How Does Privatization Work in China?

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Abstract

Using a comprehensive panel data set of China's state-owned enterprises, we investigate the impacts of privatization on social welfare and firm performance indicators. The privatization of China's state-owned enterprises was found to have little impact on the change of firm employment, but it did lead to increasing sales and hence higher labor productivity. Meanwhile, there was a gain in firm profitability contributed to mostly by the reduction of managerial expenses to sales. The impact of privatization was sustainable in the long run, and was more pronounced when state ownership was reduced to minority position as opposed to majority position.

1. Introduction

It has been thirty years since China adopted the twin policies of opening its door to foreign trade and investment and reforming its state-owned enterprises in 1978. Spectacular progress has been made in line with the first policy.[1] On reforming its state-owned enterprises, however, China has taken a gradual and selective approach, despite the fact that state-owned enterprises have had poor financial performance as compared with China's private enterprises and foreign multinationals operating in China (Cao, Qian, and Weingast, 1999).[2] Accounting for 35% of China's GDP, state ownership remains a significant, if not dominant, force in the Chinese economy after thirty years of economic reform (CAI JING Magazine, 2007).

Indeed, the speed of reforming its state-owned enterprises has distinguished China from other formerly centrally planned economies, and has thus attracted much attention in the economics literature. Studies have focused on the rationales for the Chinese government to keep inefficient state-owned enterprises. One argument is that, faced with low-powered incentives for sales and profits, China's state-owned enterprises focus on absorbing surplus labor and help to maintain social stability, which is crucial to the successful functioning of the whole economy, including

[1] China has attracted more than US$500 billion foreign direct investment (China Statistical Yearbook, 2005), and it was the second largest exporter in the world after Germany in 2007 (The World Factbook, 2007).

[2] Indeed, much improvement in efficiency and performance could be obtained from privatizing those state-owned enterprises (see, for example, Gordon and Li, 1995; Groves, Hong, McMillan, and Naughton, 1994, 1995; Li, 1997; Li and Xu, 2004; Zhang, Zhang, and Zhao, 2001). See Djankov and Murrell (2002) for a survey of enterprise restructuring in the transition economies, and Megginson and Netter (2001) for a survey of privatization in both developed and developing economies.

China's private enterprises and foreign multinationals (Bai, Li, Tao and Wang, 2000).[3] Delaying the privatization of inefficient state-owned enterprises is a second-best arrangement before the setup of an independent and efficient social security system. Another argument is that state-owned enterprises in China are controlled by their management, because they are widely held by all people in the society and the supervision by the State Assets Agency – a state agency in charge of managing state-owned enterprises for all people in the society – is not entirely profit driven and could be circumvented. Thus privatization cannot take place unless the private interests of the management are well taken care of.[4]

To shed light on why China has taken a gradual and selective approach to reforming its state-owned enterprises, we propose to investigate how the payoffs of relevant interest groups of China's state-owned enterprises changed during the privatization process (i.e., how privatization really worked in China) using a comprehensive panel data set.[5] Our data is from the annual surveys of manufacturing and mining firms conducted by the National Bureau of Statistics of China for the period of 1998 to 2005. The number of firms covered in the surveys varied from approximately 162,000 to approximately 270,000. Using a set of consistent firm identifications such as original firm identification code, firm name, firm address, region code, and industry code, we construct a panel data set of 25,970 state-owned enterprises that appeared at least three consecutive years during the period of 1998-2005 and were wholly state-owned the first time they entered in the panel.

Our data-set contains information that can be used to construct social welfare and firm performance indicators. Specifically, we have: (1) social welfare indicators on labor (size of employment and wage per labor), consumers (price index), and governments (tax contributions), (2) indicators on firm performance (logarithm of sales, sales per labor, liability to assets, and operating income to sales), and (3) individual components of the operating income to sales (profits from main products to

[3] The multi-task theory of state enterprise reform by Bai, Li, Tao and Wang (2000) is similar to the efficiency theory of public ownership by Hart, Shleifer and Vishny (1997) in that low-powered incentives under state-ownership may induce effort on some difficult-to-measure tasks that are of importance to the general economy. It builds upon the efficiency theory by highlighting the specific multiple tasks relevant to China (i.e., sales and social stability), and focusing on the public good nature of maintaining social stability. Li and Lui (2004) define surplus labor ratio as the percentage of workers who would be laid off if the company were operating at the industry-average level of sales per labor.

[4] The theoretical support for the management control view comes from the political patronage theory of Shleifer and Vishny (1994) that government officials use state-owned enterprises to create jobs and win popular support so as to stay in power, and they then extract private benefits from these enterprises.

[5] There are empirical studies focusing on the incentives for the Chinese central and local governments to privatize its state-owned enterprises (Bai, Lu, and Tao, 2005; Bai, Lu, and Tao, 2006; Guo and Yao, 2005; Li and Lui, 2004; Li and Rozelle, 2000; Wang, Xu and Zhu, 2004).

sales, profits from other products to sales, managerial expenses to sales, and financial expenses to sales).

There are two challenges for establishing the impacts of privatizing China's SOEs. One is the potential selection bias problem. As China's privatization has been gradual and selective, the impacts of privatization could be due to the characteristics of those SOEs chosen for privatization, rather than the ownership changes. The other problem is to control for all possible factors that may affect social welfare and firm performance indicators. We take two strategies to address these problems. The first strategy is to use firm fixed effect models to account for firm-specific and time-invariant factors, and the second and more important strategy is to use the Heckman two-stage estimation method on top of the firm fixed effect models. With the second strategy, we can directly deal with the selection bias problem, and estimate the impacts of privatization after addressing that problem.

