-3.74)***		-0.50 (-3.25)***
Yr2010		-0.06 (-3.32)***		-0.39 (2.50)***
Yr2009		-0.06 (-3.29)***		-0.38 (-2.49)***
Yr2008		-0.01 (-0.75)		-0.35 (-2.22)**
Yr2007		0.04 (2.14)**		-0.41 (-2.63)***
Model F Value	54.78***	31.50***	32.95***	37.39***
Adjusted R^2	0.38	0.32	0.19	0.47
Significance of the relevant instruments	H_0: $\beta_{NPM} = 0$, $\beta_{TAT} = 0$; F value = 124.39; Prob.> F = 0.000	H_0: $\beta_{NPM} = 0$, $\beta_{TAT} = 0$; F value = 109.32; Prob.> F = 0.000	H_0: $\beta_{TBQ} = 0$, $\beta_{OCTA} = 0$; F value = 65.98; Prob.> F = 0.000	H_0: $\beta_{TBQ} = 0$, $\beta_{OCTA} = 0$; F value = 54.24; Prob.> F = 0.000

Panel B: Heckman 1st stage selection regressions for the outcome model results in Table 5

Explanatory Variables	Selection model dependent variable: $\Pr(GLC_i = 1 \mid \mathbf{X}_i)$, where GLC = 1 if the government holds at least 2% of the total outstanding shares; otherwise 0			
	Outcome model dependent: $\Pr(GLC\_control_{it} = 1 \mid \mathbf{X}_i)$		Outcome model dependent variable: $\Pr(GLC\_non-control_{it} = 1 \mid \mathbf{X}_i)$	
	using firm-level mean data (N = 120)	using time-fixed pooled data (N = 765)	using firm-level mean data (N = 120)	using time-fixed pooled data (N = 765)
Constant	-0.73(-2.34)**	-0.48 (-1.63)	-0.69 (-4.07)***	-0.47 (-1.62)
STRATEGIC	1.54 (10.87)**	1.54 (11.06)***	1.53 (12.33)***	1.54 (11.02)***
ROE	0.18 (2.35)**	0.05 (1.70)*	0.20 (1.87)*	0.05 (1.68)*
PBR	0.15 (3.06)***	0.17 (3.49)***	0.16 (3.08)***	0.17 (3.45)***
LnASSET	-0.01 (-0.16)	-0.01 (-0.15)	-0.01 (-0.04)	-0.01 (-0.14)
LnREV	0.06 (1.40)	0.05 (1.44)	0.05 (1.27)	0.06 (1.42)
CEO*dual*	-79 (-7.07)	-0.82 (-7.77)***	-0.81 (-7.45)***	-0.81 (-7.70)***
BOARD	0.05 (1.87)*	0.05 (2.07)**	0.05 (2.04)*	0.05 (2.09)**
Yr2012		-0.16 (-0.53)		-0.15 (-0.54)
Yr2011		-0.27 (-0.45)		-0.28 (-0.43)
Yr2010		0.19 (-0.31)		0.17 (-0.29)
Yr2009		-0.23 (-1.35)		-0.23 (-1.31)
Yr2008		-0.16 (-0.93)		-0.17 (-0.90)
Yr2007		-0.09 (-0.4)		-0.09 (-0.45)

Note: The digits in parentheses are the z *statistics* of the model parameters Variable definitions are given the methodology section. The notes of Table 5 are also applicable for the Panel B results. The values of rho (ρ) and $\chi 2$ (testing $\rho = 0$) are reported in Table 5. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Appendix 2. Regressions using government ownership (%) as continuous dependent variable

Explanatory Variables		Full sample regressions 2-SLS regression estimates		Restricted sample regressions Heckman 2-step procedure	
		Firm-wise mean data (N=120)	Time-fixed pooled data (N=765)	Firm-wise mean data Censored N = 54 Uncensored N = 66	Time-fixed pooled data Censored N = 342 Uncensored N = 423
	Constant	-0.08 (-1.67)*	-0.10 (-1.53)	0.37 (6.14)***	0.32 (4.78)***
Main Variables	STRATEGIC	0.18 (8.70)***	0.18 (8.71)***	0.07 (2.44)**	0.07 (2.45)**
	ROE	0.08 (1.73)*	0.09 (1.71)*	0.02 (0.28)	0.06 (0.76)
	PBR	0.05 (3.15)***	0.05 (2.93)***	0.08 (7.13)***	0.09 (7.39)**
Control Variables	LnASSET	0.01 (0.83)	0.01 (0.77)		
	LnREVN	0.015 (2.11)***	0.02 (2.08)**		
	CEO*dual*	-0.09 (-5.29)***	-0.09 (-5.27)***		
	BOARD	0.003 (0.76)	0.00 (0.75)		
Time-fixed variables	Yr2012		0.01 (0.28)		0.06 (1.44)
	Yr2011		0.01 (0.22)		0.06 (1.46)
	Yr2010		0.02 (0.35)		0.05 (1.38)
	Yr2009		0.01 (0.36)		0.05 (1.40)
	Yr2008		0.02 (0.51)		0.05 (1.25)
	Yr2007		0.02 (0.76)		0.02 (0.61)
Model summary	R^2	0.24	0.24		
	Wald χ^2	244.92***	245.76***	52.77***	56.84***
	Mills λ			0.18***	0.18***
	Rho			0.76	0.76
	Sigma			0.23	0.23

