

Ultimate Control and Firm Performance

An Empirical Analysis of Listed Firms in China

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September 2019

Abstract

This is the first paper, to our knowledge, that investigates the relationship between the state control and firm performance of the listed firms in China. We use a rich sample of 2,995 listed firms in China from 2003 to 2016. We develop a new scheme to classify ultimate controllers of Chinese listed firms. We identify fourteen different types of state control based on its administrative level, function and objective. We show some state controllers, such as Central SASACs, Local SOE and Municipal SASAC have negative impacts on profitability, while they increase employment. High administrative-level state controllers improve firm performance compared to lower administrative-level controllers. Our findings imply that separation of different types of state control is necessary and the governments should provide more financial and political supports for local and small SOEs.

Keywords: ownership structure, ultimate control, China

JEL Classification: G30, G32

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1. Introduction

The relationships between ownership structure and firm performance in publicly listed companies are important concerns for decision-makers who are aiming to maximize firm performance. In particular, as presented by Jensen and Meckling (1976) the existence of information asymmetry and the divergence of interests between the principals and agents result in the problems that adversely affect corporate performance and it has been proposed that the main reasons for agency problems are the different ownership structure and different roles people have in organisations. The agency costs are generated by the divergence between owner-manager interest and those of the outside shareholders. Cao et al. (2011) discussed that the controlling shareholders in the emerging markets obtain their control through voting rights despite little percentage of cash flow rights. Chen et al. (2011) also point out that the controlling shareholders have incentive to expropriate the interests of minority shareholders. A disproportional ownership structure permits easier expropriation of the interests of minority shareholders, which leads a firm's low value. Fan et al. (2011) further show that the expropriation may ultimately be from the controlling shareholders and it could cost substantial resources for the expropriation activities. In fact, the relationship between ownership and financial performance might arise due to some company, industry and country characteristics. Empirical studies have shed light on this issue and obtained conflicting results. Andres (2008) indicates that family firms are more profitable than those with a dispersed ownership structure or one controlling shareholder. Gugler et al. (2008) present that the managerial entrenchment has a negative effect on firm performance and the insider ownership has a positive wealth effect. The effects are much stronger in the U.S. than other countries. By analyzing the relation between government ownership and the value of European firms during the global financial crisis of 2008-2009, Beuselinck et al. (2017) show that the government ownership helps alleviate financial shocks in countries with sufficient investor protection and low corruption.

Moreover, Chen et al. (2017) find statistically and economically significant evidence that state ownership is negatively related to investment efficiency while the foreign ownership has a positive effect. Nevertheless, Thomsen et al. (2006) point out that there is no effect of blockholder ownership on firm value in Anglo-American market-based economies. In continental Europe, high blockholder ownership has shown a significantly negative impact on firm value and accounting profitability. Adrian Cheung and John Wei (2006) also find no evidence of a relationship between corporate performance and insider ownership. The mixed results from these studies imply that agency problem only arises when there are interest conflicts between owner-manager and outsider shareholders.

China's economy experiences a sufficient expansion in recent years. The average growth rate of GDP is 11% from 2000 to 2010 with a peak point of 14.2% in 2007⁴. The expanding growth of economy and productivity is attributed to the economic reform in last two decades. The economic restructuring process principally concentrates on the reform of state-owned enterprises (SOEs). From the economic liberalization in the 1970s to the recent split share reform in 2005, the reforms aim at deducting the state-owned shares and increasing the performance of SOEs. In 1978 the first round of the reform focused on decentralization of control rights and profits, completing the transition from planned economy to market economy. Afterward, the second round of the reform in 1992 established the modern enterprise system to improve the management of state-owned assets by reforming the shareholding scheme. The state-owned enterprises benefit from the policy and resources, then progressively grow into strong enterprises nowadays. However, rapid economic development concealed severe

⁴ Data Source: CSMAR

problems of SOEs. As China's economic growth is slowing down, low operational efficiency, disproportionate resource allocation and capacity expansion problem are gradually revealed. The enterprises in steel, coal, cement, glass, petroleum, petrochemical, iron ore, non-ferrous metal, and other major industries suffered sufficient loss. The decline in profitability brought the excess production problem to light. In 2015, President Xi Jinping set the Supply-side Structural Reform as the main task for economic growth at the recent 19th National Congress of the Communist Party of China (CPC)⁵. The reform includes cutting excess capacity, destocking, deleveraging, reducing costs and shoring up weak areas, laying the base for future reforms. SOEs bear the major economic, political, and social responsibility. President Xi stressed that the government must unswervingly deepen the reform of SOEs and make the SOEs act as a leading role on the supply side structural reform. This requires the policymakers are aware of the accurate performance of different types of SOEs. The controllers of SOEs scatter among various agencies, and each of them has different primary objectives. This paper addresses the question that how the performance of listed firms in China is related to different types of controllers.

State-controlled firms are distinguished for the acute owner-manager agency problems as the interests of state-controller may not be aligned with those of outside shareholders (Firth et al., 2010). There is growing literature investigating the effect of state ownership on firms' performance by analysing the recent economic reforms in China. Sun and Tong (2003) estimate the shifts in SOEs' performances in two stock exchanges regarding the share issuing privatisation from 1994 to 1998. They find a negative impact of state ownership on the listed

⁵ Source: Xi Jinping hosted the 11th meeting of the central finance leading group. Xinhua Net. [Online] Available at: http://www.xinhuanet.com/politics/2015-11/10/c_1117099915.htm [Accessed 6th, June 2018].

firm after privatisation, but the legal person ownership is positively related to firms' performance. The results imply that the legal person has the different incentive from the state. Wei et al. (2005) examine the relation between ownership structure and firm value with a sample of 5,284 firm years of partially privatized former SOEs in China from 1991–2001. Their results show that state and intuitional shares are significantly negatively related to firm value. Liao et al. (2014) establish that the SOEs experience a quicker increase in output, profit, and employment than the non-SOEs after the split share reform. The findings suggest that the performance of Chinese listed firms vary with the type of ownership.

Most previous literature adopted an unofficial mechanism, share types, to represent the nature of shares held by the shareholders as the indicators for ownership. There are three major classes of shares in the annual reports of listed companies in China - the state shares, held by the government; legal person shares, held by state-controlled legal persons, or privately controlled legal persons; shares owned by individuals and institutions, most of which are tradable A shares (Conyon and He, 2011). This approach presents neither the diversity among shareholders nor the ultimate owners of the shares. Legal person shares are not only held by privately-controlled legal persons but also the state-controlled legal persons. Using the share types as the indicators of ownerships fails to separate the state-owned legal person shares and private-owned legal person shares. The owners of these two shares may perform differently when managing the firms. The state shareholders care more about the social stability than the interests of minority shareholders, while the private shareholders are focusing on profitability.

Moreover, few studies distinguish the variation of influences among different governments and agencies. The Board of Supervisors of Key and Large State-owned Enterprises points out that the reform of SOEs is a complex system engineering, involving governments at all levels,

multiple departments, the central enterprises and local enterprises, state assets supervision system to supervise enterprises, and other departments and units to supervise enterprises⁶. Bai et al. (2006) have provided a multitask theory of SOE reform in China. They argue that the divergence of interests among different levels of government increases with the amount of surplus labor. Lower-level (such as county or city) governments like to dump those SOEs that are laden with surplus labor and debts. This implies that, with privatization of SOEs affiliated with the county or city governments, there will be substantial layoffs of surplus workers and massive write-offs of bad loans. In contrast, higher-level (provincial or central) governments care more about social stability, and they are reluctant to let go those SOEs whose privatization would lead to labor layoffs and loan write-offs. This implies that there may not be any decrease in employment or debts with privatization of SOEs affiliated with the provincial or central governments. The third plenary session of the 18th CPC Central Committee also emphasized to define different capabilities of the state-owned enterprise. As the controller principally decides the operation mode of the firms, identification of roles of SOEs' controllers is necessary.

The paper investigates the ultimate controller of each listed firm and categorizes them based on the administrative levels, functions and objectives. The ultimate controller is identified by the information disclosed in the annual report of the listed company. According to the Measures for the Administration of the Takeover of Listed Companies, a person/entity can actually control a listed firm if satisfying either of the following conditions⁷: the person/entity holds the largest number of shares of all registered shareholders unless there are evidences that can prove the opposite; or the person/entity has the power to exercise or control more voting rights than those of the largest shareholder; or the person/entity has the power to exercise or

⁶ Source: Ji, X.N. (2017) People's Daily, the people's thesis: it is protracted battle to deepen the reform of state-owned enterprises. People's Daily Online. [Online] P.1. Available at: <http://opinion.people.com.cn/n1/2017/0109/c1003-29006894.html> [Accessed 25th, March 2018].

⁷ Source: CSMAR

control 30% or more of the firm's shares or voting rights unless there are evidences that can prove the opposite; or the purchaser has the power to decide the election of more than half of the directors; or other circumstances as determined by the CSRC. The ultimate controllers in China use pyramid structure, cross-holding and other methods to obtain the control rights over the listed firm. I trace the control chains to find the entity/person which dominate at the top of pyramid and identify them based on their characteristics.

In the paper the controllers firstly are identified at different administrative levels. The current administrative regions in China include three levels: Province, Municipality and Town. The controllers directly affiliated to the State Council⁸ or departments of the State Council are regarded as Central. Because of the availability of listed firms' information in CSMAR, the study adopts two official administrative regions' levels: Province and Municipality and treats them as local. Thus, there are three administrative levels in the study: Central, Province and Municipality. Secondly, among the governmental agencies, asset management entities and other governmental departments need to be distinguished. The asset management entities refer to the central and local State-owned Assets Supervision and Administration Commission of the State Council (SASAC) and other asset management departments. SASAC and local SASAC are the most common asset management bureaus in China. The SASAC is a commission of China and the only ad hoc governmental agency directly under the state council⁹. The SASAC performs investor's responsibilities, supervises and operates the state-owned assets, and enhances the management of the state-owned assets. SASAC is acting on behalf of the state council and takes charge of the daily management of the supervisory panels. Other

⁸ We also refer State Council as Central Government.

⁹ Source: SASAC Website. Major Responsibilities of SASAC. [Online] P.1. Available at: <http://www.sasac.gov.cn/n2588020/index.html#jgzn> [Accessed 25th, March 2018].

government departments may have different responsibilities. The government departments like finance ministry are following the requirements of the State Council to implement the task-based methods to support and promote the economic development and transformation, while the SASAC is responsible for operating state-owned assets.

The contributions of the paper are as follows. First, the paper employs a new classification scheme for ownership structure in Chinese listed firm. The scheme is developed by following two principles: identifying the ultimate owners and distinguishing their objectives. It classifies the shareholders into four major categories, state, foreign, private and other. The state ownership is further divided into 14 sub-categories based on the administrative level, function and objective, namely Central State-owned Enterprise, Local State-owned Enterprise, Central Department, Provincial Department, Municipal Department, Central Asset Bureau, Provincial Asset Bureau, Municipal Asset Bureau, Central SASAC, Provincial SASAC, Municipal SASAC, Provincial Government, Municipal Government, Public Institution. The foreign category includes Foreign Individual and Foreign Enterprise. The private ownership comprises Private Individual and Private Enterprise. Other ownership such as Operating Unit, Collectively-owned Enterprise and Social Organization are classified into other. The scheme not only identifies the ultimate owners of shares but also separates the state ownership to provide an accurate and comprehensive analysis of the effect of state and agencies. Second, the study applies a sample of latest data from CSMAR from 2003 to 2016 and various performance measures to investigate the ownership-performance relation. SOEs plays a significant role in the recent supply side structural reform, it is important to find out how the SOEs' performance indexes vary with different ownership structures. The study uses various indicators for performance measures, including profitability, employment, labour productivity, investment, investment efficiency, operating efficiency and firm output.

The empirical results of the paper show that the effect of the state, foreign and private controllers vary with the proxies for the firm performances. Some state controllers, such as Central SASAC, have negative impacts on profitability, but they are positively related to employment. Moreover, high administrative-level state controllers and SASACs perform better. The findings imply that policy-makers should focus on SOEs' profitability and labour productivity and improve the performances. For certain state controllers, such as central asset bureau or provincial department, they can improve firm profitability, investment or operating efficiency. Besides, the governments should provide more financial and political supports for local and small SOEs.

The rest of the study is organized as follows. Section 2 is the review of literature about ownership and firm performance and the ownership structure in China. Section 3 describes the data and methodology. Section 4 provides the empirical findings. Section 5 concludes the paper.

2. Literature Review

2.1 Ownership Structure and Firm Performance

The effect of ownership structures on firm performance has been investigated extensively in the theoretical and empirical literature¹⁰. In listed firms, the separations of ownership and control always give rise to severe agency problems. The agency problem arises when there is a conflict of interests between the managers and owners. Managers tend to take risk in investments to maximize the firm value, while the owners prefer to personal profits. Concentrated ownership can help mitigate the agency conflicts by aligning the monetary incentives of the manager with other investors. Even the controlling shareholders do not participate in management, they are capable of monitoring and directing managers. The agency problems can be decreased by monitoring. Compared with small investors, large shareholders have the incentives and capabilities to monitor the actions of managers and reduce agency costs. However, concentrated ownership could bring potential losses. Large shareholders principally satisfy their own interests instead of other investors. This means large shareholders may use their power to pursue personal benefits, even at the cost of other shareholders' profits. It is uncertain whether large shareholders behave in favour of minority shareholder. Moreover, efficient markets will result in optimal and firm-specific ownership structure. Corporations with inefficient ownership structures cannot survive in the market competitions. Thus, there should be no relation between ownership structure and firm performance. In fact, empirical studies about different types of controlling shareholders cannot reach the agreement about the effect of ownership on firm performance.

¹⁰ See Anderson and Reeb (2003), Andres (2008), Benson and Davidson (2009), Himmelberg et al. (1999), Maury (2006), Pound (1991), Woidtke (2002).

