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Effect of government share ownership on corporate risk taking: Case of the United Arab Emirates☆

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ABSTRACT

If government holds ownership in corporate firms, principal–principal conflict may arise between government and private owners. I argue conflict aggravates when government is minority owner, because the powerful minority owner (government) exerts political pressure on the majority private owners to achieve government objectives. Hence, government minority firms are likely to be conservative in risk taking due to the existence of principal–principal conflict. I provide supporting evidence from the United Arab Emirates, which has the highest record of government ownership in stock exchange listed firms of any country. However, the relationship between government ownership and risk taking is a non-linear U-shaped.

1. Introduction

Government or state corporate ownership is found across the world (Claessens et al., 2000; Dewenter and Malatesta, 2001; Boubakri et al., 2013a), but this phenomenon is especially widespread in the United Arab Emirates (UAE), where government maintains a share ownership in 48% of all the stock exchange listed firms (Uddin et al., 2014). This is perhaps the highest documented record of government ownership in the stock market listed firms of any country. Different studies report that the government share ownership negatively affects the corporate performance in different countries such as Singapore, Malaysia, China, Turkey, India, and Jordan (Ang and Ding, 2006; Feng et al., 2004; Najid and Rahman, 2011; Tian and Estrin, 2008; Sun and Tong, 2002; Gursory and Aydogan, 2002; Gupta, 2005; Zeitun and Tian, 2007). These researchers mainly suggest that a negative relationship between the government ownership and firm performance is the result of the agency problem. Interestingly, Uddin et al. (2014) document that government ownership has generally a positive effect on the corporate performance in the UAE, which is inconsistent with the evidence of the other countries. This anomaly motivates me to examine the dynamics of the relationship between the government and the corporate firm in which the government maintains an ownership.

Given the above background, I believe that the government, as the most powerful political institution of a country, having an ownership in a firm directly influences its risk-taking decisions (henceforth corporate risk taking), which determines the performance, survival, and growth of that firm in the competitive market environment (Nakano and Nguyen, 2012; Memili et al., 2010; Gilley et al., 2002; Bromiley, 1991). The government influences corporate risk taking decisions because it has

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social, political, and economic interests in the firm (Wright et al., 1996; John et al., 2008; Boubakri et al., 2013a; Uddin, 2014). The social and political interests are mainly related to public employment, social stability, and political control over the economy, whilst the economic interests are related to supplementing government revenue by additional dividends incomes, capital gains, and corporate taxes (Uddin, 2014). Since the stock market listed firms usually maintain a diffused ownership structure, the government works with other shareholders to develop a governance mechanism that is supposed to align the interests of different shareholder groups (Sur et al., 2013). However, I assume that alignment of all shareholders' interests is difficult because of the diversity of interests. Consequently, the major and/or powerful shareholders' interests ultimately determine the corporate risk taking behavior of a firm. Since government is politically the most powerful shareholder regardless of the level of ownership, the corporate risk taking of the firm with a shareholding of the government will reflect the interests of government all else the same. Therefore, a relationship between the government share ownership and corporate risk taking is expected.

Based on a cross-country sample, Boubakri et al. (2013a) recently reported that government ownership has a negative effect on corporate risk taking. This incites me to think if the government ownership inevitably discourages a firm from taking more risks then why does the study of Uddin et al. (2014) find that the UAE government linked companies (GLC) perform better than the firms without government links. Therefore, a new study on government ownership and corporate risk taking is undertaken based on the UAE data. The literature review shows that the firm owners, particularly the insiders, have both negative and positive incentives to undertake risky investments. The firm is conservative in risk taking if the government as an insider owner actively seeks to achieve its social and political objectives, whereas the firm liberally takes risk if the government gives priority to the economic objectives and provides active support to the firm. Therefore, government shareholding can have either a negative or a positive effect on the corporate risk taking, subject to the priority of government objectives. Given this knowledge, based on the theory of principal–principal conflict, I analyze that government gets into disputes with the private shareholders if the majority share goes out of the government hands. This occurs due to divergence of the interests in the firm maintained by the minority government and the majority private owners. The discord between them aggravates when the powerful minority, being the government, exerts pressures on the majority to achieve the government objectives, and in the state of high conflict, the government minority firm will be conservative in taking on risky projects. However, when government maintains the majority ownership, the conflict of interests between the government and private owners is less, and the risk taking decisions can be made more easily if needed for the country, given the circumstances of the economy. Finally, I hypothesize that the relationship between the level of government share ownership and corporate risk taking will exhibit a non-linear U-shaped pattern instead of linearity.

Using 10 years' data from 108 firms listed on the Dubai Financial Market (DFM) and Abu Dhabi stock exchange (ADX) and four alternative measures of corporate risk taking, I find that the identity of a firm as GLC (firms having government ownership) does not significantly affect its corporate risk taking. Compared with the non-GLCs (firms having no government ownership), the GLCs take more risk when government maintains full control over the firm by holding more than 50 percent ownership. Finally, the regressions identify a significantly quadratic relationship between government ownership and corporate risk taking, in which the first order effect of the government ownership on risk taking is negative but the second order effect is positive, confirming the test hypothesis. I confirm the results by conducting additional tests that examine the robustness. As a whole, the effect of government ownership on the corporate risk taking behavior in the UAE is not consistent with the only available evidence recently provided by Boubakri et al. (2013a) based on the cross-country data. The cross-country study reports that the government share ownership monotonically leads to lower corporate risk taking by the firm, whereas the current single country study shows that the propensity of corporate risk taking initially declines with the increase in government ownership but rises if the government strongly participates in the firm ownership with full control on the firm.

The findings of my study have several implications. First, a new corporate governance mechanism can align the interests of the government and private owners of the GLCs. Second, the GLC managers should make value-adding corporate decisions with a careful balance of the interests of the government and private owners. Third, the investment managers should select the GLC stocks with more analyses on the future growth prospects of the firms having government ownership. Fourth, privatization without effective transfer of the control of firms to the private shareholders will not be successful to improve firm performance due to the rise of conflict between the government and private owners. The results also suggest that majority or controlling government ownership of a firm is not to be considered bad if GLCs can be managed by the professional managers with a high standard of corporate governance and without political motive.[1] This study contributes to the literature by providing a new analysis to understand the behavior of the relationship between government ownership and corporate risk taking and by documenting the first single country evidence that the minority government share ownership has a negative effect on the corporate risk taking, but the majority government ownership has a positive effect on risk taking. I believe that the UAE evidence is an important addition to the literature, because this country has distinct characteristics that justify a new study about the effect of government ownership on corporate risk taking.

The UAE is the second-richest country in the world in terms of the value of total sovereign wealth funds invested ($975 billion) in real and financial assets across the world, including the home country (Source: *Gulf Today* May 7, 2014). As reported

[1] In the UAE, the majority of CEOs of the GLCs do not play a dual role as the board chairman (Uddin et al., 2014). An ongoing investigation shows that many of these CEOs are professionally trained people recruited from global talent.

by the Sovereign Wealth Fund Institute (SWI), this huge government-owned pool of money was generated from oil revenue and accumulated as the budgetary surplus of many years. This fund is managed by seven professional investment agencies belonging to the UAE federal and state governments (Source: http://www.swfinstitute.org, accessed November 16, 2014). The government has been working to fully diversify the economy by 2030 in order to hedge against the oil income risk (Source: http://aviationweek.com/awin/uae-industry-builds-capability, accessed November 18, 2014). As of now, the diversification of the economy raises the non-oil share of GDP to 71% due to massive government investments in the corporate sectors (Source: *Gulf News*, November 18, 2014), which results in the highest record of government ownership in the firms listed on the two local stock markets (Uddin et al., 2014). Due to massive government investment in the non-oil corporate businesses, the annual gross domestic product (GDP) of the UAE has been increased rapidly to $416 billion as of October 2014 – ranking the UAE as the 30th largest economy of the world and the second largest in the Middle East with a per capita income of $44,552 (Source: International Monetary Fund). Although the UAE is an emerging country, the government has maintained efficiency and professionalism in managing the economy. This has been witnessed by its high standing (ranked 12th) in the Global Competitiveness Index of 2014–2015 (Schwab, 2014). As a whole, it is understood that the government investment in the UAE has played an important role to develop the corporate businesses of the country. Therefore, this study is a timely attempt to investigate how an active participation of the government in corporate businesses affects the risk taking of the UAE firms.

The rest of the paper is organized as follows: in the next section, relevant literature is reviewed to understand how the government being an insider can influence the risk taking decisions of the corporate firms and thereby affect corporate risk taking. In the subsequent sections, the sample characteristics, test variables and empirical findings are described. Finally, conclusions are provided in the last section.

2. Literature and hypotheses

The level of government involvement in the economy management is a debatable issue. In an ideal market economy, the government frames policies and laws, enforces rights, and takes measures to reduce monopolies that block the market entry of new firms (Friedman, 1962). Yet the government owns and manages business enterprises across the world due to political and economic circumstances. In most countries, the government undertakes investment projects by setting up wholly-owned firms during the early stages of economic development and transfers ownership to private owners through full or partial privatizations; many of these privatized firms are listed on the stock exchanges (Uddin, 2014). In some countries, the government invests sovereign funds (budget surplus) in the stock market listed firms through their own agencies.[2] Government also provides venture capital to startup companies (Lerner, 1999) that eventually come to the stock markets. Therefore, government becomes a share owner of the stock market listed corporate firms through the privatization program, sovereign fund investment, and venture capital finance.

I now focus on how government influences the risk taking decision of a firm. Wright et al. (1996) argue that shareholders prefer growth-oriented risk taking, but the insider owners who directly participate in firm management often avoid such risk taking because the insiders' interest depends on their total wealth portfolios, pecuniary and non-pecuniary benefits, and chances of entrenchment. They analyze that the insider owners' capital invested in a firm represents a significant proportion of their total wealth that results in undiversified personal wealth. Hence, the insider owners having undiversified personal wealth may make corporate risk taking decisions based on the analysis of their personal gains and losses and may accept the low-risk, non-value-maximizing projects. Although growth of a firm is beneficial for all shareholders including insiders, the uncertainties associated with the growth-oriented projects may reduce the insiders' incentives to take high risks that may affect their pecuniary and non-pecuniary benefits. Thereby, insider owners may prefer entrenchment of their position in the firm by avoiding risk taking. Such risk avoidance behavior of the corporate insiders becomes stronger if the financial system is less developed, corporate governance standards are weak, and investors are less protected (Durnev et al., 2004; Wurgler, 2000). On the other hand, it can also be argued that insider owners who are involved in the management of a firm may prefer taking risks if the growth of firm valuation is important for them. This happens particularly when a firm is under the (i) threat of hostile takeover (Hasbrouck, 1985; Martin and McConnell, 1991; Sinha, 2004), (ii) influence of capital market signaling effects due to improvement of firm earnings and dividends payments (Easterbrook, 1984; Bhattacharya, 1979; Benartzi et al., 1997), and (iii) a strong regulatory regime protecting the interests of the shareholders – because strong investors' protection reduces the magnitude and importance of private benefits to the insiders (John et al., 2008).