We find that the privatization of China's state-owned enterprises had little impact on changes in employment, and instead the focus of privatization was on increasing sales with the existing workforce so as to improve labor productivity. We also find that there was significant gain in firm profitability, and most of the gain came from the reduction of managerial expenses to sales.

The benefits of privatization might be transitory, as there could be under-reporting of financial performance prior to privatization or one-time government subsidies at the time of privatization (Frydman, Gary, Hessel, and Rapaczynski, 1999; Song and Yao, 2004). To address this concern, we look at the long-run performance of privatized firms. It is found that the gains in firm profitability were sustainable up to four years after the privatization, and most of the gains still came from the reduction of managerial expenses to sales.

One of the consequences of gradual and selective privatization in China is that significant state ownership could still be retained after the privatization. It is thus interesting to know if the benefits of privatization varied with the extent of privatization. We find that the impacts of privatization on social welfare responsibility were statistically significant only for privatization with state ownership reduced to minority position, and that the effects on firm profitability were more pronounced when state ownership was reduced to minority position as opposed to majority position.

Our results are highly consistent with the two arguments in the literature regarding why China has had gradual and selective privatization. China has maintained state-owned enterprises as a second-best way of absorbing surplus labor and maintaining social stability. Both anecdotal evidence and our statistical analysis show that the Chinese government has made job preservation an important

pre-condition for privatization. As a result, there was no accelerated layoff of surplus labor after privatization, even though the surplus labor problem was severe in both pre-privatization SOEs and post-privatization SOEs. Facing the constraint in laying off surplus labor, privatized firms resorted to increasing sales with the existing labor force so as to improve labor productivity. Meanwhile, our finding that most of the gain in firm profitability came from the reduction in managerial expenses to sales implies that it is inefficient to keep state-owned enterprises as a way of maintaining social stability. Given the *de facto* capture of state-owned enterprises by their management, there could be significant challenges in reforming China's state-owned enterprises if the private interests of management are not taken care of during the process of privatization.

The structure of the paper is as follows. In Section 2, we describe our sample of Chinese state-owned enterprises, and offer some summary statistics. Simple non-parameter comparisons are provided in Section 3, and the results of econometric analysis are presented in Section 4. The paper concludes with Section 5.

2. Data and variables

Our data is from the annual surveys of manufacturing and mining firms conducted by the National Bureau of Statistics of China for the period of 1998 to 2005. These annual surveys covered all state-owned enterprises, and those non-state-owned enterprises with annual sales of five million RMB (Chinese currency) or more. The number of firms covered in the surveys varied from approximately 162,000 to approximately 270,000.[6] The data contain firm identification information, and their operation and performance information extracted from balance sheets and income statements.

For studying the impacts of privatization, it is essential to construct a firm-level longitudinal data set from the original data set. A usual way of doing it is to link firms across the sample period simply using firm identification codes. However, such an approach could lead to a possible loss of data in transition economies, as pointed out by Jefferson and Su (2006) in their study of China, and by Brown, Earle, and Telegdy (2006) in their work on Hungary, Romania, Russia, and Ukraine. This is because firm identification codes may undergo changes right after major firm reorganizations or changes of their legal forms – precisely the events we would like to capture. Hence, in constructing a firm-level longitudinal data set from the original data set, we first clean the data using a set of consistent firm identifications such as original firm identification code, firm name, firm address, region code, and industry code rather than simply firm identification code.[7] We then construct an unbalanced panel of firms

[6] Compared with the existing studies on privatization of China's state-owned enterprises, our study utilizes the largest and arguably the most representative data set.

[7] Our panel data construction follows a four-step process: 1) We link data for year t and year t+1 using the original firm identification codes; 2) For firms present in year t but not in year t+1, we link firms

that appeared continuously for at least three years during the sample period. The sample size differences between the firm-level panel data constructed using the original firm identification codes and that with the above set of consistent firm identifications range from 2.60 percent to 5.49 percent in various years of the sample period. This shows the importance of getting accurate and complete links for studies on privatization of China's state-owned enterprises.

We exclude observations with missing or unreasonable values of key variables.[8] After deleting these cases, there are 152,820 firms appearing continuously for at least three years during 1998-2005. Among these 152,820 firms, 25,970 were wholly state-owned in the first year they appeared in the sample,[9] while 126,850 were non-state-owned. Among these 25,970 wholly state-owned enterprises, 5,318 were privatized during 1999-2004,[10] while 20,562 remained wholly state-owned until 2004. Among these 20,562 firms, 493 were privatized in 2005. In our analysis on the impacts of privatization, we use 5,318 SOEs privatized during the 1999-2004 as the treatment group, and the remaining wholly state-owned during the period as the control group. In our robustness check, we also use those SOEs that were not privatized until 2005 as the control group.

Our sample of 25,970 SOEs is highly comprehensive, as it covers all of the 39 mining and manufacturing industries and all of the 31 Chinese regions. Table 1.1 shows the distribution of first-time privatization by two-digit industry. Medical and pharmaceutical products had the highest percentage of privatization (37.8%), followed by beverage production (35.2%), textile industry (31.5%), chemical fiber (29.9%), and raw chemical materials and chemical products (29.6%). Other minerals mining and dressing was the only industry that had no privatization at all during the sample period, followed by tobacco processing (2.4%), logging and transport of timber and bamboo (2.6%), production and supply of tap water (3.6%), production and supply of power, steam, and hot water (8.5%).

