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Abstract

Ever since Deng Xiaoping’s reforms commencing in the 1980s, how to improve efficiency of state-owned enterprises has been on the government agenda. Progress has been made but more slowly than one expects in the decade. Even worse, against all the odds, China’s large state-owned firms, mega-SOEs, the backbone of Maoist economy previously, have gained exponential growth in the past decade. Reforms of that part of the economy have stalled. Why?

To reveal the rationale and mechanisms of the rise of mega-SOEs, this study establishes a two-stage game model for an ‘authoritarian market economy’ (or a ‘market-Leninist economy’) where market monopoly and rent-seeking by state-owned conglomerates is firmly entrenched. Our findings confirm a ‘subgame perfect Nash equilibrium’ in China’s authoritarian market economy that has led the state (the owner or ‘principal’) and the large state-owned firms (the manager or the ‘agent’) to a paradox which prevents continuous reforms towards a Pareto solution for efficiency improvement.

Keywords: authoritarian market economy, rent-seeking, subgame perfect Nash equilibrium, SOEs, economic reforms, economic efficiency

JEL classification codes: D86, L13, P20, P26, P31

1. Introduction and motivations

In the past several decades of economic reforms since Deng Xiaoping's new leadership, a burning issue has been debated in terms of how to reform the state-owned enterprises (SOEs, *guoyou qiye*, or *guoqi*) that have become dominated the economy ever since their systematic adoption in the 1950s from the late Soviet Union.¹ These SOEs are notoriously inefficient. Hence, the issue of their reforms arises. As China has moved towards adoption of market mechanism in the past three decades,² SOEs' glory in China is repeatedly predicted over, *à la* the destiny of their counterparts in post-communist Eastern Europe and Russia (see Figure 1).³ This however has not yet happened. Instead, China's SOEs have been re-adjusted, streamlined, and vindicated so that their influence goes on.

All the time the state visible hand has been busy helping SOEs as a whole. A few stages can be identified. In the beginning, from *circa* 1980 to 1995, the state advocated limited degree of managerial autonomy without altering the state ownership: power decentralization (*fangquan*), profit retention (*rangli*) and contractual responsibility (*chengbao zhi*).⁴ This conservative approach did not reverse the downturn of the SOE sector which was now under the cross fire of the competition from state-of-art firms from the West on the other hand and that of highly motivated home-grown private operators on the other.

The second stage began in 1998. During his term in office Premier Zhu Rongji initiated a reform known as 'to invigorate large enterprises and let go small ones' (*zhuada*

¹ In accordance with Lin, Cai and Li, inefficiency of SOEs in China is an endogenous agency problem from the Soviet administratively planned economy. The symptoms include a lack of managerial autonomy in decision-making, a lack of incentives for profits, soft budget constraints, and so on; see J. Lin, Fang Cai, and Zhou Li, 'Competition, Policy Burdens and State-Owned Enterprise Reform', *The American Economic Review*, 88/2 (1998), pp. 422-7.

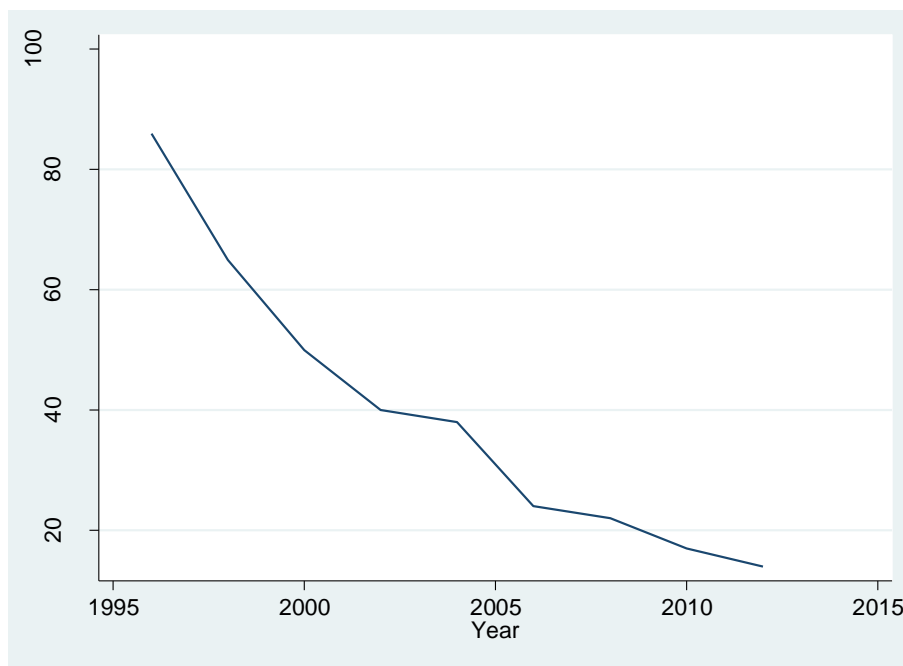
² After its TWO membership since 2001, although having a market, China has not yet been granted the status of a market economy.

³ J. Bennett, J. Maw, and S. Estrin, 'Why Did Transition Economies Choose Mass Privatisation?', *Journal of the European Economic Association*, 3/2-3 (2005), pp. 567-75.

⁴ C. Bai, J. Lu, and Z. Tao, 'The Multitask Theory of State Enterprise Reform: Empirical Evidence from China', *The American Economic Review*, 96/2 (2006), pp. 353-7.

fangxiao).⁵ The government concern was that in a communist country large state-owned enterprises (*yangqi*) ultimately determine and dictate the political colour of the economy.⁶ Small and medium firms were politically less important and their privatisation did no political harm to the communist ruling. Consequently, from 1998 to 2008, about 80 percent SOEs were under the knife for privatisation: inefficient SOEs either went bankrupt or were sold cheaply to private owners. China's reforms have allegedly reduced the aggregate number of the state-owned enterprises, as demonstrated in Figure 1.

Figure 1. Decline in the Total Number of Industrial SOEs, 1996-2012



Source: 'State-owned enterprises', <http://finance.caijing.com.cn/20150120/3803161.shtml>, available on 20th January, 2017.

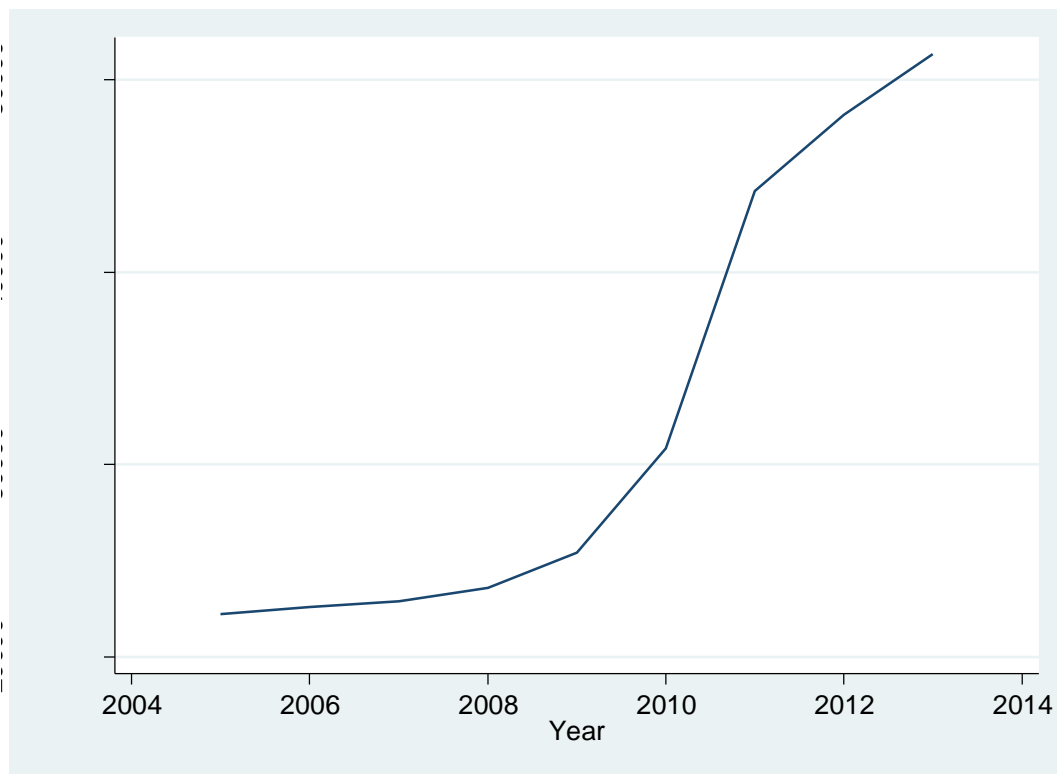
What is less known, however, is that many such firms did not die. They were simply combined and re-structured to consolidate into new state-owned conglomerates of even

⁵ J. Wu, *Contemporary China's Economic Reforms* (Shanghai: Shanghai Far East Press, 2003).

⁶ R. Garnaut and Y. Huang, *Growth without Miracles: Readings on the Chinese Economy in the Era of Reform* (Oxford: Oxford University Press, 2000), pp. 286-7.

grows sizes in order to maintain the share of SOEs in the national economy.⁷ As the real deduction made exclusively among small firms, large SOEs have took off in an all-rounded fashion: their number, assets, bank loans, profits and workforce (see Figures 2-4).