Therefore, the above studies show that the corporate insiders who are involved in the management of firms have both negative and positive incentives for taking risks. An important issue here is that there are different categories of insiders, *e.g.*, the founding person(s)/family, government, venture capitalists, financial institutions, and managers who sit on the board and play active roles in corporate decision making. While the agency theory addresses the conflict of interests between the corporate managers and shareholders, it is also likely that conflicts exist among the insiders due to divergence of their

[2] Temasek Holdings, Government of Singapore Investment Corporation, Abu Dhabi Investment Authority, Abu Dhabi Investment Council, Investment Corporation of Dubai, Emirates Investment Authority, China Investment Corporation, and Kuwait Investment Authority are examples of government investment agencies of Singapore, UAE, China and Kuwait.

interests in the firm (Gillette et al., 2003). This issue is particularly important in this study, because it intends to explain (i) how the government, as the most powerful political institution of the country, works with other insiders in the firm[3] and (ii) how the government on the board affects risk taking decisions. Uddin (2014) finds that government has social, political and economic objectives to retain ownership in the corporate firms. The social and political objectives are related to the delivery of employment, social services, and public utilities; hence government normally retains the controlling ownership in the strategically important firms (Obadan, 2008; Mattlin, 2009; Boubakri et al., 2009). The economic objectives include (i) earning additional government revenue from the corporate taxes and dividend incomes and (ii) helping the development of the capital market (Boutchkova and Megginson, 2000; De La Torre et al., 2007; Perotti and Oijen, 2001). Therefore, the government has reasons to influence the corporate risk taking decisions to achieve its social, political, and economic objectives.

However, all the government objectives do not get the same priority in the given circumstances of a country. If the government provides high importance to the social and political objectives in order to maximize social stability and employment (which helps ensure the political tenure of the government), the firms with government ownership pursue less risky investments to reduce the uncertainty of earnings (Boubakri et al., 2013a; Vickers and Yarrow, 1991). It is likely that such firms may stand against the wages and cost cuts or employee layoffs to satisfy the desire of the government. In addition, the directors and managers nominated by the government are mostly selected from the civil bureaucrats who are trained to serve the political interests of the government. Hence, in the absence of an effective monitoring system, the government appointed directors/managers pressure the firms not to engage in risky investments if the social and political objectives of the government are affected. Therefore, *ceteris paribus*, I can say that government participation in the firm ownership leads to less corporate risk taking.

The above proposition is more appropriate in those countries where the political tenure of the government is unstable, institutions are too weak to maintain checks and balances in the economy, corruption is widespread, government seeks rent from the corporate firms, and borrowing cost is high (Boubakri et al., 2013b; Stulz, 2005; Qi et al., 2010). This is because the governments of these types of countries typically try to maximize social stability and employment (Fogel et al., 2008), at least for the short term, as this helps them maintain the tenure of political power. In this regard, I further analyze that the social and political objectives of the government conflict with the economic objectives in the short term, but not in the long term. If the firms can implement risky investments successfully, the government receives more taxes, dividends, and capital gains in the longer term. Thereby, an economically strong government can provide additional social services and employment to its citizens in a more sustainable manner. Hence, my proposition of a negative effect of the government ownership on corporate risk taking is not a general phenomenon under all circumstances. The other literature shows that firms indeed benefit from their political linkage with the government in many ways: the politically connected firms receive financial support from the banks and financial institutions on liberal terms, enjoy reduced tax benefits, obtain government support in crises, and have the opportunity to acquire more market shares (Faccio et al., 2006; Faccio, 2010; Khwaja and Mian, 2005). Therefore, the ownership linkage with the government encourages a firm to take up risky investments, because government being an owner of the firm endorses and shields such risky investments. Hence, the politically linked firms having a government ownership are valued highly in the financial market (Goldman et al., 2009; Liao and Young, 2012), despite their low earning quality (Chaney et al., 2011 and Uddin et al., 2014). Therefore, *ceteris paribus*, I can also say that government participation in ownership helps a firm to take more risk.

Therefore, the review of the above literature suggests either a negative or a positive effect of government share ownership on corporate risk taking, subject to how the government pursues its social, political, and economic objectives and commits to support the firm. Given this knowledge, I now analyze the behavior of the relationship between the government ownership and corporate risk taking based on the theory of principal–principal conflict that emerges between the controlling and minority shareholders (Dharwadkar et al., 2000; Young et al., 2008; Chang, 2003; Claessens et al., 2002; Thomsen and Pedersen, 2000). If the government transfers the majority ownership of a firm to the private shareholders, conflicts arise between the government (minority owner) and the private shareholders (majority owner) due to the divergence of their interests in the firm (Gillette et al., 2003). This is because the interests of majority shareholders may not be aligned with the interests of the minority owner who has political power to intervene in corporate decisions. The political motivation of government is to maintain social stability and employment after the transfer of the majority firm ownership to the private shareholders, who are more interested in the firm's performance, survival, and growth (instead of serving the political interests) that require more risk taking. In reality, however, the private shareholders often succumb to the political pressure of the government, which is also a firm owner. If the private shareholders and government are in a state of disharmony, the firm risks not receiving the government support to gain market power, low cost finance, and monitoring services that are important to achieve faster growth (Uddin et al., 2014; Ang and Ding, 2006; Aljifri and Moustafa, 2007).

This principal–principal conflict is exacerbated when the government becomes the minority shareholder. This is because the minority shareholder (the government) exerts political pressure[4] on the majority shareholders to achieve government objectives. In an environment of high conflict between the minority and majority shareholders, the firm will not undertake

[3] This is irrelevant for the state-owned enterprises with 100% government ownership.

[4] Government maintains a grip on the firm directly by maintaining a golden share (if any) that provides a special voting right to negate the majority decision, and indirectly through the politically connected and government appointed directors of the firm (Shleifer and Vishny, 1994; Boubakri et al., 2008).

Table 1
Description of samples over 2004–2013 period.

Industry	All	Non-GLC	GLC	Range of government share ownership %	Number of firms	Summary statistics of government share ownership % in GLCs ($N = 55$)	
Panel A: Distribution industry classifications				**Panel B: Distribution of GLCs across different levels of government share ownerships and their summary statistics**			
Banks	24	7	17	$02 \leq \% \leq 10$	8 (14.55%)	Mean	32.60
Insurance	27	20	7	$11 \leq \% \leq 20$	13 (23.64%)	Median	27.00
Investments	6	3	3	$21 \leq \% \leq 30$	11 (20.00%)	Std Dev	20.74
Real Estate	10	2	8	$31 \leq \% \leq 40$	4 (7.27%)	Mode	30.00
Transportation	5	2	3	$41 \leq \% \leq 50$	4 (7.27%)	Minimum	3.00
Manufacturing	27	14	13	$51 \leq \% \leq 60$	11 (20%)	Maximum	80.00
Services	9	5	4	$61 \leq \% \leq 70$	2 (3.64%)	Skewness	0.50
Total	108	53	55	$71 \leq \% \leq 100$	2 (3.64%)	Kurtosis	−0.78

Market	All firms	Non-GLCs	GLCs	Items	All firms	Non-GLCs	GLCs
Panel C: Distribution by market listings				**Panel D: Basic characteristics of firms**			
DFM	45	27	18	Assets	15,071 mill	4917 mill	24,856 mill
ADX	63	26	37	Revenues	1626 mill	853 mill	2370 mill
Total	108	53	55	EBIT	406 mill	153 mill	650 mill
				Leverage	46%	43%	49%

GLC means government linked companies. A firm is classified as GLC if government holds a minimum of 2% share ownership. DFM means Dubai Financial Market and ADX is Abu Dhabi Exchange. The Assets, Revenues and EBIT in Panel D are average values in AED (USD 1 = AED 3.67) over 2004–2013. The leverage is measured by average debt to asset ratio of sample firms over 2004–2013.

a risky investment[5] that increases earnings uncertainty, affecting the cash flow and firm valuation. The political pressure on the private shareholders becomes less important if government maintains control of the firm by holding the majority ownership; then the government majority firms can undertake risky investments if they are important for the country.[6] Based on the above analyses, I argue that corporate risk taking is not affected due to the GLC identity of the firm *per se*, but because of the rise of principal–principal conflicts (PPC) after transfer of majority shares to the private owners. Since the level of conflicts increases if the majority ownership goes to the private shareholders but diminishes if the government maintains the majority ownership (or no ownership) in the firm, it is expected that government share ownership has a negative effect (or positive effect) on the corporate risk taking when the government is the minority (or majority) owner of the firm. Hence the testable PPC hypothesis is stated as follows:

H_A. The relationship between the government share ownership and corporate risk taking will display a nonlinear U shaped pattern, all else equal.

3. Sample description

A total of 134 companies were listed on the DFM and ADX as of December 2013. However, the sample includes 108 firms (81% of all listed firms), for which required data over the 10 years from 2004 to 2013 are available in different electronic databases. I collected the accounting data from the OSIRIS database of the Bureau Van Dijk Company and the ownership data and other information from different sources such as DFM, ADX, Emirates Securities & Commodity Authority (ESCA), Zyawa database, and company reports. While selecting the sample I ensured that a minimum of four consecutive years' earning data were available, so that inactive firms' data were not used in the empirical tests. As a whole, the sample adequately represents the UAE capital market, as it covers 81% of all listed firms. The size of the sample is adequate for a single country study, and 10 years' data are sufficient for any reasonable empirical test. DFM and ADX were established in 2000; hence the sample period from 2004 to 2013 is long enough to provide a clear idea concerning the risk taking behavior of listed firms in this market. Table 1 reports the distribution and descriptive statistics of the sample firms.

Panel A of Table 1 shows that the 108 samples are distributed across different industries classified by ESCA. It shows that 54 firms (50%) belong to two industries, Insurance and Manufacturing, while 24 firms (22%) are classified as banks. Therefore, these three industries dominate the UAE capital market. In addition, 10 Real Estate firms constitute about 9% of the sample. Of the 108 firms, the government has share ownership in 55 (51%) that are classified as Government Linked Companies (GLC). A total of 30 GLCs (60%) belong to the Bank and Manufacturing sectors. The breakdown shows that 17

[5] The major corporate investment decisions need a minimum agreement between the conflicting owners representing the board of directors. It is likely that the majority directors, under pressure, will concede to the government desire to not take up the risky investment that increases earning uncertainty. This is because the rise of earning uncertainty requires wage and cost cuts and employee layoffs that destabilize the social order and government tenure.

[6] Government-owned firms take the risk of investment in infrastructure projects during the early stages of economic development when the private entrepreneurs are not yet capable of taking up these important but highly risky projects. These firms are divested gradually over time if the private entrepreneurs are ready to take over and manage them more efficiently. However, the majority government ownership is maintained in the firms that are strategically important and/or not appropriate to go out of full control of the government. See Uddin (2014) for more discussion.

of 24 banks (71%), 8 of 10 Real Estate firms (80%), and 13 of 27 Manufacturing firms (48%) are GLCs. Panel B reports that average government ownership in GLCs is about 32.60%,[7] with a standard deviation of 20.74%. The distribution depicts that government holds more than 50% shares in 15 (27%) GLCs and less than 30% shares in 32 (58%) GLCs. Panel C reports that a total of 63 (58%) firms are listed on ADX, while 45 (42%) belong to DFM. Of the 55 GLCs, 37 (67%) are ADX firms and 18 (33%) from DFM. Panel D reports that the GLCs are significantly larger than the non-GLCs with respect to total assets (5 times larger), revenues (3 times), and operating earnings (4 times). It is also found that GLCs are more leveraged than non-GLCs. As a whole, government ownership is widespread in the banking, real estate, and manufacturing sectors; more prevalent in ADX firms; and found mostly in the large firms. The ownership percentages are spread widely across the defined ranges but concentrated on the left of the mean value.