Table 1.2 shows the distribution of first-time privatization by region. Jiangsu province had the highest percentage of privatization (42.2%), followed by Shandong

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with their names; 3) Firms unmatched in step 1 and step 2 are sorted by their industry and region codes, and then more matches are made using name and address information; 4) For firms which are linked in the above three steps, we construct new firm identification codes for year t+1 which equal their original identification codes in year t. For the rest of the sample firms, the identification codes for year t+1 remain. We thank David Brown for suggesting the linking process.

[8] We delete firm-year observations with ratios of two variables, say, profit to sales ratio, either below the 0.1% level or above the 99.9% level to ensure that our results are not distorted by a few outliers.

[9] In our panel data construction, we also eliminate those reversal privatization cases, namely, firms in which the state ownership first decreased from 100% and then went up during the sample period.

[10] In this paper, any reduction of state ownership away from 100% state ownership is regarded as privatization.

(32.1%) and Zhejiang (29.0%). Guizhou had the lowest percentage of privatization (8.1%), with Shannxi (8.5%) and Tibet (8.5%) being the second and third lowest of the 31 Chinese regions.

Table 1.3 provides information on the extent of privatization. Among 5,318 first-time privatization cases during 1999-2004, 3,684 (69%) were completely privatized. In the partial privatization cases, state ownership was the majority in 1163 (22%) and the minority in 471 (9%) cases, respectively (see panel A of Table 1.3 for details). The percentage of complete privatization among the total first-time privatization in the same year increased from 64 percent in 1999 to 84 percent in 2004. Correspondingly, the percentage of first-time privatization with state ownership being the majority decreased from 27 percent in 1999 to 11 percent in 2004. Given that not all first-time privatizations were complete, there were 978 sequential privatization cases taking place during 2000-2005, 587 (60%) of which led to complete privatization (see panel B of Table 1.3 for details).

Table 1.4 reports the changing ownership structures in the 5,318 privatized SOEs over time. The percentage of fully privatized SOEs increased steadily from 69.3% in year t to 92.1% in year t+6. Correspondingly, the percentage of privatized SOEs in which state ownership was kept as the majority decreased from 21.9% in year t to 4.7% in year t+6, as did the percentage of privatized SOEs in which state ownership was the minority from 8.9% in year t to 3.1% in year t+6. The results of Table 1.3 and Table 1.4 together show that the Chinese government became more aggressive in privatizing SOEs over the years with more and more SOEs completely privatized.

We examine impacts of privatization using two sets of indicators: one for social welfare responsibility and the other for firm performance. The set of indicators for social welfare responsibility measures the effects of privatization on labor (logarithm of labor and wage per labor), consumers (price index), and governments (tax to sales ratio), where price index is the ratio of current value of total output to its constant value (in 1990 price), and tax to sales ratio is the total amount of tax paid divided by total sales. The set of indicators for firm performance include: size of operation (logarithm of sales), productivity (sales per labor), liability to asset ratio, and profitability (operating income to sales). To investigate the sources of improvement in firm profitability, we decompose operating income to sales ratio into its four components: profits from main products to sales ratio, profits from other products to sales ratio, managerial expenses to sales ratio, and financial expenses to sales ratio.[11] We use industry-matched producer price indices to adjust all product prices (e.g.,

[11] Operating income is the sum of profits from main products and profits from other products, minus the managerial expenses and financial expenses. Profits from main products is equal to net sales revenue minus production costs, sales costs, and sales taxes; Managerial expenses include all the expenses incurred for the administrative purposes, such as salary and welfare, entertainment costs, meeting expenses, and traveling expenses of administrative staff; Financial expenses include net interest paid and commissions charged by banks.

assets, sales, and output) and use region-matched consumer price indices to adjust wage.[12] All nominal figures are expressed in thousands of RMB (Chinese currency) in 1998 value.

3. Impacts of privatization: non-parameter comparisons

In this section, we present some non-parameter comparisons of performance indicators between enterprises of different ownership categories. Before discussing the details, it is important to point out that the non-parameter comparisons could be biased, as there is no control for factors that affect social responsibility and firm performance indicators and，more importantly, there is no correction for possible sample selection bias. We will address these issues in the econometric analysis in Section 4.

In Table 2, we report means and medians of performance indicators for three types of enterprises (pre-privatization SOEs, post-privatization or privatized SOEs, and always non-SOEs) in columns 1-3, and t-statistics (z-statistics) for differences in means (medians) between post-privatization and pre-privatization SOEs and those between post-privatization SOEs and non-SOEs in columns 4-5 respectively. Comparison in performance indicators between pre-privatization SOEs and post-privatization SOEs shows a few patterns of the impact of privatization. (1) After privatization, SOEs hired fewer workers (a decrease of 15.1 percent implied by the estimated coefficients ($e^{5.436}$-$e^{5.566}$)/ $e^{5.566}$) but had more sales (an increase of 40.9 percent), thus becoming more productive (an increase of 68.4 percent). (2) After privatization, SOEs paid higher wages to workers (an increase of 26.4 percent), charged lower prices for their products (-6.8 percent), and paid slightly more in tax per unit of sales (0.1 percent). (3) After privatization, SOEs became more profitable (an increase of 3.5 percent in operating income to sales ratio). The increase in firm profitability is further decomposed into four components: a decrease of 1% in the profits from main products to sales ratio, a decrease of 0.4 percent in the profits from other products to sales ratio, a decrease of 2.8 percent in the managerial expenses to sales ratio, and finally, a decrease of 2 percent in the financial expenses to sales ratio. Clearly, most of the increased profitability came from the reduction of managerial expenses to sales and financial expenses to sales, the later of which is consistent with the decrease in the liability to asset ratio after privatization.