In the U.S., family-controlling firms tend to have higher valuations and profitability than nonfamily-controlling firms (Anderson and Reeb, 2003). Using a sample of 1672 non-financial firms from 13 Western European countries, Maury (2006) shows that the active family control increases firms' valuations and profitability while the passive family control has no effect on profitability. The results imply that family control can reduce the agency problem between owners and managers but gives rise to conflicts of interests between the controlling family and minority shareholders. Himmelberg et al. (1999) find no significant effect of managerial ownership on firm performance. However, using a sample of data from 1995 to 2003 in the U.S., Benson and Davidson (2009) present a significant inverted U-shaped relation between managerial ownership and firm performance. Pound (1991) explains that institutional investors as large shareholders have a positive effect on firm value. However, institutional investors are also the agents with their own agency problems. For example, the public pension funds are usually managed by officials and their interests may not be aligned with other shareholders'.

Researches about the effect of state ownership have mixed findings. Several scholars present that state ownership has a positive effect compared with other ownerships. Goldeng et al. (2008) find that the performance of SOEs is inferior to that of private-owned enterprises (POEs) after controlling for the market structure in Norway with a sample period from 1990 to 1999. After examining a sample of 506 non-financial firms privatized in 64 countries over 1981 to 2008, Chen et al. (2017) find that statistically and economically significant evidence that state ownership is negatively related to investment efficiency. They also show that the investment efficiency and foreign ownership is positively related.

The effect of different types of ownership on firm performance varies. If the controllers have strong incentives to monitor and supervise managerial processes, the interests of investors and

managers would be converged, and agency conflicts decrease. In contrary, large shareholders may pursue personal benefits and minority investors are expropriated. The firm's value will suffer a decrease. Of all the dominant shareholders in listed firms, the government is the most powerful and significant controller. It not only has the voting right to control the executive board, but also the political ability to benefit the firm. The ownership structure in China is distinguished from other countries as it usually has one dominant shareholder - state.

2.2 Ownership Structure in China

2.2.1 Literature of Ownership Structure in China

The ownership structure of China's listed firms is distinct. Publicly traded firms normally have a single dominant shareholder. Government is the most common dominant shareholder in Chinese listed firm. When the two major stock exchanges established in China, only one-third shares were tradable. The other two-thirds non-tradable shares were held by the state and legal person. Realizing the deficiency of the split share structure¹¹, the Chinese government implemented the Split Share Reform from 2005. After the reform, almost all firms had established a detailed timetable to convert all non-tradable shares to tradable shares. Even though the non-tradable shares which were held by state and legal person became tradable, the government still hold a significant proportion of the shares in list firms. State ownership is significant in Chinese listed firms and draws attention from researchers. Previous literature has shed lights on the effect of state ownership, but none of them adopt a unified classification of the ownership.

¹¹ The split share structure refers to the tradable and non-tradable share structure,

Sun and Tong (2003) estimate the performance changes of SOEs regarding the share issuing privatisation from 1994 to 1998. They find that SOEs' performance including profitability, productivity and sales is improved by the privatisation. The results also show that state ownership is negatively related to firm performance and legal person ownership has a positive effect on firm performance. The study uses the share types as the proxies for ownership structure, for instance, state shares as state ownership, legal person share as legal person ownership.

Wei et al. (2005) show that state shares are significantly negatively related to firm performances by investigating a sample of Chinese listed firms from 1991 to 2001. In the research, Wei et al. (2005) mainly study three types of concentrated ownership, specifically state, legal person and foreign. They also use the share types which are discussed in the previous part to classify the ownership structure. Moreover, they treated the legal person shares as the intuitional share based on the argument that legal person shares are commonly held by domestic legal entities, including domestic mutual funds, insurance firms, government agencies, and other companies.

Unlike other literature, Firth et al. (2010) study the roles played by state and mutual funds shareholders in the split share reform from 2005. The results imply that state ownership is positively related to the final compensation ratio, while the mutual fund ownership has a negative effect on the compensation ratio. In other words, state shareholders have greater incentives to promote the reform than institutional shareholders. The study also adopts the share types as ownership classification. It defines the state ownership as the number of the firms' shares owned by state-controlled entities and the mutual fund ownership as the tradable

shares held by mutual funds, divided by the total outstanding shares before the reform, respectively.

Liao et al. (2014) also study the split share reform in China. They show that the SOEs experience a quicker boost in output, profit, and employment than the non-SOEs. The research classifies a firm as SOE if the ultimate controller is the state, otherwise non-SOE. Listed firms disclose the ultimate controller parties in annual financial reports. It also uses the ratio of the number of state-owned shares to the number of total shares outstanding as a proxy for state ownership.

Chen et al. (2008) investigate performance changes in Chinese listed firms when there is an ownership transfer in the controlling shareholder from 1996 to 2000. They conclude that firms performance is positively improved when the control is transferred to a private entity. However, there are little changes in the firm performance when the control is passed to another government agency. The results imply that private control is more beneficial to the firms than state control. The study employs share types like state and legal person share as the proxy for state ownership as well.

Cull et al. (2015) study the role of firms' government connections in determining the severity of financial constraints faced by Chinese firms. Government connection is defined by government intervention in CEO appointment and the status of state ownership. The research defines firms' ownership type based on the response to the corresponding question in the questionnaire. The finding implies that government connections are related to financial constraints and large non-state firms with weak government connections are especially financially constrained.

The Table 1 summarizes the literature about the effect of state ownership in Chinese listed firms and the proxies used for the ownership classification. From the table, we can see most literature adopt the share types to represent the ownership structure in the firms. For example, state shares which are owned by the state are treated as state ownership, legal person shares held by the legal person entities are classified as legal person ownership (some literature treat legal person shares as institutional ownership). However, as discussed in the previous part, legal person shares could be held by different entities such as government agency and institutions. Simply classifying legal person shares as one type of ownership without investigating the ultimate holders of these shares may lead to inaccurate results.

Insert Table 1

2.2.2 The Characteristics of the Ownership Structure in China

China as an emerging market country established its stock market two decades ago. The market is far from mature compared with the developed countries. The ownership and control structure in Chinese has its unique characteristics.

First of all, the equity of listed companies is highly concentrated. The average shareholding rates of the largest shareholder and top three shareholders are 39.98% and 52.23% respectively in 1995¹². The rates increase in 2005 and are 40.10% and 53.76%, respectively. Secondly, non-tradable shares account for large proportion in listed firms. The largest shareholder of listed companies is normally a holding company, rather than a natural person. Most of China's listed company is transformed from former state-owned enterprises, collective enterprises and private

¹² Data Source: CSMAR

enterprises. The state and legal persons convert a part of the original assets to the non-tradable shares of listed companies. The former enterprise act as the holding company of the listed firm in the pyramid structure. Thirdly, listed firms controlled by enterprise group account for large proportion. Most of the listed companies belong to the enterprise group and are the core competitive enterprises in the group. The formation of this pattern is due to state-owned enterprise shareholding system reforms. The original enterprises are merged as group or high-quality assets of original enterprise group are integrated for listing. Fourth, the ultimate controllers exist in the listed firms. La Porta et al. (1999) is the first study that investigates the issue of ultimate control. They trace the chain of ownership to find who has the most voting rights. Claessens et al. (2000) investigate the separation of ownership and control for 2,980 corporations in nine East Asian countries. In all countries, voting rights frequently exceed cash flow rights via pyramid structures and cross-holdings.

Specifically, the Chinese authorities build a “the government and the department of state-owned assets management - state-owned capital investment and operation companies – listed firms” three-level control structure. The system structure is similar but also distinguished with Zhou and Lian’s (2016) three-level hierarchical organization model. Specifically, the three-level control structure includes: First level (principal) is the administration of the state-owned asset, such as government, SASAC, asset management bureau etc. They mainly perform the assets administrative functions. Second level (manager) is the management and operation of the state-owned asset, such as the state-owned capital investment and operation companies. They help the government agencies to raise the capital for investment and exercise part of the shareholders’ rights entitled by the principal. Third level (agent) is the direct controlling shareholders of the listed firms. They are the large shareholders in the listed firm and are engaged in the professional state-owned assets/capital operation relying on the market

mechanism. They are responsible for increase state-owned assets value and create profits for the principal. Figure 1 presents the three-level control structure of listed firms.

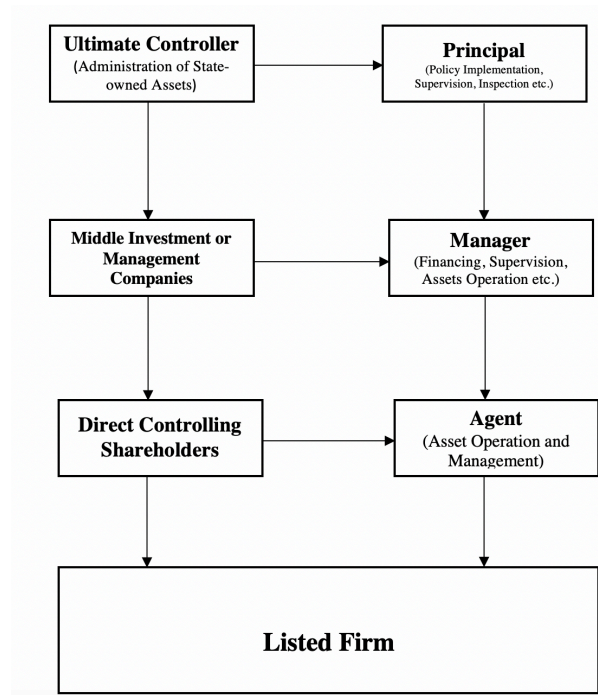


Figure 1 Three-Level Control Structure of Listed Firms.

Similar with the Zhou and Lian's (2016) conceptualization of the control rights, the rights of three-level control structure in the study can also be divided in to three dimensions: Firstly, target enactment right is held by the administration level. For example, the SASAC establishes and improves the index system for preservation and increase of the value of state-owned assets. The documents issued by the SASAC include management of SOEs' shares, assets and dividends, as well as the targets of the central government such as employment stabilization. Secondly, inspection & acceptance right is also held by the administration level. The inspection & acceptance right is affiliated to the target enactment right. After setting the targets, principal can exercise their inspection & acceptance right regularly. The SASAC periodically investigates the performance of state-owned listed firms, and also maintain the rights to collect the dividends. Thirdly, incentive distribution right is held by both administration and

management levels. The SASAC or other asset management bureaus have the responsibilities to set incentives and evaluation mechanism. The resources allocation is normally decided by the state-owned assets management companies. As the principal, the ultimate controller integrates the target enactment right, inspection & acceptance right and incentive distribution right which give the ultimate controller the power to affect firm performances.

2.3 Hypothesis Development

The deputy director of the SASAC, Shuhe Huang, summarized the process and results of the central enterprises fulfilling social responsibility at the press conference on 3rd August 2010¹³. Since the establishment, the SASAC pays close attention to corporate social responsibility, actively promotes the central enterprise to perform social responsibility and achieves new progress and success. SASAC carries out the national macroeconomic regulation and control policy to ensure a smooth economic and social development. For example, central power enterprises conscientiously implement national price policy, overcome the difficulties of the long-term low electricity price, build reasonable electricity price formation mechanism and the sustainable development ability, accelerate electric power construction, and optimize the allocation of national energy resources. According to the international energy agency statistics, from 2002 to 2007, average electricity price of 56 countries increased 76%, industrial electricity price increased 84% on average. Over the same period in China, the price only increased 32%. From 2005 to 2009, central grain companies implemented accumulated policy acquisition of more than 259 million tons of grain and oil, which increased the average annual

¹³ Source: The speech of Huang Shuhe in the “Central Enterprises are making efforts in performing social responsibility” press conference. SASAC Website. [Online] Available at: <http://www.sasac.gov.cn/n2588030/n2588939/c4297402/content.html> [Accessed 3rd, August 2018].

income of the grain farmers by ten billion yuan directly. In the world's international food crisis from 2006 to 2008, the central enterprises enforced national minimum price to purchase, sell, auction and other controlling policy to maintain the stability of grain market, making China a "safety island" in the global food crisis. The petroleum and petrochemical enterprises actively support the national macroeconomic regulation and control to ensure the stability of the domestic oil supply and maintain China's fuel prices relatively stable. The refining plate of three central petroleum and petrochemical enterprises suffered a loss of 165.2 billion yuan due to the policy factors, of which the state provided financial subsidies about 63.2 billion yuan and companies used their own capital subsidy of more than 100 billion yuan. To fulfil the social responsibility, the SOEs controlled by the SASAC may suffered financial loss and low investment and operating efficiency.

SASAC also actively absorbs employment, protecting the legitimate rights and interests of employees. The central enterprises positively response to the appeal "the key of ensuring people's well-being and maintaining stability is to protect the employment" from the state council. The companies take active measures absorbing as much as possible employment to ease the employment pressure. In 2009 central enterprises took the initiative to hire more two hundred thousand graduates, increased by 7% of 2008. Central enterprises shall, in accordance with the requirements of "cutting salary but no layoff, suspending but no unemployment", stabilize employment, comply with the new labour law, sign labour contract with employees, cover five basics, namely insurance pension, unemployment, medical treatment, industrial injury and birth. I develop the first hypothesis based on the objectives of central enterprises.

H_{1a} The SASACs as controllers have negative impact on the firms' performance excepting the employment.

Besides the SASACs, there are numbers of governmental organs under the state council. The researcher from the state council development research centre, Wenkui Zhang, has explained the characteristics of SASAC after its establishment¹⁴. The SASAC is a unique institution under the state council and different from the existed governmental organ. Chinese government gives it the rights to manage the state-owned assets and flexibility in in many other aspects such as personnel selection mechanism and compensation system. Previous asset bureaus were the accountants of state-owned enterprises, but the SASAC is the institution exercising the investors' rights on the behalf of state council such as the selection rights of economic personnel. Even though the SASAC integrates the rights to regulate and supervise state-owned assets, the enterprises controlled by other governmental agencies such as the Ministry of Finance and Ministry of Education may have preponderance.