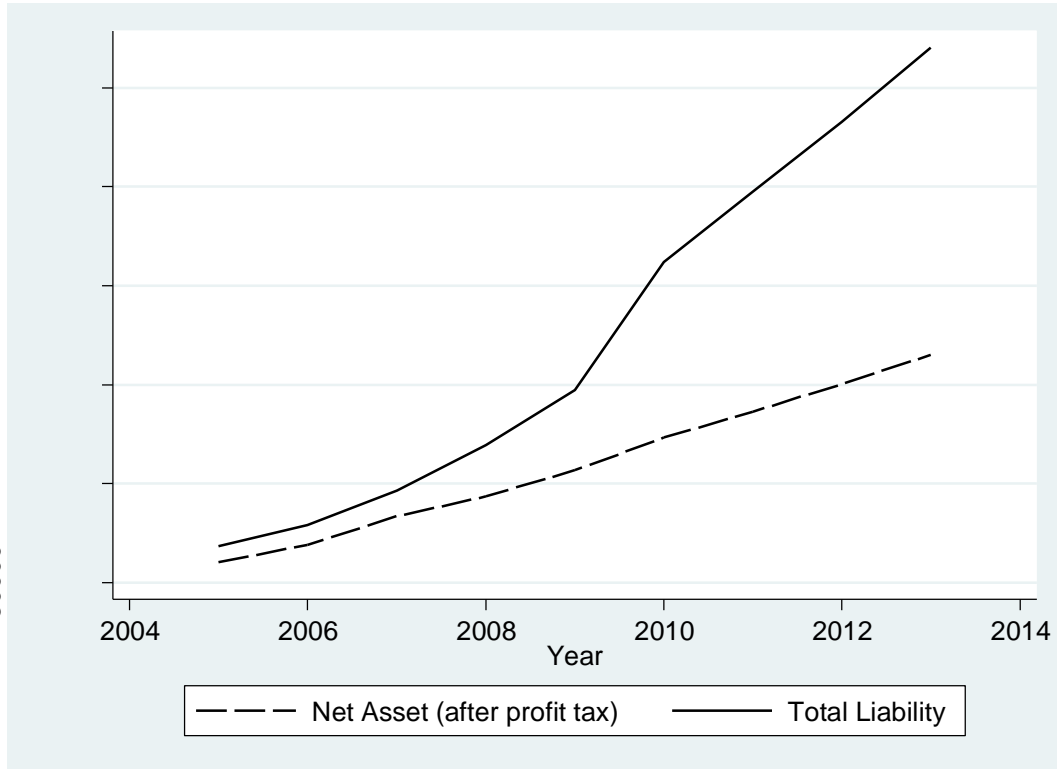
Figure 2. Rise of the Number of Mega-SOEs, 2005-2013



Source: 'State-owned enterprises', www.wind.com.cn, available on 10th February, 2017.

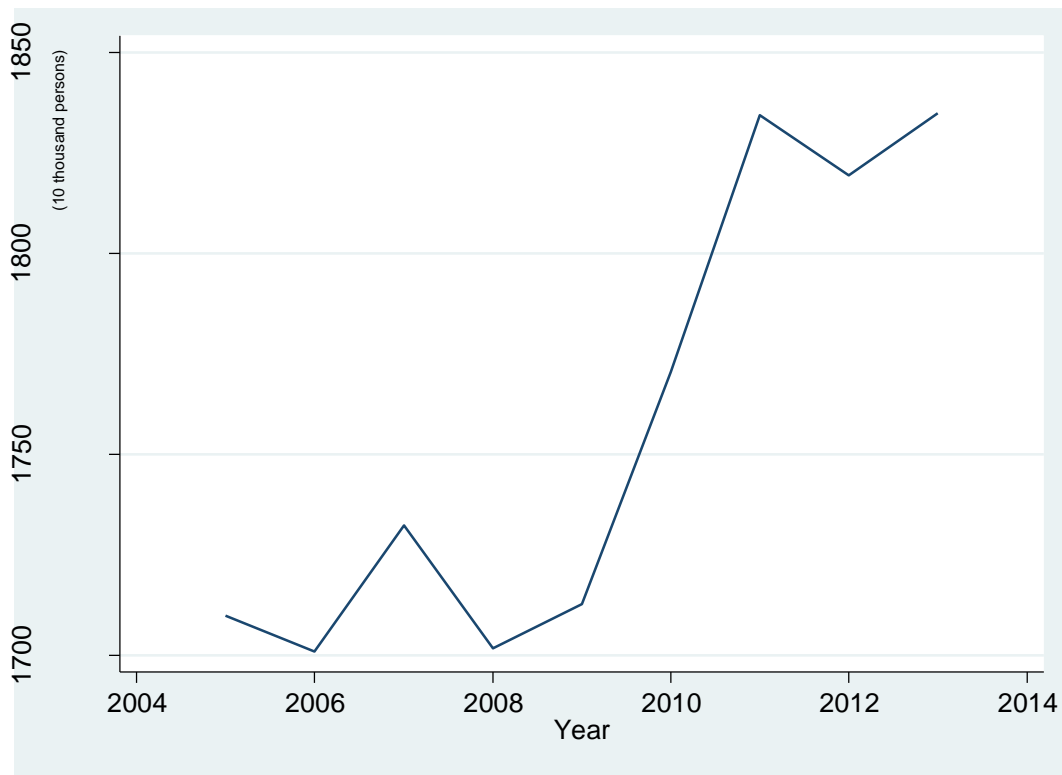
⁷ C. Hsieh and Zheng (M.) Song, 'Grasp the Large, Let Go of the Small: The Transformation of the State Sector in China', *Brookings Papers on Economic Activity*, Spring 2015, pp. 295-346.

Figure 3. Rise of the Total Bank Loans (Liability) and Net Assets of Mega-SOEs, 2005-2013



Source: 'State-owned enterprises', www.wind.com.cn, available on 10th February, 2017.

Figure 4. Rise of the Total Workforce Hired by Mega-SOEs, 2005-2013



Source: ‘State-owned enterprises’, www.wind.com.cn, available on 10th February, 2017.

SOEs have maintained a heavy weight in the Chinese economy: throughout the 2000s the SOE sector hired 40 percent of China’s urban workforce;⁸ the top 100 SOEs possessed 35 percent of all corporate assets in China; state-owned banks practically

⁸ Q. Sun and W. H. S. Tong, ‘China Share Issue Privatisation: The Extent of Its Success’, *Journal of Financial Economics*, 70 (2003), pp. 183-222; C. A. Holz, *China’s Industrial State-Owned Enterprises: Between Profitability and Bankruptcy* (Singapore: World Scientific Press, 2003)

controlled all the capital in the banking sector.⁹ Such a move marked the beginning of the ‘red *zaibatsu* era’ in China’s contemporary business history: now large SOE conglomerates, or ‘mega-SOEs’ (*yangqi*), control China’s key economic sectors more firmly than ever before,¹⁰ similar to privileged conglomerates *zaibatsu* in modern Japan but under the banner of communism, hence the term ‘red *zaibatsu*’.¹¹ Most tellingly, profitability of the state sector seems to be superior to its private counterpart all the time (see Figure 5).

⁹ B. Young, ‘The Asian Growth Models and Asia Challenges’, 2nd Annual OECD WPC World Pensions and Investments Forum, 2017): <http://www.oecd.org/finance/private-pensions/49720953.pdf>.

¹⁰ Such as those in the energy, transport, telecommunication, defence, banking and finance sectors today.

¹¹ The contemporary Chinese terms is *da-er*.

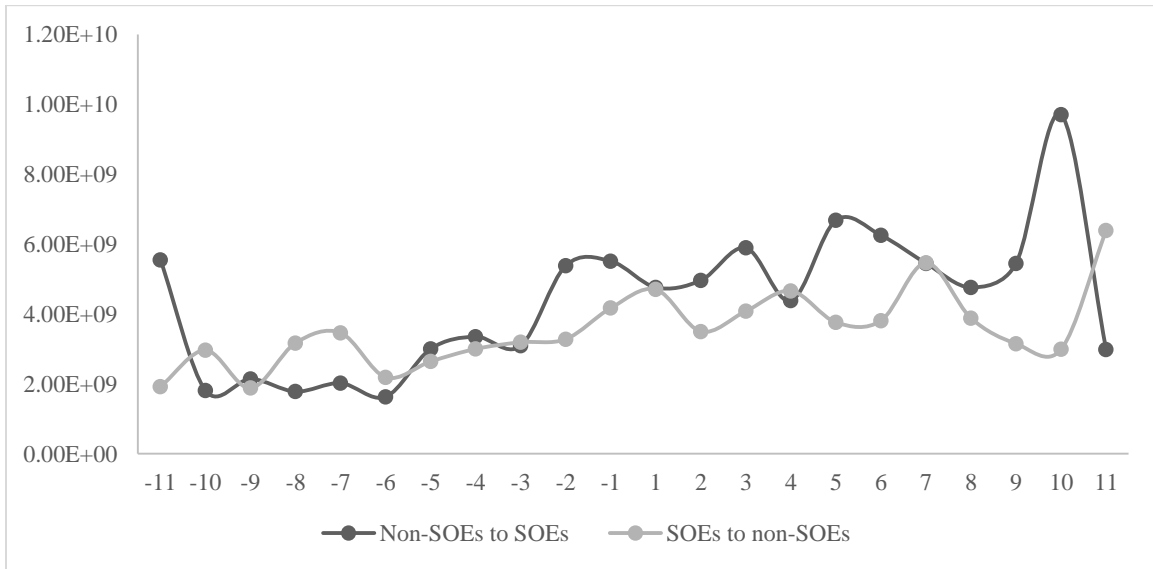
Figure 5. Profitability of State-Controlled Firms and Private Firms, 1999-2009



Source: Based on the own calculations of authors. The data are collected from *Wind Information database*, www.wind.com.cn; National Statistical Bureau, *Zhongguo Daxing Gongye Qiye Nianjian (Chinese Large Industrial Enterprises Yearbook)* (Beijing, Statistical Press, 1999-2009).

