Divergent Interests between Central and Local Governments: Testing Theories of Public Ownership

Chong-En Bai*Jiangyong Lu†and Zhigang Tao‡

September 2005

Abstract

There are two main theories about the costs and benefits of public ownership: the efficiency theory that public ownership is a means for government to achieve its social objectives and the political patronage theory that public ownership is used by government officials to pursue their personal gains. The latest development of the efficiency theory emphasizes that state-owned enterprises engage in multiple tasks and one of the tasks has externalities. This theory implies that the incentives for privatization depend on the level of the government. Using a panel data set of 26,153 state-owned enterprises in China from 1995 to 1997, this paper tests this as well as other implications of the two main theories of public ownership and finds strong support for the efficiency theory, especially the multi-task efficiency theory, but mixed support for the political patronage theory.

Key words: multi-task efficiency theory of public ownership, political patronage theory of public ownership, divergent interests of local and central governments, privatization
JEL classification codes: D23, H7, L2

*School of Economics and Management, Tsinghua University, and School of Economics and Finance, The University of Hong Kong.
†Center for China in the World Economy, Tsinghua University.
‡School of Business, The University of Hong Kong.

1 Introduction

In the last three decades, we have witnessed privatization of state-owned enterprises (SOEs) in economies around the world, first in developed economies such as the United Kingdom (Vickers and Yarrow, 1988), and then in the former Soviet Union and the Eastern European countries on a massive scale (see, for example, Boycko, Shleifer and Vishny, 1995). Much of this wave of privatization was triggered by the mounting evidence of poor performance of SOEs (Vernon and Aharoni, 1981; Donahue, 1989; World Bank, 1995) and, ultimately, the collapse of the socialist economies.

Along with the change of fortune of SOEs, there has been a rekindling of interest in understanding the costs and benefits of public ownership. There are two types of theories on public ownership, the efficiency theory and the political patronage theory.[1] The efficiency theory emphasizes that privately owned firms may not pursue social objectives that are considered to be important by the government and therefore public ownership is needed to achieve these objectives. Traditionally, this theory emphasizes public goods and the information problem in regulating market failures (see for example Atkinson and Stiglitz, 1980). The more recent development of this theory, which we call the multi-task efficiency theory, emphasizes the incentive problems when firms perform multiple tasks and one of the tasks has externalities (see for example Hart, Shleifer and Vishny, 1997; Bai, Li, Tao, Wang, 2000). The second main type of theory, the political patronage theory, focuses on the private interests of politicians and bureaucrats in maintaining public ownership (see Shleifer and Vishny, 1994; Boycko, Shleifer and Vishny, 1996). This theory argues that public ownership helps government officials cultivate political support among their constituents, exert control over important resources, and pursue personal interests. These theories of public ownership have different implications on policy choices and it is important to better understand their relative empirical relevance.

---

[1]Ideology may also be a reason for public ownership. This paper will not attempt to test the ideology theory due to the limitation of our data.

However, empirical testing of these theories is inadequate.[2] As far as we know, there has been no testing of the multi-task efficiency theory of public ownership. Most of the recent empirical work focuses solely on the political patronage theory. For example, Lopez-de-Silanes, Shleifer and Vishny (1997) do this by studying in-house provision vs. contracting out of public services by county governments in the United States. Clarke and Cull (2002) find evidence supporting the political patronage theory using data on bank privatization in a developing country. Li, Qiang and Xu (2005) also find evidence for some of the predictions of the political patronage theory using data on telecommunications sector reform in developing countries. This paper aims to provide the first empirical test of the multi-task efficiency theory of public ownership and at the same time also offer additional tests of some implications of the traditional efficiency theory and the political patronage theory.

The multi-task efficiency theory of public ownership was first advanced by Hart, Shleifer and Vishny (1997). In their model, the provider of a good or service can choose to invest in quality improvement and/or cost reduction. It is assumed that cost reduction has an adverse effect on the quality of the good or service. Under private ownership, the provider can benefit more from cost reduction and therefore invests more in cost reduction than under public ownership. Given the adverse effect of cost reduction on product quality and the assumption that quality is enjoyed mostly by the consumer of the good or service, quality is lower under private ownership than under public ownership, thereby offering a rationale for public ownership when product quality is deemed more important than cost. Hart, Shleifer and Vishny (1997) adopt an incomplete-contract framework and assume that no contract can be written on the benefits of the trade. Then, investment incentives are determined by the nature of the holdup problem, which depends on the ownership arrangement. Bai, Li, Tao, and Wang (2000) model the multi-task efficiency theory of public ownership using a different approach; they assume that contracts can be written about sharing the benefits of trade and that one of the multiple tasks performed

---

[2]Most existing studies focus on comparing the performance of publicly owned firms with that of privately owned firms (Djankov and Murrell, 2002; Megginson and Netter, 2001).

by the manager of each firm has negative effects on other firms. They then show that it is optimal to have some firms publicly owned and others privately owned, with the former choosing lower levels of the negative-externality producing activities than the latter. If the externalities spread through the whole economy, then different levels of the government have different incentives for privatizing SOEs because they internalize the externalities to different extent. Such differences offer us an opportunity to test the multi-task efficiency theory of public ownership. The main focus of this paper is on the empirical investigation of the divergent interests among different levels of government in privatizing SOEs.

The privatization process in China provides data for us to conduct the investigation. SOEs in China are affiliated with different levels of the government, including central, provincial, city, and county levels. This allows us to investigate the divergent interests among different levels of government to privatize SOEs, thereby testing the multi-task efficiency theory of public ownership. Furthermore, China has taken a gradual approach to reforming its economy. Until the mid 1990s privatization of SOEs was strictly forbidden, and since then it has been gradual and selective. This gradualist approach gives us enough variation among firms to conduct meaningful econometric analysis.