Column 5 summarizes the comparison in performance indicators between post-privatization SOEs and non-SOEs. The major findings are: (1) Privatized SOEs hired more workers than non-SOEs by 63.3 percent yet had only a modest increase of 9.6 percent in sales, thus remaining less productive (a decrease of 26.8 percent) than non-SOEs. (2) Compared with non-SOEs, privatized SOEs charged higher prices for products (an increase of 14.1 percent), paid more in tax per unit of sales (0.7 percent)

[12] PPI and CPI come from China Statistics Yearbooks for various years.

and had similar wages per labor. (3) Privatized SOEs remained less profitable (-4.9 percent) than non-SOEs. The difference in the operating income to sales ratio between post-privatization SOEs and non-SOEs is further decomposed to an increase of 2.2 percent in the profits from main products to sales ratio, an increase of 1% in the profits from other products to sales ratio, an increase of 6.9 percent in the managerial expenses to sales ratio, and an increase of 1.2 percent in the financial expenses to sales ratio. Clearly, much of the lower profitability of post-privatization SOEs as compared with non-SOEs stem from their higher managerial expenses to sales ratio and financial expenses to sales ratio, the latter of which is consistent with the finding that post-privatization SOEs still had a higher liability asset ratio (12.6 percent) than non-SOEs.

The comparisons in mean firm performance and social welfare indicators across the three types of enterprises suggest that privatized SOEs made performance improvements when compared with pre-privatization SOEs but still lagged behind non-SOEs, as reflected in labor productivity, operating income to sales ratio, sources of gain in firm profitability (managerial and financial expenses to sales), and liability to asset ratio. Privatized SOEs had larger sales than both pre-privatization SOEs and non-SOEs, because they had a more motivated albeit smaller workforce than pre-privatization SOEs and because they had more (though not as productive) workers than non-SOEs. Similarly, privatized SOEs contributed more taxes per unit of sales than both pre-privatization SOEs and non-SOEs. It is possible that privatized SOEs had better performance than pre-privatization SOEs and hence more tax contributions, yet they still did not get time to learn techniques of evading tax payment as profit-oriented non-SOEs do (Cai and Liu, 2008).

Next we report the annual growth rates of social welfare and firm performance indicators of the three types of enterprises (pre-privatization SOEs, privatized SOEs, and non-SOEs), and compare privatized SOEs with pre-privatization SOEs on the one hand and with non-SOEs on the other hand. Growth rates of social welfare and firm performance indicators offer information about the changes or trends instead of just levels, and they are thus more informative than the mean or median values of social welfare and firm performance indicators.

As shown in columns 1-3 of Table 3, negative employment growth was observed both before and after the privatization of SOEs, in sharp contrast to positive employment growth experienced by non-SOEs.[13] The shrinking of employment in pre-privatization and post-privatization SOEs is a reflection of the severe surplus labor problem that existed in China's SOEs. Indeed one of the rationales for keeping China's SOEs is that jobs could be easily created or maintained to absorb surplus labor coming from all parts of China and therefore maintain social stability (Bai, Li,

[13] Given that neither the entry of non-state owned enterprises nor the exit of state-owned enterprises was present in our panel data set, both the job creation effect of non-SOEs and the layoffs at SOEs may well be under-estimated.

Tao and Wang, 2000). Our finding that labor shedding took place before privatization could be interpreted as enterprise preparation for successful privatization and also for minimizing the adverse impacts of privatization on employment.[14] It should be emphasized, however, that there was no statistically noticeable increase in the speed of labor shedding after the privatization (column 4 of Table 3) despite the fact that surplus labor remained significant in privatized firms as compared with non-SOEs. These results highlight an important feature of China's privatization – an overwhelming concern for keeping the surplus labor and maintaining social stability. We will confirm this result in section 4 with several econometric methods that deal with sample selection and omitted variable problems.

All three types of enterprises (pre-privatization SOEs, privatized SOEs, and non-SOEs) are found to experience sales growth. Non-SOEs had the fastest growth rate in sales, followed by privatized SOEs and pre-privatization SOEs, with the difference between non-SOEs and privatized ones being statistically significant but not the difference between privatized SOEs and pre-privatization SOEs. All three types of enterprises also had growth in sales per labor. It is not a surprising result for pre-privatization SOEs and privatized SOEs as they had labor force contraction, but it is not obvious for non-SOEs, for they had substantial employment growth. It turns out that privatized SOEs had the fastest growth in sales per labor among all three types of enterprises, revealing the great efficiency improvement unleashed from privatization.

Among the three types of enterprises, only privatized SOEs managed to have growth in the operating income to sales ratio. One interpretation is that privatized SOEs benefitted from the improvement in ownership structures and management incentives, and grew at the expense of pre-privatization SOEs and non-SOEs. The growth of firm profitability at privatized SOEs did not come from the increase in the main profits to sales ratio, but from the decrease of the managerial expenses to sales ratio vis-à-vis pre-privatization SOEs and non-SOEs, and the decrease of the financial expenses to sales ratio vis-à-vis non-SOEs. Recall from the non-parameter comparison in means of firm performance indicators that privatized SOEs still had a higher managerial expenses to sales ratio than non-SOEs. Thus much of the reduction in the managerial expenses to sales at privatized SOEs came from the slack, not really efficiency improvement at the frontier.