To prove the point further, after becoming SOEs, non-SOEs become infected by gigantism. From our data, 126 companies have changed from non-SOEs to SOEs, and 239 from SOEs to non-SOEs. In Figure 6, the vertical line represents a base-year (Year 1, when the change happened) and those years before the change (with a negative value, for example, “-1” implying one year before the change happened) and after the change (with a positive value, for example, “2” implies the second year after the change happened). The horizontal line shows size of asset (in RMB ¥). The change makes ex-non-SOEs growing larger.

Figure 6. Size Changes due to Non-SOEs Becoming SOEs, and Vice Versa



Source: Wind Financial Terminal Database, vide www.wind.com.cn.

Note: Year 1 is the time when the change happened. Year 1 is thus not any calendar year but the year when a firm makes a switch. So, Year 1 thus varies from firm to firm.

One may safely assume that such a development does not happen randomly but is well planned. It is thus worth mapping evolutionary changes of SOEs in post-Mao China. In the beginning, from *circa* 1980 to 1995, the state permitted limited degree of managerial autonomy without altering the state ownership, known as (1) power decentralization (*fangquan*), (2) profit retention (*rangli*) and (3) contractual responsibility (*chengbao zhi*).¹² This conservative approach did not reverse the downturn of the SOE sector which was under the cross fire of market competition from state-of-art firms from the West on the other hand and that of highly motivated home-grown private operators on the other. As result, a third of them ran businesses into the red.¹³ The reform did not work. The second stage began in 1998. During his term in office Premier Zhu Rongji initiated a

¹² C. Bai, J. Lu, and Z. Tao, 'The Multitask Theory of State Enterprise Reform: Empirical Evidence from China', *The American Economic Review*, 96/2 (2006), pp. 353-7.

¹³ Q. Sun and W. H. S. Tong, 'China Share Issue Privatisation: The Extent of Its Success', *Journal of Financial Economics*, 70 (2003), pp. 183-222.

reform ‘to invigorate large enterprises and let go small ones’ (*zhuada fangxiao*).¹⁴ The key dogmatic concern is that in a communist country large state-owned enterprises (*yangqi*) ultimately determine and dictate the political colour of the economy.¹⁵ Small firms are politically less important and their privatisation cause less political harm to the communist rule.¹⁶ Consequently, from 1998 to 2008, as many as 80 percent SOEs were either combined into mega-firms or under the knife for bankruptcy/privatisation and thus reduced the aggregate number of the state-owned enterprises (see Figure 1). The third stage came in the wake of the 2008 global banking crisis and during Premier Wen Jiabao’s term in office. This time the SOE sector went for an overdrive. The new strategies were (1) to ‘create bigger and stronger SOEs to expand beyond China’s territory’ (*zuoda zuoqiang, zou chuqu*), and (2) to ‘expand SOEs at the expanses of the private sector’ (*guojin mintui*) side by side with the government stimulus package of four trillion RMB *yuan* whose beneficiaries were almost exclusive meg-SOEs.¹⁷ In this context, further privatisation of the SOE sector has not only been thrown out of the window but also become an ideological taboo.

The question is whether the rise of mega-SOEs automatically mean that they are now more efficient than private firms. If they are, deepening reforms in the state sector becomes unnecessary. Or, the mega-SOEs’ high profitability has little to do with their market efficiency and competitiveness. After all, in neo-classical economics, there is a model concerning monopoly and oligopoly with which profitability is not linked to

¹⁴ J. Wu, *Contemporary China’s Economic Reforms* (Shanghai: Shanghai Far East Press, 2003).

¹⁵ R. Garnaut and Y. Huang, *Growth without Miracles: Readings on the Chinese Economy in the Era of Reform*. Oxford (Oxford University Press, 2000), pp. 286-7.

¹⁶ This raises a question whether the Chinese system is ‘state capitalism’; see Xi, Li, X. Liu, and Y. Wang, ‘A Model of China’s State Capitalism’, *HKUST IEMS Working Paper*, February 2015.

¹⁷ Wu J., ‘*Guojin Mintui*’ (Expansion of SOEs at the Expanses of the Private Sector), *Shangwu Zhoukan* (*Business Weekly*), 24 (2009), pp. 20-1; Deng Wei, ‘*Guojin Mintuide Xueshu Lunzheng Jiqi Xia Yibu*’ (Debate on Expansion of SOEs at the Expanses of the Private Sector), *Gaige* (*Reforms*), 4 (2010), pp. 39-46; Ge Z., ‘*Guojin Mintuide Benzhi Yu Zhongguo Shichang Jingji Tizhi Jiangou*’ (Essence of Expansion of SOEs at the Expanses of the Private Sector and Construction of China’s Market Economy), 1/10 (2010), pp. 43-7.

economic efficiency but economic rent. This sheds light on our understanding of the entrenchment and expansion of mega-SOEs in the era of red *zaibatsu* in China.

The reality is that financial or accounting gains achieved by large state-owned firms continue to be associated with an old ownership framework.¹⁸ Granted, the post-Mao economic reforms made the Soviet system more malleable than it was originally designed. This mutant Soviet system can be called ‘authoritarian market economy’ which operates in a distorted market and yields monopolistic rent as the main characteristics of large SOEs in China. For our purpose, it is better to define SOEs as a phenomenon of ‘authoritarian market economy’ rather than ‘state-capitalism’ to capture both the origin and essence of the ‘SOE economy’.¹⁹ This is because the state constantly exerts its administrative power to manipulate the market and milk the economy for rent.

In this context, SOEs are merely a means for the state’s end, whatever the end might be. Three such aspects of the state’s end can be identified: (1) ‘policy burdens’ (artificially imposed targets beyond the healthy economic function of the enterprise),²⁰ (2) ‘soft budget’ (meaning that firms will not be made liable if they cannot deliver their performance targets), and (3) business conglomeration or ‘business empire-building’ (meaning business diversification). Policy load forces SOEs to operate inside the production possibility frontier instead along it by employing more labour than they technically need in order to fulfil mandatory government social-warfare targets at the expense of SOEs’ economic efficiency. This is the stick. Soft budget, the prevailing form of government

¹⁸ It has been argued that the high profitability of SOEs appears exclusively from the closed ‘upper stream’ infrastructure sector of the Chinese economy that is controlled by the state through exploitation of the open ‘lower stream’ manufacturing sector of the economy; see Zhang Jun, *China’s Unfinished Reform* (Singapore: World Scientific Publisher, 2013), ch. 1.

¹⁹ The concept of ‘market-Leninism’ was coined in 1993 by the American journalist Nicholas Kristof who argued that the key feature of market-Leninism in China is that the state uses its centralised administrative power to promote the economic growth with a degree of liberalisation of a planned economy. The later terms ‘authoritarian market economy’ and ‘market authoritarianism’ were created by Stefan Halper in his book *The Beijing Consensus* (2010). The influence of SOEs, currently prevailing in the Chinese economy, illustrates such a ‘heretic market form’ in full swing.

²⁰ Such burdens commonly take the forms of (1) extra labour-hiring quotas beyond the optimal size of the workforce for a firm, and (2) low return investment projects that no other investors are interested.

finance, is then used to compensate SOEs' suboptimal performance. Thanks to generous soft budget moribund mega-SOEs in China have not only remained unscathed but also magnified. This is the carrot. These two always come as a pair. Both are endogenous for China's authoritarian market economy. Intuitively, such a system that rewards SOEs' economic inefficiency will not last. But in reality, the SOE sector flourishes and expands by gobbling up market after market, sector after sector, region after region, and on its way to take on the world. Indeed, almost all Chinese companies on the world top 500 league table are mega-SOEs. In the process, they conquer more market and hire more workers. Against all the odds, 'two wrongs' - policy burdens and soft budget - make a right. But there is a catch: the soft budget is financed by rent yielded somewhere from the authoritarian market economy. The loop is now complete.

Aggressive diversification in capital investment and increase in workforce hired by mega-SOEs strengthen the legitimacy and *raison d'être* for the party-state in China. So much so, China's SOEs are seen as the embodiment of 'state capitalism'.²¹ In this context, mega-SOEs are the state *per se* in China. The result is institutionalised distortion of the Chinese economy.

We argue that (1) market monopoly for monopolistic rent rather than operational efficiency is the paramount concern of both the state and the mega-SOEs, in turn rent extraction facilitates policy load-bearing; (2) there exists no incentive for stakeholders - the state and the SOEs - to give up monopoly because China's authoritarian market economy created a subgame perfect Nash equilibrium in which no players have incentives to reform unilaterally; (3) without political will, the current reform deadlock will continue indefinitely.

The remainder of the study is organized as the follows: Section 2 is devoted to a review of literature; Section 3 offers a statistical model; Section 4 contains a theoretical/mathematical framework for the rise and expansion of mega-SOEs; Section 5 offers final remarks.

2. Literature review

²¹ A. Szamosszegi and C. Kyle, 'An Analysis of State-owned Enterprises and State Capitalism in China', U.S.-China Economic and Security Review Commission, October 26, 2011.

Generally speaking, opinions are divided into two camps. One sees a reduction of government policy burdens and hardening soft budget on mega-SOEs as the pragmatic way to solve the inefficiency problem of the SOEs; the other sees changes in firms' ownership (hence privatisation of mega-SOEs) as the panacea for reversing poor performance.