We construct a panel data set of 26,153 enterprises from 1995 to 1997. All of the enterprises were state-owned in both 1995 and 1996, but some of them were privatized in 1997. The representation of this data set is comprehensive, as it covers SOEs in 27 out of the 30 Chinese regions and all of the 38 two-digit Chinese manufacturing and mining industries. In Section 2, we will develop hypotheses from the multi-task efficiency theory of public ownership in combination with several externality issues unique to China. We will also develop some hypotheses from the traditional efficiency theory and the political patronage theory of public ownership. In Section 3, data will be described and summary statistics offered. In Section 4, we present our empirical results, which lend strong support for the efficiency theory, especially the multi-task efficiency theory, but mixed support for the political patronage theory of public ownership. The paper concludes with Section 5.

2 Theories and hypotheses

2.1 Multi-task efficiency theory and other efficiency theories of public ownership

To test the multi-task efficiency theory of public ownership, we need to adapt it to the context of China's privatization process. According to this theory, some activities of the firm have negative externalities, and the incentives for the manager of the firm to engage in the negative-externality producing activities are weaker under public ownership than under private ownership. In China, given the strong legacy of central planning, such negative-externality producing activities take the form of laying-off workers and getting debt written off by banks.

Before China started its economic reform in 1979, all workers were guaranteed lifetime employment at SOEs or similar firms. Furthermore, these firms provided and managed the pension and health care plans for their current and past employees, and sometimes for their families. There were no other government social security agencies or commercial institutions that provided unemployment insurance, pension, or medical insurance; the SOEs' provision of the social security services was exclusively. Later in the reform process, the government realized the importance of an independent social security system outside of the firms and started initiatives to build it up, but the system is still so rudimentary that both its coverage and efficiency are very limited. This important institutional background must be kept in mind when one analyzes the costs and benefits of privatizing China's SOEs.

China started gradual and selective privatization, or using the term preferred by the government due to its ideological sensitivity, restructuring of SOEs in the mid-1990s. By that time, most of the SOEs were burdened with a large amount of surplus labor.[3] When

---

[3]Li and Xu (2001) estimate that the mean and median rates of surplus labor in China's SOEs for the period of 1993-1996 were 23.5% and 26.3%, respectively. Estimates in Dong and Putterman (2003) are even higher; the mean and median labor redundancy rates were 44.4% and 42.6%, respectively, in 1994. A World Bank survey of 142 enterprises in 1994 found 60 percent of the firms had redundant

an SOE is privatized, the manager gets stronger profit incentives and weaker incentives to help government achieve its social goals. As a result, the manager often lays-off the surplus workers when and after the firm is privatized. Many of the laid-off workers cannot find other jobs for a long time and become unemployed. Given the poor state of the social security system, the cost of providing social security to the unemployed workers through the government social security system is very high; it is often higher than the cost of keeping these workers in the firm. As a result, the government often fails to provide sufficient social security to these workers. Severe unemployment and poor provision of social security may lead to public demonstration and social unrest, causing social instability and damaging the whole economy. Therefore, laying-off surplus workers may be good for the firm's profit, but it has a severe negative externality on other parts of the economy. This factor should not be ignored when making the privatization decision.[4]

The negative externality is not restricted to the local region. One channel for the negative effect of privatizing SOEs to spread to other regions is the cascading effect of social unrest. When public demonstration and social unrest occur in one region, it may trigger a chain reaction in other regions.[5] Another channel for the spread is the result of migration. Unemployed workers in one region sometimes migrate to other regions to look for jobs and they increase the unemployment pressure on their destination regions. Given that the negative externality of privatizing SOEs spreads widely in the economy, different levels of governments may have different incentives to privatize SOEs. Higher-level governments internalize the negative external effect of privatization to greater extent and therefore the cost of privatization relative to the benefit increases with the level of the government. This does not necessarily mean that the higher-level government worries about the cost of privatizing an SOE more than the lower-level government of the region where the SOE is located; because the higher-level government may care

---

workers exceeding 10 percent of their labor force, and one-third of the firms reported labor redundancy rate exceeding 20 percent (Lardy, 1998).

[4]Bai, Li, Tao, and Wang (2000) offer a more detailed discussion of this point.

[5]A formal model of this cascading effect is given by Lohmann (1994).

even less about the benefit of privatizing the SOE than the lower-level government, it may happen that the cost-benefit trade-off of the lower level government is in favor of privatization while that of the higher-level government is against.[6] Therefore, we have:

Hypothesis 1: According to the multi-task efficiency theory of public ownership, state-owned enterprises with higher level of government-affiliation are less likely to be privatized.

The negative external effect of privatization increases with the amount of surplus labor the firm started with. Therefore the cost of privatization increases with the amount of surplus labor, and the increase is faster for higher-level governments than for lower-level governments because the former internalize the negative externality to greater extent. The benefit of privatizing an SOE also increases with its surplus labor as more cost saving can be realized after the surplus workers are laid-off. However, the rate of increase in the benefit is the same for different levels of government. Comparing the changes in costs and benefits, the cost may increase faster than the benefit for higher-level governments and slower for lower-level governments. Consequently, we have:

Hypothesis 2: According to the multi-task efficiency theory of public ownership, there may exist a government-affiliation level below which SOEs with more surplus labor are more likely to be privatized, but above which the opposite is true.

Another cost of privatizing SOEs in China is related to the large amount of debt the SOEs carry. Many of the SOEs are heavily in debt and most of the debt is owed to banks owned by the central government.[7] When SOEs are privatized, they often have a large amount of debt written off by the banks with the help of the local government.

---

[6]Institutional analysis of China's privatization process by Cao, Qian, and Weingast (1999) reveals that China's central government is fully aware of the divergent interests of the lower-level governments in privatizing SOEs, and has repeatedly called for maintaining social stability during the privatization process.

[7]The liabilities to assets ratio of SOEs in China increased from 55% in 1989 to 85% in 1995 (Lardy, 1998).

The write-off is not just for solving the debt overhang problem as discussed by Myers (1977) but is a result of strategic default; many firms use privatization as a pretense to evade their debt obligations. This activity not only costs the central government by reducing the profitability of the banks it owns, but also threatens the stability of the financial system. Knowing this problem, the central government has issued directives to forbid firms from doing it (State Council Directive on bankruptcy and re-employment of workers of privatized SOEs, issued on March 2, 1997), but the directives have not been successful at stopping the activity, especially for firms affiliated with lower-level governments.[8] This phenomenon of debt-obligation evasion implies lower-level governments have stronger incentives to privatize their affiliated SOEs, for two reasons: One is that lower level government pay less attention to the negative effect of privatizing their affiliated SOEs on the stability of the financial system and the other is that central government directives are less effective in preventing lower-level governments from pressuring the banks to write-off debt for their affiliated firms in the process of privatization. Therefore, Hypothesis 1 is also implied by the consideration of the debt write-off.