Most enterprises controlled by the Ministry of Education belong to the high-tech industries¹⁵. The Chinese government attaches great importance to the innovation of science and technology. Innovation is an essential part during the reform of SOEs. The Guidance of the Central Enterprises to fulfil Social Responsibility issued on 4th Jan 2008 stressed that the central enterprises must promote independent innovation and technological progress. These technical innovation companies receive political support from the government and have the capacity to surpass other state-controlled enterprises. The SASAC has the rights to manage the property rights of SOEs, but the financial power still belongs to the Ministry of Finance. State-owned enterprises are a part of national finance substantially. The Ministry of Finance would give

¹⁴ Source: Wan, J.Y. and Wei, X.R. (2003) Interpretation of institutional reform of the state council. People's Daily Online. [Online] P.1. Available at: <http://www.people.com.cn/GB/jinji/36/20030307/938503.html> [Accessed 23th, August 2018].

¹⁵ Source: Ministry of Education. (2015) Further standardize and strengthen the management of state-owned assets of the enterprises directly affiliated to educational institutions. Ministry of Education Website. [Online] P.1. Available at: http://www.moe.gov.cn/srcsite/A05/s7504/201507/t20150707_192795.html [Accessed 29th, March 2018].

interest subsidies to the enterprises in difficulties and provides support for the state-owned enterprises suffering bankruptcy or laid-off workers. Theoretically, the SASAC manages the state-owned assets from the angle of investor, but the Ministry of Finance has connection with the SOEs from the perspective of public finance and business. Without substantial financial rights, the SASAC's power is obviously restricted. In fact, the budget and final accounts are determined by the Ministry of Finance. SOEs controlled by the Ministry of Finance can receive direct financial benefits compared with other enterprises. The study classified all the governmental agencies excepting the government, asset bureau and SASAC as the governmental departments. The enterprises controlled by the governmental departments are supposed to have higher profitability than those controlled by the SASAC.

H_{1b} The governmental departments as controllers have higher profitability than the SASAC.

SASAC has the responsibility of supervising the preservation and increment of the value of the state-owned assets; guiding and pushing forward the reform and restructuring of state-owned enterprises; improving corporate governance and propelling the strategic adjustment of the layout and structure of the state economy. SASAC should legislate laws and regulations on the management of the state-owned assets, establishes related rules and regulations. SASAC also has the rights to appoint or dismiss the executives of the supervised enterprises and evaluate their performances through legal procedures. SASAC can establish corporate executives' selection system in accordance with the requirements of the socialist market economic system and improve incentives and restraints system for corporate management. Compared to other asset management bureaus, the SASAC is more powerful in supervising and managing the state-owned assets.

H_{1c} The SASACs as controllers have less negative impact on firm performance than other asset bureaus.

Premier Jiabao Wen emphasized that the reform of local state-owned assets management system must be in accordance with the central unified deployment, from top to bottom, proceed orderly on the Second Session of the Sixteenth Central Committee of the CPC¹⁶. Higher-level SASAC must guide and supervise the lower-level SASAC in accordance with the law. Strengthening the guides and supervision of local state-owned assets is the effective measure to guarantee the implementation of the regulations and policies. However, the policies and regulations are not sufficiently carried out in some areas. Some sponsor duties need to be further standardized of some local SASACs. The guide and supervision systems are divided into two levels. First one is the guide and supervision between the central SASAC and local SASACs at all levels. The central SASAC implements unified guidance and supervision to the local state-owned assets according to laws, administrative regulations and authorisation by the state council. The main method to supervise is to develop and execute assets supervision regulations. The regulations have general norms guiding effects on local SASACs at all levels. The second one is the guide and supervision between high-level and low-level local SASACs. The provincial SASAC has the responsibility to guide and supervise the management of state-owned assets at municipal or lower levels.

¹⁶ Source: The SASAC principal's replies to the journalists about "The interim Regulations and guide of the supervision of the local state-owned assets". SASAC Website. [Online] Available at: <http://www.sasac.gov.cn/n2588035/n2588320/n2588340/c4426972/content.html> [Accessed 25th, August 2018].

The social responsibility leads to the loss of SOEs. For example, central enterprises enforced national minimum price to purchase, sell, auction and other controlling policy to maintain the stability of the grain market in the global food crisis. Moreover, the government regulates the dispose of SOEs' profits. The SOEs need to hand over 100%/10%/5%/None of their profits to the government according to different industries. Some of the SOEs have very low profitability or even suffer loss. Excepting the operating expense, some enterprises barely have capital for investment and research which could further lead to low profitability. The SOEs should have low profitability. The financial support also decreases with the administrative level. High-level enterprises can receive more financial relief. SOEs at different levels are supposed to have different performances.

H₂ High-level state controllers have fewer negative effects on firm performance and more positive effects on employment than the low-level state controllers.

3. Data and Methodology

3.1 Sample and Variables

The ownership data is obtained from CSMAR database which is available from 2003 to 2016. The initial sample includes yearly data of up to 2,955 firms. The data set provides essential information, such as the name of ultimate controllers and hierarchy, to develop a new ownership scheme. We adjust the data set by deleting the enterprises whose ownership data is missing, the enterprises those have two or more controllers and the enterprises whose controller's nature cannot be identified.

3.1.1 Ownership Structure Classification

The paper adopts the ultimate controller instead of the share types to classify the listed firms and develop the new ownership mechanism. The ultimate controller is separated based on administrative level, functions and objectives. First, all the controllers of SOEs are divided into three levels: central, provincial and municipal. It is worth mentioning that there are four municipals directly under the central government, namely Beijing, Shanghai, Tianjin, and Chongqing. The municipals directly under the central government are at the provincial level. The controllers of Beijing, Shanghai, Tianjin and Chongqing SOEs are categorized into the provincial level. Second, the SASAC is the ad hoc department under state council and distinguished with other governmental departments. Normal asset management departments are also separated from SASAC as they may not have the same rights with SASAC. For the non-SOEs, individual controllers may not have the sufficient managerial experience as enterprise-controllers when operating a firm. They are separated as private, private enterprise, foreign and foreign enterprise.

The ownership classification in the study comprise four major categories: State, Foreign, Private and Other. The State includes 14 sub-categories: Public Institution, Provincial Government, Municipal Government, Central Department, Central Asset Bureau, Central SASAC, Central State-owned Enterprise, Provincial Department, Provincial Asset Bureau, Provincial SASAC, Local State-owned Enterprise, Municipal Department, Municipal Asset Bureau, Municipal SASAC. The Foreign includes 2 sub-categories: Foreign Individual and Foreign Enterprise. The Private includes 2 sub-categories: Private Individual and Private Enterprise. The Other includes 3 sub-categories: Operating Unit, Collectively-owned Enterprise and Social Organization. The classification is shown in Table 2.

Insert Table 2

3.1.2 Distribution of Firm Types

The distribution of firm types over all the sample years is presented in Table 3. We identify the types of listed firms based on the ultimate controllers. The firms controlled by one of the State controllers are identified as state-owned enterprises, the firms controlled by one of the Foreign controllers are identified as foreign enterprises, the firms controlled by one of the Private controllers are identified as private enterprises, the firms controlled by of the Other controllers are identified as other enterprises, and the firms without controllers are treated as widely held firms.

Insert Table 3

The distribution shows that the SOEs accounted for 74.32% of all listed firms in 2003. The proportion of SOEs drops gradually year by year with the figure 56.38% in 2009 and 37.89% in 2015. Meanwhile, the portion of private enterprises increases from 13.08% in 2003 to 55.19% in 2015. The number of private enterprises exceeds SOEs in 2011. It implies the effects of a

series of reforms by Chinese government, especially the Split Share Reform in 2005. From 2005 to 2010, the percentage of private enterprises almost doubled and that of SOEs declined by about one forth. Figure 2 displays the trends of SOEs, private and foreign enterprises. The proportion of foreign enterprises is stable in the past decade. The number of firms without ultimate controllers was increasing over one decade which implies the ownership of listed firms in China is becoming dispersed.

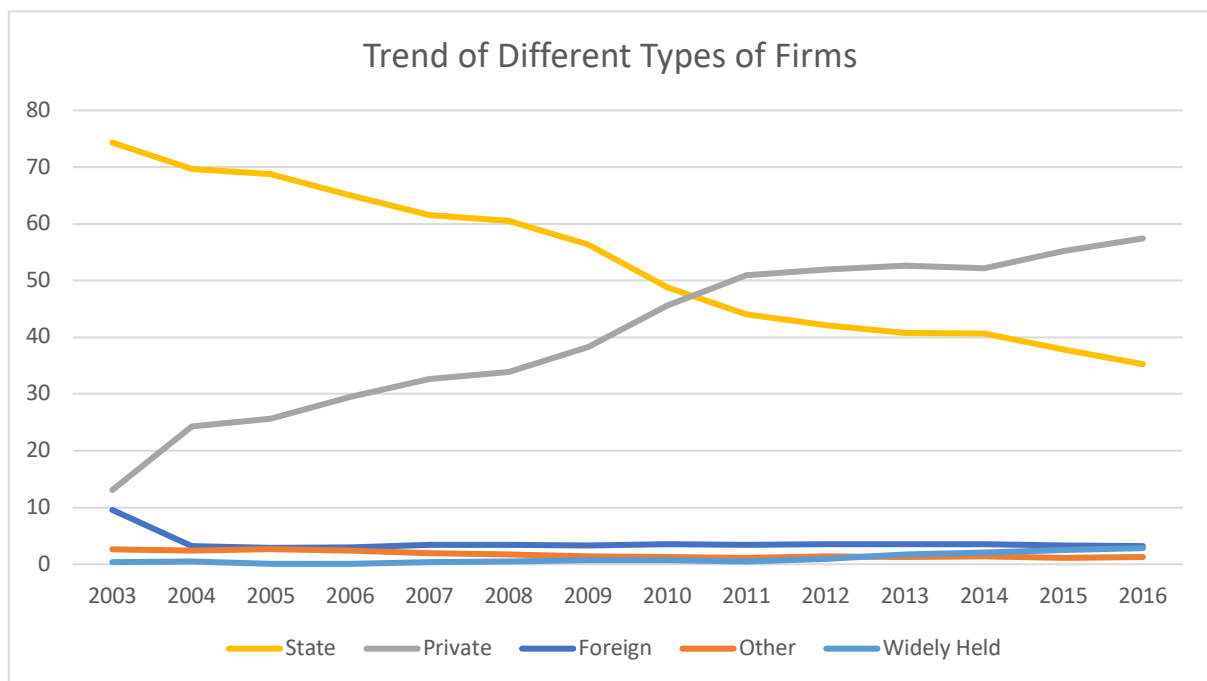


Figure 2 Trend of Different Types of Listed Firms

Figure 3 shows the distribution of 21 detailed controllers' ownerships types from 2003 to 2016. The local state-owned enterprises were the most common controllers of SOEs in 2003. However, they were gradually replaced by SASAC from 2004. This is due to the establishment of SASAC in 2003. Central SASAC, provincial and municipal SASAC constantly supersede other state controllers.

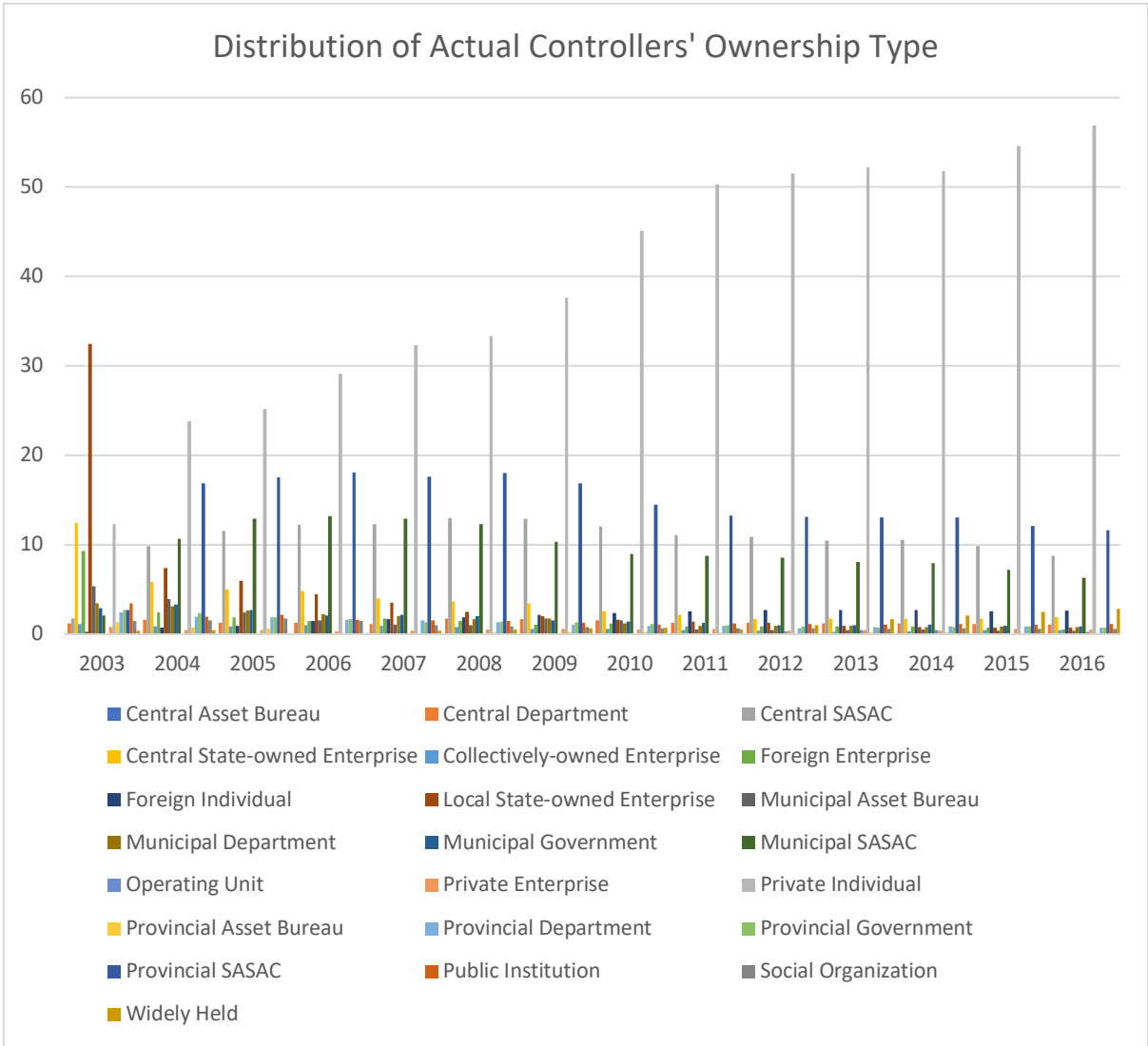


Figure 3 Distribution of Controllers' Ownership

3.1.3 Ownership Variables

We use dummy variable to measure the ownership structure of listed firms. *Controller* is the dummy variable to indicate the ultimate controller of the firm. The firms without controllers are used as the baseline. Demsetz and Villalonga's (2001) point out a study that uses the management to account for the complexity of interests represented by a given ownership structure would present a more accurate description of the ownership– performance relation. This paper uses the fraction of shares held by board of directors, board of supervisors,

executives and management, namely *Director, Supervisor, Executive, Management* as control variables to provide an exact relation between ownership and performance.