Regarding causes for SOE inefficiency, there are the aforementioned 'policy burdens' and 'soft budget'. The former was used to fulfil government's general social welfare schemes;²² and the latter, to rescue firms in difficulty due to the burdensome schemes.²³ The negative impact of policy burdens have been well analysed. Types of government mandatory policy burdens on SOEs have been identified as compulsory labour-hiring quotas for excessive workers, often unskilled and technically redundant, together with their welfare entitlement packages.²⁴ Moreover, there is compulsory extra investment, ignoring China's absolute or comparative advantages.²⁵ From the viewpoint of neo-classical economics, the removal of these burdens is the *sine qua non* for any efficiency

²² E.g. J. Lin and G. Tan, 'Policy Burdens, Accountability, and the Soft Budget Constraint', *American Economic Review*, 89/2 (1999), pp. 426-31; X. Dong and L. Putterman, 'Soft Budget Constraints, Social Burdens, and Labour Redundancy in China's State Industry', *Journal of Comparative Economics*, 31/1 (2003), pp. 110-33; L. Li, 'Employment Burden, Government Ownership and Soft Budget Constraints: Evidence from a Chinese Enterprise Survey', *China Economic Review*, 19/2 (2008), pp. 215-29; J. Lin and Z. Li, 'Policy Burden, Privatization and Soft Budget Constraint', *Journal of Comparative Economics*, 36/1 (2008), pp. 90-102.

²³ C. Bai and Y. Wang, 'Bureaucratic Control and the Soft Budget Constraint', *Journal of Comparative Economics*, 26/1 (1998), pp. 41-61; Y. Cao, Y. Qian, and B. R. Weingast, 'From Federalism, Chinese Style, to Privatisation, Chinese Style', *Economics of Transition*, 7/1 (1999), pp. 103-31; M. Dewatripont and G. Roland, 'Soft Budget Constraints, Transition and Financial Systems', *Journal of Institutional and Theoretical Economics*, 156/1 (2000), pp. 245-60; R. Garnaut and Y. Huang, *Growth without Miracles: Readings on the Chinese Economy in the Era of Reform* (Oxford: Oxford University Press, 2000), p. 112.

²⁴ J. Lin, Fang Cai, and Zhou Li, 'The Lessons of China's Transition to a Market Economy', *Cato Journal*, 16/2 (1996), pp. 201-31; J. Lin, Fang Cai, and Zhou Li, 'Competition, Policy Burdens and State-Owned Enterprise Reform', *The American Economic Review*, 88/2 (1998), pp. 422-7; J. Lin, Fang Cai, and Zhou Li, *The China Miracle: Development Strategy and Economic Reform* (Hong Kong: The Chinese University of Hong Kong Press, 2003).

²⁵ It means that a considerable proportion of the state sector's workforce is technically redundant.

improvement in the SOE sector.²⁶ Such improvement will make privatisation unnecessary.²⁷ Similarly, studies argue that firms' autonomy from the state, or freedom of the 'agent' from the 'principal', will improve SOEs' efficiency.²⁸ Others go as far as suggesting that SOE bureaucrat-managers should be replaced by 'real capitalists'.²⁹

Meanwhile, it is agreed that policy burdens need soft budget to support.³⁰ As a pillar of the institution in China, such soft-budget cannot become 'hardened' without some fundamental political changes. So, alternatively, reforms may be carried out on soft budget. It is argued that a change in the rule of the game by stopping soft budget will

²⁶ J. Kornai, *The Socialist System: The Political Economy of Communism* (Oxford: Clarendon Press, 1992); Andrei Shleifer and R. W. Vishny, 'Politicians and Firms', *The Quarterly Journal of Economics*, 109/4 (1994), pp. 995-1025; J. Lin, Fang Cai, and Zhou Li, 'The Lessons of China's Transition to a Market Economy', *Cato Journal*, 16/2 (1996), pp. 201-31; J. Lin, Fang Cai, and Zhou Li, 'Competition, Policy Burdens and State-Owned Enterprise Reform', *The American Economic Review*, 88/2 (1998), pp. 422-7; J. Lin and G. Tan, 'Policy Burdens, Accountability, and the Soft Budget Constraint', *American Economic Review*, 89/2 (1999), pp. 426-31; J. Lin, Fang Cai, and Zhou Li, *State-owned Enterprise Reform in China* (Hong Kong: The Chinese University of Hong Kong Press, 2001); L. C. Xu, Tian Zhu, and Y. Lin, 'Politician Control, Agency Problems and Ownership Reform: Evidence from China', *Economics of Transition*, 13/1 (2005), pp. 1-24.

²⁷ J. Bennett, J. Maw, and S. Estrin, 'Why Did Transition Economies Choose Mass Privatisation?' *Journal of the European Economic Association*, 3/2-3 (2005), pp. 567-75; J. Lin and Z. Li, 'Policy Burden, Privatization and Soft Budget Constraint', *Journal of Comparative Economics*, 36/1 (2008), pp. 90-102.

²⁸ W. Zhang, 'Decision Rights, Residual Claim and Performance: A Theory of How the Chinese State Enterprise Reform Works', *China Economic Review*, 8/1 (1997), pp. 67-82; W. Zhang, 'A Principal-agent Theory of the Public Economy and Its Applications to China', *Economics of Planning*, 31/2 (1998), pp. 231-51.

²⁹ W. Zhang, 'China's SOE Reform: A Corporate Governance Perspective', *Corporate Ownership and Control*, 3/4 (2006), pp. 132-50.

³⁰ E. C. Perotti, L. Sun, and L. Zhou, 'State-owned versus Township and Village Enterprises in China', *Comparative Economic Studies*, 41/2-3 (1999), pp. 151-79; C. Bai, D. Li, Z. Tao, and Y. Wang, 'A Multitask Theory of State Enterprise Reform', *Journal of Comparative Economics*, 28/4 (2000), pp. 716-38; X. Dong and L. Putterman, 'Soft Budget Constraints, Social Burdens, and Labour Redundancy in China's State Industry', *Journal of Comparative Economics*, 31/1 (2003), pp. 110-33; L. Li, 'Employment Burden, Government Ownership and Soft Budget Constraints: Evidence from a Chinese Enterprise Survey', *China Economic Review*, 19/2 (2008), pp. 215-29; J. Lin and Z. Li, 'Policy Burden, Privatization and Soft Budget Constraint', *Journal of Comparative Economics*, 36/1 (2008), pp. 90-102.

remove incentives among SOE managers.³¹ As soft-budget is determined by the Leninist political economy in China, its removal is much harder than one might think. The ‘soft budget–poor performance’ causality may be very stubborn.

Needless to say, there is school of thought that views privatisation as the panacea for SOEs’ inefficiency,³² despite the fact that SOEs yield handsome profits until now.³³ A general equilibrium model has been developed to explain why mega-SOEs in China yield more profits than non-SOEs from the viewpoint of value chain where SOEs monopolise ‘upstream’ industries to rip off non-SOEs in ‘downstream’ industries for rent,³⁴ a legacy of the Soviet/Leninist ‘scissors’ pricing’ (*jiandao cha*) under Mao to accumulate capital for large-scale heavy industry mainly for the military.³⁵

But so far, very few scholars have investigated the rationale and dynamics of the rise of China’s red *zaibatsu* – the mega-SOEs. Rather, most attention has been paid to how to dissolve SOEs in the name of neo-classical free market. Such an approach is outdated and misleading, because it cannot explain why mega-SOEs have flourished and reforms of mega-SOEs have stalled.

³¹ J. Lin and Z. Li, ‘Policy Burden, Privatization and Soft Budget Constraint’, *Journal of Comparative Economics*, 36/1 (2008), pp. 90-102.

³² J. Kornai, *The Socialist System: The Political Economy of Communism* (Oxford: Clarendon Press), 1992; A. Shleifer and R. W. Vishny, ‘Politicians and Firms’, *The Quarterly Journal of Economics*, 109/4 (1994), pp. 995-1025; W. Zhang, ‘Decision Rights, Residual Claim and Performance: A Theory of How the Chinese State Enterprise Reform Works’, *China Economic Review*, 8/1 (1997), pp. 67-82; W. Zhang, ‘A Principal-agent Theory of the Public Economy and Its Applications to China’, *Economics of Planning*, 31/2 (1998), pp. 231-51; S. Estrin, J. Hanousek, E. Kovenda, and J. Svejnar, ‘The Effects of Privatisation and Ownership in Transition Economies’, *Journal of Economic Literature*, 47/3 (2009), pp. 1-30.

³³ Based on a dataset of 50,000 Chinese SOEs from 1998 to 2003, Tong argues that the speed and scale of privatisation improved SOEs’ performance in China. We now know that these firms were all small and medium ones; see S. Y. Tong, ‘Why Privatize or Why Not? Empirical Evidence from China’s SOEs Reform’, *China Economic Review*, 20/3 (2009), pp. 402-13.

³⁴ Wang Yong, ‘Guoyou Qiyede Chenfu Luoji He Jiegou Weizhi’ (Growth Dynamics and Structural Location of SOEs in China) 2015, unpublished paper, vide www.aisixiang.com/data/93066.html.

³⁵ Kent Deng, *Mapping China’s Growth and Development in the Long Run, 221 BC to 2020* (Singapore: World Scientific Press and Imperial College Press, 2015), pp. 164, 172, 190.

This study establishes a statistical model and a two-stage game model for an ‘authoritarian market economy’ where market monopoly and rent-seeking by state-owned conglomerates is firmly entrenched. Our findings confirm a ‘subgame perfect Nash equilibrium’ in China’s economy that has led the state (the owner or ‘principle’) and the large state-owned firms (the manager or the ‘agent’) to a paradox which prevents continuous reforms towards a Pareto solution for efficiency improvement; as a result, further ownership reforms become very hard if not entirely impossible.

3. Statistical model and analysis

3.1. Empirical evidence

In this part, we aim to prove empirically three underlying incentives for both the state and the manager to enlarge SOEs to make the red zaibatsu a reality in China: i.e. (1) the SOE manager is interested in increasing his/her benefits; (2) the state wants more tax revenue (direct taxes as proxies), and (3) secures ‘social welfare’ in terms of increasing labour hiring in society for its legitimacy to rule the country. We first apply ‘Three Stage Least Square’ (3SLS) to estimate simultaneous equations with the three incentives being the explained variables. This is then followed by Oaxaca-Blinder Decomposition to identify, in percentage terms, the contribution made by each incentive to the size difference between SOEs and non-SOEs, as well as between mega-SOEs and lesser SOEs (or small and medium SOEs). Such a comparative investigation will identify the dominant reason why the size of SOEs keeps on increasing.