Similar argument to those made just before Hypothesis 2 about surplus labor implies the following prediction about the effect of debt level on privatization:

Hypothesis 3: According to the multi-task efficiency theory of public ownership, there may exists a government-affiliation level below which state-owned enterprises with more debts are more likely to be privatized, but above which the opposite is true.

The multi-task efficiency theory of public ownership also has implications about the effect of firm size on privatization. Privatization of larger SOEs has significantly more negative impact on social stability. Larger SOEs tend to be more diversified (conglomerates or company towns) and more inefficient, implying significantly more layoff of

---

[8]In an emergency directive to lower level courts regarding their handling of privatization cases, issued on August 10, 2001, China's Supreme Court expressed its extreme concern about the tendency for local governments to help their affiliated SOEs use privatization as a pretense to evade bank loan obligations, and about the adverse effects of this practice on the stability of the country's financial system.

workers. The size of the firm also has another effect: Even assuming proportional layoff of surplus labor, it is more difficult for the labor market to absorb 3,000 laid-off workers from the same large SOE with similar skills and the same social network than 3,000 laid-off workers from several smaller SOEs, and furthermore it is much easier for 3,000 laid-off workers from a large SOE to organize protests than 3,000 laid-off workers from several smaller SOEs. Following the logic of the multi-task efficiency theory of public ownership, we have:

Hypothesis 4: According to the multi-task efficiency theory of public ownership, larger state-owned enterprises are less likely to be privatized even after the number of surplus workers is controlled.

An earlier version of the efficiency theory focuses on public ownership as a means to deal with market power. If regulation is too costly due to lack of information, public ownership is a possible substitute for regulation. The stronger is the market power, the more need there is for government intervention and the more likely that public ownership is desirable. Because market concentration of an industry is a measure of market power of firms in the industry, we have:

Hypothesis 5: According to the efficiency theory related to market power, privatization of state-owned enterprises is less likely in industries with higher degrees of concentration.

Before concluding the discussion on the efficiency theory of public ownership, we would like to point out its similarities and differences with the soft-budget-constraint theory (Kornai, 1979 and 1980). It is argued that SOEs are so inefficient and so much in debt that they cannot survive without being bailed out by the government. The phenomenon that government bails out failing firms is called the soft-budget-constraint syndrome. It is also argued that higher-level governments control more financial resources and therefore have stronger ability to bail out failing SOEs. These arguments can also explain Hypothesis 1. However, they cannot explain Hypotheses 2 and 3. According to Hypotheses 2 and 3, county-level governments are more likely to privatize

SOEs with more surplus labor and debt. One could explain this by arguing that county-level governments are themselves financially constrained and they cannot afford to bail out SOEs with large amount of surplus labor and debt. The flip side of this argument is that the government will bail out SOEs whenever they can afford to. If this is true, then one cannot explain why high-level governments are less likely to keep SOEs with smaller amount of surplus labor and debt, because if these governments can afford to bail out SOEs with large amount of surplus labor and debt, they can also afford to bail out those with small amount of surplus labor and debt. In sum, the efficiency theory of public ownership can explain all the hypotheses above but the soft-budget-constraint theory can only explain some of them.

Existing empirical studies on the privatization of SOEs in China focus on testing the soft-budget-constraint theory. Li (2003) and Brandt, Li, and Roberts (2004) both find that privatization is more likely when the firm faces harder budget constraint. Li (2003) also considers the effect of product market competition and Brandt, Li, and Roberts (2004) the health of local banks. Li and Lui (2004) find that privatization is less likely for SOEs with more surplus labor, but more likely for those SOEs the higher debt of which has become a major financial burden to the government. They argue that their result on debt is consistent with the predictions of the soft-budget-constraint theory. However, they do not take into account the fact that, in privatizing SOEs with a given amount of surplus labor or debt, higher-level governments place more importance on maintaining social stability (Cao, Qian and Weingast, 1999). As a result, they cannot offer a unified explanation for both their result on debt and that on surplus labor.

2.2 Political patronage theory of public ownership

The political patronage theory (Shleifer and Vishny, 1994; Boycko, Shleifer and Vishny, 1996) considers the personal interests of government officials, and explores the implications for public ownership. One of the most important objectives of government officials

is to keep their positions and influences. To achieve this objective, they need to cultivate political support among their constituents by creating jobs for them or protecting their jobs, which Boycko, Shleifer and Vishny (1996) argue is relevant in not only advanced economies but also transition economies. The proponents of the political patronage theory further argue that government officials face less risk when ordering SOEs to have an over-sized labor force than when arranging transfers from the treasury to private enterprises for them to hire more workers. The value of an SOE as a base for political support is partially determined by the specific industries involved. In labor-intensive industries, the cost of employing one worker in terms of required capital resources is low, and therefore firms in such industries offer better value as bases for political support. Consequently, we have:

Hypothesis 6: According to the political patronage theory, privatization of state-owned enterprises is less likely in those industries with lower capital labor ratios.

Meanwhile there are intra-industry differences in the value of firms as the bases of political support. In firms with more surplus labor, privatization will lead to more job losses and weakening of political support. Therefore, we have:

Hypothesis 7: According to the political patronage theory, within any given industry, state-owned enterprises with more surplus labor are less likely to be privatized.

This hypothesis is different from Hypothesis 2. Here the effect of surplus labor on privatization is independent of the level of government affiliation, while in Hypothesis 2, it depends on the level.

Aside from creating jobs and cultivating political support among their constituents, government officials are also interested in acquiring and maintaining control over resources. The control of a firm is more valuable to government officials if the firm has more market power. In such a firm, their rent seeking activities are not tightly constrained by market competition. Using the degree of concentration as a proxy for market power, we have:

Hypothesis 8: According to the political patronage theory of public ownership, privatization of state-owned enterprises is less likely in industries with higher degrees of concentration.