3.1.4 Performance Measures

The paper adopts various proxies to measure the firm performance, including the profitability (ROA, ROE, Tobin Q, Net Profit Margin and EBIT), employment (the number of employees), investment, labour productivity (Operating Revenue per Employee and Operating Profit per Employee), Investment (Capital Expenditure), Investment Efficiency (Return on Capital Employed and ROI), Operating Efficiency (ROS and Expense Ratio) and Firm Output (Operating Revenue and Operating Profit). We adjust the EBIT, Capital Expenditure, Operating Revenue and Operating Profit based on Consumer Price Index¹⁷ (CPI 2003 =100). We also winsorize the data at 1% and 99% level to exclude extremum. The explanation of performance measures is shown in the table 4.

Insert Table 4

3.1.5 Control Variables

The study controls firm level characteristics, including managerial ownership, split share reform, firm size, leverage, firm age and financial crisis from 2007 to 2010. The explanation of control variable is presented in table 5.

Insert Table 5

¹⁷ CPI data is obtained from National Bureau of Statistics of China.

3.2 Methodology

The empirical model used in the study is based on fixed effects regression analysis, as the Ordinary Least Squares (OLS) would ignore individually specific effects and Hausman Test in table 6 shows that fixed effect is more suitable for the data set. Following Anderson and Reeb (2003), Gugler et al. (2014), we employ dummy variables for each year and dummy variables for each stock code as fixed effects. The regression equation is described as follows:

$$Performance_{i,t} = \alpha_0 + \alpha_1 Controller_{i,t} + \alpha_3 Firm - level Variables_{i,t} + \beta_1 StockCode_{i,t} + \beta_2 Year_{i,t} + \varepsilon_{i,t}$$

Where

$Performance_{i,t}$ are the measures for firm performances of firm i in year t , namely profitability, employment, labour productivity, investment, investment efficiency, operating efficiency and firm output;

$Controller_{i,t}$ is the dummy variable indicating the type of ultimate controller of firm i in year t ;

$Firm - level Variables_{i,t}$ are the variables controls firm-level effects of firm i in year t , namely *Director, Supervisor, Executive, Management, SSR, Size, Leverage, Firm Age and Crisis*;

$StockCode_{i,t}$ is the firm fixed effects variable identifying the unique code of firm i in year t ;

$Year_{i,t}$ is the year fixed effects variable identifying year of firm i in year t .

4. Empirical Findings

The section provides the empirical results of the study. Section 4.1 presents the univariate analysis of the different performance measures. Section 4.2 describes the regression results of the effect of controllers on firm performances.

4.1 Univariate Analysis

Table 7 show the mean value of various performance measures for the listed firm with different controllers. The average value of performances varies with the types of controllers. The central SASAC has larger average number of employees than other controllers. As one of the governmental agencies, the SASACs bear the responsibility to stabilize society and hire more employees. The number of employees of SASAC decreases with its administrative level. Specifically, the central, provincial and municipal SASAC has the average employee value of 3.501, 3.431 and 3.372 respectively. The SASACs, especially the central SASAC, show higher labour productivity in operating revenue per employee than other controllers. Similar with the employment, the SASACs are capable to invest more than other controllers. There is no surprise that firms with the controller of central SASAC has the largest average output. Acting as the supervisor and manager of SOEs, the SASAC has sufficient resources and financial support from the government. The paper estimates the significance of differences in firm performance by using the ANOVA and Tukey-Kramer test¹⁸. Table 8 show the comparison groups which have significant differences at 5%.

Insert Table 7 and 8

¹⁸ We use the Tukey-Kramer test from UCLA website: <https://stats.idre.ucla.edu/stata/faq/faqhow-can-i-do-post-hoc-pairwise-comparisons-using-stata/>. UCLA proves three methods post-hoc pairwise comparisons: Tukey HSD, Tukey-Kramer and Fisher-Hayter. The three methods will yield the same test statistic when the cell sizes are equal but will differ when cell sizes are unequal. The Tukey-Kramer or the Fisher-Hayter are usually preferred when the cell sizes are unequal.

4.2 Effects of Controllers on Firm Performance

The section applies the firm and year fixed effects regression to estimate the effect of listed firms' ultimate controllers on different types of firm performance, namely profitability, employment, labour productivity, investment, investment efficiency, operating efficiency and firm output. The results are presented in Table 9.

Insert Table 9

In Table 4.6, column 1 shows the results for ROA. The Central Asset Bureau has positive effects on firm ROA, while Municipal Asset Bureau and Municipal SASAC are negatively related to ROA. Specifically, when the Central Asset Bureau controls the listed firm, the firm ROA would increase 0.03 but decrease by 0.019 and 0.016 if Municipal Asset Bureau and Municipal SASAC controls. The Private, Foreign Individuals and Social Organization also increase firm ROA by 0.01, 0.0028 and 0.024, respectively. Column 2 shows the results for Tobin Q. Among all the controllers, the Central SASAC and Municipal Government have a negative effect on the Tobin Q. The coefficients -0.882 and -1.013 and significant at 10% level. The results about the effect of controllers on firm profitability show that governmental controllers have negative effect on firm profitability, such as Central SASAC, Municipal Asset Bureau, Municipal Government and Municipal SASAC. However, certain governmental controllers are positively related to firm profitability, such as Central Asset Bureau. The finding is inconsistent with previous studies. (Wei et al., 2003; Sun and Tong, 2005) Previous studies report a negative relationship between state ownership and firm performance. The studies do not separate different governmental agencies and treat the state share as one type of ownership. Different forms and levels of state ownership can lead to different firm performances. The positive relationship between Central Asset Bureau and firm ROA implies the significance to categorize different governmental agencies and examine their effects on firm performance separately. Central Asset Bureaus is the asset management and operation department affiliated

to central government, excepting SASAC. There are only two Central Asset Bureaus acting as the ultimate controller in our sample, namely Orient Asset Management Bureau and State-owned Assets Administration Department. They are the professional state-owned assets management entities and aim at asset value appreciation.

The Foreign Individual and Private Individual both have positive relationship with firm profitability. Wei et al. (2003) discuss that foreign investors can monitor and positively impact the firm. The presence of foreign ownership drives management to perform consistently with firm value maximization. Foreign ownership could provide access to international capital resources, advanced technology, and superior managerial expertise. Preservation of the access is profitable to shareholders and firms. Firms with the controller of a private individual are actively monitored by the individual. In fact, the private controllers usually appoint themselves or representatives as the chairman of the firms. These controllers or representatives have the managerial and industrial knowledge to operate a company and effectively monitor the management. Moreover, as the private controller could receive more dividends from the efficient daily operation, the agency conflicts between ownership and management could be mitigated when a private individual is the controller. Given the discussion, the foreign and private controllers are expected to have positive effect on firm profitability.

The coefficients of Municipal SASAC and Municipal Asset Bureau related to ROA are -0.016 and -0.019, respectively. The results show that when Municipal SASAC and Municipal Asset Bureau control the listed firms, the ROA of listed firm would decrease by 0.016 and 0.019. The Municipal SASAC has less negative effect on ROA than Municipal Asset Bureau. As the SASAC performs investor's responsibilities, supervises and operates the state-owned assets, enhances the management of the state-owned assets, and has the responsibility of supervising

the preservation and increment of the value of the state-owned assets. SASAC should legislate laws and regulations on the management of the state-owned assets, establishes related rules and regulations. SASAC also has the rights to appoint or dismiss the executives of the supervised enterprises and evaluate their performances through legal procedures. In sum, SASAC is acting on behalf of the state council and takes charge of the daily management of the supervisory panels. With the responsibilities, SASAC is expected to manage and monitor the listed firm more efficiently. Besides, compared with Municipal Asset Bureau, the Central Asset Bureau is positively associated with ROA. The Chairman of the Board of State Development and Investment Corporation, Wang Huisheng, points out that the title of the central enterprise itself is the largest social responsibilities in the conference of 22nd June 2017¹⁹. The controllers at central level should obey and serve the national strategy, develop in conformity with legal provisions, act as the representative and pioneers of the times. In turn, the central enterprises could receive more benefits and supports from the central government, and then perform better than the enterprise on lower administrative level. The finding implies that privatization is not the only implement benefiting the profitability of listed firm, transformation of control rights to central asset bureau or provincial department from other state controllers can also improve the firms' profitability.

Column 3 shows the results for employment. Among all the controllers, the Central SASAC, Central Department, Central and Local State-owned Enterprises, Municipal Asset Bureau, Municipal Government, Municipal SASAC and Foreign Enterprise have positive impact on employment, and the Social Organization has negative effects. The coefficients of the Central

¹⁹ Wang, J. and Du, Y.F. (2017) Hui-sheng wang: the title of the central enterprise itself is the biggest social responsibilities. People's Daily Online. [Online] P.1. Available at: <http://ccnews.people.com.cn/n1/2017/0623/c142089-29358418.html> [Accessed 25th, March 2018].

SASAC is significantly positive at 1% level and larger than that of other State Controllers. The central enterprises have the political responsibility, social responsibility, economic responsibility and the responsibility of the enterprise development. A central enterprise may fail in its obligations without the responsibilities. The third plenary session of the 18th CPC Central Committee indicated that central enterprises should standardize employment system and eliminate the systematic obstacles and employment discrimination of area, industry, identity, gender and other factors affecting equal employment. In practice, central enterprises participants energetically in the recent Belt and Road Initiative²⁰. The Belt and Road is a development strategy proposed by Chinese Government that focuses on connectivity and cooperation between Eurasian countries. There are 47 central enterprises investing in or cooperating with other countries' firms. These central enterprises are constructing 1676 projects focusing on infrastructure construction, energy construction, capacity corporation parks and performing social responsibility, such as ecological environmental protection, employment problems and public welfare establishments. For example, the PetroChina promotes employment by providing more than thirty thousand jobs in Kazakhstan; sponsor education by funding the international students; improves people's livelihood by building and reconstructing 72 schools, 30 hospitals, power facilities, water supply facilities, roads, and bridges. Employment is a primary objective of State-owned Enterprises, especially the central enterprise. The Central SASAC as the controller has greater responsibility on employment than the other state controllers.

²⁰ Source: Li, N.H. and Du, Y.F. (2017) A figure to understand how central enterprises participate in the "The Belt and Road". People's Daily Online. [Online] P.1. Available at: <http://ccnews.people.com.cn/n1/2017/0512/c141677-29271634.html> [Accessed 25th, March 2018].

Column 4 shows the results for operating revenue per employee. The listed firm controlled by Central Asset Bureau have a 23.5% increase in the operating revenue per employee than widely-held companies. Local State Enterprise, Municipal Asset Bureau, Municipal Government, Municipal SASAC are negatively associated with the operating revenue per employee. Most state controllers have negative effects on the labour productivity except the Central Asset Bureau. The asset bureau is either the precursor, the sub-level entity of SASAC or a sole asset management department focusing on culture, education etc. As a distinguished asset management entity, the asset bureau could perform individually from SASAC. Other state controllers have to sacrifice labour productivity to fulfil social tasks. Compared with the state controllers at the same level, SASAC also performs better in the labour productivity, which implies appointing Central Asset Bureau and other central state controllers could benefit the labour productivity of SOEs.

Column 5 presents the results for capital expenditure which is proxied for firm investment. The Provincial Department and Provincial SASAC can increase the firm investment by 20.7% and 14.2% respectively when they control the listed firms. Foreign Controllers, Private Individual and Operating Unit also have positive impacts. The state controllers at provincial level can not only enjoy political benefits, there also exist numerous financing platforms helping the controllers raise capital and invest. The positive relationship between foreign individual and investment show that foreign controllers could get access to international capital and benefit the firm and shareholders. (Wei et al., 2003) Column 6 shows the results for investment efficiency. There is no controller affecting the investment efficiency.