3.2. Definition of variables

We define ‘SOEs’ as those business entities with their effective holders being one of the following: (1) central and local state apparatus, (2) State-owned Assets Supervision and Administration Commissions (SASAC) of both the national and local levels.

We use the amount of asset to measure the size of a company. In China, companies’ assets vary from the minimum of RMB ¥ 84,000 to the maximum of RMB ¥ 2,200 billion. We adopt log of asset instead of the absolute value to avoid being affected by extreme sums. Mega-SOEs are those whose assets are larger than the 90 percentile for the convenience of our assessment.

To quantify the impact of the three incentives on the firm size, we opt for remuneration of firm executive directors, government revenues from business taxes, and the employed workers to measure the manager's benefit in terms of material reward and the state benefit regarding taxes, and labour hiring, respectively. Moreover, the firm's net profit and the GDP growth rate of the national economy are controlled in our modelling. The justification is to be provided in Section 3.3.

Our sample includes 2,887 listed firms in stock markets in both A-share markets and B-share markets from 2004 to 2015,³⁶ totalling 23,856 observations. Among them, 11,837 are SOEs; and 1,891 mega-SOEs. Definitions and sources of all variables used in this study are presented in Table 1.

Table 1. Definitions and sources of all variables

Category	Name	Definition	Source*
Size	Asset	$\ln(\text{asset})$	<i>Wind Financial Terminal Database</i> , vide www.wind.com.cn
Incentives	Personal benefits	$\ln(\text{remuneration of executive directors})$	
	Government taxes	$\ln(\text{income tax} + \text{business tax})$	
	Labour hiring	$\ln(\text{number of total employees})$	
Control	Profit	If net profit is larger than 0, it is $\ln(\text{net profit})$; otherwise $-\ln(-\text{net profit})$	<i>World Bank Database</i> , vide data.worldbank.org
	GDP	GDP growth rate	

Note: * For detail, please see Appendix.

3.3. Three incentives to enlarge mega-SOEs

³⁶ Mainland China runs two stock exchanges, in Shanghai and Shenzhen. Both have A- and B-share markets. The key distinction is that A-shares are denominated in *renminbi* and B-shares in foreign currencies (US dollars in Shanghai and Hong Kong dollars in Shenzhen). See *Financial Times*, <http://lexicon.ft.com/>.

To prove the three incentives in question that determines the size of a mega-SOE, following simultaneous equations are constructed:

$$\begin{cases} \text{Benefits}_{it} = \alpha_1 + \beta_{11}\text{Asset}_{it} + \beta_{12}\text{Profit}_{it} + \beta_{13}\text{GDP}_t + \varepsilon_{it1} \\ \text{Taxes}_{it} = \alpha_2 + \beta_{21}\text{Asset}_{it} + \beta_{22}\text{Benefits}_{it} + \beta_{23}\text{Profit}_{it} + \varepsilon_{it2} \\ \text{Employees}_{it} = \alpha_3 + \beta_{31}\text{Asset}_{it} + \beta_{32}\text{GDP}_{it} + \varepsilon_{it3} \end{cases}$$

Here, the amount of asset is the explanatory variable in all the three equations. In the first equation, the explained variable is *personal benefits for the manager*. Net profit of each company that year and China's GDP growth rate are controlled, because both have impacts on the manager's remuneration according to Cosh and Zhang and Huang.³⁷ In the second equation, the explained and control variables are *taxes*, *personal benefits for the manager* and *net profit*, respectively. Personal benefits for the manager are controlled because as a part of the cost, they reduce tax revenues for the government. Net profit is also controlled since governments can collect more tax from more profitable companies. The last equation shows labour hiring with GDP controlled *à la* Havlik and Landesmann; Bradshaw and Stenning.³⁸ Parameters α , β and ε represent intercepts, coefficients and residual errors, respectively; i and t , the i th company and year t .

We notice that as the explained variable on the left hand side in the first equation, benefits for the manager can also be a control variable on the right hand side. This makes it endogenous. To solve the problem of endogeneity and to evaluate the simultaneous equations, we use 3SLS, which consider the three equations as a whole system. Only in this way can one estimate the coefficients efficiently, because interaction between residual errors of the three equations is considered in 3SLS. In the regression, effects of

³⁷ A. Cosh, 'The remuneration of chief executives in the United Kingdom', *The Economic Journal*, 85/337 (1975), pp. 75-94; J. Zhang and T. Huang, 'What Determines Chinese Firms' Salaries', *China Industrial Economics* 3 (2010), p. 8.

³⁸ M. Bradshaw and A. Stenning, *East Central Europe and the Former Soviet Union: the Post-socialist States* (London: Routledge, 2016); P. Havlik and M. Landesmann, 'Structural Change, Productivity and Employment in the New EU Member States', *Working Paper*, Vienna Institute for International Economic Studies, No. 313, 2005.

different industries and years are also controlled in each equation as dummy variables. The regression results of 3SLS are presented in Table 2.

Table 2. 3SLS Regression Results

Variable	Coef.	Std. Err.	z	
<i>Benefits</i>				
Asset	0.28 ^{***}	0.00	58.61	
Profits	0.01 ^{***}	0.00	22.73	
GDP	0.76 ^{***}	0.01	69.43	
<i>Taxes</i>				
Asset	1.22 ^{***}	0.02	75.90	
Benefits	-0.67 ^{***}	0.03	-25.23	
Profit	0.04 ^{***}	0.00	40.96	
<i>Employees</i>				
Asset	0.19 ^{***}	0.01	17.52	
GDP	0.35 ^{***}	0.02	14.40	
	Observation	Parameter	RMSE	chi2
<i>Equations</i>				
Benefits	11478	31	0.64	6210000.00 ^{***}
Taxes	11478	31	1.18	2600000.00 ^{***}
Employees	11478	30	1.46	309572.28 ^{***}

Source: See Appendix.

Note: ^{***} present significant at 1% respectively, and hereinafter the same.

According the results listed above in Table 2, all the coefficients of $Asset_{it}$ are significantly positive, i.e. the larger the firm, the higher the benefits for managers, and the more taxes collected by the governments, and the more labour-hiring opportunity. Therefore, the three incentives are correlated to the size of mega-SOEs.

Meanwhile, coefficients of the control variables are also significant and consistent with our expectations. In the first equation, the higher the firm's net profit and the GDP growth rate of the national economy, the higher the benefits for the SOE manager, which

is reasonable as the manager gains more when his/her company is more profitable and the whole national economy expands. In the second equation, more benefits received by the manager increase business costs and reduce tax revenues, while more profitable companies pay more taxes. In the last equation, when the GDP growth rate of the national economy is high, SOEs provide more jobs as expected.

3.3. Dominant incentive for meg-SOEs to expand

The previous regression results confirm the three incentives to increase the size of SOEs. However, which one is dominant remains unclear, let alone the contributory weight of each incentive to the size difference between SOEs and non-SOEs, or that between mega-SOEs and lesser SOEs. To tackle these issues, we introduce Oaxaca-Blinder Decomposition to our analysis.³⁹ We use the two-fold method to decompose the difference in size of companies:⁴⁰

$$Difference = [E(X_1) - E(X_2)]'\beta^* + [E(X_1)'(\beta_1 - \beta^*) + E(X_2)'(\beta^* - \beta_2)]$$

Here we denote Group 1 as possessing more asset than Group 2. X is a vector containing predictors and a constant, β contains the slope parameters and the intercept, and β^* is the non-discriminatory coefficients vectors. The first part on the right-hand side is the

³⁹ This method was firstly used in finding out the causes of difference in income between females and males; see R. Oaxaca, 'Male-female Wage Differentials in Urban Labor Markets', *International Economic Review* 14/3 (1973), pp. 693-709; A. S. Blinder, 'Wage Discrimination: Reduced Form and Structural Estimates', *Journal of Human Resources* 8/4 (1973), pp. 436-55. It was gradually applied to other fields to analyse causes of differences such as obesity and urban-rural inequality; see D. R. Taber, W. R. Robinson, S. N. Bleich, and Y. C. Wang, 'Deconstructing Race and Gender Differences in Adolescent Obesity: Oaxaca-Blinder Decomposition', *Obesity* 24/3 (2016), pp. 719-26; F. L. A. Castro, W. A. Diamada, K. L. Guevara, and V. Manalang, 'Is the Grass Really Greener on the Other Side? Decomposing Urban-Rural Inequality in the Philippines', unpublished paper (2016).

⁴⁰ B. Jann, 'A Stata Implementation of the Blinder-Oaxaca Decomposition', *Stata Journal* 8/4 (2008), pp. 453-79.

explainable part, i.e. size difference in firms is caused by the aforementioned three incentives and control variables (the firm's net profit and the GDP growth rate of the national economy), while the second part is the size difference caused by all other factors, which are hard to measure and not important to the present study. To be comprehensive, we first decompose the size difference between SOEs and non-SOEs, and secondly that between mega-SOEs and lesser SOEs. The results are presented in Table 3.