This hypothesis agrees with Hypothesis 5. Therefore, both the efficiency theory and the political patronage theory of public ownership imply the same effect of market power on privatization.

The value of control over a firm by the government official also depends on the profitability of the firm. More profits produced by the firm give the controlling government officials more financial resources for them to engage in rent seeking activities. It follows that:

Hypothesis 9: In any given industry, state-owned enterprises with higher profit margins are more likely to be maintained.

Before concluding the discussion on the political patronage theory of public ownership, we would like to summarize some of the other theories of public ownership that are related to the hypotheses above. First of all, capital markets in China are imperfect with strong preference for lending to SOEs, partly because most banks are also state-owned and partly because both the central and local governments were prejudiced against private enterprises until recently. Given that demand for capital is higher in industries with higher capital labor ratios, we expect lower probability of SOEs being privatized in those industries, which is the opposite of Hypothesis 6.

Regarding the effect of SOEs' financial performance on the likelihood of privatization, there are two competing arguments in the transition-economics literature. One view is that worst performing SOEs should be privatized first as it can generate most (static) efficiency gain. On the other hand, Su and Jefferson (2003) suggest that better-performing SOEs would deteriorate much faster, possibly because of asset stripping by insiders, and therefore they should be privatized first from the dynamic efficiency point of view, which is the opposite of Hypothesis 9. Gordon et al (1999) argue that collecting taxes from

private enterprises is very difficult in developing countries. This is especially relevant in China where domestic private enterprises are wary about the protection of private property while multinational firms are given preferential tax treatment. A second-best solution is for the central and local governments to operate businesses themselves as a way of securing revenue for the provision of public goods. It follows that better performing SOEs are more likely to be maintained, again supporting Hypothesis 9. When we discuss the empirical findings about privatizing, these other theories should be kept in mind as well as the efficiency and political patronage theories.

3   Data and variables

3.1   Data

The data used in this paper covers enterprises in China's manufacturing and mining industries from 1995 to 1997. It was provided by China's National Bureau of Statistics, which conducts industrial censuses every five years, and annual surveys of large- and medium-size enterprises (i.e., with sales over 5 million Chinese Yuan). The year 1995 was an industrial census year, and so the data covers 491,539 enterprises at or above the county level. The data for 1996 and 1997 are from the annual surveys, covering 194,088 and 198,494 enterprises, respectively.

In the dataset, each enterprise is assigned a unique identification number. The first step in our sample construction is to use enterprise identification numbers to search for those enterprises of which we have coverage for each of the three years, 1995-1997. This step yields a balanced panel data set of 95,243 enterprises. The second step is to delete those enterprises whose value of total assets or number of employees or sales is missing or negative, and those enterprises whose value of profits is missing. This step of sample construction yields a set of 92,878 enterprises. Among these 92,878 enterprises, 90,131 enterprises did not undergo any ownership change between 1995 and 1996. Of these

90,131 enterprises, 55.67% were collective-owned enterprises, 29.02 % (26,153) SOEs, 12.69% foreign-invested (including those with investment from Hong Kong, Macao, and Taiwan), and 2.62% others. As our objective is to explore conditions under which the central and local governments allow SOEs to be privatized, we focus on those enterprises that were state-owned in both 1995 and 1996 (i.e., the sample of 26,153 enterprises) and use their 1995 data to construct independent variables.

For our final sample of 26,153 enterprises whose ownership status was state-owned in both 1995 and 1996, 24,795 (94.8%) remained state-owned in 1997 while 1,358 of them (5.2%) were privatized in 1997. In particular, 403 SOEs became collective-owned, 32 foreign-owned, 38 private-owned, 788 shareholding companies, and 97 others.[9]

Table 1.1 lists the geographic distribution of these 26,153 enterprises among various Chinese regions. 27 out of the 30 Chinese regions are covered by the sample; the three missing regions are Inner Mongolia, Hainan, and Tibet from which China's National Bureau of Statistics did not have any data in its 1996 annual survey. Table 1.1 also shows the percentage of SOEs being privatized in 1997 among the various Chinese regions. Anhui has the highest percentage of SOEs being privatized (26.63%), followed by Fujian (10.97%), Gansu (9.45%), Henan (9.15%), Hunan (8.28%), JiangXi (7.86%), and Sichuan (7.41%). At the other extreme, Beijing had no privatization at all (0%), followed by Xinjiang (0.34%), Tianjin (0.42%), and Qinghai (0.66%). It is understandable that Anhui and Sichuan, two provinces leading the agricultural reform in late 1970s and early 1980s, were ahead of other provinces in the privatization of SOEs, while Beijing, the capital of China and the center of ideological debates, lagged far behind. Meanwhile, even among adjacent provinces, such as Gansu and Qinghai, there were drastic differences in the percentage of SOEs being privatized.

Table 1.2 shows that all manufacturing and mining industries are represented in the sample. Among all the industries, the other mining and dressing industry has the highest

---

[9]For ideological reasons, China's central government has used the word "restructuring" instead of privatization. Without making any further distinctions, all changes away from state ownership are categorized as either privatization or restructuring.

percentage of SOEs being privatized (40%),[10] followed by beverage production (8.17%), electric equipment and machinery (7.68%), and nonmetal mineral products (7.43%). At the other extreme, petroleum and natural gas extraction had no privatization of SOEs (0%), followed by tobacco processing (0.59%), tap water production and supply (1.43%), logging and transport of timber and bamboo (1.53%), and gas production and supply (1.65%).

Table 1.3 breaks down the sample of 26,153 enterprises by levels of affiliation: county, city, provincial, or central. County-level SOEs had the highest percentage of privatization (7.84%), followed by city-level (3.39%), provincial level (1.57%), and the central level (0.85%).[11]

3.2   Variables

Next we construct variables for testing the hypotheses listed in Section 2. The dependent variable of this study is a dummy variable, which takes the value of 1 if a SOE was privatized in 1997 and 0 otherwise.