Column 7 shows the results for ROS. The Central Asset Bureau, Provincial Department, Foreign Individual, Private Individual and Social Organizations are all positively related to firm operating efficiency. The provincial state controller is the mediation between the central and grassroots. Without direct supervision, the provincial controllers use juggling strategies and collusions to skimp or weaken the policy implementation. They focus on the improvement of firm operation and management rather than fulfilling social responsibilities. Bai et al. (2006) point out that the local governments capture only a fraction of the external benefits of social stability and therefore do not have sufficient incentives to maintain social stability. The results also indicate that foreign and private controllers can monitor and positively affect the operation and management of the firm. Wei et al. (2003) discuss that the presence of foreign ownership could force the managers to align their interests with firm value maximization. Column 8 presents the results for operating revenue. The Central SASAC and Central Asset Bureau can improve firm output by 6.7% and 6.2 % when obtain the control rights. The controllers at central level should obey and serve the national strategy, develop in conformity with legal provisions, act as the representative and pioneers of the times. In turn, the central enterprises could receive more benefits and supports from the central government, and then perform better than the enterprise on lower administrative level. So, there is no surprise that the central controllers do perform better than others on the employment.

To sum up, different types of controllers has distinct impacts on firm performance. The findings are summarized as follows. First, the effects of state controllers are inconsistent. Previous studies report a negative relationship between the state ownership and firm performance. (Wei et al., 2003; Sun and Tong, 2005) However, the results in the study show that some of state controllers could have positive impacts on profitability, employment, investment, operating efficiency and firm output which almost covers all performance measures in the paper. And

others may decrease firm performances. The finding is consistent with the argument that the state-controlled enterprises have the political responsibility, social responsibility, and economic responsibility. Employment is a primary objective of state-controlled enterprises, especially the central enterprise. And the state controllers have close relationship with the authority and easily access to the sources. Second, different types of state controllers have distinguishing effects on firm performances. The results present that state controllers may be negatively related to firm performances. Nevertheless, provincial department has positive effects on investment and operating efficiency. It is significant to distinguish different types of state controllers when estimating their effects on firm performance. Third, the state controllers at higher administrative level perform better than those at lower level. The central state controllers are superior to the municipal controllers in profitability, employment and labour productivity. The controllers at central level should obey and serve the national strategy, develop in conformity with legal provisions. They could receive more supports from the central government and perform better than the enterprise on lower administrative level. Fourth, the SASAC perform better than other state controllers. The SASAC is a commission of China and directly under the state council. It performs investor's responsibilities, supervises and operates the state-owned assets, and enhances the management of the state-owned assets. The results in the study show that the SASAC has fewer negative impacts than other governmental agencies at the same administrative level. Fifth, Private and Foreign controllers have positive effects on firm profitability, employment, investment and operating efficiency.

4.3 Effects of Controllers on Firm Performances in Different Groups

To further estimate the effect of different types of controllers, the paper groups the controllers in different categories. The section first estimates the effects of four major controllers on firm performances, namely State, Foreign, Private and Other. The result is shown in Table 10. The

results show that the state controllers only have positive influences on firm employment. Private controllers can increase firm investment and operating efficiency, and the foreign controllers would improve investment when they control the listed companies.

Insert Table 10

Then we estimate the effects of 14 state controllers on firm performance. The results are presented in Table 11. In this estimation, non-state controllers are treated as the reference group. The results show that only the Central Asset Bureau increases firm ROA comparing with non-state controllers. For other performance measures, state controllers are superior to others in employment and firm output. State controllers bear too many duties to stabilize society and engage in public welfare which may lead to low profitability and efficiency. Transferring the control rights from other controllers to the state results in firm inefficiency.

Insert Table 11

Tables 12 and 13 show the effects of foreign and private controllers on firm performance. The listed firms controlled by foreign controllers perform better in profitability, employment, investment, operating efficiency, but worse in labour productivity than others. The private controlled firms have higher profitability, labour productivity, investment, operating efficiency and less employment. The results provide a general view about the control rights transfer between controllers in different groups.

Insert Table 12 and 13

Table 14 show the effects of state controller without central and local SOEs at central, provincial and municipal levels. The results are consistent with previous findings. State controllers at central level bring less harm to firm profitability and operating efficiency than those at municipal level. As discussed before, high-level connection means more political and financial supports which lead to better performances. But the coefficients of state controllers at provincial level of Tobin's Q are less negative than those at central level. This could be attributed to that lower-level governments have long gaming relationships with local SOEs and are the most sensitive agencies to policies demand of the microcosmic systems. They can also represent of microcosmic bodies to negotiate effectively with the higher-level governments and strive for proper reforming spaces and resources. Especially, the provincial level as the mediation between the central and municipal levels enjoy flexible social policy implementation and also benefits from local financing platform.

Insert Table 14

We also group state controllers into 6 categories, namely government, department, asset bureau, SASAC, SOEs and Public Institution and estimate the effects of every group on firm performance. Table 15 show the effects of every state group on firm performance. SOEs as controllers have least negative influences on firm profitability and operating efficiency. The SOEs are more profit-oriented than other governmental organs. Also, the SASACs are superior to other state controllers in several firm performance, such as the Tobin Q, labour productivity, investment, and firm output. This is also consistent with previous findings. SASAC is acting on behalf of the state council and takes charge of the daily management of the supervisory panels. With the responsibilities, SASAC is expected to manage and monitor the listed firm more efficiently than other state controllers.

Insert Table 15

4.4 Endogeneity

The SASAC was established in 2003 and the number of SOEs controlled by the SASAC has been steadily increasing since then. As estimated in the previous part, the SASAC as the controller has less adverse impact on the performance of listed firms. There is reason to believe that the controlling rights by the SASAC is affected by the firms' performance to some extent. The Chinese government always attaches importance to the pillar firms and may select the firms with outstanding performances and transfer the controlling rights to SASAC. A potential concern with the regressions is that controlling rights may not be exogenous and some firm performances could result in fixed effects model's coefficients to be biased. The endogeneity lays on the existence of selection bias of SASAC.

To test whether the selection bias and reverse causality problem exist, we adopt the Heckman two-step selection model from Heckman (1979) and Maury (2006). We model the control of SASAC as the endogenous variable. Following the Maury (2006), we include the Tobin's Q, Operating Revenue per Employee, Capital Expenditure, ROI, ROS, and Operating Revenue in the first stage *Probit* model respectively as these performances may affect the SASAC's control over the listed firms. The *Probit* model also includes all control variables. Then we regress the performance measures on the SASAC dummy with all control variables and *lambda* from the first stage. The results are presented in the following table 16²¹. The SASAC is more likely to control the listed firms with low firm value, operating efficiency, firm output and high labour productivity. The second-stage regressions present results which are consistent with previous findings.

Inset Table 16

²¹ Control variables are not presented in the first-stage regression to conserve space and only the two stage regressions with significant lambdas are presented in table 16.

5. Conclusion

The paper aims at investigating the effect of ownership structure on the listed firm performance in China. Previous studies (Wei et al., 2003; Sun and Tong, 2005; Chen et al., 2008; Firth et al., 2010) use share types as the proxies for the ownership structure which may obfuscate the actual effects of ownership. Using the share types as the indicators of ownerships fails to separate the state-owned legal person shares and private-owned legal person shares. To estimate the accurate effects of different types of ownership, the study investigates the nature of the top shareholders rather than the types of shares they hold and classifies the shareholders into four major categories: state, foreign, private, other, and 21 sub-categories. The classification scheme is developed by distinguishing the shareholders' objectives. The sample in the paper includes 957,987 firm years from 2003 to 2016. The firm performance measures include: profitability, employment, labour productivity, investment, investment efficiency, operating efficiency and firm output. The paper employs firm and year fixed effect to estimate the relationship between ultimate controllers and firm performance.

The results in the study shows state controllers, such as Central SASACs and Municipal Controllers, have negative effects on profitability. Compared with the widely held companies, the firms controlled by Central SASAC, or Municipal Controllers have lower profitability. However, when the Central Asset Bureaus obtain the control rights, they can improve firm profitability, labour productivity, operating efficiency and firm output. The finding is not consistent with previous studies which present negative relations between state ownership and firm performance (Wei et al., 2003; Sun and Tong, 2005). Most state controllers can increase firm employment when they control the listed firms, as they obey the instruction of the government to fulfil social responsibilities such as absorbing employees. With the support from the government, the listed firm controlled by Central SASAC or Asset Bureau would have

higher firm output than others. The state controllers at central level are superior to the municipal controllers in profitability and operating efficiently. Moreover, SASACs perform better than other state controllers. SASAC has fewer negative impacts than other governmental agencies at the same administrative level in labour productivity, investment and firm output. The Private and Foreign controllers have positive effects on firm profitability, employment, investment and operating efficiency

The findings imply that it is necessary to separate different types of ownerships when estimating their effects on firm performances. When implementing reforming strategies, the policy-makers should be aware that the privatization only benefits the former SOEs in certain aspects, such as profitability, but decreases the employment and firm output. Even though most state controllers may harm the performances of firm, several types of state controllers are beneficial to employment, investment and operating efficiency, such as Central SASAC, Central Asset Bureau, Provincial SASAC and Provincial Department. Moreover, providing sufficient financial and political supports for local and small SOEs could be an efficient method to improve their performances.

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Table 1 Literature of the ownership structure in China

Table 1 summarizes the literature about ownership structure about Chinese market including purposes, findings and the methods used to identify ownership structure.

Authors	Objectives	Findings	Ownership Structure
Sun and Tong (2003)	Performance changes of SOEs regarding the share issuing privatisation from 1994 to 1998	SOEs' performance is improved by the privatisation. State ownership is negatively related to firm performance	Share types
Wei et al. (2005)	Relation between ownership structure and firm value	State shares are significantly negatively related to firm performances	Share types
Firth et al. (2010)	Roles played by state and mutual funds shareholders in the split share reform	State ownership is positively related to the final compensation ratio. State shareholders have greater incentives to promote the reform than institutional shareholders.	Share types
Liao et al. (2014)	Firm performance after split share reform	SoEs experience a quicker boost in output, profit, and employment than the non-SoEs.	Ultimate controller in the financial reports
Chen et al. (2008)	Performance changes when ownership transferring in the controlling shareholder from 1996 to 2000	Firms performance is improved when the control is transferred to a private entity. There are little changes in the firm performance when the control is passed to another government agency.	Share types
Cull et al. (2015)	Role of firms' government connections in determining the severity of financial constraints faced by Chinese firms	Government connections are related to financial constraints and large non-state firms with weak government connections are especially financially constrained	Questionnaire

Table 2 Ownership Classification

Table 2 shows the classification of ownership and the definitions.

Ownership	Definition
State Type	The State category includes all the types of state controller. The enterprises owned by state controller are State-Owned Enterprises.
Public Institution	Public Institution refers to the social service organization established by the government operate education, science and technology, culture, health, media and other activities. Public Institution is the legal person entity as the form of organization or institution. For example, China Agricultural University and Television Station are classified into this category.
Provincial Government	Provincial Government is the government at provincial level. It also includes municipal government directly under central government. For example, government of Zhejiang Province is classified into this category.
Municipal Government	Municipal Government is the government at municipal level. For example, government of Hangzhou is classified into this category.
Central Department	Central Department is the governmental department affiliated to central government, such as ministry, bureaus, commission, office et al. For example, Ministry of Finance is classified into this category.
Provincial Department	Provincial Department is the governmental department affiliated to provincial government, such as ministry, bureaus, commission, office et al. For example, Ministry of Finance of Zhejiang Province is classified into this category.
Municipal Department	Municipal Department is the governmental department affiliated to municipal government, such as ministry, bureaus, commission, office et al. For example, Ministry of Finance of Hangzhou is classified into this category.
Central Asset Bureaus	Central Asset Bureaus is the asset management and operation department affiliated to central government, such as asset bureaus, department, office et al., excepting SASAC. For example, Orient Asset Management Bureaus is classified into this category.
Provincial Asset Bureaus	Provincial Asset Bureaus is the asset management and operation department affiliated to provincial government, such as asset bureaus, department, office et al., excepting SASAC. For example, Beijing Economic-Technological Development Area State-owned Assets Management Office is classified into this category.
Municipal Asset Bureaus	Municipal Asset Bureaus is the asset management and operation department affiliated to municipal government, such as asset bureaus, department, office et al., excepting SASAC. For example, Anshan State-owned Assets Administration Bureau is classified into this category.
Central SASAC	Central SASAC is the State-owned Assets Supervision and Administration Commission.
Provincial SASAC	Provincial SASAC is the State-owned Assets Supervision and Administration Commission affiliated to provincial government. For example, Anhui State-owned Assets Supervision and Administration Commission is classified into this category.
Municipal SASAC	Municipal SASAC is the State-owned Assets Supervision and Administration Commission affiliated to municipal government. For example, Baotou Municipal People's Government State-owned Assets Supervision and Administration Commission is classified into this category.

(continued)

(continued)

Central State-owned Enterprise	Central State-owned Enterprise refers to the controller is the SOE affiliated to central government (SOEs here are legal persons). For example, Air China Limited is classified into this category.
Local State-owned Enterprise	Local State-owned Enterprise refers to the controller is the SOE affiliated to local (provincial/municipal) government (SOEs here are legal persons). For example, Anhui Conch Group Co., Ltd. is classified into this category.
Foreign Type	The Foreign category includes foreign individual and foreign enterprise. The enterprises owned by foreign controller are Foreign Enterprises
Foreign Individual	Foreign Individual refers to the individuals who are not the citizens of China, including the individuals from Hong Kong, Macao and Taiwan
Foreign Enterprise	Foreign Enterprise is a common investment vehicle for mainland China-based business wherein foreign parties can incorporate a foreign-owned limited liability company. For example, American Airlines, Inc. is classified into this category.
Private Type	The Private category includes private individual and private enterprise. The enterprises owned by private controller are Private Enterprises.
Private Individual	Private Individual refers to the individuals who domestic citizens of China, excluding the individuals from Hong Kong, Macao and Taiwan
Private Enterprise	Private Enterprise refers to the business or company that is managed by independent companies or private individuals rather than being controlled by the state. For example, Beijing Haidian Technology Development Co., Ltd. is classified into this category.
Other Type	The Other category includes Operating Unit, Collectively-owned Enterprise and Social Organization
Operating Unit	Operating Unit is one type of economic organization with their own name, address, fixed operation place, institutional framework, financial system, and employees. Operating Unit cannot have legal person status, control and dispose of the property or bear civil liability independently. For example, Aluminum Corporation of China is classified into this category
Collectively-owned Enterprise	Collectively-owned Enterprise refers to the independent commodity-economy organization based on public ownership of the means of production which benefit all its members. For example, All China Federation of Supply and Marketing Cooperatives is classified into this category
Social Organization	Social organization is a pattern of relationships between and among individuals and social groups. For example Employee Joint Stock Fund of Yuxian Nanlou Group, Yangquan is classified into this category.