4. Test design and variables

I first examine whether the GLC identity of a firm has an effect on its corporate risk taking. Then I test whether minority and majority government share ownership have different effects on the risk taking that follows an examination of the behavioral pattern of the relationship between the government ownership and corporate risk taking. Last, I implement a number of robustness tests that address the endogeneity issue, lag effect, and restrict sample. I duplicate the tests by using the cross-sectional and panel data to confirm the consistency of results. Several empirical models are estimated using alternative risk-taking and government ownership variables that are elaborated on in Appendix and summarized below.

4.1. Risk-taking variables

I construct four alternative risk-taking variables following prior studies (Faccio et al., 2011; John et al., 2008; Boubakri et al., 2013a, 2013b; Hilary and Hui, 2009; Uddin, 2014) and common knowledge. The cross sectional tests use the firm's high-low earning spread (*SPD1*) and earning volatility (*VOL1*) over a 10-year period as the risk proxies. However, the panel data regressions use the squared deviation (*DEV1*) of a firm's earnings in year *t* from its sample period mean, as well as the overlapping periods' earning volatilities ($VOL^{OL}1$) as the risk proxies. In these four risk taking variables, earning is determined by the percentage of return on assets (ROA) that is calculated as the ratio of earnings before taxes (EBIT) to total assets times 100. The risk measures are adjusted for the industry and market effects to generate adjusted risk taking variables, which are used in the analyses. The adjusted risk measures are identified as SPD2, VOL2, DEV2 and $VOL^{OL}2$. The summary descriptive statistics of all variables are reported in Table 2. I, in which Panel A shows that the means of *SPD1*, *VOL1*, *DEV1* and $VOL^{OL}1$ are 19.30, 6.38, 62.73, and 4.45, respectively. However, the means of SPD2, VOL2, DEV2 and $VOL^{OL}2$ are 18.03, 5.76, 44.75, and 4.54, respectively. The standard deviation and minimum and maximum values of all risk measures depict a large variation. Therefore, data are winsorized on both sides to address outlier problems in regression analyses.

4.2. Government ownership variables

A dummy variable is created to examine whether the GLC identity of a firm has an effect on its corporate risk taking. Therefore, a firm is identified as *GLC* = 1 if government ownership is more than or equal to 2% of the total outstanding shares,[8] otherwise 0. For testing if the minority and majority government ownership affect the risk taking differently due to the change in the firm control, the sample is classified into three groups: (i) non-GLC (the firms having no government ownership), (ii) GLC with government being the non-largest shareholder, and (iii) GLC with government being the largest owner. Taking the non-GLC as the base group, two dummy variables are constructed: $GLC^{Nonlargest} = 1$ if government is not the largest shareholder, otherwise 0; while $GLC^{Largest} = 1$ if government is the largest shareholder, otherwise 0. It is noted that I do not use an arbitrary cut-off to determine the minority or majority shareholder; instead, I identify who is the largest shareholder. This is because prior studies found that the largest shareholder is able to maintain an effective control of the firm since the ownership structure of a market listed company is usually diffused (Chen et al., 2008; Rousseau and Xiao, 2008). Nonetheless, an arbitrary cut-off of above 50% ownership is applied for testing robustness. Additionally, the government minority and majority effects are also tested based on the GLCs only (restricted sample). Next, I track the percentage of government ownership (*GOVOWN*) in each firm at the end of each year and use the data in the panel regressions that determine the pattern of relationship between the government ownership and risk taking. The average percentage of government ownership in each firm is also computed for use in the cross-sectional regressions. Last, the squared percentage of government share ($GOVOWN^2$) is included in the regressions to determine if the relationship between government ownership and risk taking displays a U-shaped pattern, as hypothesized. More details of the government ownership variables are given in Appendix (Panel B). The statistics in Panel B of Table 2 shows that government maintains an ownership in 51% firms, with a majority

[7] This is higher than the international average (28.4%) of government ownership in privatized firms as reported by Boubakri et al. (2013a).

[8] Firm ownership is an important channel of linkage through which government acquires voting rights and can nominate board members. In the UAE, the public firms disclose ownership information if the holding is more than 2% of total shares. It is normally understood that any individual, group, entity, or institution shows active interest in a firm by holding a minimum 2% of the outstanding shares.

Table 2
Summary of descriptive statistics for regression variables.

Variables	Mean	Median	Std Dev	Min	Max	Variables	Mean	Median	Std Dev	Min	Max
Panel A: Risk variables						**Panel B: Government ownership variables**					
SPD1	19.30	14.46	17.03	0.40	85.77	*GLC*	0.51	1.00	0.50	0.00	1.00
SPD2	18.03	14.99	13.39	0.37	61.23	GLC^{Minor}	0.31	0.00	0.46	0.00	1.00
VOL1	6.38	5.12	5.45	0.20	28.00	GLC^{Major}	0.20	0.00	0.41	0.00	1.00
VOL2	5.76	5.16	4.15	0.26	20.05	*GOVOWN*	0.17	0.04	0.22	0.00	0.80
DEV1	62.73	7.94	234.02	0.00	4759.1	$GOVOWN^2$	0.08	0.01	0.14	0.00	0.64
DEV2	44.75	7.50	136.90	0.00	2071.8						
$VOL^{OL}1$	4.45	2.52	5.30	0.00	36.91						
$VOL^{OL}2$	4.54	3.55	4.20	0.05	26.95						

Variables	Mean	Median	Std Dev	Min	Max	Variable	Mean	Median	Std Dev	Min	Max
Panel C: Control variables						**Panel D: Instrumental variable to predict government ownership**					
LEVER	0.46	0.44	0.25	0.02	0.9	*STRATEGIC*	0.38	0.00	0.49	0.00	1.00
SIZE	3.38	3.28	0.85	1.27	5.43						
FOREIGN	0.10	0.03	0.16	0.00	0.67						
GROWTH	0.42	0.19	1.03	−0.11	9.26						
MSHARE	0.06	0.02	0.12	0.01	0.71						
AGE	17.86	22.00	12.53	1.00	41.00						
MARKET	0.42	0.00	0.50	0.00	1.00						

This table reports summary of descriptive statistics for regression variables based on the full sample data set (10 years' data for 108 firms), which includes both the government linked and non-government linked companies (GLCs and non-GLCs). Of the variable acronyms, *SPD* means spread between the highest and lowest ROAs over sample period. *VOL* is volatility of ROA over sample period. *DEV* is squared deviation of ROA of a firm from its sample period mean, VOL^{OL} is volatility of ROA over a four-year overlapping period. The attached numbers 1 and 2 indicate respectively unadjusted and adjusted for industry and market. *GLC* is the firm identification as government linked company, GLC^{Minor} is a firm in which government is not the largest shareholder, GLC^{Major} is a firm in which government is the largest shareholder. *GOVOWN* is percentage of shares held by government. $GOVOWN^2$ is squared percentage of government share. *LEVER* is leverage as debt to asset ratio. *SIZE* is natural logarithm of total assets. *FOREIGN* is percentage of total shares held by foreign investors. *GROWTH* is annual sales growth. *MSHARE* is market share ratio within industry. *AGE* is number of years since incorporation of firm. *MARKET* means stock market. STRATEGIC means classification of firm if it belongs to strategically important industry. Statistics of six dummies for industries and nine dummies for years are not reported to save space. More details about these regression variables are available in Appendix.

share in 20% firms. The average government ownership level in all firms (GLCs and non-GLCs combined) is 17 percent, while that in the GLCs only is 32.60%, as reported earlier in Panel B of Table 1.

4.3. Control variables

I select a number of control variables based on the literature (Boubakri et al., 2013a; Faccio et al., 2011; John et al., 2008; Corones, 1993). Among the control variables, the ratio of total debt to assets (*LEVER*) captures the earning fluctuations due to financial risk. The size of firm (*SIZE*) measured by the natural log of total assets captures the firm size effect. Foreign participation in ownership is welcomed to improve the performance of firm as it infuses new management know-how, business strategy, and production technology that help reduce production costs and other expenses (Frydman et al., 1999). This implies that the foreign ownership participation may influence the variability of earnings; hence the percentage of foreign ownership (*FOWN*) is included as a control variable. The sales growth usually indicates the firm's ability to expand business activities that involve taking more risks. Therefore, sales growth (*GROWTH*) captures the influence of growth opportunities on risk taking. Firms usually try to gain market power in the industry by increasing their market share through undertaking risky investments (Corones, 1993). Hence, the market share (*MSHARE*) is included as a control variable. A new firm, being the late entrant in the market, faces more challenge to gain additional market share; therefore, a young firm has more entrepreneurial sprit and motivation to take high risks (Kacperczyk, 2012). Therefore, age of the firm (*AGE*) captures the new firm effect on the risk taking. Since the firms are listed on two different stock markets and belong to different industries, *MARKET* and *IND* dummies are added to the regression models that capture the unknown market and industry effects. Finally, nine dummy variables are included in the models to capture unknown time (year) effect on corporate risk taking. The descriptive statistics of these control variables are found above in Panel C of Table 2, while their definitions and construction methods are elaborated in Appendix (Panel C). To mitigate the outlier problems, the data of control variables are also winsorized on both the sides at a 1% level.

4.4. Instrumental variable

There is a concern that government ownership in a firm may not be exogenous, because the government maintains firm ownership to achieve its socio-political and economic goals. If risk taking decisions affect firm performance and growth the government, as an owner, is also affected. Hence, the regression results may be biased because of the likely reverse causality problem. In addition, some unobserved factors may also determine the government share ownership. Therefore, I attempt to address the likely endogeneity problem by identifying an instrumental variable that predicts the government ownership in

the firms and using it in the two-stage regression tests. Uddin (2014) finds that the probability of government shareholding in the market listed firms is determined by the strategic importance of the industry, the profit earning ability of the firm, and the market valuation of firm. However, in this study, I select the strategic importance of industry (*STRATEGIC*) as the instrument to estimate government ownership in the firms because the economic and political circumstances determine the strategic importance of the industries. I find that *STRATEGIC* has a significant relationship with the government ownership but an insignificant relationship with the risk taking variables.[9] The details of the *STRATEGIC* variable are given in Appendix (Panel D), while the descriptive statistics reported in Panel D of Table 2 above show that approximately 38% firms in the UAE belong to the industries that are strategically important for the country.

5. Empirical findings

The logical argument of this paper is that the firm identity *per se* as GLC or non-GLC is not the main reason for having an effect on the corporate risk taking, but the government ownership affects the risk taking decisions since the government and the private owners engage in conflict when the majority shares go out of the government control. Hence, I implement the empirical tests along this line of logical argument. In this section, I first analyze the results related to the effect of firm identify on corporate risk taking, and then I discuss the findings on the effect of the level of government ownership participation on the risk taking by the firm and the pattern of the relationship between the government shareholding and the corporate risk taking. Next, I examine whether the government ownership has any lagged effect on risk taking, in addition to the contemporaneous effect. These tests are executed with and without endogeneity correction. Finally, I examine the robustness of the results with respect to the different government ownership classifications and restrict samples of the GLCs only.