To mitigate endogeneity problems, we use 1995 data to calculate independent variables and examine their effects on the possibility of the firm being privatized in 1997.

First, we discuss firm-level variables. The *Affiliation* is defined as an ordered dummy variable which takes 0 if a SOE is affiliated with a county government, 1 if it is affiliated with a city government, 2 if it is affiliated with a provincial government, and 3 if it is affiliated with the central government. The *Surplus Labor Percentage* for a SOE is defined as the percentage of workers who would be laid off if the company were operating at the industry-average level of sales per capita. It is equal to $\left(L_i - \frac{S_i}{S}L\right)/L_i$, where L_i (or S_i) is firm i's employment (or sales), and L (or S) is the industry-average

---

[10]Our econometric results still hold when the observations from the other mining and dressing industry are deleted from the sample. See Section 4 for details.

[11]Removing those state-owned enterprises affiliated with the central government does not affect our results either. See Section 4 for details.

employment (or sales) calculated at the four-digit industry level using industrial census data of 491,539 enterprises in 1995. The *Surplus Labor Percentage*Affiliation* is the interaction term between surplus labor percentage and affiliation. The *Debt Ratio* is defined as the total liabilities divided by total assets of firms. The *Debt Ratio * Affiliation* is the interaction term between debt ratio and affiliation. The *Logarithm of Sales* is used to measure the size of a SOE. The *Return on Assets* (*ROA*) is used as an indicator of a firm's financial performance. It is calculated as an enterprise's profit (or loss) before income tax (or credit) divided by its total assets. To accommodate the possible nonlinear effects of ROA, the *Square of ROA* is also included in the econometric analysis.

Next we have a set of industry-level variables, which are all calculated at the four-digit industry level using industrial census data of 491,539 enterprises in 1995. The *Herfindahl Index* indicates the degree of concentration of a four-digit industry, and equals the summation of the square of the sales share of each enterprise in the industry. The *Capital Labor Ratio* is defined as the industry-average total assets divided by industry-average labor employment. Summary statistics of the variables are given in Tables 2 and 3.

4   Econometric analysis

Since the dependent variable in our study is a categorical variable, 1 for privatized, and 0 for not, we use the binary logistic method to estimate the effects of our independent variables on the dependent variable. The probability of a SOE being privatized is modeled as a function of the independent variables as follows:

$$\text{Probability of privatization} = \frac{1}{1 + e^{-Y}},$$

where $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n$, and $X_1, X_2, ... , X_n$ are the independent variables.

Results of the econometric tests of the hypotheses are summarized in Table 4. Column 1 of Table 4 shows the results from using the full sample (26,153 firms). The coefficient of *Affiliation* is negative and statistically significant at the 1% level, and the coefficients of *Surplus Labor Percentage * Affiliation* and *Debt Ratio * Affiliation* are negative and statistically significant at 10% and 15% level respectively. Therefore, for SOEs with positive surplus labor, the likelihood of privatization decreases with the level of government affiliation, supporting Hypothesis 1. The results also indicate that the effects of surplus labor percentage and debt ratio on the likelihood of privatization depend on the level of affiliation. Specifically, the combination of the estimated coefficient of the interaction term *Surplus Labor Percentage * Affiliation* with the estimated coefficient of *Surplus Labor Percentage* suggests that as the percentage of surplus labor increases, SOEs affiliated with the county or below level government (*Affiliation*=0) are more likely to be privatized, but SOEs affiliated with higher levels governments (*Affiliation*=1, 2, or 3) are less likely to be privatized, although the estimates are not always statistically significant. Similarly, the results also suggest that as debt ratio increases, SOEs affiliated with the city or below levels governments (*Affiliation*=0 or 1) are more likely to be privatized, but SOEs affiliated with higher levels governments (*Affiliation*=2, or 3) are less likely to be privatized. Therefore, Hypotheses 2 and 3 are strongly supported. *Logarithm of Sales* has a negative coefficient with 5% statistical significance, implying that larger SOEs are less likely to be privatized and offering support to Hypothesis 4. The negative and 15% statistically significant coefficient of the *Herfindahl Index* marginally supports the hypothesis that SOEs are less likely to be privatized in industries with higher degree of concentration, i.e., Hypothesis 5. Taken together, the econometric results lend strong support to the efficiency theory, especially the multi-task efficiency theory, of public ownership.[12]

---

[12] As explained in Section 2.1, the soft-budget-constraint theory has the predictions of Hypothesis 1 (the effect of affiliation alone on the probability of privatization) but not those of Hypotheses 2 or 3 (the interaction effect of affiliation with surplus labor or debt ratio on the probability of privatization). Our empirical support for Hypotheses 1-3 implies that the soft-budget-constraint theory has less explanatory

Next we discuss results regarding the political patronage theory of public ownership (Hypotheses 6-9). The negative and significant (at 1% level) coefficient of *Capital Labor Ratio* suggests more privatization for SOEs in industries with lower capital labor ratios (or more workers employed per unit of capital), and strongly rejects Hypothesis 6.[13] Similarly, the positive but not statistically significant coefficient of the *Surplus Labor Percentage* does not support Hypothesis 7 either. The coefficient of the *Herfindahl Index* is negative and significant at the 15% level, implying less privatization of SOEs in more concentrated (or more profitable) industries and supporting Hypothesis 8. *Return on Assets (ROA)* has a positive coefficient with 1% statistical significance, whereas the *Square of ROA* – introduced to take into account the possible non-linear effects of firm-level performance on the possibility of privatization – has a negative coefficient with 5% statistical significance. Thus there exists a performance level above which SOEs with higher returns on assets are less likely to be privatized, but below which the opposite holds. The non-linear effects of ROA suggest that SOEs with mediocre financial performance are most likely to be privatized. This finding rejects both the prediction that SOEs with worse than average financial performance should be privatized first to achieve static efficiency gain, and that SOEs with better than average financial performance should be privatized first to achieve dynamic efficiency gain (Su and Jefferson, 2003). But the finding supports the theory proposed by Gordon, Bai, and Li (1999) that better performing SOEs should be maintained to secure revenue for the provision of public goods. It could also be interpreted as offering partial support to the political patronage theory. Taken together, our results in column 1 of Table 4 offer mixed support to the political patronage theory of public ownership.[14]

power than the multi-task efficiency theory of public ownership.