Table 3 Distribution of Firm Type

Table 3 presents the distribution of firm types from 2003 to 2016. We identify the types of listed firms based on the ultimate controllers. The firms controlled by state controllers are identified as state-owned enterprises, the firms controlled by foreign controllers are identified as foreign enterprises, the firms controlled by private controllers are identified as private enterprises, the firms controlled by other controllers are identified as other enterprises, and the firms without controllers are treated as widely held firms. The weight of every type of listed firm is presented as the proportion among the total firms every year. The number of every type of listed firms and the total number of listed firms are also shown in the table.

Year	State		Private		Foreign		Other		Wildely held		Total Number of Firms
	Weights in Total Firms (%)	Number of Firms	Weights in Total Firms (%)	Number of Firms	Weights in Total Firms (%)	Number of Firms	Weights in Total Firms (%)	Number of Firms	Weights in Total Firms (%)	Number of Firms	
2003	74.32	932	13.08	164	9.57	120	2.63	33	0.4	5	1254
2004	69.66	939	24.26	327	3.19	43	2.45	33	0.45	6	1348
2005	68.76	929	25.61	346	2.89	39	2.66	36	0.07	1	1351
2006	65.06	931	29.49	422	2.94	42	2.45	35	0.07	1	1431
2007	61.56	953	32.62	505	3.42	53	2	31	0.39	6	1548
2008	60.56	969	33.88	542	3.38	54	1.69	27	0.5	8	1600
2009	56.38	985	38.24	668	3.26	57	1.43	25	0.69	12	1747
2010	48.78	1019	45.67	954	3.59	75	1.24	26	0.72	15	2089
2011	44.02	1020	50.93	1180	3.41	79	1.12	26	0.52	12	2317
2012	42.1	1026	51.95	1266	3.57	87	1.4	34	0.98	24	2437
2013	40.76	1017	52.67	1314	3.57	89	1.32	33	1.68	42	2462
2014	40.7	1020	52.19	1308	3.59	90	1.4	35	2.11	53	2562
2015	37.89	1018	55.19	1483	3.28	88	1.12	30	2.53	68	2687
2016	35.26	1042	57.43	1697	3.15	93	1.32	39	2.84	84	2955

Table 4 Firm Performance Measures

Table 4 presents the proxies for firm performance. Firm profitability measures include ROA and Tobin's Q, followed by the definition of each proxy. Firm employment measure includes the number of employees, followed by the definition; Firm labour productivity measure includes operating revenue per employee, followed by the definition; Firm investment measure includes capital expenditure, followed by the definition; Firm investment efficiency measure includes ROI, followed by the definition; Operating efficiency measure includes ROS, followed by the definition; Firm output measure includes operating revenue, followed by the definition. Among the measures, capital expenditure, operating revenue, operating profit are adjusted based on Consumer Price Index (CPI 2003=100).

Performance Measures	Definition
Profitability	
Return on Asset (ROA)	Net profits / Average total assets, <i>where</i> Average total assets = (Total assets of the start of this year+ Total assets of the end of this year) / 2)
Tobin's Q	(Market value of Equity + Book Value of Debt)/ Book value of assets <i>Where</i> Book Value of Debt = Notes Payable + Current Portion of Long-term Debt (Non-current liabilities due within one year) + Long-term Debt; Book Value of Asset= Total Asset - Net Intangible Assets – Net Goodwill – Total Liabilities
Employment	
Number of Employees	Logarithm of the number of Employees
Labor Productivity	
Operating Revenue per Employee	Logarithm of operating revenue per employee
Investment	
Capital Expenditure	Logarithm of capital expenditure (measured as change in gross property, plant, and equipment plus change in intangible assets)
Investment Efficiency	
Return on investment (ROI)	Investment Gains/ (Long Term Equity Investment + Held-To-Maturity Investment + Trading Financial Assets + Available-For-Sale Financial Assets + Derivative Financial Assets)
Operating Efficiency	
Return on sales (ROS)	Operating Profit/Operating Revenue <i>Where</i> Operating revenue is the revenue arising from operating business of the company except interests income, net earned premiums, commissions and fees income.
Firm Output	
Operating Revenue	Logarithm of Operating Revenue

Table 5 Control Variable and Definition

Table 5 presents the control variables and the definitions. We control firm-level factor, including the managerial ownership, Split Share Reform, firm size, firm leverage, firm age and financial crisis.

Control Variable	Definition
Director, Supervisor, Executive and Management	The fraction of shares held by director, supervisor, executive and management to control the effect of managerial ownership
SSR	The dummy variable control the impact of Split Share Reform on listed firms. SSR equals 1 if the listed firms had state ownership transfer during the period from 2005 to 2010, otherwise 0.
Size	Logarithm of total assets to control firm size
Leverage	(Long-term debt + current portion of long-term debt (Non-current Long-term Liability due within one year)) divided by total assets
Firm age	The number of years since the firm's establishment.
Crisis	A dummy variable controls the impact of recent financial crisis on listed firms. SSR equals 1 if the sample year is from 2007 to 2010, otherwise 0.

Table 6 Hausman Test for the Effect of Controllers on Firm Performance

Table 6 shows the results of Hausman Test for the effect of controllers on firm performance. The value of Prob > chi2 of all performance measure are less than 0.05, which means fixed effect should be adopted.

Performance Measues	Prob>chi2
ROA	0
TobinQ	0
Employees	0
Operating Revenue per Employee	0
Capital Expenditure	0
ROI	0.043
ROS	0
Operating Revenue	0

Table 7 Summary Statistics of Firm Performances with Different Controllers Types

Table 7 reports the summary statistics of the firm performances with all controllers' ownership types. Panel A presents the performances of state controllers; Panel B presents the performances of foreign controllers; Panel C presents the performances of private controllers; Panel D presents the performances of other controllers; Panel E presents the performances of widely held firms. In every panel, the maximum number of observations of different performance measures with every state controller and the mean value of every performance measure with standard diversion in parentheses are reported.

Controller Types	Max. Obs.	ROA	TobinQ	Employees	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
Panel A: State									
Public Institution	387	0.043 (0.056)	4.669 (3.454)	3.109 (0.489)	5.803 (0.360)	7.766 (0.648)	0.231 (1.110)	0.070 (0.189)	8.910 (0.530)
Central Asset Bureau	3	0.047 (0.037)	4.583 (2.296)	2.673 (0.859)	6.134 (0.207)	7.877 (0.906)	0.493 (0.679)	0.056 (0.065)	8.807 (0.665)
Central Department	358	0.028 (0.056)	4.414 (4.936)	3.343 (0.629)	5.794 (0.479)	7.939 (0.916)	0.305 (1.381)	0.033 (0.262)	9.116 (0.632)
Central SASAC	2908	0.031 (0.058)	4.194 (3.661)	3.501 (0.577)	5.997 (0.417)	8.167 (0.827)	0.259 (1.082)	0.041 (0.165)	9.475 (0.628)
Central State-owned Enterprise	891	0.034 (0.060)	3.898 (3.733)	3.333 (0.591)	5.856 (0.473)	7.977 (0.870)	0.156 (0.715)	0.048 (0.198)	9.158 (0.652)
Local State-owned Enterprise	957	0.029 (0.062)	3.553 (2.986)	3.210 (0.558)	5.787 (0.551)	7.754 (0.855)	0.226 (1.265)	0.043 (0.209)	8.997 (0.575)
Provincial Asset Bureau	74	0.028 (0.076)	3.696 (5.384)	2.893 (0.701)	6.120 (0.590)	7.714 (0.850)	0.265 (1.278)	0.024 (0.347)	9.067 (0.444)
Provincial Department	317	0.030 (0.054)	3.932 (4.358)	3.134 (0.512)	5.791 (0.393)	7.910 (0.827)	0.158 (0.950)	0.104 (0.281)	8.886 (0.490)
Provincial Government	334	0.036 (0.058)	3.433 (3.215)	3.287 (0.698)	5.999 (0.554)	8.071 (0.943)	0.139 (0.371)	0.075 (0.232)	9.300 (0.619)
Provincial SASAC	3829	0.031 (0.056)	3.967 (4.224)	3.431 (0.606)	6.013 (0.497)	8.106 (0.902)	0.192 (0.834)	0.054 (0.189)	9.432 (0.622)
Municipal Asset Bureau	344	0.019 (0.059)	3.643 (3.982)	3.274 (0.426)	5.695 (0.423)	7.822 (0.814)	0.125 (0.493)	0.026 (0.199)	8.967 (0.516)
Municipal Department	397	0.028 (0.060)	4.423 (5.060)	3.178 (0.471)	5.743 (0.448)	7.853 (0.656)	0.142 (0.999)	0.064 (0.219)	8.905 (0.491)
Municipal Government	430	0.028 (0.052)	3.671 (3.334)	3.310 (0.383)	5.763 (0.401)	7.943 (0.673)	0.206 (0.844)	0.062 (0.152)	9.074 (0.455)
Municipal SASAC	2474	0.029 (0.056)	3.796 (4.047)	3.372 (0.507)	5.868 (0.422)	7.968 (0.782)	0.269 (1.238)	0.048 (0.189)	9.237 (0.560)
Panel B: Foreign									
Foreign Enterprise	407	0.029 (0.075)	4.001 (5.514)	3.278 (0.584)	5.762 (0.573)	7.864 (0.933)	0.407 (1.603)	-0.002 (0.347)	9.030 (0.721)
Foreign Individual	630	0.048 (0.058)	5.322 (5.094)	3.105 (0.535)	5.910 (0.428)	7.752 (0.683)	0.618 (1.773)	0.093 (0.175)	8.983 (0.513)
Panel C: Private									
Private Enterprise	140	0.037 (0.055)	4.278 (4.554)	3.159 (0.716)	5.849 (0.412)	7.690 (1.041)	0.263 (0.868)	0.034 (0.305)	9.064 (0.719)
Private Individual	12278	0.050 (0.060)	5.193 (4.847)	3.095 (0.499)	5.851 (0.410)	7.762 (0.763)	0.365 (1.437)	0.077 (0.195)	8.948 (0.557)
Panel D: Other									
Operating Unit	39	0.035 (0.057)	5.598 (4.779)	3.129 (0.489)	5.917 (0.368)	7.862 (0.800)	0.440 (1.739)	0.066 (0.190)	9.045 (0.559)
Collectively-owned Enterprise	164	0.054 (0.063)	3.814 (3.550)	3.381 (0.462)	5.791 (0.411)	7.906 (0.604)	0.401 (1.640)	0.085 (0.126)	9.132 (0.527)
Social Organization	239	0.032 (0.051)	3.140 (2.931)	3.326 (0.706)	5.784 (0.636)	7.890 (0.849)	0.199 (0.776)	0.052 (0.235)	9.110 (0.518)
Panel E: No Controller									
Widely Held Firms	331	0.037 (0.055)	4.538 (4.607)	3.371 (0.663)	5.951 (0.376)	8.068 (0.953)	0.283 (0.951)	0.050 (0.256)	9.168 (0.758)

Table 8 The ANOVA Results of the Significance of Firm Performance between Controller Group

Table 8 presents the comparison groups with significant differences of the firm performance. We first use ANOVA to determine the differences exist among the mean values of performance in firms with various controllers. Then we adopt Tukey-Kramer method (post-hoc pairwise comparison) to investigate the differences exist among which groups. The results in the table show that the mean values of different performance measures in every group are significantly different from each other at 5% level. For example, the mean value of ROA of the listed firm controlled by Central Department is significantly different from that of the listed firm controlled by Collectively-owned Enterprise. The comparison groups in which no significant differences exist are not reported in the table.