Finally, we find little difference across the three types of enterprises in terms of the changes in the social welfare responsibility indicators. For example, there was growth in wage per labor across all three types of enterprises, but no noticeable difference between privatized SOEs and the other two types of enterprises. Similarly, price indices decreased across all three types of enterprises due to the increasingly competitive market in China, but there was no statistically significant difference

[14] We thank an anonymous referee for pointing out that layoffs could take place even before the starting year of our sample period – 1998. An even longer data set than ours is needed to look into that possibility.

between privatized SOEs and the other two types of enterprises. There was growth in taxes to sales ratios at both pre-privatization and privatized SOEs, yet a decline in tax contribution from non-SOEs. Nevertheless, such differences were not statistically significant.

4. An econometric analysis of the impacts of privatization

4.1. Estimation strategies

Results from the non-parameter comparisons reported in Section 3 give us some basic ideas of how privatization worked in China. To establish the exact impacts of privatization on social welfare and firm performance, however, we need to deal with the potential selection bias problem and control for other factors that could affect social welfare and firm performance indicators.

Unlike other formerly centrally planned economies, China has taken a gradual and selective approach to privatizing its state-owned enterprises. Questions naturally arise as to which types of state-owned enterprises were first selected for privatization, and whether the performance changes of privatized firms really came from their ownership changes or if they were due to some unobserved features of those state-owned enterprises. In addition to this selection bias problem, we also need to control for possible factors that may affect social welfare and firm performance indicators before assigning the residual in performance to the ownership effect.

In this study, we deal with the selection bias and omitted variables problems using two estimation strategies: firm fixed effects models for omitted variables problem, and the Heckman two-stage estimation method for the selection bias problem.

To the extent that some unobserved firm-specific and time-invariant characteristics of privatized firms could explain why those firms were chosen for privatization and also affect their social welfare and firm performance indicators, we can follow Frydman, Gray, Hessel and Rapaczyski (1999) and Jefferson and Su (2006) to estimate firm first-difference models. The basic firm first-difference model we employ to estimate the impacts of privatization takes the following format:

$$y_{it} = \alpha + \beta x_{it-1} + \gamma Dpriv_{itp} + \varphi D_t + \varepsilon_{it} \quad \text{..... (1)}$$

where y_{it} is the rate of growth of a performance indicator for firm *i* between time *(t-1)* and time *t*, and x_{it-1} is a vector of performance indicators at the beginning of the period for which the rate of growth is computed to control for differences in initial

levels of performance indicators. The key independent variable, $Dpriv_{itp}$, indicates whether an SOE has been privatized, and it equals 1 for firm *i* in the post-privatization period, and 0 in the pre-privatization period. D_t is a set of year dummies controlling for possible differences in the macroeconomic environment in different years. ε_{it} is the error term.

Our second estimation strategy is to deal with the potential selection bias problem directly by using the Heckman two-stage estimation method. In the first stage, the probability of SOEs being privatized is estimated. In the second stage, the vector of inverse Mill's ratios obtained in the first stage is added to the firm first-difference model of (1) (Brown and Earle, 2001).

In estimating the probability of SOEs being privatized, we take two further approaches. One is to use the Probit model to predict the probability of an SOE being privatized, with the dependent variable being 1 if an SOE is privatized and zero otherwise. The other is to use a multinomial Logit model to estimate the probability of an SOE remaining fully state-owned, less than 50% privatized, and more than 50% privatized, with the dependent variable being 0, 1 and 2 respectively. In both approaches, the key explanatory variables are a set of lagged firm characteristics (including firm size, sales labor ratio, and liability asset ratio) and squared terms of these firm characteristics, a set of group dummies (including region, industry, and year), and changing shares of SOEs at region and 3-digit industry levels. Firm characteristics and their squared terms are included to test whether privatization decisions are biased towards SOEs with specific size, productivity, and liability features. Dummies of region, industry, and year are included to control group-specific fixed determinants of privatization, while changing shares of SOE in regions and 3-digit industries are included to capture time-varying macroeconomic determinants of privatization.

4.2. The main results

We implement the above two estimation strategies (firm fixed effects models, and the Heckman two-stage estimation method) with the sample of 25,970 firms that were wholly state-owned the first time they entered in the sample and appeared continuously for at least three years during the period 1998-2005. Here we investigate privatization impacts with SOEs privatized in the period of 1999-2004 as the treatment group and non-privatized SOEs in the same period as the control group.

The first-stage estimation results of the Heckman method are summarized in Table 4. As shown in column 1 of Table 4, the Probit regression reveals that firm size

has an inverted U-shape effect on the likelihood of privatization, implying that SOEs with medium sizes were more likely to be privatized. Note that Bai, Lu, and Tao (2005) found that larger firms are less likely to be privatized using a panel of SOEs for the period of 1995-1997, whereas Jefferson and Su (2006) found larger enterprises exhibited higher growth rates of the share of non-state assets in a sample of 1996-2001. We argue that the differences between these findings may reflect the timing trend of privatization. This is because large SOEs were not allowed to go for privatization in the earlier stage of reform when there was a policy of "Grasp the large and let the smaller go", but this policy was relaxed in the later years when only the truly largest ones were still kept as state-owned.