[13]This empirical result, however, supports the imperfect capital market hypothesis, which was discussed in Section 2.2.

[14]Using data on bank privatization in Argentina, Clarke and Cull (2002) find that poorly performing state-owned banks are more likely to be privatized (Hypothesis 9) and over-staffed banks are less likely to be privatized (Hypothesis 7). These hypotheses are two of the four developed from the political patronage theory of public ownership. With data on telecommunications sector reform in 50 developing

Finally we test the robustness of our results through regression analysis with several sub-samples. First, Column 2 of Table 4 reports results from the sample excluding SOEs affiliated with the central government. Second, we delete the observations in the "other mining and dressing" industry from the sample due to its very high privatization rate (40%) and report results in Column 3 of Table 4. Last, we report results from a sample in which both SOEs affiliated with the central government and those in the "other mining and dressing" industry are deleted in Column 4 of Table 4. The findings show that the results in Column 1 of Table 4 are robust to these changes in the sample.

5   Conclusion

Privatization of state-owned enterprises (SOEs) in economies around the world in the last three decades has led to intense debates about the costs and benefits of public ownership. Two main views stand out in the literature. The first is the efficiency theory. It argues that privately owned firms may not pursue social objectives that are considered to be important by the government and therefore public ownership is needed to achieve these objectives. The more recent development of this theory, the multi-task efficiency theory, assumes that firms perform multiple tasks and one of the tasks has externalities. It considers the role of public ownership in dealing with such externalities when other means are absent or inadequate. The second main view is the political patronage theory. It focuses on the private interests of politicians and bureaucrats in maintaining public ownership.

The two theories above of public ownership have different policy implications. According to the efficiency theory, public ownership may play a positive role in dealing with market failures even though it does not measure up when one looks at narrowly defined

---

countries, Li, Qiang and Xu (2005) find that initial profitability has negative effects on both regulatory and tariff regimes, supporting Hypothesis 9, which is one of the four predictions of the political patronage theory of public ownership.

or private efficiency indicators, such as poor financial performance. To improve overall efficiency, one needs to find other means to deal with the market failures so that private efficiency can be achieved without sacrificing important social objectives. Therefore, the most important part of the privatization process is not the change of ownership per se, rather it is the establishment of necessary institutional infrastructure that can help achieve social objectives that relied on public ownership before the infrastructure was established. For example, the establishment of a well-functioning social security system that is independent of the SOEs can reduce the negative effect of laying off employees on social stability and therefore make it unnecessary to rely on SOEs to maintain stability. The improvement of the financial system can reduce the cost of privatization to the banks and make it more efficient to privatize SOEs. The political patronage theory, however, implies that privatization is always efficiency enhancing and the only issue is how to overcome the political resistance.

Given the significant differences in the implications of the two theories of public ownership, it is surprisingly that there is little empirical work testing these two theories at the same time, especially the multi-task efficiency theory. Recent work in this area has focused solely on testing the political patronage theory (Lopez-de-Silanes, Shleifer and Vishny, 1997; Clarke and Cull, 2002; and Li, Qiang, and Xu, 2005). A possible reason for a total lack of test of the more recent development of the efficiency theory is because it is based on externalities and it is difficult to measure externalities. This paper finds an indirect way to test the effect of externalities on public ownership by identifying activities that yield widespread externalities in the economy and studying the divergent interests of different levels of government in responding to these activities. By doing so, we are able to offer the first test of the multi-task efficiency theory as well as some implications of the traditional efficiency theory and the political patronage theory of public ownership.

Our test uses a panel data set of 26,153 enterprises in China from 1995 to 1997. These enterprises were initially all state-owned and some of them were later privatized. The data set includes all of the large- and medium-sized SOEs in China except for those

19

with missing variable values, and it represents all of the 38 Chinese manufacturing and mining industries and all but three economically backward regions in China. Each SOE is affiliated with a level of government and this unique information is crucial for our investigation of the divergent incentives for different levels of government to privatize SOEs. The time period covered, 1995-1997, is also most ideal, as privatization of SOEs was not permitted until mid 1990s. In addition, the gradual privatization approach taken by the Chinese government leads to significant variations in the sample, facilitating the econometric test of the two theories of public ownership.

In developing testable hypotheses from the efficiency theory of public ownership, we notice that, due to the legacies of the plan economy, there is a lack of efficient and independent social security system and sound financial system in China. As a result, privatizing SOEs may lead to massive layoff of workers and unwarranted write-off of debts, which have adverse effects on the rest of the economy. Because these adverse effects extend widely in the economy, it is implied that China's central and local governments have divergent interests in privatizing SOEs. Indeed we find that, given the level of surplus labor or debt, privatization is less likely for SOEs that are affiliated with higher-level governments, which place more importance on maintaining social stability according to the multi-task efficiency theory of public ownership. Furthermore, as surplus labor and debt ratio increase, higher levels governments become less likely to privatize and lower levels government become more. Thus these empirical results offer strong support for the multi-task efficiency theory of public ownership. The political patronage theory predicts that privatization is less likely for industries that offer more employment opportunities and for SOEs that have more surplus labor. It also predicts that privatization is less likely in those industries that offer higher financial benefits of control, and for SOEs that have better financial performance. Our empirical findings offer support to the set of predictions on the financial benefits of control but not those on the employment opportunities, thereby providing only mixed support to the political patronage theory of public ownership.

References

Atkinson, Anthony B. and Joseph E. Stiglitz (1980). Lectures on Public Economics. London, McGraw-Hill Book Co.

Bai, Chong-en, David D Li, Zhigang Tao and Yijiang Wang (2000). "A Multitask Theory of State Enterprise Reform." Journal of Comparative Economics 28(4): 716-738.

Boycko, Maxim, Andrei Shleifer and Robert W. Vishny (1995). Privatizing Russia, MIT Press.

Boycko, Maxim, Andrei Shleifer and Robert W. Vishny (1996). "A Theory of Privatization." Economic Journal 106(435): 309-319.