ROA		Tobin Q		Employees		Operating Revenue per Employee	
Comparison Groups	Comparison Groups	Comparison Groups	Comparison Groups	Comparison Groups	Comparison Groups	Comparison Groups	Comparison Groups
Central Department	vs Collectively-owned Enterprise	Central SASAC	vs Foreign Individual	Central Department	vs Central SASAC	Central Department	vs Central SASAC
Central Department	vs Foreign Individual	Central SASAC	vs Local State-owned Enterprise	Central Department	vs Foreign Individual	Central Department	vs Foreign Individual
Central Department	vs Private Individual	Central SASAC	vs Private Individual	Central Department	vs Local State-owned Enterprise	Central Department	vs Provincial Asset Bureau
Central SASAC	vs Collectively-owned Enterprise	Central State-owned Enterprise	vs Foreign Individual	Central Department	vs Municipal Department	Central Department	vs Provincial Government
Central SASAC	vs Foreign Individual	Central State-owned Enterprise	vs Private Individual	Central Department	vs Private Individual	Central Department	vs Provincial SASAC
Central SASAC	vs Private Individual	Collectively-owned Enterprise	vs Foreign Individual	Central Department	vs Provincial Asset Bureau	Central Department	vs Without
Central SASAC	vs Public Institution	Collectively-owned Enterprise	vs Private Individual	Central Department	vs Provincial Department	Central SASAC	vs Central State-owned Enterprise
Central State-owned Enterprise	vs Collectively-owned Enterprise	Foreign Enterprise	vs Foreign Individual	Central Department	vs Public Institution	Central SASAC	vs Collectively-owned Enterprise
Central State-owned Enterprise	vs Foreign Individual	Foreign Enterprise	vs Private Individual	Central SASAC	vs Central State-owned Enterprise	Central SASAC	vs Foreign Enterprise
Central State-owned Enterprise	vs Municipal Asset Bureau	Foreign Individual	vs Foreign Enterprise	Central SASAC	vs Municipal SASAC	Central SASAC	vs Foreign Individual
Central State-owned Enterprise	vs Private Individual	Foreign Individual	vs Municipal Asset Bureau	Central SASAC	vs Foreign Individual	Central SASAC	vs Local State-owned Enterprise
Collectively-owned Enterprise	vs Foreign Enterprise	Foreign Individual	vs Municipal Government	Central SASAC	vs Local State-owned Enterprise	Central SASAC	vs Municipal Asset Bureau
Collectively-owned Enterprise	vs Local State-owned Enterprise	Foreign Individual	vs Municipal SASAC	Central SASAC	vs Municipal Asset Bureau	Central SASAC	vs Municipal Department
Collectively-owned Enterprise	vs Municipal Asset Bureau	Foreign Individual	vs Provincial Department	Central SASAC	vs Municipal Department	Central SASAC	vs Municipal Government
Collectively-owned Enterprise	vs Municipal Department	Foreign Individual	vs Provincial Government	Central SASAC	vs Municipal Government	Central SASAC	vs Municipal SASAC
Collectively-owned Enterprise	vs Municipal Government	Foreign Individual	vs Provincial SASAC	Central SASAC	vs Municipal SASAC	Central SASAC	vs Private Enterprise
Collectively-owned Enterprise	vs Municipal SASAC	Foreign Individual	vs Social Organization	Central SASAC	vs Operating Unit	Central SASAC	vs Private Individual
Collectively-owned Enterprise	vs Provincial Department	Local State-owned Enterprise	vs Private Individual	Central SASAC	vs Private Enterprise	Central SASAC	vs Provincial Department
Collectively-owned Enterprise	vs Provincial SASAC	Local State-owned Enterprise	vs Public Institution	Central SASAC	vs Private Individual	Central SASAC	vs Public Institution
Collectively-owned Enterprise	vs Social Organization	Municipal Asset Bureau	vs Private Individual	Central SASAC	vs Provincial Asset Bureau	Central SASAC	vs Social Organization
Foreign Enterprise	vs Foreign Individual	Municipal Government	vs Private Individual	Central SASAC	vs Provincial Department	Central State-owned Enterprise	vs Municipal Asset Bureau
Foreign Enterprise	vs Private Individual	Municipal SASAC	vs Private Individual	Central SASAC	vs Provincial Government	Central State-owned Enterprise	vs Municipal Department
Foreign Individual	vs Local State-owned Enterprise	Municipal SASAC	vs Public Institution	Central SASAC	vs Provincial SASAC	Central State-owned Enterprise	vs Provincial Asset Bureau
Foreign Individual	vs Municipal Asset Bureau	Private Individual	vs Provincial Department	Central SASAC	vs Public Institution	Central State-owned Enterprise	vs Provincial Government
Foreign Individual	vs Municipal Department	Private Individual	vs Provincial Government	Central SASAC	vs Social Organization	Central State-owned Enterprise	vs Provincial SASAC
Foreign Individual	vs Municipal Government	Private Individual	vs Provincial SASAC	Central SASAC	vs Without	Collectively-owned Enterprise	vs Provincial Asset Bureau
Foreign Individual	vs Municipal SASAC	Private Individual	vs Social Organization	Central State-owned Enterprise	vs Foreign Individual	Collectively-owned Enterprise	vs Provincial Government
Foreign Individual	vs Provincial Department	Provincial Government	vs Public Institution	Central State-owned Enterprise	vs Local State-owned Enterprise	Collectively-owned Enterprise	vs Provincial SASAC
Foreign Individual	vs Provincial SASAC	Public Institution	vs Social Organization	Central State-owned Enterprise	vs Foreign Enterprise	Foreign Enterprise	vs Foreign Individual
Local State-owned Enterprise	vs Private Individual	Social Organization	vs Without	Central State-owned Enterprise	vs Private Individual	Foreign Enterprise	vs Municipal SASAC
Local State-owned Enterprise	vs Public Institution			Central State-owned Enterprise	vs Provincial Asset Bureau	Foreign Enterprise	vs Private Individual
Municipal Asset Bureau	vs Private Individual			Central State-owned Enterprise	vs Provincial Department	Foreign Enterprise	vs Provincial Asset Bureau
Municipal Asset Bureau	vs Provincial Government			Central State-owned Enterprise	vs Provincial SASAC	Foreign Enterprise	vs Provincial Government
Municipal Asset Bureau	vs Provincial SASAC			Central State-owned Enterprise	vs Public Institution	Foreign Enterprise	vs Provincial SASAC
Municipal Asset Bureau	vs Without			Collectively-owned Enterprise	vs Foreign Individual	Foreign Enterprise	vs Without
Municipal Department	vs Private Individual			Collectively-owned Enterprise	vs Local State-owned Enterprise	Foreign Individual	vs Local State-owned Enterprise
Municipal Government	vs Private Individual			Collectively-owned Enterprise	vs Municipal Department	Foreign Individual	vs Municipal Asset Bureau
Municipal SASAC	vs Private Individual			Collectively-owned Enterprise	vs Private Individual	Foreign Individual	vs Municipal Department
Municipal SASAC	vs Public Institution			Collectively-owned Enterprise	vs Provincial Asset Bureau	Foreign Individual	vs Municipal Government
Private Individual	vs Provincial Department			Collectively-owned Enterprise	vs Provincial Department	Foreign Individual	vs Provincial Asset Bureau
Private Individual	vs Provincial Government			Foreign Enterprise	vs Public Institution	Foreign Individual	vs Provincial Department
Private Individual	vs Provincial SASAC			Foreign Enterprise	vs Foreign Individual	Foreign Individual	vs Provincial SASAC
Private Individual	vs Social Organization			Foreign Enterprise	vs Private Individual	Foreign Individual	vs Public Institution
Private Individual	vs Without			Foreign Enterprise	vs Provincial Asset Bureau	Foreign Individual	vs Social Organization
				Foreign Enterprise	vs Provincial SASAC	Local State-owned Enterprise	vs Municipal SASAC
				Foreign Enterprise	vs Public Institution	Local State-owned Enterprise	vs Private Individual
				Foreign Enterprise	vs Provincial Government	Local State-owned Enterprise	vs Provincial Asset Bureau
				Foreign Enterprise	vs Provincial SASAC	Local State-owned Enterprise	vs Provincial Government
				Foreign Enterprise	vs Without	Local State-owned Enterprise	vs Provincial SASAC
				Foreign Enterprise	vs Social Organization	Local State-owned Enterprise	vs Without
				Foreign Enterprise	vs Without	Municipal Asset Bureau	vs Municipal SASAC
				Foreign Enterprise	vs Provincial SASAC	Municipal Asset Bureau	vs Private Individual
				Foreign Enterprise	vs Public Institution	Municipal Asset Bureau	vs Provincial Asset Bureau
				Foreign Enterprise	vs Provincial Government	Municipal Asset Bureau	vs Provincial Government
				Foreign Enterprise	vs Provincial SASAC	Municipal Asset Bureau	vs Provincial SASAC
				Foreign Enterprise	vs Without	Municipal Asset Bureau	vs Without
				Foreign Enterprise	vs Social Organization	Municipal Asset Bureau	vs Without
				Foreign Enterprise	vs Without	Municipal Asset Bureau	vs Without
				Foreign Enterprise	vs Provincial Asset Bureau	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Public Institution	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial Government	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Without	Municipal Department	vs Without
				Foreign Enterprise	vs Private Individual	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial Asset Bureau	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Public Institution	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial Government	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Without	Municipal Department	vs Without
				Foreign Enterprise	vs Social Organization	Municipal Department	vs Without
				Foreign Enterprise	vs Without	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Public Institution	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial Government	Municipal Department	vs Without
				Foreign Enterprise	vs Provincial SASAC	Municipal Department	vs Without
				Foreign Enterprise	vs Without	Municipal Department	vs Without
				Foreign Enterprise	vs Social Organization	Municipal Department	vs Without
				Foreign Enterprise	vs Without	Municipal Department	vs Without

(continued)

Table 9 Regression Results of the Effects of Ultimate Controller on Firm Performance

Table 9 presents the regression results examining the effect of ultimate controllers on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of state, foreign, private, other and non-controllers respectively with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis. The sample is yearly from 2003 to 2016. *Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Controller Type	(1) Profitability ROA	TobinQ	(2) Employment Employee	(3) Labor Productivity Operating Revenue per Employee	(4) Investment Capital Expenditure	(5) Investment Efficiency ROI	(6) Operating Efficiency ROS	(7) Firm Output Operating Revenue
State								
PublicInstitution	-0.010 (0.009)	-0.683 (0.694)	-0.002 (0.047)	-0.067 (0.052)	0.085 (0.083)	0.242 (0.194)	-0.018 (0.035)	-0.081*** (0.030)
CentralAssetBureau	0.030*** (0.008)	-1.589 (3.411)	-0.154 (0.126)	0.235* (0.125)	-0.144 (0.319)	0.392 (0.359)	0.101* (0.054)	0.067** (0.027)
CentralDepartment	-0.001 (0.009)	0.080 (0.812)	0.092* (0.050)	-0.082 (0.054)	0.121 (0.083)	0.178 (0.142)	-0.009 (0.053)	0.003 (0.040)
CentralSASAC	-0.010 (0.007)	-0.882* (0.534)	0.102*** (0.036)	-0.031 (0.037)	0.055 (0.072)	0.040 (0.114)	-0.020 (0.029)	0.062** (0.027)
CentralStateEnterprise	-0.007 (0.007)	-0.196 (0.567)	0.072* (0.039)	-0.035 (0.040)	0.066 (0.075)	0.081 (0.113)	-0.016 (0.030)	0.024 (0.032)
LocalStateEnterprise	-0.005 (0.007)	-0.219 (0.526)	0.063* (0.035)	-0.071* (0.037)	0.066 (0.069)	0.049 (0.116)	0.025 (0.027)	-0.013 (0.027)
ProvincialAssetBureau	0.001 (0.014)	0.404 (1.155)	-0.015 (0.074)	0.027 (0.073)	0.191 (0.121)	0.182 (0.262)	-0.054 (0.067)	0.013 (0.050)
ProvincialDepartment	0.011 (0.009)	-0.015 (0.680)	0.052 (0.054)	-0.079 (0.056)	0.207** (0.101)	-0.065 (0.133)	0.071** (0.033)	-0.026 (0.038)
ProvincialGovernment	-0.005 (0.011)	-0.745 (0.655)	0.043 (0.060)	-0.020 (0.060)	0.169 (0.121)	-0.165 (0.152)	0.012 (0.044)	0.023 (0.041)
ProvincialSASAC	-0.001 (0.007)	-0.764 (0.549)	0.031 (0.036)	0.008 (0.040)	0.142* (0.074)	-0.147 (0.111)	0.018 (0.028)	0.040 (0.028)
MunicipalAssetBureau	-0.019** (0.008)	-0.889 (0.648)	0.093** (0.042)	-0.093** (0.045)	0.024 (0.087)	-0.189 (0.136)	-0.019 (0.031)	-0.011 (0.031)
MunicipalDepartment	-0.002 (0.008)	-0.234 (0.685)	0.050 (0.053)	-0.060 (0.048)	0.076 (0.088)	-0.142 (0.118)	0.026 (0.035)	-0.017 (0.037)
MunicipalGovernment	-0.010 (0.008)	-1.013* (0.558)	0.104** (0.044)	-0.141*** (0.044)	0.123 (0.094)	-0.045 (0.125)	0.019 (0.031)	-0.055 (0.035)
MunicipalSASAC	-0.016** (0.007)	-0.661 (0.528)	0.099*** (0.035)	-0.063* (0.036)	0.039 (0.073)	-0.124 (0.104)	-0.006 (0.027)	0.025 (0.026)
Foreign								
ForeignEnterprise	-0.001 (0.008)	-0.087 (0.641)	0.079** (0.036)	-0.052 (0.041)	0.207*** (0.075)	0.056 (0.159)	0.027 (0.031)	0.019 (0.030)
ForeignIndividual	0.028*** (0.010)	-0.031 (1.119)	-0.039 (0.057)	0.032 (0.060)	0.424*** (0.092)	0.154 (0.214)	0.095** (0.039)	-0.007 (0.049)
Private								
PrivateEnterprise	0.009 (0.011)	-1.008 (1.081)	-0.082 (0.073)	0.001 (0.063)	0.054 (0.132)	-0.094 (0.122)	0.048 (0.040)	-0.086* (0.047)
PrivateIndividual	0.010* (0.006)	-0.004 (0.503)	0.001 (0.029)	0.026 (0.032)	0.144** (0.062)	0.055 (0.101)	0.060** (0.024)	0.010 (0.023)
Other								
CollectiveEnterprise	0.006 (0.011)	0.317 (0.811)	-0.037 (0.064)	0.037 (0.065)	0.016 (0.100)	-0.445 (0.275)	0.053 (0.033)	-0.009 (0.037)
OperatingUnit	0.011 (0.016)	0.976 (1.126)	0.077 (0.067)	-0.114 (0.077)	0.294*** (0.108)	-0.108 (0.400)	0.039 (0.051)	-0.051 (0.033)
SocialOrganization	0.024** (0.010)	-0.242 (0.622)	-0.161* (0.094)	0.083 (0.076)	0.090 (0.124)	-0.101 (0.142)	0.075* (0.045)	-0.091 (0.067)
Firm-level Control Variables				Included				
Constant	-0.058** (0.024)	5.102** (2.285)	-2.102*** (0.179)	3.180*** (0.205)	-1.885*** (0.265)	1.318*** (0.449)	-0.924*** (0.097)	1.087*** (0.156)
Observations	23428	23393	23381	22984	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845
R-squared	0.051	0.084	0.368	0.204	0.287	0.010	0.040	0.710