5.1. GLC identity

I implement two tests to determine the effect of the GLC identity of the firm *per se* on corporate risk taking. TEST-A uses the cross sectional data and TEST-B uses the panel data with the dimensions of firm and year. A number of alternative risk taking variables are used as the dependent variables to estimate the effect of the GLC identity of the firm. TEST-A uses *SPD1*, *VOL1*, *SPD2*, and *VOL2* as the dependent variables in the cross-sectional regressions, in which *SPD1* and *VOL1* are the unadjusted measures of risk taking, while *SPD2* and *VOL2* are the industry and market adjusted measures of risk. Similarly, TEST-B uses *DEV1*, $VOL^{OL}1$, *DEV2* and $VOL^{OL}2$ as the dependent variables in the panel regressions. Of these, *DEV1* and $VOL^{OL}1$ are the unadjusted risk taking variables while *DEV2* and $VOL^{OL}2$ are the industry and market adjusted risk variables. In the both cross-sectional and panel data regressions, *GLC* is assigned as the dummy (1, 0) variable, where *GLC* = 1 if the firm is identified as the government linked company, otherwise 0. A number of control variables such as *LEVER*, *SIZE*, *FOREIGN*, *GROWTH*, *MSHARE*, and *AGE* are included in the both cross-sectional and panel regressions. Additionally, *IND*, *MARKET* and *YEAR* (for panel regressions only) are included to capture the fixed effect on the dependent variables.

In Table 3, the cross-sectional regressions of TEST-A show that *GLC* has an insignificant negative effect on all of the risk taking variables such as *SPD1*, *VOL1*, *SPD2*, and *VOL2*. However, the panel regressions of TEST-B show that the two models that use *DEV1* and $VOL^{OL}1$ as the dependent variables find an insignificant positive effect of *GLC*; while those use *DEV2* and $VOL^{OL}2$ as the dependent variables find an insignificant negative effect of *GLC*. Therefore, setting aside the results related to the unadjusted risk measures, all of the adjusted risk variables show an insignificant negative effect of the GLC identity of the firm. The negative *GLC* coefficients apparently indicate that the government ownership *per se* may discourage the firm from taking up risky projects, but I cannot confirm it based on the tests of significance. As whole, the UAE evidence shows that the GLC identity of the firm *per se* does not significantly affect the corporate risk taking.

Looking at the control variables, I find that *LEVER* is significant only in the two cross-sectional regressions of TEST-A that use the *SPD1* and *VOL1* as the dependent variables. All of the cross-sectional and panel regressions identify that *SIZE* has no significant association with corporate risk taking. I also find that *FOREIGN* has a significantly negative relationship with corporate risk taking, as shown by all the risk variables except $VOL^{OL}1$ and $VOL^{OL}2$, which are used in the panel regressions of TEST-B. This result is not consistent with the cross-country evidence of Boubakri et al. (2013a). They find that the foreign ownership has a significantly positive relationship with the corporate risk taking. Therefore, my finding of the negative relationship between the foreign ownership and risk taking suggests that the foreign investors avoid risk taking in the UAE, which may concern both the economic policymakers and foreign investors. This issue is important because prior studies found that foreign investment normally improves the level of corporate governance and thereby the risk taking, since a better governance environment prevents the stakeholders from pursuing their own interests in the firm (Stulz, 1999; John et al., 2008). However, the UAE case looks different. Hence, the UAE policymakers can review the corporate governance rules and regulations to iron out the inconsistencies that seem to hinder foreign investments in the local firms.

[9] Two other variables (the ability to earn profit and firm valuation) of Uddin (2014) determine the government share ownership in the UAE firms, but they have a significant relationship with the risk taking. Therefore, these cannot be used as suitable instruments. Nonetheless, the strategic importance of the industry adequately serves my purpose to estimate the exogenous variation of the government ownership in the firms.

Table 3
Cross-sectional and panel data regressions testing the effect of firm identity (as government-linked) on corporate risk taking.

Variables	ROA high-low spread (SPD)		ROA volatility (VOL)		ROA squared deviation from the sample period mean (DEV)		ROA volatility over four-year overlapping period (VOL^{OL})	
	SPD1	SPD2	VOL1	VOL2	DEV1	DEV2	$VOL^{OL}1$	$VOL^{OL}2$
	TEST-A: Cross-sectional regressions				**TEST-B: Panel data regressions**			
Intercept	28.68	26.65	10.63	9.15	128.71	163.54	10.12	10.61
	(2.50)***	(2.94)***	(2.86)***	(3.12)***	(2.00)**	(3.62)***	(3.74)***	(5.13)***
GLC	−0.91	−1.00	−0.47	−0.40	2.46	−5.74	0.17	−0.42
	(−0.29)	(−0.47)	(−0.47)	(−0.60)	(0.11)	(−0.49)	(0.23)	(−0.80)
LEVER	−27.73	−10.14	−9.07	−3.38	−64.77	3.44	−2.99	−1.47
	(−2.38)***	(−1.33)	(−2.49)**	(−1.43)	(−0.83)	(0.08)	(−1.56)	(−1.07)
SIZE	2.64	2.00	0.68	0.42	−7.35	−17.18	−0.49	−0.68
	(0.85)	(0.94)	(0.69)	(0.64)	(−0.48)	(−1.26)	(−0.66)	(−1.21)
FOREIGN	−0.27	−0.21	−0.07	−0.05	−1.03	−0.65	−0.02	−0.02
	(−3.18)***	(−3.34)***	(−2.61)***	(−2.69)***	(−2.41)**	(−2.37)**	(−1.04)	(−1.53)
GROWTH	−2.09	−2.04	−0.51	−0.48	−0.03	−0.02	−0.00	−0.00
	(−2.00)**	(−3.54)***	(−1.48)	(−2.74)***	(−2.27)**	(−4.10)***	(−4.19)***	(−3.38)***
MSHARE	−25.54	−29.66	−8.74	−8.28	−70.59	−58.52	−2.16	−1.56
	(−1.45)	(−2.27)**	(−1.51)	(−2.10)**	(−0.60)	(−0.81)	(−0.72)	(−0.78)
AGE	−0.24	−0.17	−0.08	−0.07	−1.13	−1.00	−0.05	−0.04
	(−2.00)**	(−2.08)**	(−2.10)**	(−2.76)***	(−1.78)*	(−2.79)***	(−1.85)*	(−2.10)**
MARKET	1.85	0.71	0.42	−0.01	10.01	−1.53	0.43	−0.02
	(0.59)	(0.32)	(0.44)	(−0.02)	(0.54)	(−0.15)	(0.60)	(−0.04)
Industry effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.58	0.00***	0.55	0.00***	0.40	0.05**	0.40	0.00***
Year effect					*P* value	*P* value	*P* value	*P* value
					0.03**	0.02**	0.01***	0.00***
Model *P* value	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
R-squared	0.42	0.55	0.45	0.57	0.07	0.11	0.22	0.30
N	108	108	108	108	961	961	707	707

This table reports OLS estimation of the following basic regression models:

$$Y_i = \alpha + \beta_1 GLC_i + \sum_{N=1}^{N} B_{2i} X_i + \sum_{K=1}^{K-1} B_{3i} IND_i + \beta_4 MARKET_i + \varepsilon_i \quad \text{(TEST-A)}$$

$$Y_{it} = \alpha + \beta_1 GLC_{it} + \sum_{N=1}^{N} \beta_{2i} X_{it} + \beta_3 MARKET_{it} + \sum_{K=1}^{K-1} \beta_{4i} IND_{it} + \sum_{K=1}^{K-1} \beta_5 YEAR_{it} + \varepsilon_{it} \quad \text{(TEST-B)}$$

where Y_i is the measure of corporate risk taking of firm *i*. GLC_i is identification of firm *i* whether it has an ownership linkage with government. GLC = 1 if government has an ownership, and 0 otherwise. *X* is the set of control variables that include *LEVER*, *SIZE*, *FOREIGN*, *GROWTH*, *MSHARE*, *AGE*, and *MARKET* as defined in Appendix. There are four types of risk measures used the regressions. *SPD* and *VOL*, respectively, are the high-low spread and standard deviation of ROA over the sample period. *DEV* is the squared deviation of a firm ROA in year *t* from its mean over the sample period. VOL^{OL} is the volatility of ROA over the four-year overlapping periods, following the procedure of Boubakri et al. (2013a, 2013b), Faccio et al. (2011), and John et al. (2008). These four risk taking variables are adjusted for the industry and market effects. The unadjusted risk variables are identified as *SPD1*, *VOL1*, *DEV1* and $VOL^{OL}1$ while the adjusted ones are named as *SPD2*, *VOL2*, *DEV2* and $VOL^{OL}2$. The coefficients of the six dummy variables for the firm's industry identity (*IND*) and the nine dummies for the year of data (*YEAR*) are not reported due to space limitations. Instead, the joint significance of the industry and year dummies is reported in the table. Definitions of all variables are given in Appendix. The robust t-statistic clustered at the firm level is reported in parentheses. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

I also find that *GROWTH*, *MSHARE*, and *AGE* negatively affect the corporate risk taking. Of these variables, *GROWTH* and *AGE* are significant in the both TEST-A and TEST-B. However, *MSHARE* is significant in TEST-A only, which estimates the cross-sectional regressions. The results of the both tests also show that *MARKET* does not affect corporate risk taking. This may be because the sample firms belong to the UAE, complying with the same laws of the country, although they list on different stock markets. Based on the adjusted risk variables, both TEST-A and TEST-B find that corporate risk taking is significantly affected due to the industry classification of firm. Finally, TEST-B confirms that risk taking of the firm varies from year to year.

5.2. Government ownership levels

I carry out three tests to determine the effect of the level of government ownership on corporate risk taking and also to identify the pattern of the relationship between the government ownership and risk taking. TEST-A ascertains the risk taking of the firms in which the government is the largest owner ($GLC^{Largest}$) and those with the government not the largest owner ($GLC^{Nonlargest}$), in comparison to the firms with no government ownership (non-GLCs). Accordingly, in the regression, $GLC^{Nonlargest}$ and $GLC^{Largest}$ enter as two separate dummy (1, 0) variables. TEST-B determines if there is a linear relationship between government ownership and corporate risk taking. Hence, the percentage of government ownership (*GOVOWN*) is used in the regression as the main explanatory variable. TEST-C determines if the relationship between government

Table 4
Cross-sectional regressions testing the effect of the level of government participation in the firm ownership on corporate risk taking.