Brandt, Loren, Hongbin Li and Joanne Roberts (2004). Why Do Governments Privatize?, Working Paper, Univ. of Toronto.

Cao, Yuanzheng, Yingyi Qian and Barry Weingast (1999). "From Federalism, Chinese Style, to Privatization, Chinese Style." Economics of Transition 7(1): 103-131.

Clarke, George R. G. and Robert Cull (2002). "Political and Economic Determinants of the Likelihood of Privatizing Argentine Public Banks." Journal of Law and Economics 45: 165-197.

Djankov, Simeon and Peter Murrell (2002). "Enterprise Restructuring in Transition: a Quantitative Survey." Journal of Economic Literature 25(3): 739-792.

Donahue, John D. (1989). The Privatization Decision: Public Ends, Private Means. New York, Basic Books.

Dong, Xiao-Yuan and Louis Putterman (2003). "Soft Budget Constraints, Social Burdens, and Labor Redundancy in China's State Industry." Journal of Comparative Economics 31: 110-133.

Gordon, Roger H., Chong-En Bai and David D. Li (1999). "Efficiency Losses from Tax Distortions vs. Government Control." European Economics Review 43(4-6): 1095-1103.

Hart, Oliver, Andrei Shleifer and Robert W. Vishny (1997). "The Proper Scope of Government: Theory and An application to Prisons." Quarterly Journal of Economics 112: 1127-1161.

Kornai, Janos (1979). "Resource-constrained versus Demand-constrained Systems." Econometrica 47(3): 801-819.

Kornai, Janos (1980). Economics of Shortage. Amsterdam, North Holland.

Lardy, Nicholas R. (1998). China's Unfinished Economic Revolution. Washington, DC, Brookings Institution Press.

Li, David D and T. Francis Lui (2004). "Why Do Governments Dump State Enterprises? Evidence form China." In Ito Takatoshi and Anne O. Krueger, eds., Governance, Regulation, and Privatization in the Asia-Pacific Region., The University of Chicago Press, pp. 211-230.

Li, Wei, Christine Z. Qiang, and Lixin Xu (2005). "Deregulating the telecommunications sector in developing countries: The role of democracy and interest groups." World Development 33(8), 1307-1324, August 2005.

Li, Guo and Lixin Xu (2001). "State-owned Enterprises, Labor Redundancy, and Job

Creation: The Experience of the Chinese Provinces." China Economic Quarterly 1(1): 97-110.

Li, Hongbin (2003). "Government's Budget Constraint, Competition, and Privatization: Evidence from China's Rural Industry." Journal of Comparative Economics 31(3): 486-502.

Lohmann, Susanne (1994). "Information Aggregation Through Costly Political Action." American Economic Review 84(3): 518-530.

Lopez-de-Silanes, Florencio, Andrei Shleifer and Robert W. Vishny (1997). "Privatization in the United States." Rand Journal of Economics 28(3): 447-471.

Megginson, William L. and Jeffry M. Netter (2001). "From State to Market: A Survey of Empirical Studies on Privatization." Journal of Economic Literature 39(2): 321-389.

Myers, Stewart C. (1977). "Determinants of Corporate Borrowing." Journal of Financial Economics 5(2): 147-175.

Shleifer, Andrei and Robert W. Vishny (1994). "Politicians and Firms." Quaterly Journal of Economics 109(4): 995-1025.

Su, Jian and Gary Jefferson (2003). A Theory of Decentralized Privatization: Evidence from China, Brandeis University, Working Paper.

Vernon, Raymond and Yair Aharoni (eds) (1981). State-owned Enterprise in the Western Economies. New York, St. Martin's Press.

Vickers, John and George Yarrow (1988). Privatization: an Economic Analysis, MIT

Press.

World Bank (1995). Bureaucrats in Business. London, Oxford University Press.

Table 1.1: Privatization of State-owned Enterprises by Province

Province	Number of SOEs in 1995 and 1996	Number of SOEs privatized in 1997	Percentage of SOEs privatized in 1997
Anhui	1044	278	26.63%
Fujian	839	92	10.97%
Gansu	550	52	9.45%
Henan	874	80	9.15%
Hunan	797	66	8.28%
Jiangxi	1196	94	7.86%
Sichuan	1943	144	7.41%
Hubei	885	60	6.78%
Yunnan	928	61	6.57%
Ningxia	181	10	5.52%
Guizhou	517	23	4.45%
Hebei	1579	65	4.12%
Jiangsu	2075	79	3.81%
Zhejiang	1430	48	3.36%
Heilongjiang	955	29	3.04%
Guangxi	945	26	2.75%
Shanghai	524	13	2.48%
Jilin	712	17	2.39%
Liaoning	1448	34	2.35%
Shannxi	803	18	2.24%
Shandong	1900	30	1.58%
Guangdong	2017	31	1.54%
Shanxi	246	3	1.22%
Qinghai	151	1	0.66%
Tianjin	476	2	0.42%
Xinjiang	597	2	0.34%
Beijing	541	0	0.00%
Inner Mongolia	--	--	--
Hainan	--	--	--
Tibet	--	--	--
Total	**26153**	**1358**	**5.19%**