Table 10 Regression Results of the Effects of Four Major Ultimate Controller on Firm Performance

Table 10 presents the regression results about the effect of four major ultimate controllers on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of state, foreign, private, and other respectively with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Controller Type	(1) Profitability		(2) Employment	(3) Labor Productivity	(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
State	-0.008 (0.006)	-0.615 (0.501)	0.070** (0.031)	-0.047 (0.033)	0.087 (0.067)	-0.042 (0.092)	0.002 (0.026)	0.017 (0.024)
Private	0.010 (0.006)	-0.051 (0.497)	-0.001 (0.029)	0.027 (0.032)	0.144** (0.063)	0.055 (0.096)	0.058** (0.024)	0.009 (0.023)
Foreign	0.007 (0.007)	-0.120 (0.646)	0.049 (0.036)	-0.028 (0.039)	0.273*** (0.070)	0.079 (0.137)	0.044 (0.028)	0.016 (0.029)
Other	0.016* (0.008)	0.187 (0.577)	-0.075 (0.060)	0.034 (0.052)	0.118 (0.087)	-0.186 (0.151)	0.0617* (0.032)	-0.055 (0.041)
Firm-level Control Variables				Included				
Constant	-0.053** (0.024)	5.261** (2.288)	-2.116*** (0.181)	3.174*** (0.207)	-1.888*** (0.267)	1.337*** (0.449)	-0.915*** (0.098)	1.070*** (0.157)
Observations	23428	23393	23381	22984	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845
R-squared	0.047	0.082	0.364	0.200	0.285	0.008	0.037	0.708

Table 11 Regression Results of the Effects of State Controller on Firm Performance

Table 11 presents the regression results about the effect of state controllers on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of 14 state controllers respectively with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Controller Type	(1) Profitability		(2) Employment	(3) Labor Productivity	(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
PublicInstitution	-0.019** (0.007)	-0.659 (0.560)	-0.002 (0.042)	-0.084* (0.046)	-0.061 (0.065)	0.210 (0.178)	-0.072** (0.030)	-0.084*** (0.028)
CentralAssetBureau	0.020*** (0.006)	-1.560 (3.392)	-0.154 (0.125)	0.218* (0.122)	-0.288 (0.315)	0.365 (0.352)	0.047 (0.050)	0.065*** (0.022)
CentralDepartment	-0.010 (0.007)	0.104 (0.705)	0.093** (0.045)	-0.100** (0.049)	-0.022 (0.065)	0.146 (0.114)	-0.063 (0.050)	0.000 (0.038)
CentralSASAC	-0.020*** (0.005)	-0.850*** (0.324)	0.106*** (0.029)	-0.050* (0.029)	-0.087* (0.051)	0.017 (0.079)	-0.075*** (0.019)	0.062*** (0.023)
CentralStateEnterprise	-0.017*** (0.006)	-0.160 (0.387)	0.073** (0.033)	-0.051 (0.034)	-0.076 (0.055)	0.058 (0.077)	-0.069*** (0.021)	0.024 (0.029)
LocalStateEnterprise	-0.014*** (0.005)	-0.197 (0.297)	0.061** (0.027)	-0.086*** (0.029)	-0.0840* (0.044)	0.019 (0.084)	-0.029* (0.016)	-0.016 (0.020)
ProvincialAssetBureau	-0.009 (0.013)	0.420 (1.070)	-0.015 (0.070)	0.012 (0.070)	0.029 (0.108)	0.152 (0.250)	-0.110* (0.063)	0.012 (0.047)
ProvincialDepartment	0.002 (0.007)	-0.007 (0.513)	0.051 (0.050)	-0.094* (0.051)	0.056 (0.087)	-0.094 (0.106)	0.016 (0.025)	-0.029 (0.034)
ProvincialGovernment	-0.014 (0.010)	-0.725 (0.491)	0.042 (0.056)	-0.036 (0.055)	0.024 (0.103)	-0.192 (0.132)	-0.043 (0.038)	0.020 (0.037)
ProvincialSASAC	-0.011** (0.005)	-0.743** (0.314)	0.033 (0.031)	-0.010 (0.033)	-0.008 (0.053)	-0.177** (0.079)	-0.037** (0.019)	0.0382* (0.023)
MunicipalAssetBureau	-0.028*** (0.006)	-0.853* (0.498)	0.093*** (0.036)	-0.110*** (0.039)	-0.117* (0.067)	-0.219** (0.106)	-0.072*** (0.023)	-0.013 (0.026)
MunicipalDepartment	-0.012* (0.006)	-0.219 (0.532)	0.048 (0.049)	-0.078* (0.043)	-0.070 (0.067)	-0.175** (0.086)	-0.028 (0.027)	-0.021 (0.033)
MunicipalGovernment	-0.019*** (0.007)	-0.991*** (0.359)	0.103*** (0.037)	-0.159*** (0.036)	-0.023 (0.072)	-0.078 (0.089)	-0.036 (0.023)	-0.0583*** (0.029)
MunicipalSASAC	-0.025*** (0.005)	-0.642** (0.317)	0.097*** (0.028)	-0.079*** (0.027)	-0.107** (0.049)	-0.155** (0.064)	-0.060*** (0.018)	0.022 (0.020)
Firm-level Control Variables	Included							
Constant	-0.045* (0.023)	5.019** (2.237)	-2.115*** (0.179)	3.204*** (0.203)	-1.715*** (0.261)	1.378*** (0.436)	-0.860*** (0.096)	1.087*** (0.155)
Observations	23428	23393	23381	22984	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845
R-squared	0.049	0.084	0.365	0.203	0.285	0.010	0.039	0.709

Table 12 Regression Results of the Effects of Foreign Controller on Firm Performance

Table 12 presents the regression results about the effect of foreign controllers on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of 2 foreign controllers respectively with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Controller Type	(1) Profitability		(2) Employment	(3) Labor Productivity	(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
ForeignEnterprise	-0.006 (0.005)	0.076 (0.443)	0.065** (0.025)	-0.052* (0.030)	0.090* (0.048)	0.043 (0.138)	-0.016 (0.021)	0.019 (0.022)
ForeignIndividual	0.023** (0.009)	0.158 (1.071)	-0.056 (0.052)	0.025 (0.055)	0.304*** (0.077)	0.136 (0.208)	0.058* (0.035)	-0.021 (0.046)
Firm-level Control Variables				Included				
Constant	-0.052** (0.023)	5.051** (2.228)	-2.094*** (0.180)	3.184*** (0.206)	-1.774*** (0.260)	1.365*** (0.437)	-0.880*** (0.096)	1.083*** (0.156)
Observations	23428	23393	23381	23159	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2854	2883	2597	2852	2845
R-squared	0.044	0.082	0.362	0.204	0.285	0.008	0.034	0.708

Table 13 Regression Results of the Effects of Private Controller on Firm Performance

Table 13 presents the regression results about the effect of private controllers on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of 2 private controllers respectively with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Controller Type	(1) Profitability		(2) Employment	(3) Labor Productivity	(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
PrivateEnterprise	0.011 (0.009)	-0.715 (0.930)	-0.132* (0.068)	0.039 (0.054)	0.090* (0.048)	0.043 (0.138)	-0.016 (0.021)	0.019 (0.022)
PrivateIndividual	0.012*** (0.003)	0.397 (0.266)	-0.048** (0.020)	0.062*** (0.022)	0.304*** (0.077)	0.136 (0.208)	0.058* (0.035)	-0.021 (0.046)
Firm-level Control Variables	Included							
Constant	-0.056** (0.024)	4.849** (2.253)	-2.062*** (0.179)	3.144*** (0.205)	-1.774*** (0.260)	1.365*** (0.437)	-0.880*** (0.096)	1.083*** (0.156)
Observations	23428	23393	23381	22984	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845
R-squared	0.045	0.082	0.363	0.200	0.285	0.008	0.034	0.708

Table 14 Regression Results of the Effects of Administrative Levels on Firm Performance

Table 14 presents the regression results about the effect of state controllers at different administrative levels on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of state controllers at 3 administrative levels, central, provincial, and municipal level respectively with standard error in the parentheses. The central state-owned enterprise and local state-owned enterprise are not included in the state controllers in the table. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

Administrative Level	(1) Profitability		(2) Employment	(3) Labor Productivity	(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue
CentralLevel	-0.007** (0.003)	-0.515** '(0.203)	0.061*** (0.017)	-0.019 (0.018)	-0.025 (0.029)	-0.002 (0.052)	-0.031** (0.012)	0.046*** (0.012)
ProvincialLevel	-0.001 (0.004)	-0.511** '(0.211)	-0.002 (0.021)	0.026 (0.023)	0.051 (0.038)	-0.182*** (0.059)	-0.012 (0.013)	0.035** (0.016)
MunicipalLevel	-0.015*** (0.004)	-0.539** '(0.231)	0.061*** (0.020)	-0.057*** (0.019)	-0.051 (0.036)	-0.176*** (0.052)	-0.033*** (0.013)	0.004 (0.015)
Firm-level Control Variables	Included							
Constant	-0.048** (0.023)	5.059** (2.232)	-2.102*** (0.179)	3.191*** (0.204)	-1.731*** (0.260)	1.383*** (0.435)	-0.871*** (0.096)	1.087*** (0.155)
Observations	23428	23393	23381	22984	23377	19180	23212	23201
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845
R-squared	0.046	0.083	0.364	0.200	0.284	0.009	0.035	0.708

Table 15 Regression Results of the Effects of State Groups on Firm Performance

Table 15 presents the regression results about the effect of 6 state groups on firm performance. The firm performances include profitability (ROA and Tobin's Q), employment (the number of employees), labor productivity (operating revenue per employee), investment (capital expenditure), investment efficiency (ROI), operating efficiency (ROS), firm output (operating revenue). The table shows the coefficients of 6 state groups, namely government, department, asset bureau, SASAC, state-owned enterprise and public institution with standard error in the parentheses. The firm-level control variables comprise managerial ownership, split share reform, firm size, firm age, leverage and financial crisis.

The sample is yearly from 2003 to 2016.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

State Group	(1) Profitability		(2) Employment	(3) Labor Productivity		(4) Investment	(5) Investment Efficiency	(6) Operating Efficiency	(7) Firm Output
	ROA	TobinQ	Employee	Operating Revenue per Employee	Capital Expenditure	ROI	ROS	Operating Revenue	
Government	-0.017*** (0.006)	-0.869*** (0.336)	0.078** (0.035)	-0.101*** (0.035)	-0.002 (0.066)	-0.116 (0.085)	-0.043* (0.023)	-0.018 (0.026)	
Department	-0.008* (0.005)	-0.084 (0.388)	0.067** (0.033)	-0.094*** (0.033)	-0.026 (0.049)	-0.053 (0.068)	-0.026 (0.023)	-0.018 (0.024)	
AssetBureau	-0.023*** (0.006)	-0.644 (0.482)	0.0674** (0.034)	-0.076** (0.036)	-0.082 (0.061)	-0.109 (0.068)	-0.080*** (0.024)	0.000 (0.025)	
SASAC	-0.018*** (0.004)	-0.757*** (0.261)	0.077*** (0.024)	-0.049* (0.025)	-0.068* (0.041)	-0.118** (0.054)	-0.055*** (0.015)	0.037** (0.018)	
SOE	-0.016*** (0.004)	-0.185 (0.279)	0.0661*** (0.025)	-0.077*** (0.026)	-0.086** (0.042)	0.012 (0.067)	-0.043*** (0.015)	-0.005 (0.020)	
PublicInstitution	-0.019*** (0.007)	-0.693 (0.532)	-0.010 (0.041)	-0.081* (0.045)	-0.064 (0.066)	0.152 (0.181)	-0.065** (0.027)	-0.089*** (0.027)	
Firm-level Control Variables	Included								
Constant	-0.045* (0.024)	5.040** (2.238)	-2.109*** (0.180)	3.202*** (0.205)	-1.723*** (0.262)	1.372*** (0.435)	-0.865*** (0.096)	1.090*** (0.155)	
Observations	23428	23393	23381	22984	23377	19180	23212	23201	
Number of Firms	2892	2903	2883	2840	2883	2597	2852	2845	
R-squared	0.048	0.083	0.364	0.201	0.284	0.009	0.038	0.709	

Table 16 Heckman Two-step Selection Model of Firm Performances

Table 16 show the results of the Heckman two-step selection model. The first-stage probit model estimates the relation between SASAC control rights and firm performances. The second-stage model estimates the relation between firm performances and state controllers with corrected self-selection.

*Significance at 10% level. **Significance at 5% level. ***Significance at 1% level.

	Tobin's Q	OperatingRevenuePerEmployee	ROS	OperatingRevenue
First Stage Regression				
Firm Performances	-0.0022***	0.0167***	-0.0758***	0.1118***
Firm-Level Variable	Include	Include	Include	Include
Second State Regression				
Government	-0.927***	-0.0550***	-0.0382***	0.0132**
Department	-0.412**	-0.0407***	-0.0302***	0.0110**
AssetBureau	-1.020***	-0.0217	-0.0650***	0.0235***
SASAC	-0.193***	0.00657	-0.0186***	0.0441***
SOE	-0.202	-0.0392***	-0.0242***	0.0042
PublicInstitution	-0.841***	-0.0259	-0.0516***	-0.00049
Firm-Level Variable	Include	Include	Include	Include
lambda	57.64***	-1.727***	2.246***	-2.180***
Constant	-271.6***	13.10***	-13.11***	12.14***