Variables	TEST-A		TEST-B		TEST-C	
	SPD2	VOL2	SPD2	VOL2	SPD2	VOL2
Intercept	27.41	9.41	26.80	9.19	29.06	10.05
	(3.07)***	(3.26)***	(2.97)***	(3.14)***	(3.21)***	(3.46)***
$GLC^{Nonlargest}$	−2.10	−0.78				
	(−0.93)	(−1.09)				
$GLC^{Largest}$	1.34	0.41				
	(0.50)	(0.50)				
GOVOWN			2.59	0.96	−23.34	−8.80
			(0.58)	(0.66)	(−1.75)*	(2.13)**
$GOVOWN^2$					42.25	15.91
					(2.12)**	(2.46)**
LEVER	−11.24	−3.76	−9.53	−3.13	−10.55	−3.52
	(−1.48)	(−1.62)	(−1.26)	(−1.35)	(−1.47)	(−1.61)
SIZE	1.74	0.33	1.57	0.26	1.56	0.26
	(0.84)	(0.53)	(0.74)	(0.40)	(0.75)	(0.41)
FNOWN	−0.20	−0.05	−0.19	−0.05	−0.21	−0.05
	(−3.09)***	(−2.44)**	(−3.02)***	(−2.34)**	(−3.27)***	(−2.63)***
GROWTH	−1.20	−0.13	−1.00	−0.06	−1.12	−0.10
	(−1.73)*	(−0.49)	(−1.53)	(−0.24)	(−1.58)	(−0.38)
MSHARE	−29.79	−8.32	−29.94	−8.38	−28.65	−7.90
	(−2.32)**	(−2.16)**	(−2.30)**	(−2.14)**	(−2.22)**	(−2.07)**
AGE	−0.17	−0.06	−0.18	−0.06	−0.18	−0.06
	(−2.12)**	(−2.44)**	(−2.13)**	(−2.45)**	(−2.20)**	(−2.57)***
MARKET	1.31	0.18	1.35	0.23	1.03	−0.11
	(0.59)	(0.30)	(0.61)	(0.36)	(0.48)	(−0.18)
Industry effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.00	0.00***	0.00***	0.00***	0.00***	0.00***
Model P value	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	0.44	0.58	0.55	0.57	0.57	0.59
N	108	108	108	108	108	108

This table reports OLS estimation of the following regression models:

$$Y_i = \alpha + \beta_1 GLC_i^{Nonlargest} + \beta_2 GLC_i^{Largest} + \sum_{N=1}^{N} \beta_{3i} X_i + \beta_4 MARKET_i + \sum_{K=1}^{K-1} \beta_{5i} IND_i + \varepsilon_i \quad \text{(TEST-A)}$$

$$Y_i = \alpha + \beta_1 GOVOWN_i + \sum_{N=1}^{N} \beta_{2i} X_i + \beta_3 MARKET_i + \sum_{K=1}^{K-1} \beta_{4i} IND_i + \varepsilon_{it} \quad \text{(TEST-B)}$$

$$Y_{it} = \alpha + \beta_1 GOVOWN_i + \beta_1 GOVOWN_i^2 + \sum_{N=1}^{N} \beta_{3i} X_i + \beta_4 MARKET_i + \sum_{K=1}^{K-1} \beta_{5i} IND_i + \varepsilon_i \quad \text{(TEST-C)}$$

where $GLC^{Nonlargest} = 1$ if government is not the largest owner of the firm, and otherwise 0. $GLC^{Largest} = 1$ if government is the largest owner, and otherwise 0. *GOVOWN* is the percentage of firm ownership held by the government. $GOVOWN^2$ is squared percentage of government ownership. Other parameters of the three models are the same as described earlier, and details are available in Appendix. The robust *t*-statistics clustered at the firm level are reported in parentheses. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

ownership and corporate risk taking shows a non-linear U-shape pattern, as hypothesized. Therefore, the regression includes the government ownership percentage (*GOVOWN*) and squared percentage ($GOVOWN^2$) as the main predictor variables. The three empirical tests also take the control variables (*X*) including *MARKET*, *IND* and *YEAR*, as mentioned earlier. Finally, I estimate them using the cross-sectional and panel data regressions, as well as alternative measures of corporate risk taking.

The cross-sectional results of TEST-A, presented in Table 4, show that the coefficients of $GLC^{Nonlargest}$ and GLC^{Lagest} are respectively negative and positive, but they are not statistically significant. Although the coefficients of $GLC^{Nonlargest}$ and GLC^{Lagest} are insignificant, the results generally indicate that the firms with government minority may take fewer risks while those with government majority take more risks, compared to the firms having no government ownership. However, the statistical significance of the coefficients concerns me as to whether government as the largest owner can maintain full control over the firm (Chen et al., 2008; Rousseau and Xiao, 2008). The cross-sectional results of TEST-B reported in Table 4 show an insignificant positive linear association between the degree of government ownership and corporate risk taking; the coefficient of *GOVOWN* is insignificantly positive with regard to alternative risk measures SPD2 and VOL2. However, turning to the cross-sectional results of TEST-C, I find that *GOVOWN* has a significantly negative relationship with corporate risk taking, while $GOVOWN^2$ has a significantly positive relationship. All the coefficients of *GOVOWN* and $GOVOWN^2$ are significant at the 5% level except one (*GOVOWN* coefficient with regard to SPD2), which is significant at the 10% level.

Table 5 reports the results of the same tests using the panel data. In this table, I find that the coefficients of $GLC^{Nonlargest}$ and GLC^{Lagest} are respectively negative and positive with regard to both *DEV2* and $VOL^{OL}2$. The coefficients are not statistically significant, similar to those of the cross-sectional tests. Therefore, TEST-A results cannot not confirm if minority government

Table 5
Panel data regressions for testing the effect of government participation level in the firm ownership on corporate risk taking.

Variables	TEST-A		TEST-B		TEST-C	
	DEV2	$VOL^{OL}2$	DEV2	$VOL^{OL}2$	DEV2	$VOL^{OL}2$
Intercept	146.33	10.68	143.46	10.53	162.92	11.08
	(2.98)***	(5.19)***	(2.86)***	(5.13)***	(3.05)***	(5.24)***
$GLC^{Nonlargest}$	−13.85	−0.62				
	(−1.21)	(−1.11)				
$GLC^{Largest}$	10.87	0.00				
	(0.65)	(0.01)				
GOVOWN			30.00	−1.00	−171.36	−7.08
			(0.89)	(−0.10)	(−2.21)**	(2.15)**
$GOVOWN^2$					324.73	11.30
					(2.27)**	(2.33)**
LEVER	−8.45	−1.60	−0.57	−1.34	−6.10	−1.52
	(−0.20)	(−1.17)	(−0.01)	(−0.97)	(−0.15)	(−1.13)
SIZE	−18.40	−0.73	−19.90	−0.74	−19.92	−0.73
	(−1.33)	(−1.29)	(−1.38)	(−1.27)	(−1.33)	(−1.26)
FNOWN	−0.64	−0.02	−0.52	−0.02	−0.66	−0.02
	(−2.29)**	(−1.30)	(−1.80)*	(−1.26)	(−2.41)**	(−1.57)
GROWTH	−0.02	−0.00	−0.02	−0.00	−0.02	−0.00
	(−4.76)***	(−3.59)***	(−4.58)***	(−3.31)***	(−5.57)***	(−3.68)***
MSHARE	−58.57	−1.52	−60.58	−1.59	−54.34	−1.46
	(−0.84)	(−0.77)	(−0.88)	(−0.79)	(−0.75)	(−0.74)
AGE	−0.97	−0.04	−1.02	−0.04	−1.08	−0.04
	(−2.83)***	(−2.10)**	(−2.86)***	(−2.14)**	(−3.11)***	(−2.23)**
MARKET	2.72	0.08	4.85	0.10	2.07	−0.00
	(0.27)	(0.15)	(0.47)	(0.20)	(0.23)	(−0.01)
Industry effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.04**	0.00***	0.06*	0.00***	0.04**	0.00***
Year effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.01***	0.00***	0.01***	0.00***	0.01***	0.00***
Model P value	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	0.11	0.30	0.11	0.30	0.12	0.31
N	961	707	961	707	961	707

$$Y_{it} = \alpha + \beta_1 GLC_{it}^{Nonlargest} + \beta_2 GLC_{it}^{Largest} + \sum_{N=1}^{N} \beta_3 X_{it} + \beta_4 MARKET_{it} + \sum_{K=1}^{K-1} \beta_5 IND_{it} + \sum_{J=1}^{J-1} \beta_6 YEAR_{it} + \varepsilon_{it} \quad \text{(TEST-A)}$$

$$Y_{it} = \alpha + \beta_1 GOVOWN_{it} + \sum_{N=1}^{N} \beta_{2i} X_{it} + \beta_3 MARKET_{it} + \sum_{K=1}^{K-1} \beta_4 IND_{it} + \sum_{K=1}^{K-1} \beta_5 YEAR_{it} + \varepsilon_{it} \quad \text{(TEST-B)}$$

$$Y_{it} = \alpha + \beta_1 GOVOWN_{it} + \beta_1 GOVOWN_{it}^2 + \sum_{N=1}^{N} \beta_{3i} X_{it} + \beta_4 MARKET_{it} + \sum_{K=1}^{K-1} \beta_{5i} IND_{it} + \sum_{j=1}^{j-1} \beta_6 YEAR_{it} + \varepsilon_{it} \quad \text{(TEST-C)}$$

where $GLC^{Nonlargest} = 1$ if the government is not the largest owner of the firm, and otherwise 0. $GLC^{Largest} = 1$ if the government is the largest owner, and otherwise 0. *GOVOWN* is the % of government ownership. $GOVOWN^2$ is squared % of government ownership. Other parameters of the three models are same as described earlier, and details are available in Appendix. The robust *t*-statistics clustered at the firm level are reported in parentheses. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

ownership leads to significantly lower risk taking and the majority government ownership results in significantly higher risk taking, based on the majority (minority) classification with the largest (non-largest) shareholding. It perhaps indicates maintaining effective control over the firm requires the absolute majority of the ownership. However, the panel data results of TEST-B and TEST-C are consistent with those of the cross-sectional results. Hence, these tests confirm that the relationship between government ownership and corporate risk taking in the UAE is not linearly negative, but it is nonlinear and U-shaped. Therefore, the PPC hypothesis is accepted based on the above evidence. Turning to the cross-sectional and panel data results of the control variables that are reported in Tables 4 and 5, I observe that *FOWN* maintains a significantly negative association with all alternative risk taking variables, with a few exceptions in the panel data results. Based on both the cross-sectional and panel data results, *GROWTH* and *AGE* have significantly negative effects on all the risk taking proxies in the three tests using the panel data only. *MSHARE* displays a significantly negative effect on the corporate risk taking proxies used by the cross-sectional regressions only. Finally, all cross-sectional tests except one detect the industry effect on corporate risk taking. On the other hand, all the panel regressions identify both the industry and year effects on risk taking.

5.3. Contemporaneous and lagged effect

Having confirmed the U-shaped pattern of the relationship between government ownership and corporate risk taking, I conduct two additional tests to further check the PPC hypothesis. Test-A examines the contemporaneous relationship between the government ownership and corporate risk taking, considering that the government ownership is endogenously

Table 6
Testing contemporaneous and lagged relationship between government ownership and risk-taking.

Explanatory variables	TEST-A		TEST-B: Lagged effect			
	Contemporaneous effect with *GOVOWN* as an endogenous variable [2-SLS regression]		*GOVOWN* as exogenous variable [OLS: TEST-B1]		*GOVOWN* as endogenous variable [2-SLS: TEST-B2]	
	DEV2	$VOL^{OL}2$	DEV2	$VOL^{OL}2$	DEV2	$VOL^{OL}2$
Intercept	161.95	10.93	115.40	9.13	118.48	9.18
	(3.59)***	(8.74)***	(2.40)	(6.26)***	(2.56)**	(6.46)***
GOVOWN	−157.78	−4.71	−145.44	−7.40	−188.84	−8.04
	(−1.71)*	(1.71)*	(−2.03)**	(−3.07)***	(1.75)*	(2.47)**
$GOVOWN^2$	305.40	7.90	187.45	8.50	249.05	9.41
	(2.06)**	(1.87)*	(2.03)**	(2.59)***	(1.75)*	(2.14)**
LEVER	−5.77	−1.47	−16.08	−1.34	−17.18	−1.35
	(−0.13)	(1.67)*	(−0.57)	(−1.68)	(−0.63)	(−1.74)*
SIZE	−20.05	−0.76	−1.47	−0.14	−1.01	−0.13
	(−1.85)*	(−2.50)**	(−0.17)	(−0.44)	(−0.11)	(−0.43)
FOREIGN	−0.65	−0.02	−0.91	−0.03	−0.96	−0.04
	(−2.02)**	(−2.13)**	(−2.87)***	(−3.33)***	(−2.82)***	(−3.32)***
GROWTH	−0.02	−0.00	0.00	−0.00	0.00	−0.00
	(−4.18)***	(−3.26)***	(1.24)	(−4.31)***	(1.15)	(−4.38)***
MSHARE	−54.78	−1.52	−77.80	−2.48	−76.78	−2.47
	(−0.99)	(−1.29)	(−1.81)*	(−2.19)**	(−1.85)*	(−2.24)**
AGE	−1.08	−0.04	−0.77	−0.04	−0.77	−0.04
	(−3.29)***	(−3.83)	(−2.50)**	(−3.08)***	(−2.51)**	(−3.14)***
MARKET	2.47	0.06	3.74	0.27	2.44	0.25
	(0.22)	(0.20)	(0.42)	(0.80)	(0.28)	(0.74)
Industry effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.00***	0.00***	0.15	0.00***	0.00***	0.00***
Year effect	*P* value	*P* value	*P* value	*P* value	*P* value	*P* value
	0.00***	0.00***	0.34	0.00***	0.00***	0.00***
Model *P* value	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	0.12	0.31	0.08	0.31	0.08	0.31
Observations	961	707	747	493	747	493

$$Y = \alpha + \beta_1 GOVOWN + \beta_2 GOVOWN^2 + \sum_{i=1}^{N} \beta_3 X + \beta_4 MARKET + \beta_5 IND + \beta_6 YEAR + \varepsilon. \quad \text{(TEST-A)}$$

$$Y = \alpha + \beta_1 GOVOWN_{t-2} + \beta_2 GOVOWN^2_{t-2} + \sum_{i=1}^{N} \beta_3 X + \beta_4 MARKET + \beta_5 IND + \beta_6 YEAR + \varepsilon. \quad \text{(TEST-B)}$$