Table 1.2: Privatization of State-owned Enterprises by Industry

Industry	Number of SOEs in 1995 and 1996	Number of SOEs privatized in 1997	Percentage of SOEs privatized in 1997
Other Mining and Dressing	5	2	40.00%
Beverage Production	955	78	8.17%
Electric Equipment & Machinery	859	66	7.68%
Non-mental Mineral Products	2463	183	7.43%
Rubber Products	206	14	6.80%
Raw Chemical Materials & Chemical Products	1979	131	6.62%
Medical & Pharmaceutical Products	792	52	6.57%
Papermaking & Paper Products	583	36	6.17%
Special Equipment Manufacturing	1467	86	5.86%
Food Processing & Production	3175	185	5.83%
Furniture Manufacturing	54	3	5.56%
Timber Processing, Bamboo, Cane, Straw Products	218	12	5.50%
Garments & Other Fiber Products	182	10	5.49%
Ordinary Machinery Equipment	1633	89	5.45%
Manufacturing of Foods	979	51	5.21%
Printing & Medium Reproduction	756	37	4.89%
Leather, Furs, Down & Related Products	147	7	4.76%
Metal Products	554	26	4.69%
Cultural, Educational & Sports Goods	88	4	4.55%
Petroleum Refining, Coking, & Gas Production & Supply	132	6	4.55%
Transportation Equipment	981	44	4.49%
Nonmetal Minerals Mining & Processing	314	14	4.46%
Smelting & Pressing of Ferrous Metals	415	18	4.34%
Coal Mining & Processing	673	29	4.31%
Nonmetal Mineral Products	338	14	4.14%
Instruments, Meters, Cultural & Clerical Machinery	336	13	3.87%
Ferrous Mental Ores Mining and Dressing	78	3	3.85%
Textile Industry	1686	61	3.62%
Chemical Fibers	123	4	3.25%
Other Manufacturing	161	5	3.11%
Nonferrous Mental Ores Mining and Dressing	106	3	2.83%
Electronics & Telecommunications	557	14	2.51%
Electricity Power, Steam & Hot Water Production & Supply	1949	42	2.15%
Gas Production and Supplies	121	2	1.65%
Logging & Transport of Timber & Bamboo	261	4	1.53%
Tap Water Production & Supply	629	9	1.43%
Tobacco Processing	169	1	0.59%
Petroleum & Natural Gas Extraction	29	0	0.00%
Total	**26153**	**1358**	**5.19%**

Table 1.3: Privatization of State-owned Enterprises by Affiliation

Affiliation	Number of SOEs in 1995 and 1996	Number of SOEs privatized in 1997	Percentage of SOEs privatized in 1997
County or below	12965	1016	7.84%
City	8085	274	3.39%
Province	3448	54	1.57%
Central	1655	14	0.85%
Total	**26153**	**1358**	**5.19%**

Table 2: Summary Statistics of Dependent and Independent Variables

Variable	Maximum	Minimum	Mean	Std
Privatized in 1997	1	0	0.05	0.22
Surplus Labor Percentage	0.94	-3.84	0.09	0.79
Debt Ratio	1.36	0.05	0.69	0.25
Affiliation	3	0	0.76	0.91
Logarithm of Sales	17.5	2.63	9.67	1.41
ROA	0.96	-1.05	0.01	0.08
Square of ROA	1.11	0	0.006	0.032
Herfindahl Index	9553.57	1.85	193.92	351.36
Capital Labor Ratio	203	0.65	23.34	31.34

Table 3: Correlation Table

		1	2	3	4	5	6	7	8	9	10	11
Privatized in 1997	1	1										
Surplus Labor Percentage	2	.014[b]	1									
Surplus Labor Percentage *Affiliation	3	-.006[c]	.098[a]	1								
Debt ratio	4	.022[a]	.106[a]	.038[a]	1							
Debt Ratio * Affiliation	5	-0.004	.040[a]	.121[a]	-.015[c]	1						
Affiliation	6	-.116[a]	-.043[a]	-.061[a]	-.076[a]	-.129[a]	1					
Logarithm of Sales	7	-.051[a]	-.357[a]	-.051[a]	-.001	-.062[a]	.335[a]	1				
ROA	8	.019[a]	-.295[a]	-.045[a]	-.355[a]	-.026[a]	-.047[a]	.138[a]	1			
Square of ROA	9	-.010[c]	-.059[a]	.011[c]	.077[a]	-.008	.011[c]	-.034[a]	-.069[a]	1		
Herfindahl Index	10	-.025[a]	.060[a]	.014[c]	-.030[a]	-.002[c]	.137[a]	.082[a]	.002	.001	1	
Capital Labor Ratio	11	-.039[a]	-.254[a]	-.134[a]	-.311[a]	-.101[a]	.147[a]	.154[a]	.086[a]	-.006	.081[a]	1

Note: a, b, c indicate significance at the 0.001, 0.01, 0.1 level, respectively.

Table 4: Regression Results

Independent Variable	(1)	(2)	(3)	(4)
Affiliation	-0.56 ***	-0.54 ***	-0.56 ***	-0.53 ***
	(0.14)	(0.17)	(0.14)	(0.17)
Surplus Labor Percentage	0.067	0.057	0.084 *	0.074 +
	(0.048)	(0.05)	(0.05)	(0.05)
Surplus Labor Percentage *Affiliation	-0.10 *	-0.098 +	-0.11 **	-0.11 *
	(0.053)	(0.06)	(0.05)	(0.06)
Debt ratio	0.41 ***	0.39 ***	0.39 ***	0.39 ***
	(0.14)	(0.14)	(0.14)	(0.15)
Debt Ratio * Affiliation	-0.30 +	-0.36 +	-0.29 +	-0.36 +
	(0.20)	(0.23)	(0.19)	(0.23)
Logarithm of Sales	-0.05 **	-0.054 **	-0.047 *	-0.051 **
	(0.025)	(0.025)	(0.025)	(0.026)
Herfindahl Index	-0.0002 +	-0.0002 *	-0.0002 +	-0.0002 *
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Capital Labor Ratio	-0.0049 ***	-0.0051 ***	-0.0051 ***	-0.0053 ***
	(0.0013)	(0.0014)	(0.0013)	(0.0014)
ROA	1.52 ***	1.35 ***	1.54 ***	1.36 ***
	(0.48)	(0.49)	(0.48)	(0.49)
Square of ROA	-3.03 **	-4.15 **	-2.98 **	-4.08 **
	(1.51)	(1.80)	(1.49)	(1.79)
Province dummy	Yes	Yes	Yes	Yes
Number of Observations	26153	24498	26148	24493
Log Likelihood	-5090.76	-5009.21	-5081.28	-5002.78

Note: Standard errors are in the parentheses. +, *, **, *** indicate significance at the 15, 10, 5, 1% level, respectively. Columns (1)-(4) present results for all hypotheses from regressions including: (1): all firms. (2): firms affiliated with the province and below levels governments. (3): firms other than the "other mining industry." (4): firms affiliated with the province and below levels governments; and other than the "other mining industry. "