Table 3. Oaxaca-Blinder Decomposition Results

Asset	(1) SOEs vs (2) non-SOEs				(1) Mega-SOEs vs (2) lesser SOEs			
	Coef.	Std. Err.	z	%	Coef.	Std. Err.	z	%
Prediction 1	22.14 ^{***}	0.01	1619.52		24.61 ^{***}	0.03	861.07	
Prediction 2	21.30 ^{***}	0.01	2077.11		21.67 ^{***}	0.01	2258.67	
Difference	0.85 ^{***}	0.02	49.47	100	2.93 ^{***}	0.03	97.37	100
Benefits	0.02 ^{***}	0.00	4.88	1.78	0.22 ^{***}	0.01	19.72	7.45
Taxes	0.41 ^{***}	0.01	31.75	47.93	1.21 ^{***}	0.03	46.03	41.17
Employees	0.02 ^{***}	0.00	10.22	1.96	0.03 ^{***}	0.00	8.28	1.12
Controls	-0.02 ^{***}	0.00	-7.21	-2.21	0.01 ^{***}	0.01	1.18	0.22
Explained	0.42 ^{***}	0.01	28.28	49.46	1.47 ^{***}	0.03	56.76	49.95
Other	0.43 ^{***}	0.01	40.52	50.54	1.47 ^{***}	0.02	64.96	50.05
Obs	23111				11478			

According to Table 3, the size difference between SOEs and non-SOEs seen from $\ln(asset)$ is 0.85, and 47.93% of the size change can be attributed to the tax incentive. The attribution to increase in labour-hiring accounts only for 1.96%, and that to the manager's benefits is mere 1.78%. Therefore, the government tax incentive overshadows the other two incentives.

Moreover, the size difference between mega-SOEs and lesser SOEs is 2.93, larger than that between SOEs and non-SOEs. But, government tax incentive is still dominant, attributing 41.17% to the size difference. However, benefits for managers of mega-SOEs seem more influential, claiming 7.45% of the weight in deciding the firm size. The social

welfare incentive to increase labour-hiring opportunity only contributes 1.12%, far smaller than its counterparts.

In this decomposition, the state incentives for tax revenues loom large which is fully compatible with the authoritarian market model (or market-Leninism). In such a power asymmetry, the SOE manager has small slice of the pie while the benefits of ordinary workers are optional.

4. Mathematic model and theorisation

Now, we take one step further to establish a theoretical model to explain the mechanisms behind the rapid growth of mega-SOEs in China.

4.1. Basic environment. Suppose that a market is under monopoly of a mega-SOE with a tendency of empire-building, according to studies by Baumol, Grossman and Hart, Hart and Moore, and Stulz,⁴¹ without ownership of a mega-SOE, its manager tends to maximize his/her total revenue from the an enlarged size of the firm (hence empire-building). We denote this behaviour as TR_m .⁴²

Suppose also that the degree of privatisation of a mega-SOE is β , and $0 \leq \beta \leq 1$. The manager's personal benefit function $R_m = \beta\pi_0 + (1 - \beta) TR_m$, where $(1 - \beta) TR_m$ is the 'business empire-building effect'.

When $\beta = 1$, this SOE is full privatized, the manager will choose to maximise profit. When $\beta = 0$, the SOE remains state-owned, the manager to will choose to maximise revenue and becomes a business empire builder.

⁴¹ W. J. Baumol, *Business Behavior, Value and Growth* (Princeton: Princeton University Press, 1959); S. G. and O. Hart, 'One Share-One Vote and the Market for Corporate Control', *Journal of Financial Economics*, 20/1-2 (1988), pp. 175-202; O. Hart and J. Moore, 'Debt and Seniority: An Analysis of the Role of Hard Claims in Constraining Management', *American Economic Review* 85 (1995), pp. 567-585; R. M. Stulz, 'Managerial Discretion and Optimal Financing Policies', *Journal of Financial Economics*, 26/1 (1990), pp. 3-27.

⁴² The benefit for managers depends their 'control rights'; so when they do not own their firms they maximise total sales instead of total profit; see W. J. Baumol, *Business Behavior, Value and Growth* (Princeton: Princeton University Press, 1959).

An over-sized SOE with business empire-building does two things in a win-win situation: (1) it bears more policy burdens to suit the state; and (2) it produces more revenue to benefit the manager individually. Inevitably, the firm will not be efficient. But it does not matter because all the extra costs can be shifted to other producers and consumers through monopolistic pricing.

4.2. Demand curve for the mega-SOE. The monopolistic SOE faces an inverse demand curve $p = a - bq$, where p is market price; and intercept a , the price level when the output produced is at 0; b is a positive parameter, $b > 1$; q is the output.

4.3. Cost function for the mega-SOE. The cost function for the monopolistic SOE is constructed as: $C_m = kq^2$, where k is a positive parameter, and $k > 1$. C_m is the cost of this mega-SOE for any given output. Its function kq^2 is increasing as well as convex. When the of output increases, the cost increases faster, hence efficiency suffers.

4.4. Rent yielded by the mega-SOE. SOEs' monopolistic pricing leads to rent. The rent is then shared between the firm (including the manager) and the state through government taxes on 'profit' (rent in real terms).⁴³ The average total cost of this mega-SOE after profit taxes can be denoted as $ATC_p = \frac{TC}{q} + w = kq + w$, where ATC_p is the average total cost; TC , total cost; w , a positive fixed-cost shifter parameter to measure the degree of the rent share by the state. The state economic return can be constructed as $R_L = [AC_{after} - AC] \times q = wq$, where R_L is the rent extracted from the SOE by the state in state-SOE rent-sharing. AC_{after} is the average cost of the mega-SOE after sharing out its gross rent with the state via corporal taxes; and AC is the initial cost of the mega-SOE pre-corporal taxes.

4.5. Two-stage sequential game between the state and the mega-SOE. To suppose that the game involves two-stage decision making, the state always dictates the degree of privatisation β at the first stage to maximize $R_L = wq$. Once β is given, the manager decides the firm's output to maximize his benefit. We denote R_m as the personal benefit that mega-SOE's manager is able to maximize. We denote π_0 as the total profit yielded by this mega-SOE.

⁴³ H. Sheng and Zhao Nong, *China's State-owned Enterprises: Nature, Performance and Reform* (Singapore: World Scientific Press, 2013).

We solve this game by backward induction. From the viewpoint of the SOE manager, he/she acts after β is decided by the state. In other words, the SOE manager can only respond to β but has no control over β . So, the final decision is always in the hands of the state.

$$\underbrace{\text{Max}}_q R_m = \beta\pi_0 + (1 - \beta) TR_m \quad (1)$$

Where $\pi_0 = (a - bq)q - kq^2 = aq - bq^2 - kq^2$. Rearrange the right hand side of (1), then convert it to:

$$\underbrace{\text{Max}}_q R_m = \pi_0 + C(1 - \beta) \quad (2)$$

Plug the profit function and cost function into (2) to obtain:

$$\underbrace{\text{Max}}_q R_m = aq - bq^2 - kq^2 + kq^2(1 - \beta) \quad (3)$$

Differentiate (3) with respect to q , it results in a Nash equilibrium output set by the manager:

$$q^* = Q_L = \frac{a}{2(\beta k + b)} \quad (4)$$

Where Q_L is the equilibrium output level set by the manager at the second stage of the game. It determines the scale and scope of the SOE that manager chooses to expand. Set the second order derivative $-2b - 2\beta k < 0$, the output level defined by (4) is an optimum where the manager's benefit maximises. Plug (4) into the demand function to obtain a Nash equilibrium price operated by this monopolistic SOE:

$$P_L = \frac{a(2\beta k + b)}{2(\beta k + b)} \quad (5)$$

With (4) and (5), the maximum economic return R_m can be obtained as follows:

$$\begin{cases} \pi_0 = \frac{a^2k(2\beta-1)+a^2b}{4(\beta k+b)^2} \\ R_m^* = \frac{a^2}{4(\beta k+b)} \end{cases} \quad (6)$$

Similarly, the amount of mandatory policy burdens (CS) can be decided:

$$CS = \left[a - \frac{a(2\beta k+b)}{2(\beta k+b)} \right] \times \frac{a}{2(\beta k+b)} \times \frac{1}{2} = \frac{a^2b}{8(\beta k+b)^2} \quad (7)$$

Here, CS benefits exclusive employees of SOEs, we call it ‘SOE internal social benefit’.

Proposition 1: Comparative statics. Based on (4), (5), (6) and (7), we have equilibria of price, output, profits, and SOE social benefit with a given degree of privatisation β in China’s authoritarian market economy:

$$\begin{cases} \frac{\partial Q_L}{\partial \beta} = \frac{-2ak}{4(\beta k+b)^2} < 0 \\ \frac{\partial P_L}{\partial \beta} = \frac{2akb}{4(\beta k+b)^2} > 0 \\ \frac{\partial \pi_0}{\partial \beta} = \frac{8k(8k+b)[a^2k(9-2\beta)]}{16(\beta k+b)^4} > 0 \\ \frac{\partial R_m^*}{\partial \beta} = \frac{-4a^2k}{16(\beta k+b)^2} < 0 \\ \frac{\partial CS}{\partial \beta} = \frac{-a^2kb}{4(\beta k+b)^3} < 0 \end{cases} \quad (8)$$

Against the neoclassical intuition, according to (8) the optimal output and the degree of privatisation are negatively correlated to each other. This is because in an authoritarian market economy the manager gains more by output maximisation without privatisation of

the SOE.⁴⁴ If privatisation is introduced, the mechanisms of profit maximisation kick in to replace output maximisation.⁴⁵ In addition, the manager will have strong disincentives for fulfilling policy burdens imposed by the state. The result of (8) also shows a higher degree of privatisation leading to higher market prices. For these outcomes, the party-state will disfavour privatisation of the mega-SOE for the sake of state legitimacy, labour employment and price stability.

We now move back to the first stage at which the state chooses the degree of privatisation β . Hence, substitute (7) with $R_L = wq$ and obtain the expression for R_L :

$$R_L = \frac{aw}{2(\beta k + b)} \quad (9)$$

Given that all other parameters remain constant, R_L is a decreasing function in relation to the degree of privatization β . Thus, the SOE monopolistic rent is maximised when $\beta^* = 0$. The maximised amount of rent is $R_L^* = \frac{aw}{2b}$. This leads to Proposition 2.