TEST-A is based on 2-SLS regression, while TEST-B uses on both OLS and 2-SLS regressions that are identified as TEST-B1 and TEST-B2, respectively. All these tests use the panel data only with firm (i) and time (t) dimensions. In 2SLS regressions for TEST-A, the strategic importance of a firm (*STRATEGIC*) is used as the instrumental variable to estimate the predicted government ownership percentage (*GOVOWN*) based on the first-stage regression: $\boldsymbol{GOVOWN} = \beta' \boldsymbol{STRATEGIC} + \gamma' \boldsymbol{X} + \boldsymbol{\varepsilon}$. The predicted *GOVOWN* is then applied in the second stage regressions. The $GOVOWN^2$ is the squared value of the predicted *GOVOWN*. It follows that the same first stage regression for 2SLS are estimations for TEST-B2, except that the *GOVOWN* is lagged by two years ($t-2$). The predicted $GOVOWN_{t-2}$ is then applied in the second stage regression. Likewise, the $GOVOWN^2_{t-2}$ is the squared value of the predicted $GOVOWN_{t-2}$. Other variables of the both tests are same as before and details in Appendix. The robust t-statistics clustered at the firm level are reported in parentheses. Asterisks ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

determined. TEST-B examines the lagged effect of government ownership on the risk taking based on alternative measures of government ownership. I implement two variants of TEST-B. First, in TEST-B1, I determine the lagged effect of government ownership, assuming that it is exogenously determined. Second, in TEST-B2, I check the lagged effect, considering that the government ownership is endogenously determined. As required by the tests design, TEST-A is estimated based on 2-SLS regression. However, TEST-B1 is determined based on OLS regression and TEST-B2 uses 2-SLS regression. All these tests use the panel data with firm and time dimensions, so that the results from the contemporaneous variables can be compared with those of the lagged variables (cross-sectional regression is not appropriate). For 2-SLS regression in TEST-A, the percentage of government shareholding (*GOVOWN*) is predicted based on the strategic importance of the firm (*STRATEGIC*) in the first stage regression. Similarly, in TEST-B2, $GOVOWN_{t-2}$ is also predicted from *STRATEGIC* in the first stage regression. The predicted values of *GOVOWN* and $GOVOWN_{t-2}$ are then applied in the second stage regressions. The $GOVOWN^2$ and $GOVOWN^2{}_{t-2}$ are also the squared values of the predicted *GOVOWN* and $GOVOWN_{t-2}$, respectively.

Table 6 reports the results of the three tests mentioned above. TEST-A results show that the 2-SLS coefficients of *GOVOWN* with regard to both *DEV2* and $VOL^{OL}2$ are negative, whereas those for $GOVOWN^2$ are positive. All of these coefficients are statistically significant at the 10% level, except the coefficient of the $GOVOWN^2$ with regard to *DEV2*, which is significant at the 5% level. Therefore, based on the 2-SLS results, I further confirm that the contemporaneous relationship between government ownership and the corporate risk taking maintains a U-shaped pattern. Turning to the results of TEST-B1 and TEST-B2 related to the lagged effect on the government ownership, I find that there is a lagged effect of government ownership on corporate risk taking. The coefficients of *GOVOWN* and $GOVOWN^2$ are significantly negative and positive. These

Table 7
The robustness tests.

	Variables	Cross-sectional regressions (N = 108)		Panel regressions (N = 961 for DEV4 and 707 for $VOL^{OL}4$)	
		SPD2	VOL2	DEV2	$VOL^{OL}2$
	Panel A: Full sample test to examine the effect of the different classifications of government ownership				
TEST-A	GLC^{Low}	−0.51	−0.26	−7.86	0.03
		(−0.26)	(−0.42)	(−0.65)	(0.05)
	GLC^{Medium}	−4.51	(−1.63)	−25.35	−1.91
		(2.03)**	(2.45)**	(−1.80)*	(−2.85)***
	GLC^{High}	3.80	1.37	28.50	0.74
		(1.30)	(1.62)	(1.82)*	(1.12)
	Variables	Cross-sectional regressions Censored N = 53, Uncensored N = 55		Panel regressions Censored N = 445, Uncensored N = 516 (For DEV4) Censored N = 334, Uncensored N = 373 (For $VOL^{OL}4$)	
		SPD2	VOL2	DEV2	$VOL^{OL}2$
	Panel B: Restricted sample tests to re-examine the key findings of this study				
TEST-B1	GLC^{Medium}	−4.42	−1.45	−17.10	−1.90
		(1.82)*	(−1.92)*	(−1.19)	(4.59)***
	GLC^{High}	5.60	1.89	45.06	0.73
		(2.21)**	(2.41)**	(3.00)***	(1.70)*
TEST-B2	$GLC^{Majority}$	7.25	2.45	48.18	1.41
		(2.96)***	(3.21)***	(3.41)***	(3.40)***
TEST-B3	$GOVOWN$	−34.68	−12.69	−220.25	−12.40
		(−1.76)*	(−2.08)**	(−1.94)*	(−3.75)***
	$GOVOWN^2$	58.37	20.99	388.22	17.63
		(2.32)**	(2.68)***	(2.67)***	(4.16)***

$$Y = \alpha + \beta_1 GLC^{Low} + \beta_2 GLC^{Medium} + \beta_3 GLC^{High} + \sum_{N=1}^{N} \beta_4 X + \beta_5 MARKET + \sum_{K=1}^{K-1} \beta_6 IND + \sum_{J=1}^{J-1} \beta_7 YEAR + \varepsilon. \quad \text{(TEST-A)}$$

$$Y = \alpha + +\beta_1 GLC^{Medium} + \beta_2 GLC^{High} + \sum_{N=1}^{N} \beta_3 X + \beta_4 MARKET + \sum_{K=1}^{K-1} \beta_5 IND + \sum_{J=1}^{J-1} \beta_6 YEAR + \varepsilon. \quad \text{(TEST-B1)}$$

$$Y = \alpha + \beta_1 GLC^{Majority} + \sum_{N=1}^{N} \beta_2 X + \beta_3 MARKET + \sum_{K=1}^{K-1} \beta_4 IND + \sum_{J=1}^{J-1} \beta_5 YEAR + \varepsilon. \quad \text{(TEST-B2)}$$

$$Y = \alpha + \beta_1 GOVOWN + \beta_2 GOVOWN^2 + \sum_{N=1}^{N} \beta_3 X + \beta_4 MARKET + \sum_{K=1}^{K-1} \beta_5 IND + \sum_{J=1}^{J-1} \beta_6 YEAR + \varepsilon. \quad \text{(TEST-B3)}$$

In TEST-A, GLC^{Low} = 1 if government share < 20% share, otherwise 0; GLC^{Medium} = 1 if 20% < government share > 50%, otherwise 0; GLC^{High} = 1 if government share > 50%. TEST-B1, -B2, and -B3 are based on the restricted samples that include only the GLCs. The restricted samples are selected following the Heckman 2-step procedure that first determines a sample selection model $\Pr(GLC_i = 1|\mathbf{X_i}) = \alpha + \beta STRATEGIC + \upsilon$, then estimates the outcome models (TEST-B1, -B2, and -B3). TEST-B1 uses two dummies for the medium and high categories, since the non-GLCs are dropped. For TEST-B2, the restricted sample is categorized into two groups (the government majority and government minority), and one dummy is included for the government majority. $GLC^{Majority}$ = 1 if government share > 50%. In all four tests, other variables are the same as those used in the previous models. The results of control variables (*Xs*), *MARKET*, *IND*, and *YEAR* are not reported to save space, but they are consistent with those reported previously. It is noted that *YEAR* dummies are used only in regressions using panel data. Asterisks ***, **, and * denote statistical significance of robust *t*-values at less than 1%, 5%, and 10% levels, respectively.

are statistically significant in the both OLS and 2-SLS regressions, which use *DEV2* and $VOL^{OL}2$ as alternative risk proxies. Therefore, both regressions detect a significant lagged effect of government ownership on the risk taking. Similar to the contemporaneous relationship between government ownership and risk taking, the lagged relationship also maintains the non-linear U-shaped pattern. The results related to the *X* variables *MARKET*, *IND* and *YEAR* for the three tests are generally consistent with the earlier findings.

5.4. Robustness tests

I implement two robustness tests in this study using full and restricted samples. TEST-A determines corporate risk taking at the different levels of government ownership by using the full sample and TEST-B reexamines the key findings of this study based on the restricted samples comprised of the GLCs only. TEST-A is needed because the earlier classification of the majority and minority ownership did not confirm if the government, as the largest owner, maintains full control over the firm. TEST-B is required because the full sample includes both the GLCs and non-GLCs, and all the earlier tests generally

provide an idea about the GLCs' risk taking relative to non-GLCs. Therefore, it is important to reexamine the GLC risk taking behavior if the tests are confined to GLCs only.

The results of TEST-A reported in Table 7 show that the firms having government ownership between 20% and 50% (GLC^{Medium}) take significantly fewer risks, compared with the firms with no government ownership (non-GLC). This is confirmed by the cross-sectional and panel data regressions using alternative risk taking variables (SPD2, VOL2, DEV2 and $VOL^{OL}2$). The firms with government ownership below 20% (GLC^{Low}) take insignificantly fewer risks than those of the non-GLCs, which is found in the all cross-sectional and panel regressions using alternative risk measures. However, the firms having government ownership above 50% (GLC^{High}) take significantly higher risks (at the 10% level) relative to the non-GLCs. This is found by the panel regression using *DEV2* as the dependent variable, but other regressions do not confirm this. As a whole, TEST-A results indicate that the principal–principal conflict leads to significant lower risk taking when the government ownership is within the range of 20% to 50%. This finding suggests that the government influence on the majority private owners is intensive when the government maintains ownership in the firm at the medium level. If the government reduces its stake to a lower level, below 20%, the risk taking is not significantly lower than the non-GLCs. This is because the government influence on the private owners becomes less intensive. On the other hand, the firm is likely to take more risk if the government maintains full control of the firm by maintaining the ownership at a level higher than 50%.