The non-linear effects of labor productivity suggest that SOEs with mediocre productivity were 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. 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. The estimated impacts of liability to assets ratio on the probability of privatization are also of an inverted U-shape. The result implies that the probability of privatization for SOEs with very high debt ratios is low because the potential risk of debt write-offs is too high. On the contrary, SOEs with very low debt ratios are also less likely to be privatized as their financial conditions are good. In addition, the probability of privatization is positively associated with the share and the changing rate of non-SOEs in the same 3-digit industry in the previous year – a proxy for the competitiveness of the industry concerned and also the general government altitude toward privatization in the industry concerned. The results are consistent with Jefferson and Su (2006)'s finding on the growth rate of the share of non-state assets.

The multinominal logit estimation results are similar to the probit results, except that the estimated coefficients for predicting non-state ownership being the majority are in general larger than those for predicting non-state ownership being in the minority.

Table 5 summarizes the firm fixed-effect estimation results and the second-stage estimation results of the Heckman approach regarding the impacts of privatization on social welfare and firm performance indicators. In both cases, privatization had little impact on the change of employment, with the coefficients of privatization on the change of employment being negative but not statistically significant. This result suggests that privatization of China's state-owned enterprises was harmonious, consistent with the multitask theory of state-owned enterprises as a second-best way of maintaining social stability (Bai, Lu, and Tao, 2006) and reflecting the overwhelming concern of the Chinese government for not laying off surplus labor even after privatization. For the remaining firm performance indicators, the regression

results are similar to the simple non-parameter comparison results: privatized SOEs had improvement in sales and sales per labor, enjoyed higher profit margins contributed to mostly by the reduction in the managerial expenses to sales and financial expenses to sales, and consistently managed to have a lower liability to asset ratio. However, the results on social welfare contribution are quite mixed and somewhat different from the results reported in Section 3. Privatized SOEs paid lower wage to their workers, charged higher prices for their products, and made more tax contributions, implying that both workers and consumers were worse off but government benefitted from having more tax revenues.

4.3. The long-run impacts of privatization

In the above regression analysis, it was assumed that the impacts of privatization were uniform across the sample period. In reality, the impacts of privatization could be transitory, if privatized SOEs had some window-dressing activities such as under-reporting of financial performance prior to privatization or receiving large one-off subsidies during the privatization process. The impacts could also be sustainable if incentive structures were put in place during the privatization process and substantial restructuring of businesses were made in response to market situations. It is generally accepted that the success of China's state-owned enterprises privatization hinges upon the long-term and sustainable, rather than short-term and transitory, impacts on social welfare and firm performance indicators.

To investigate the long-run impacts of privatization, we modify model (1) by replacing the dummy variable of privatization by seven dummy variables indicating the number of years after the initial privatization. The revised estimation model is as follows:

$$y_{it} = \alpha + \beta x_{it-1} + \sum_{k=0}^{6} \delta_k Dyear\_after_{itk} + \varphi D_t + \varepsilon_{it} \quad \text{..... (2)}$$

$Dyear\_after_{jtk}$ equals one for year *t* if firm *i* has been privatized for *k* years after the initial privatization, and zero otherwise. The year of initial privatization is defined as year 0 after privatization. Since the earliest possible privatization in our sample occurred in 1999, the highest number of years after initial privatization (or subscript k) is 6.

As shown in Table 6, the negative impact of privatization on the change of firm employment took place immediately in the year of privatization, but was reversed in later years as privatized SOEs expanded, explaining why no overall effect of privatization on the change of employment was found in the uniform-impact model (1). But we found positive and sustainable increases in both sales and sales per labor up to two years after privatization. Similarly, there was a long-term impact on firm profitability up to four years after the privatization, with the biggest contribution

made by the reduction of managerial expenses to sales up to five years after the privatization. While privatized SOEs managed to lower their liability to asset ratio up to five years after the privatization, the impact on the financial expense to sales ratio was quite short-term and transitory. Presumably, privatized SOEs could no longer enjoy low borrowing costs as they had had previously, and their financial expenses could not be lowered further despite their ever decreasing liability to asset ratios.

The results on social welfare responsibility provide more details on who won and who lost than what could be inferred from the uniform-impact estimation results of Table 5. Wage per labor increased in the year of privatization, but decreased in subsequent years up to six years after the privatization, explaining why there was a negative effect on the change of wage per labor in the uniform-effect estimations. There was no noticeable change of price index in the first year of privatization, followed by statistically significant increases up to six years after the privatization. Privatized SOEs were found to have sustainable increases in tax contributions in the first two years of privatization.

4.4. The extent of privatization

One consequence of China's gradual reform is that many state-owned enterprises were not completely privatized. Of those state-owned enterprises that were chosen for privatization, 69% underwent complete privatization in their first try, 9% kept minority state ownership, and the remaining 22% still had majority state ownership. One extreme view is that no change could take place unless private ownership has the majority position. Indeed, using data on telecom sector privatization around the world, Li and Xu (2004) found that only full privatization led to substantial improvement in the allocation of capital and labor, output expansion, network penetration, and labor and total factor productivity. Others argue that even minority private ownership would lead to productivity and efficiency improvements as observed in the early stage of China's economic reform.