Proposition 2: Resistance to privatisation. In an authoritarian market economy, the monopolistic rent is maximized when $\beta^* = 0$. There are two determinants for rent extracted by the state: output and taxes. The larger the output, the greater the gross income (and hence gross rent) of the SOE, *ceteris paribus*. The larger the tax rate (value w), the bigger the slice for the state from the cake of the SOE gross income, *ceteris paribus*. This leads to Proposition 3.

Proposition 3: Comparative statics. In an authoritarian market economy $\frac{dR_L}{dw} = \frac{a}{2(\beta k + b)} > 0$. It means that the higher tax rate imposed by the state, the more rent that the state shares with the SOE. If $\beta^* = 0$, subgame perfect Nash equilibria for prices, output,

⁴⁴ Conceptually, the SOE manager benefits from the average output of his/her firm (although his/her personal share multiplies the average output for SOE workers). So, it is imperative to maximised the firm's total output technically allowed in order to share it out internally.

⁴⁵ Neoclassically, profit is determined by the marginal product of labour. The latter has diminishing returns well before a firm's total output is maximised. When the marginal product of labour drops to zero, the total output reaches the maximum. It is thus necessary for a profit-aiming capitalist firm to stop producing well before the technically permitted total output is maximised.

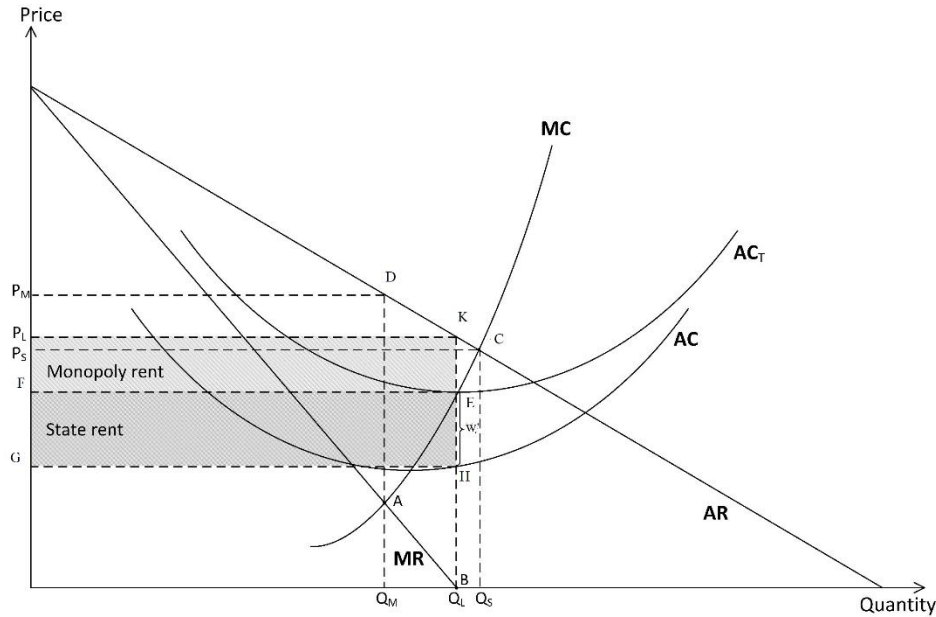
profits, manager's personal benefit, state's economic return and SOE social benefit can all be determined. This leads to Proposition 4.

Proposition 4: Subgame perfect equilibrium in China's authoritarian market economy. Given that the state decides not to privatize mega-SOEs, the subgame perfect Nash equilibrium can be expressed as follows:

$$\left\{ \begin{array}{l} P_L^* = \frac{a}{2} \\ Q_L^* = \frac{a}{2b} \\ R_m^* = \frac{a^2}{4b} \\ R_L^* = \frac{aw}{2b} \\ CS^* = \frac{a^2}{8b} \\ \pi_0^* = \frac{a^2(b-k)}{4b^2} \\ W^* = CS^* + \pi_0^* = \frac{a^2(3b-2k)}{8b^2} \end{array} \right. \quad (10)$$

Where P_L^* and Q_L^* are the equilibrium price and output set by the SOE manager when privatization is not an option ($\beta^* = 0$). Other equilibrium values follow: R_m^* (total personal benefit for the manager), R_L^* (rent shared by the state), CS^* (SOE internal social benefit), π_0^* (total profit of the SOE), W^* (aggregate gains for an authoritarian market economy). Such Nash dynamics can be illustrated by Figure 7.

Figure 7. Subgame Perfect Nash Equilibrium with SOE Monopoly



Notes: (1) Q_m = monopolistic equilibrium output in a privatised market economy as a comparator; Q_L = revenue-maximisation equilibrium output in an authoritarian market economy; Q_S = equilibrium output under perfect market competition as a comparator; P_m = monopolistic equilibrium price under a privatised market economy; P_L = revenue-maximisation equilibrium price in an authoritarian market economy; P_S = equilibrium price under perfect market competition as a comparator.

(2) AR = average revenue of the mega-SOE; AC = average cost curve for the mega-SOE; AC_t = average cost curve, post-tax; MC = marginal cost curve of the mega-SOE; MR curve = marginal revenue of the mega-SOE.

(3) A = profit-maximising equilibrium for the monopolist under a private market economy as a comparator; B = revenue-maximising equilibrium for the monopolist SOE under the authoritarian market economy. C = social optimum point under perfectly competitive market economy as a comparator; D = point corresponding to the monopolistic equilibrium price under a fully privatized market economy; E = break-even point for monopoly after profit tax where the marginal cost curve crosses; F = price level corresponding to the break-even point F, post-tax; G = price level corresponding to the break-even point H of the mega-SOE, pre-tax; H = break-even point for the mega-SOE, pre-tax. (4) GP_LKH = gross rent; $GFEH$ = state rent share; FP_LKE = SOE's rent share.

In the above figure, Q_m is the monopolist equilibrium output under a private market economy in which there is no institutional zeal for business empire-building. Q_L is the equilibrium output under an authoritarian market economy where business empire-building, policy burdens as well as rent seeking taking place all at once. Q_L is necessarily larger than Q_m . However, neither of the two equilibria is a Pareto-optimum. The behaviour of prices is even more interesting. Although the SOE monopoly price P_L is higher than its counterpart under perfectly competitive market economy (P_s), it is lower than P_m set by the monopolist under a private market economy.

Moreover, AR represents the average revenue that a mega-SOE can yield, which is also a market demand curve. AC in a U-shaped form is the average cost of the mega-SOE. AC_t is the average cost after tax. The gap between AC and AC_t is the government tax. MC stands for choice of technology by the mega-SOE's. We assume that in the short run MC stays unchanged. MR represents marginal revenue which drops faster than AR. At Point B, MR reached zero and the SOE's output maximises. At Point A, the firm produces more output than its counterpart in a private market economy which operates at Point A. Point C where the market supply curve (overlapping with MC) intersects with the market demand curve (overlapping with AR) is Pareto-optimum in a perfectly competitive market economy. Point E is the break-even point for monopoly after profit tax where the marginal cost curve crosses. Its corresponding price is marked by F. Likewise, Point H is the break-even point for the mega-SOE before tax. Its corresponding price is marked by G. The total or gross rent is marked by GP_LKH ; the state share of the rent by $GFEH$; and the SOE's share of the rent by FP_LKE .

4.6. Welfare implications

Table 4 compares welfare a monopolist firm in three contexts: of an authoritarian market economy, of a privatised market economy, and of a perfectly competitive economy, respectively.

Table 4. Welfare Comparisons

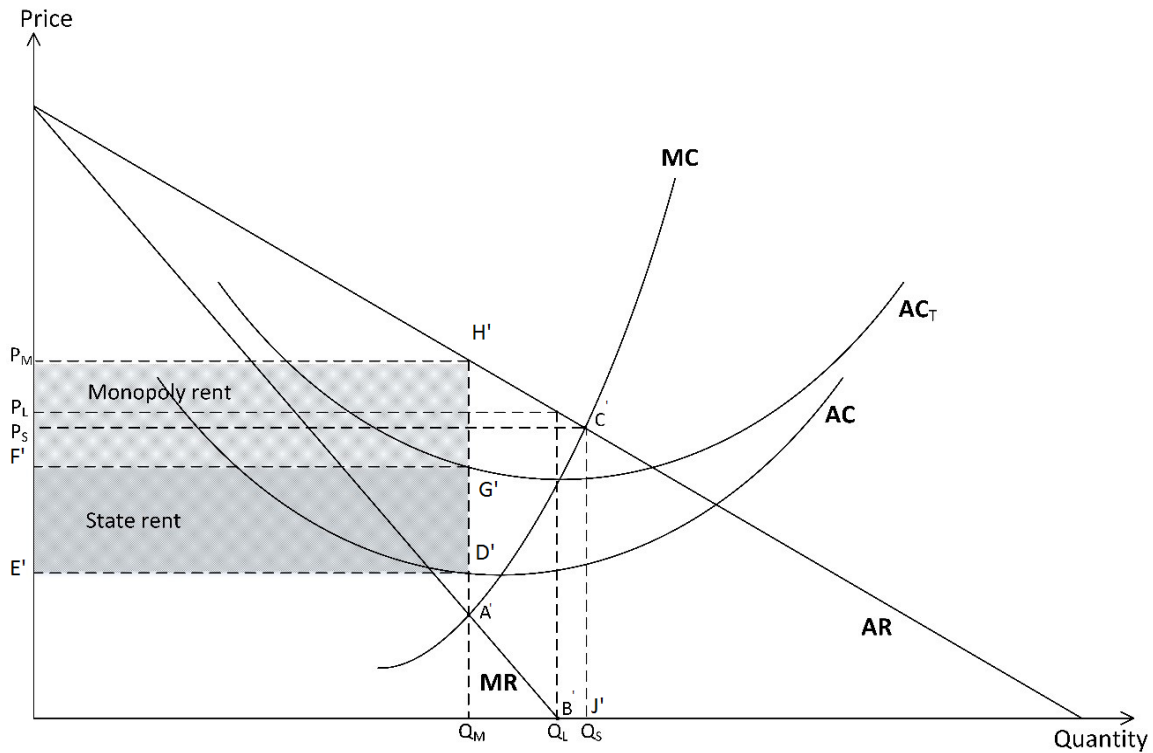
	Monopolistic equilibrium	Monopolistic equilibrium in a	Competitive equilibrium in a perfectly
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	in an authoritarian market economy	privatised market economy	competitive market economy
Price	$\frac{a}{2}$	$\frac{a(2k+b)}{2(k+b)}$	$\frac{2ak}{2k+b}$
Output	$\frac{a}{2b}$	$\frac{a}{2(k+b)}$	$\frac{a}{2k+b}$
Manager's personal benefit	$\frac{a^2}{4b}$	$\frac{a^2(b+k)}{4(k+b)^2}$	$\frac{a^2k}{(2k+b)^2}$
State's rent	$\frac{aw}{2b}$	$\frac{aw}{2(k+b)}$	0
Firm level social benefit	$\frac{a^2}{8b}$	$\frac{a^2b}{8(k+b)^2}$	$\frac{a^2b}{2(2k+b)^2}$
Profit	$\frac{a^2(b-k)}{4b^2}$	$\frac{a^2(k+b)}{4(k+b)^2}$	$\frac{a^2k}{(2k+b)^2}$
Social surplus*	$\frac{a^2(3b-2k)}{8b^2}$	$\frac{a^2(2k+3b)}{8(k+b)^2}$	$\frac{a^2}{2(2k+b)}$