Next, I execute three variants of TEST-B based on the restricted samples comprising the GLCs only. TEST-B1 estimates the risk taking effects of the medium (GLC^{Medium}) and high levels of government ownership (GLC^{High}) relative to those of the low level of government ownership (GLC^{Low}). TEST-B2 determines the risk taking of the firms with government majority ownership ($GLC^{Majority}$) due to the holding of more than 50% share, compared with that of the government minority firms ($GLC^{Minority}$) due to the holding of less than 50% share. TEST-B3 reexamines the U-shaped relationship between government ownership and corporate risk taking based on only the firms having a government ownership. In the three variants of TEST-B, the restricted samples are selected based on the Heckman 2-step procedure, which first determines a sample selection model $\Pr(GLC_i = 1|\mathbf{X_i}) = \alpha + \beta STRATEGIC + \upsilon$, then estimates the outcome models (TEST-B1, -B2, and -B3). Finally, the three models are estimated based on both the cross-sectional and panel data regressions and using the alternative risk proxies as dependent variables.

TEST-B1 results, presented in Table 7, show that the coefficients of GLC^{High} are significantly positive in the both cross-sectional and panel data regressions and using alternative risk measures. All the coefficients of GLC^{Medium} are significantly negative, except one for the panel regression with *DEV2* as the risk proxy. Therefore, aggravation of the principal–principal conflict is again evident in the firms having a medium level of government ownership. Hence, these firms take fewer risks, compared to the firms with a low level of government shareholding. The decline of principal–principal conflict is evident in the firms having a high level of government ownership; thereby, the corporate risk taking of these firms is significantly higher than that of the firms with low government ownership. The results of TEST-B2 show that the coefficients of $GLC^{Majority}$ are significantly positive in the both cross-sectional and panel data regressions using alternative risk proxies. Therefore, it is evident that the government majority firms take more risks than the government minority firms. Finally, I find from the results of TEST-B3 that the coefficients of *GOVOWN* are significantly negative and those of $GOVOWN^2$ are significantly positive. This is confirmed by both the cross sectional and panel regressions and using alternative risk measures (*SPD2*, *VOL2*, *DEV2*, and $VOL^{OL}2$). Therefore, as I initially hypothesized, the restricted sample test further confirms the nonlinear U-shaped relationship between government share ownership and corporate risk taking.

6. Conclusion

Prior studies find that the government share ownership negatively affects corporate performance in many countries, but not the UAE, which has the highest record of government ownership in the stock market listed firms of any country. This anomaly motivates me to analyze the role of government in the firms. I believe that government, as a politically powerful owner, influences the corporate risk taking decisions that are important for the performance, survival, and growth of the firm. The government influences corporate risk decisions to achieve its social, political, and economic objectives. The literature shows that, subject to the priority of these objectives, government ownership either negatively or positively affects corporate risk taking. Given this knowledge, I analyze the behavior of the relationship between government ownership and corporate risk taking, based on the theory of principal–principal conflict that develops between the controlling and minority shareholders. If the government transfers the majority ownership to the private owners, conflict arises due to the divergence of owners' interests in the firm. The principal–principal conflict becomes worse when the government becomes the minority shareholder, because the powerful minority (government) exerts political pressure on the majority private owners to achieve the government objectives. Therefore, in the environment of high conflict of interests between the government and private owners, the firm becomes more conservative in risk taking to avoid earnings uncertainty. If the government remains the majority owner, the conflict of interests arising from the political influence diminishes and the government majority firms can take-up the risky projects that are important for the economy. Based on these analyses, it is expected that government share ownership has a negative effect (or positive effect) on the corporate risk taking when the government is the minority (or majority) owner of the firm. Therefore, I hypothesize that the relationship between government ownership and corporate risk taking will display a U-shaped pattern, all else being equal.

I implement an empirical study based on 108 stock exchange listed firms of the UAE over a period 10 years from 2004 to 2013. Based on the cross-sectional and panel data regressions, I find that the identity of a firm as GLC does not significantly affect corporate risk taking, but the level of government ownership determines whether the GLCs take more or less risk relative to the non-GLCs. If the government is the minority owner, the GLC takes less corporate risk. However, if the government maintains full control on the firm by holding the majority share ownership, the GLC takes more risk. Finally, the regressions identify a significantly quadratic relationship between government ownership and corporate risk taking, confirming the hypothesis of a nonlinear U-shaped relationship. The findings passed different robustness checks addressing the endogeneity problem, lag effect, and restricted sample. As a whole, I contribute to the literature in two ways: by a providing a new analysis based on the principal–principal conflict theory that helps us to understand the behavior of the relationship between government ownership and the corporate risk taking, and by documenting the first single country evidence from the UAE, which has the highest record of government shareholding in the market listed firms. The first single country evidence of this study, however, is not consistent with the only cross-country evidence recently provided by Boubakri et al. (2013a), who find that the government ownership monotonically leads to lower corporate risk taking. Therefore, more study is needed to fully understand the dynamics of the relationship between government ownership and corporate risk taking in the context of the other countries.

Based on the findings, I conclude that the relationship between government ownership and corporate risk taking depends on the government interests in the firm, and the way government pursues its interests within the structure of the corporate ownership combining the government and private shareholders. The results of this study have implications for corporate governance, corporate finance, and investments. A new corporate governance mechanism is perhaps needed for GLCs that can better align the interests of the government and private owners. The corporate GLC managers need to make value adding investment and finance decisions by balancing the diverse interests of the government and private shareholders so that the firm value can be maximized. Investment managers need to consider the growth potential of the GLC stocks, because the government minority GLCs usually take up the less risky investments. The findings also have implications for the economic policymakers of the country. In privatization, if the economic circumstances require, the government should retain the majority ownership in the firm to implement certain risky projects that cannot be managed otherwise. Other than these cases, privatization without effective transfer of the control of firms to the private owners will not be successful in improving the firm's performance and achieving its maximum growth.

Appendix. Variable definitions

Variables	Definition	Remarks and references
Panel A: Corporate risk taking variables		
SPD	$SPD_{1i} = (ROA_i^{High} - ROA_i^{Low})$ *Unadjusted spread* SPD_{2i} = *Market & industry adjusted spread* where $ROA = EBIT/(Total\ Assets)$, ROA_i^{High} and ROA_i^{Low} are respectively the highest and lowest ROAs of firm i over sample period (2004–2013). SPD_{1i} is the unadjusted spread between the highest and lowest ROAs of firm i over the period 2004–2013. Then for each year, the difference between a firm's ROA and the average ROA of all firms listed on a market (DFM or ADX) under a particular industry category is computed to adjusted spread SPD_{2i}.	The spread between the highest and the lowest value of data series provides an idea about extremity of the variations. This is used in the cross-sectional tests.
VOL	$VOL_{1i} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(ROA_{it} - \frac{1}{T}\sum_{t=1}^{T}ROA_{it}\right)^2}$ *unadjusted* VOL_{41} = *Industry & market adjusted volatility* where $ROA = EBIT/(Total\ Assets)$. VOL_{1i} is the unadjusted ROA volatility of firm i over the period 2004–2013. For each year, the difference between a firm's ROA and the mean ROA of all firms in a market (DFM or ADX) under a particular industry category is computed to obtain adjusted volatility VOL_{2i}.	This determines how tightly the values in the dataset are bunched around the mean. This is used in the cross-sectional tests. Faccio et al. (2011), John et al. (2008)
DEV	$DEV_{1it} = \left(ROA_{it} - \frac{1}{T}\sum_{t=1}^{T}ROA_{it}\right)^2$ *Unadjusted deviation* DEV_{2it} = *Market & industry adjusted deviation* where$ROA = EBIT/(Total\ Assets)$, DEV_{1it} is unadjusted squared deviation of ROA of firm i in year t from mean ROA of the same firm over the period 2004–2013. For each year, the difference between a firm's ROA and the average ROA of all firms in a market (DFM or ADX) under a particular industry category is computed to obtain adjusted squared deviation DEV_{2it}. The notations i and t index data across firms and years for panel regressions.	It gives an idea of how much a firm's ROA in year t deviates from its sample period mean. It has two purposes: (i) know the magnitude of direction-less deviation, and (ii) emphasize the large variations. This is used in the panel regressions.

Variables	Definition	Remarks and references
VOL^{OL}	$VOL^{OL}_{1it} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(ROA_{it} - \frac{1}{T}\sum_{t=1}^{T} ROA_{it}\right)^2}$ *Unadjusted* VOL^{OL}_{2it} = *Market & industry adjusted overlapping volatility* where *ROA* = *EBIT*/(*Total Assets*), VOL^{OL}_{1it} is unadjusted ROA volatility of firm *i* over '*four-year overlapping-period*' starting from 2004. For example, the first period is from 2004 to 2007 while the second period is from 2005 to 2008, and so on until 2013. For each year, the difference between a firm's ROA and the average ROA of all firms in a market (DFM or ADX) under a particular industry category is computed to obtain adjusted overlapping-period volatility VOL^{OL}_{2it}. The notations *i* and *t* index data across firms and years for panel regressions.	The overlapping-period standard deviations track the changes in the ROA standard deviations over the years. This is used in the panel regressions. Boubakri et al. (2013a, 2013b), Faccio et al. (2011), Hilary and Hui (2009)
Panel B: Government ownership variables		
GLC	A firm is classified as government linked company (GLC) if the UAE federal or state governments hold a minimum 2% of total outstanding shares. A dichotomous variable is defined as GLC = 1 if firm is a GLC, and otherwise 0.	Determines if the identity of firm as the government-linked has an effect on the risk taking. Uddin (2014)
$GLC^{Nonlargest}$	The GLC in which the government is not the largest shareholder. This is a dichotomous variable with $GLC^{Nonlargest}$ = 1 if government is not the largest shareholder, and otherwise 0.	Determines the risk taking if the government does not control the firm. Uddin (2014), Chen et al. (2008), Rousseau and Xiao (2008)
$GLC^{Largest}$	The GLC in which the government is the largest shareholder. This is a dichotomous variable with $GLC^{largest}$ = 1 if government is the largest shareholder, and otherwise 0.	Determines the risk taking if the government controls the firm. Uddin (2014), Chen et al. (2008), Rousseau and Xiao (2008)
GOVOWN	The percentage of total shares held by the government	Determines the linear relationship between government ownership and risk taking. Uddin (2014), Boubakri et al. (2013a)
$GOVOWN^2$	The squared percentage of total shares held by the government	Determines if the relationship between government ownership and risk taking is nonlinear and U-shaped
Panel C: Control variables		
LEVER	The ratio of total debt to assets.	Boubakri et al. (2013a, 2013b), Faccio et al. (2011)
SIZE	The natural logarithm of total assets.	Boubakri et al. (2013a, 2013b), Faccio et al. (2011)
FOWN	The percentage of total shares held by foreign investors.	Boubakri et al. (2013a)
GROWTH	Firm's revenue growth % using total revenue.	Boubakri et al. (2013a, 2013b), Faccio et al. (2011)
MSHARE	Market share ratio is calculated as total annual revenue of a firm divided by the total annual revenue of the industry.	Firms gain market power by increasing their market share in the industry (Corones, 1993). Hence, they have incentive to take more business risk.
AGE	Number of years from incorporation to the last day of sample year.	As late entrants, the new firms face more market challenges. Therefore, younger firms have incentive to take risk (Kacperczyk, 2012).
MARKET	A dichotomous variable: *MARKET* = 1 if firm is listed on Dubai Financial Market (DFM), and 0 otherwise.	Controls the market effects
IND	Samples are classified in seven industrial categories. Therefore, a total of six dummy variables are included in test models.	Controls the industry effects
YEAR	Data are collected over 10-year period from 2004 to 2013. Hence, a total of nine dummy variables are included in test models.	Controls the year effects
Panel D: Instrumental variable to predict government ownership		
STRETEGIC	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 strategically important industries are identified by reviewing different policy documents, such as Abu Dhabi Economic Vision 2030, The Business Environment, Enterprise Performance and the Development in Dubai – Policy Report 2011, and The UAE Vision 2021 (http://www.vision2021.ae), among others. More review of these policy documents is given by Uddin (2014).	This instrument is to test the robustness of base results, provided that the government ownership is exogenously determined. Uddin (2014)

Note: In cross-sectional regressions, independent variables (other than dummies) take mean values over the sample period (2004–2013). In panel regressions, data of all relevant variables are arranged by firm and year dimensions, as well as by firm and overlapping-period dimensions. In panel regressions with VOL^{OL}, the independent variables are entered as in the first year of respective overlapping-period, following John et al. (2008) and Boubakri et al. (2013a).