It is thus interesting to investigate whether the impacts of privatization vary with the extent of privatization or, more precisely, whether it is important to have more than 50% non-state ownership in order to have any impact from privatization. To address this question, we replace the privatization dummy in model (1) by two dummy variables regarding whether the state ownership still had majority control after the privatization. The modified estimation model is as follows:

$$y_{it} = \alpha + \beta x_{it-1} + \phi_1 Dnnsmaj_{itp} + \phi_2 Dnns\min_{itp} + \varphi D_t + \varepsilon_{it} \quad \text{..... (3)}$$

Dnnsmaj equals one when non-state ownership is in the majority position including 50% non-state ownership, and zero otherwise; and Dnnsmin equals one when non-state ownership is in the minority position, and zero otherwise.

As shown in Table 7, neither majority nor minority privatization had any

statistically significant impact on the change of firm employment, suggesting that even privatized SOEs with less than 50% state ownership were under pressure to minimize layoffs in some sort of deals with the relevant governments. It is also found that both minority privatization and majority privatization had positive impacts on sales, sales per labor, and operating income to sales ratio with most contribution made by the reduction of managerial expenses to sales. However, there are also interesting differences between these two types of privatization. It is found that the positive impact of privatization on operating income to sales ratio was greater under majority privatization than minority privatization, and so was the reduction of managerial expenses to sales ratio. In addition, liability to sales ratio only decreased under majority privatization, and so did the financial expenses to sales ratio. Finally, it is found that only majority privatization had a significant impact on social welfare indicators: lower wage per labor, higher price index, and higher tax contributions. In other words, the impacts of privatization on social welfare indicators found in Table 5 were entirely due to the majority privatization.

4.5. Alternative data sample

In the above analysis, we adopt firm fixed effects models to account for some firm-specific and time-invariant unobservable factors, and in addition we use the Heckman two-stage estimation method to directly deal with the selection bias problem. However, it is still possible that there are some unobservable and time-variant characteristics separating state-owned firms that were privatized from those that were not. To address this concern, we follow the method suggested in Frydman, Gray, Hessel and Rapaczyski (1999) to restrict our data sample to those state-owned enterprises that were privatized during the sample period, and compare the performance of those that were privatized before 2005 with those that weren't privatized until 2005. There were altogether 5,811 SOEs privatized during 1999-2005: 5,318 SOEs privatized during 1999-2004 and 493 SOEs privatized in 2005. We restrict the sample period to 1999-2004, and focus on the subsample of 5,318 SOEs using SOEs privatized in 2005 as the control group. Presumably, state-owned enterprises that were privatized in later years may share some time-variant characteristics with those privatized in earlier years, and therefore they are a better comparison group than those that were never privatized in the sample period.

We repeat all the econometric analysis as in Tables 4-7, with the results summarized in Tables 4a-7a respectively. Similar to what we found earlier, privatization had a positive impact on sales, sales per labor, and operating income sales ratio, albeit with contribution made almost entirely by the reduction of managerial expenses to sales. In addition, these impacts of privatization were found to be long-term and sustainable.

One major contrast with our earlier results is that privatization had a negative and statistically significant impact on the change of firm employment, an impact that

was found to persist up to four years after the privatization. Recall that in our earlier analysis the control group was those SOEs that were not privatized during 1999-2005, whereas the control group in the current analysis is those SOEs that were not privatized until 2005. Our results reveal that earlier privatized SOEs had faster layoff than those latter privatized SOEs, but they had no noticeable faster layoffs than never-privatized SOEs. Another interpretation is that SOEs did not speed up their layoffs in the run-up to privatization.

The other major contrast with our earlier results is that the impacts of privatization on sales, sales per labor, operating income to sales ratio and managerial expenses to sales ratio were found under majority privatization, but not under minority privatization. These results are striking as they suggest that only majority privatization matters as argued by the extreme view of ownership change.

5. Conclusion

This paper investigates how privatization worked in China using a panel data set of 25,970 China's state-owned enterprises that appeared for at least three consecutive years during the period of 1998-2005 and were wholly state-owned the first time they entered in the panel. The focus is to elucidate the winners and losers among the interest groups of China's state-owned enterprises during the process of privatization, and shed light on why China has taken a gradual and selective approach to privatizing its state-owned enterprises.

In establishing the impacts of privatization on social welfare and firm performance indicators, we take into account the potential selection bias and omitted variables problems. We use firm fixed effect models to account for firm-specific and time invariant variables that may affect social welfare and firm performance indicators. On top of that, we use the Heckman two-stage estimation method to directly address the concern that the impacts of privatization could be due to the specific characteristics of firms chosen for privatization rather than the ownership changes. In examining the impacts of privatization, we look at the social welfare indicators (size of employment and wage per labor for workers; price indexes for consumers; and tax contributions to governments) and firm performance measures (sales, sales per labor, and operating income to sales ratio including its specific components).

We find that privatization of China's state-owned enterprises had little impact on the change of firm employment, though surplus labor was a severe problem for both pre-privatization SOEs and post-privatization SOEs. While shrinking of the labor force before privatization was observed and could have also taken place even before our sample period, there was no evidence for an accelerated layoff of surplus labor after the privatization. These results suggest that even privatized firms were under

pressure from the Chinese government to minimize the layoff of surplus labor and care about social stability, possibly due to some sort of deals as part of the privatization. They are consistent with the view that delaying the privatization of China's state-owned enterprises is a second-best way of absorbing surplus labor and maintaining social stability, a public good for the rest of the economy (Bai, Li, Tao and Wang, 2000).