Note: Social surplus is the sum of both firm level social benefit (consumer surplus) and SOE's profit (producer surplus).

An authoritarian market economy allows the state to have higher economic returns than that in a privatised market economy, owing to $\frac{aw}{2b} > \frac{aw}{2(k+b)}$. This is because the latter has less tax revenue when business empire-building is absent, as shown by the following diagram.

Figure 8. Monopoly Rent with a Privatised Market Economy Equilibrium after Profit Taxes



Notes: (1) Q_L is the revenue-maximization equilibrium output under the Authoritarian market economy. Q_S is the perfectly competitive equilibrium output. P_m is the monopolistic equilibrium price under a privatised market economy. P_L is the revenue-maximization equilibrium price under the Authoritarian market economy. P_S is the perfectly competitive equilibrium price level. AC is the average cost of this monopolistic firm. AC_t is the average cost curve after the imposition of the profit-tax. The monopolistic rent is represented by the area $F'P_mH'G'$. The state's rent is represented by the area $E'F'G'D'$.

(2) A' = monopoly profit-maximizing equilibrium point where the MC curve intersects with the MR curve. Q_m is the monopolistic equilibrium output under private market economy. B' = revenue maximizing equilibrium point under an authoritarian market economy. C' = social equilibrium point where the increasing marginal cost curve intersects with the demand curve which is AR. D' = break-even point for mega-SOE corresponding to the price level indicated by point E', pre-tax. E' = price level at the break-even Point D', pre-tax. F' = price level at the break-even point G', post-tax. G' = break-even point for the mega-SOE corresponding to price level indicated by Point F',

post-tax. H' = point on the demand curve corresponding to the monopolistic equilibrium prices level under a privatised market economy. J' = social optimum (Pareto-optimum) point under perfect-competitive market economy.

In Figure 8, the monopolistic equilibrium in a privatised market economy lies at the point where the marginal cost curve intersects with marginal revenue curve (Point A). Given that the cost shifter w remains unchanged, the output shrinks from Q_L to Q_m . The state rent share can be computed as $\frac{aw}{2(k+b)}$. From the state rent-seeking point of view, privatisation of a mega-SOE reduces the state rent amount from GFEH in Figure 7 to E'F'G'D' in Figure 8. If the market is in full competition, the equilibrium for the social efficiency level reaches Point C, rent disappears. It is in the core interest of the Leninist state that this does not happen.

Moreover, in an authoritarian market economy the price level is higher than that under private monopoly. A Leninist state welcomes a lower price level for the sake of social stability. So the state will not permit a monopoly by a private firm but tolerate a monopoly by an SOE.

Furthermore, the mega-SOE manager is better off than his or her counterpart in a private market economy due to the equilibrium $\Delta = \frac{a^2}{4b} - \frac{a^2(2b+k)}{4(k+b)^2} = \frac{a^2[(k-1)(k+2b)+b^2]}{4b(k+b)^2}$; $k > 1$, then $\Delta > 0$. So there is no incentive for the SOE manager to undertake privatisation either. The SOE manager also rakes in more personal benefit than a manager of a firm in a perfectly competitive market, as $\frac{a^2}{4b} - \frac{a^2k}{(2k+b)^2} = \frac{4a^2k+a^2b^2}{4b(2k+b)^2} > 0$.

Finally, in term of the total social surplus W , the perfectly competitive equilibrium is superior among all three economic types. This leads to our last Proposition 5.

Proposition 5: Welfare comparison.

$$\left\{ \begin{array}{l} W_s > W_m, W_s > W_L \text{ if } b \neq 2k \\ W_L > W_m \text{ if } k < b \\ W_L < W_m \text{ if } k < 2b \end{array} \right.$$

Where W_s is the total social surplus under the perfectly competitive equilibrium; W_L is that under the authoritarian market economy; W_m is that under a monopoly in a privatised market economy.

Proof of Proposition 5: Define $\Delta = W_s - W_m$.

$$\text{Hence, } \Delta = \frac{a^2}{2(2k+b)} - \frac{a^2(2k+3b)}{8(k+b)^2} = \frac{4a^2(k+b)^2 - [a^2(2k+3b)] \times (2k+b)}{8(k+b)^2(2k+b)} = \frac{b^2}{8(k+b)^2(2k+b)} > 0$$

So $W_s > W_m$.

Define $\Delta' = W_s - W_L$

$$\Delta' = \frac{a^2}{2(2k+b)} - \frac{a^2(3b-2k)}{8b^2} = \frac{4a^2b^2 - [a^2(3b-2k)(2k+b)]}{8b^2(2k+b)} = \frac{a^2(b-2k)^2}{8b^2(2k+b)} > 0$$

$$\text{Now define } \Delta'' = W_L - W_m = \frac{a^2(3b-2k)}{8b^2} - \frac{a^2(2k+3b)}{8(k+b)^2} = \frac{a^2[(3b-2k)(k+b)^2 - b^2(2k+3b)]}{8b^2(k+b)^2}$$

Which decides the following:

$$\Delta'' = W_L - W_m = \frac{a^2k(-bk+2b^2-2k^2)}{8b^2(k+b)^2}$$

If $\Delta'' > 0$ (as $a > 0, k > 1$), $-bk + 2b^2 - 2k^2 > 0$

Hence, $2b^2 - 2k^2 > bk > 0$

And, $b^2 > k^2$; $b > k$.

If $\Delta'' < 0$ (as $a > 0, k > 1$), $-bk + 2b^2 - 2k^2 < 0$

Hence, $2b^2 - 2k^2 < bk$

Then, $b < \frac{2k^2}{2b-k}$

As $b > 0$, and $2b-k > 0$, $k < 2b$.

An authoritarian market economy can never achieve a Pareto-optimum under free market competition where the total social surplus is maximized. Nevertheless, it may generate more social surplus than a monopolised market of the private kind. It all depends on the demand and supply faced by the firm which is determined by the parameters k and b , respectively. Such unambiguity is not surprising as it is still unclear in the literature about the welfare gains from revenue-maximisation or profit-maximisation of a firm.⁴⁶

5. Final remarks

After four-decade long opening up of the Chinese economy by Deng Xiaoping, and against all the neoclassic logic and precedents of the ex-communist economies in Eastern Europe, reforms in the state sector in China has visibly halted. So, instead of moving forward towards a market economy by the WTO standards, and despite what the Chinese official media tell us, China's economic reforms have stalled in a half-way house. Meanwhile the scale and scope of the state-owned enterprises have expanded exponentially since circa 1990. This is a huge puzzle which has bewildered many.

Our findings have revealed the rationale and forces behind China's reform stalemate: monopoly is easy and rent is sweet for both the SOE manager and the Leninist state in a win-win game. To create jobs has little bearing in the decision on the excessive growth of the SOEs. These are supported by our empirical results, we prove that nearly half of the size difference between SOEs and non-SOEs and that between mega-SOEs and lesser SOEs is correlated with government tax incentive as *the* dominant variable. So, the state has been pushing excessive growth of China's SOEs since 1990. We perform tests by

⁴⁶ Some economists, such as G. Tullock and M. Wetzstein, argue that a revenue-maximizing firm could be superior to a profit-maximizing firm in terms of social welfare; see G. Tullock, 'Welfare Effects of Sales Maximization' *Economic Inquiry*, 16/1 (1978), pp. 113-18; M. Wetzstein, *Microeconomic Theory: Concepts and Connections*, 2nd Edition (London, Routledge, 2013).

varying mega-SOEs, using different percentiles (90, 75, 50 percentiles or mean). Our results remain robust for the available data.

We take one step further to theorise such a development with subgame perfect Nash equilibrium between the state and SOEs. Theoretically, neither the state nor the manager has incentives to move unilaterally away from the equilibrium. Although this Nash equilibrium can never be a Pareto optimum where economic rent does not exist, the SOE monopoly is not necessarily worse than a private monopoly in a market economy. It is a monopoly nonetheless. As a doubled edged sword, rent yielded by SOEs and shared by the state may fuel the ongoing expansion of SOEs, it is a heavy burden on the Chinese economy. With such ‘Chinese characteristics’, further economic reforms in China look bleak.

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Appendix. Data for mega-SOEs