Note: The full sample results are based on two-stage least square regressions, because two endogenous regressors (ROE and PBR) are instrumented by NPM, TAT, TBQ and OCTA. The 1st stage regressions results are not reported here due to space limitation, but they are similar to those in Panel A of Appendix 1. The restricted sample regressions are estimated following Heckman 2-step procedure. In which, the dependent variable of the outcome models (government ownership percentage) is observed conditional on $\Pr(GLC_i=1 \mid \mathbf{X}_i)$, which is the dependent variable of the selection models where GLC = 1 if the government holds at least 2% of the total outstanding shares; otherwise 0. The explanatory variables of the outcome models include only the main variables: STRATEGIC, ROE, and PBR. However, the explanatory variables of the selection models includes all variables: STRATEGIC, ROE, PBR, LnASSET, LnREVN, CEO*dual*, and BOARD. The predicted values of two endogenous regressors (ROE and PBR) are first estimated based on four instruments (NPM, TAT, TBQ, and OCTA) and bootstrapped their standard errors before applying them in Heckman 2-step procedure. The digits in parentheses are the *z statistics* of the model parameters. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively.

Appendix 3. Tests of alternative models using PROBIT regression (N=120)

Explanatory Variables		Dependent Variable $\Pr(\text{GLC}_i = 1 \mid \mathbf{X}_i)$									
		All variables (**Test A**)				All variables minus endogenous variables (**Test B**)				Only the variables of interest (**Test C**)	
		Without control variables (Test A1)		With control variables (Test A2)		Without control variables (Test B1)		With control variables (Test B2)		Without control variables (Test C1)	With control variables (Test C2)
		Coefficient	VIF	Coefficient	VIF	Coefficient	VIF	Coefficient	VIF	Coefficient VIF	Coefficient VIF
Constant		-0.62 (-4.56)***		-0.20 (-0.55)		-0.57 (-4.56)***		-0.32 (-0.91)		-0.43 (-4.76)***	-0.21 (-0.69)
Variables in the main models	STRATEGIC	1.61 (13.36)***	1.53	1.66 (10.71)***	2.77	1.62 (13.78)***	1.41	1.60 (10.90)***	2.65	1.57 1.39 (14.59)***	1.59 3.12 (11.20)***
	ROE	0.26 (0.58)	12.72	-0.04 (-0.11)	13.05					0.28 1.46 (2.00)**	0.18 1.81 (2.18)**
	PBR	-0.12 (-1.14)	12.88	-0.16 (-1.73)*	11.65					0.10 1.55 (2.12)**	0.13 2.44 (2.62)***
Variables not included in the main models	NPM	0.04 (1.59)	10.15	0.08 (1.55)	12.26	0.02 (1.56)	1.11	0.03 (1.87)*	1.00		
	TAT	-0.16 (-0.23)	21.11	-0.67 (-0.92)	23.22	-0.39 (-0.67)	3.32	0.95 (1.51)	6.17		
	TBQ	0.10 (1.27)	8.19	0.16 (1.70)*	8.98	-0.02 (-0.40)	1.59	0.02 (0.22)	1.98		
	OCTA	0.45 (0.62)	7.50	0.50 (0.66)	8.54	0.59 (0.94)	3.54	0.80 (1.22)	3.91		
Control Variables	LnASSET			-0.16 (1.67)*	42.20			-0.10 (-1.27)	45.01		-0.03 39.44 (-0.62)
	LnREV			0.18 (1.55)	33.21			0.13 (1.86)*	31.32		0.03 24.21 (0.72)
	CEO*dual*			-0.88* (-7.36)***	1.54			-0.88 (-7.55)***	1.61		-0.84 1.55 (-7.33)***
	BOARD			0.02 (0.46)	4.67			0.02 (0.50)	4.21		0.03 4.32 (0.85)
Summary	LR χ^2	242.48***		313.21***		239.01***		308.41***		262.33***	323.83***
	Pseudo R^2	0.25		0.33		0.25		0.32		0.26	0.31

Note: The digits in parentheses are the *z statistics* of the model parameters. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels respectively. VIF is variance inflation factor that measures the severity of multicolinearity problem in the model estimation. The variables descriptions are found within the methodology section.