References

Aljifri, K., Moustafa, M., 2007. The impact of corporate governance mechanisms on the performance of UAE firms: an empirical analysis. J. Econ. Adm. Sci. 23 (2), 71–93.
Ang, J.S., Ding, D.K., 2006. Government ownership and the performance of government linked companies: the case of Singapore. J. Multinatl. Financ. Manag. 16, 64–88.
Benartzi, S., Michaely, R., Thaler, R., 1997. Do changes in dividend signal the future or the past? J. Finance 52 (3), 1007–1034.
Bhattacharya, S., 1979. Imperfect information, dividend policy, and 'the bird in the hand" fallacy. Bell J. Econ. 10 (1), 259–270.
Boubakri, N., Cosset, J.C., Saffar, W., 2013a. The role of state and foreign owners in the corporate risk-taking the evidence from privatization. J. Financ. Econ. 108 (3.), 641–658.
Boubakri, N., Cosset, J.C., Saffar, W., 2013b. Political institutions, connectedness, and corporate risk-taking. J. Int. Bus. Stud. 44, 195–215.
Boubakri, N., Cosset, J.C., Saffar, W., 2008. Political connections of newly privatized firms. J. Corp. Finance 14 (5), 654–673.
Boubakri, N., Cosset, J.C., Geudhami, O., 2009. From the state to private ownership: issues from strategic industries. J. Bank. Finance 33 (2), 357–379.
Boutchkova, M., Megginson, W.L., 2000. Privatization and the rise of global capital markets. Financ. Manag. 29 (4), 31–75.
Bromiley, P., 1991. Testing a casual model of corporate risk taking and performance. Acad. Manag. J. 34 (1), 37–59.
Chang, S.J., 2003. Ownership structure, expropriation, and performance of group-affiliated companies in Korea. Acad. Manag. J. 46 (2), 238–253.
Chaney, P., Faccio, M., Parsley, D., 2011. The quality of accounting information in politically connected firms. J. Account. Econ. 51 (1–2), 58–76.
Chen, G., Firth, M., Xin, Y., Xu, L., 2008. Control transfers, privatization, and corporate performance: efficiency gains in China's listed companies. J. Financ. Quant. Anal. 43 (1), 161–190.
Claessens, S., Djankov, S., Lang, L.H.P., 2000. the separation of ownership and control in East Asian corporations. J. Financ. Econ. 58, 81–112.
Claessens, S., Djankov, S., Fan, J.P.H., Lang, L.H.P., 2002. Disentangling the incentive and entrenchment effects of large shareholdings. J. Finance 57 (6), 2741–2771.
Corones, S., 1993. The relative significance of market share and barriers to entry as indicator of market power. Aust. Bus. Law Rev. 21 (5), 373–376.
De La Torre, A., Gozzi, J.C., Schmukler, S.L., 2007. Stock market development under globalization: whither the gains from reforms? J. Bank. Finance 31 (6), 1731–1754.
Dewenter, K.L., Malatesta, P.H., 2001. State-owned and privately owned firms: an empirical analysis of profitability, leverage, and labor intensity. Am. Econ. Rev. 91 (1), 320–334.
Dharwadkar, R., George, G., Brandes, P., 2000. Privatization in emerging economies: an agency theory perspective. Acad. Manag. Rev. 25 (3), 650–669.
Durnev, A., Li, K., Morck, M., Yeung, B., 2004. Capital markets and capital allocation: implications for economies in transition. Econ. Transit. 12 (4), 593–634.
Easterbrook, F.H., 1984. Two agency-cost explanations of dividends. Am. Econ. Rev. 74 (4), 375–390.
Faccio, M., Marchica, M., Mura, R., 2006. Political connections and corporate bailouts. J. Finance 61 (6), 2597–2635.
Faccio, M., 2010. Difference between politically connected and nonconnected firms: a cross-country analysis. Financ. Manag. 39 (3), 905–928.
Faccio, M., Marchica, M., Mura, R., 2011. Large shareholder diversification and corporate risk-taking. Rev. Financ. Stud. 24 (11), 3601–3641.
Feng, F., Sun, Q., Tong, W.H.S, 2004. Do government-linked companies underperform? J. Bank. Finance 28, 2461–2492.
Fogel, K., Mork, R., Yeung, B., 2008. Big business stability economic growth: is what's good for General Motors good for America? J. Financ. Econ. 89 (1), 83–108.
Friedman, M., 1962. Capitalism and Freedom. University of Chicago Press, Chicago.
Frydman, R., Gray, C., Hessel, M., Rapaczynski, A., 1999. When does privatization work? The impact of private ownership on corporate performance in the transitional economies. Q. J. Econ. 114 (4), 1153–1191.
Gilley, K.M., Walters, A.B., Olson, B.J., 2002. Top management team risk taking propensities and firm performance: direct and moderating effects. J. Bus. Strateg. 19 (2), 95–114.
Gillette, A.B., Noe, T.H., Rebello, M.J., 2003. Corporate board composition, protocols, and voting behavior: experimental evidence. J. Finance 58 (5), 1997–2031.
Goldman, E., Rocholl, J., Jongil, S., 2009. Do politically connected boards affects firms value? Rev. Financ. Stud. 22 (6), 2331–2360.
Gursory, G., Aydogan, K., 2002. Equity ownership structure, risk taking, and performance. Emerg. Mark. Finance Trade 38 (6), 6–20.
Gupta, N., 2005. Partial privatization and firm performance. J. Finance 60 (2), 987–1015.
Hasbrouck, J., 1985. The characteristics of takeover targets. J. Bank. Finance 9 (3), 351–362.
Hilary, G., Hui, K.W., 2009. Does religion matter in corporate decision making in America? J. Financ. Econ. 93 (3), 455–473.
John, K., Litov, L., Yeung, B., 2008. Corporate governance and risk taking. J. Finance 63 (4), 1679–1728.
Khwaja, A.I., Mian, A., 2005. Do lenders favor politically connected firms? Rent provision in an emerging financial market. Q. J. Econ. 120 (4), 1371–1411.
Liao, J., Young, M., 2012. The impact of residual government ownership in privatized firms: new evidence from China. Emerg. Mark. Rev. 13 (3), 338–351.
Lerner, J., 1999. The government as venture capitalist: the long-run impact of the SBIR program. J. Bus. 72 (3), 285–318.
Memili, E., Eddleston, K.A., Zellweger, T.M., Kellermanns, F.W., Barnett, T., 2010. The importance of looking toward the future and building on the past: entrepreneurial risk taking and image in family firms, in Alex Stewart. In: Lumpkin, G.T., Katz, J.A. (Eds.), Entrepreneurship and Family Business (Advances in Entrepreneurship, Firm Emergence and Growth, vol. 12). Emerald Group Publishing Limited, pp. 3–29.
Martin, K.J., McConnell, J.J., 1991. Corporate performance, corporate takeovers and management turnover. J. Finance 46 (2), 671–687.
Mattlin, M., 2009. Chinese strategic state-owned enterprises and ownership control. BICCS Asia Paper 4 (6.), 1–28.
Najid, N.A., Rahman, R.A., 2011. Government ownership and performance of Malaysian government-linked companies. Int. Res. J. Finance Econ. 61, 42–56.
Nakano, M., Nguyen, P., 2012. board size and corporate risk taking: further evidence from Japan. Corp. Gov. 20 (4), 369–387.
Obadan, M.I., 2008. The Economic and Social Impact of Privatization of State Owned Enterprises in Africa. CODESRIA, Dakar.
Perotti, E.C., Oijen, P.V., 2001. Privatization, political risk and stock market development in emerging economies. J. Int. Money Finance 20 (1), 43–69.
Qi, Y., Roth, L., Wald, J., 2010. Political rights and the cost of debts. J. Financ. Econ. 95 (2), 202–226.
Rousseau, P.L., Xiao, S., 2008. Change of control and the success of China's share issue privatization. China Econ. Rev. 19 (4), 605–613.
Sinha, R., 2004. The role of hostile takeovers in corporate governance. Appl. Financ. Econ. 14 (18), 1291–1305.
Schwab, K., 2014. The Global Competitiveness Report 2014–2015. World Economic Forum, Geneva, Available at: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf (accessed 30.12.14).
Stulz, R., 1999. Globalization, corporate finance, and the cost of capital. J. Appl. Corp. Finance 12 (3), 8–25.
Stulz, R., 2005. The limits of financial globalization. J. Finance 60 (4), 1595–1638.
Shleifer, A., Vishny, R.W., 1994. Politicians and firms. Q. J. Econ. 104 (4), 995–1025.
Sun, Q., Tong, W.H.S., 2002. How does government ownership affect firm performance? Evidence from China's privatization experience. J. Bus. Finance Account. 29 (1–2), 1–27.
Sur, S., Lvina, E., Magnan, M., 2013. Why do boards differ? Because owners do: assessing ownership impact on the board composition. Corp. Gov. 21 (4), 373–389.
Tian, L., Estrin, S., 2008. Retained state shareholding in Chinese PLCs: does government ownership always reduce corporate value? J. Comp. Econ. 36, 74–89.
Thomsen, S., Pedersen, T., 2000. Ownership structure and economic performance in the largest European companies. Strateg. Manag. J. 21 (6), 689–705.

Uddin, M.H., Halbuni, S., Raj, M., 2014. Performance of government-linked companies listed on the two stock exchanges of United Arab Emirates – an empirical study. Emerg. Mark. Finance Trade 50 (S1), 212–236.
Uddin, M.H., 2014. Government ownership in corporate firms: an empirical study of the United Arab Emirates, Working Paper. University of Sharjah.
Vickers, J., Yarrow, G., 1991. Economic perspectives on privatization. J. Econ. Perspect. 5 (2), 111–132.
Wurgler, J., 2000. Financial markets and the allocation of capital. J. Financ. Econ. 58 (1–2), 187–214.
Wright, P., Ferris, S.P., Sarin, A., Awasthi, V., 1996. Impact of corporate insider, blockholder, and institutional equity ownership on firm risk taking. Acad. Manag. J. 39 (2), 441–463.
Young, M.N., Peng, M.W., Ahlstrom, D., Bruton, G.D., Jiang, Y., 2008. Corporate governance in emerging economies: a review of the principal–principal perspective. J. Manag. Stud. 45 (1), 196–220.
Zeitun, R., Tian, G., 2007. Does ownership affect a firm's performance and default risk in Jordan? Corp. Gov. 7 (1), 66–82.