We also find that much of the gain in profit margin after privatization is due to the reduction of managerial expenses to sales, and to a lesser extent the reduction of financial expenses to sales. These results reveal the inefficiency of keeping state-owned enterprises as a way of maintaining social stability, and the importance of establishing an efficient and independent social security system. They also imply significant challenges in reforming China's state-owned enterprises. To the extent that China's state-owned enterprises are captured by management due to their widely held ownership structure and minimal supervision by the State Asset Agency, it is important to take into account the private interests of the management and have them as allies in the privatization process.

Finally the impacts of privatization are found to be long-term and sustainable, alleviating the concerns that much of the benefit of privatization could be due to window-dressing activities before privatization or one-time subsidies during the privatization. They are also robust to sub-sampling of the data set used for dealing with omitted variable problems. However, there is evidence for a more pronounced impact of privatization when state ownership is reduced to minority than state ownership being kept as the majority, suggesting the importance of continuing and completing privatization.

Reference:

Bai, C., D. Li, Z. Tao and Y. Wang (2000). "A Multitask Theory of State Enterprise Reform." Journal of Comparative Economics 28(4): 716-738.

Bai, C., J. Lu, and Z. Tao (2005). " Divergent Interests between Central and Local Governments: Testing Theories of Public Ownership." Working Paper, Hong Kong Institute of Economics and Business Strategy.

Bai, C., J. Lu, and Z. Tao (2006). “The Multitask Theory of State Enterprise Reform: Empirical Evidence from China.” American Economic Review Papers and Proceedings 96(2), 353-357.

Brown, D., and J. Earle (2001). “Privatization, Competition, and Reform Strategies: Theory and Evidence from Russian Enterprise Panel Data”, Stockholm School of Economics Working Paper.

Brown, J. D., J. S. Earle, and A. Telegdy (2006). "The Productivity Effects of Privatization: Longitudinal Estimates from Hungary, Romania, Russia, and Ukraine." Journal of Political Economy 141(1): 61-99.

Cai, H., and Q. Liu (2008). "Competition and corporate tax avoidance: evidence from the Chinese industrial firms." forthcoming, Economic Journal.

Cao, Y., Y. Qian and B. Weingast (1999). "From federalism, Chinese style, to privatization, Chinese style." Economics of Transition 7(1): 103-131.

Djankov, S. and P. Murrell (2002). "Enterprise restructuring in transition: a quantitative survey." Journal of Economic Literature 25(3): 739-792.

Frydman, R., C. Gary, M. Hessel and A. Rapaczynski (1999). "When Does Privatization Work? The Impact of Private ownership on Corporate Performance in the Transition Economies." Quarterly Journal of Economics 114(4): 1153-1191.

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

Gordon, R. H. and W. Li (1995). "The Change in Productivity of Chinese State Enterprises, 1983--1987." Journal of Productivity Analysis 6(1): 5-26.

Groves, T., Y. Hong, J. McMillan and B. Naughton (1994). "Autonomy and Incentives in Chinese State Enterprises." Quarterly Journal of Economics 109(1): 183-209.

Groves, T., Y. Hong, J. McMillan and B. Naughton (1995). "China's Evolving Managerial Labor Market." Journal of Political Economy 103(4): 873-892.

Guo, K. and Y. Yao (2005). "Causes of privatization in China-Testing several hypotheses."

Economics of Transition 13(2): 211-238.

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

Jefferson, G. H. and J. Su (2006). "Privatization and Restructuring in China: Evidence from Shareholding Ownership, 1995-2001." Journal of Comparative Economics 34(1): 146-166.

Li, D. D. and T. F. Lui (2004). Why Do Governments Dump State Enterprises? Evidence form China. Governance, Regulation, and Privatization in the Asia-Pacific Region. I. Takatoshi and A. O. Krueger, The University of Chicago Press. 12.

Li, H. and S. Rozelle (2000). "Saving or Stripping Rural Industry: an Analysis of Privatization and Efficiency in China." Agricultural Economics 23(3): 241-252.

Li, W. (1997). "The Impact of Economic Reforms on the Performance of Chinese State-Owned Enterprises." Journal of Political Economy 105(5): 1080-1106.

Li, W. and L.C. Xu (2004). "The Impact of Privatization and Competition in the Telecommunications Sector around the World." Journal of Law & Economics 47(2): 395-430.

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

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

Song, L. and Y. Yao (2004). Impacts of Privatization on Firm Performance in China. Working Paper.

Wang, X., L. C. Xu and T. Zhu (2004). "State-owned enterprises going public: The case of China." Economics of Transition 12(3): 467-487.

Zhang, A., Y. Zhang and R. Zhao (2001). "Impact of Ownership and Competition on the Productivity of Chinese Enterprises." Journal of Comparative Economics 29(2): 327-346.

Table 1.1: State-owned enterprises privatized during 1999-2004, by industry

Industry	Number of SOEs	Number of privatized SOEs	Percentage of privatization
Medical and Pharmaceutical Products	695	263	37.8%
Beverage Production	758	267	35.2%
Textile Industry	1021	322	31.5%
Chemical Fiber	87	26	29.9%
Raw Chemical Materials and Chemical Products	1655	490	29.6%
Nonmetal Mineral Products	2082	602	28.9%
Electric Equipment and Machinery	730	205	28.1%
Rubber Products	163	45	27.6%
Electronic and Telecommunications	458	122	26.6%
Ferrous Metal Mining and Dressing	325	83	25.5%
Nonferrous Metal Mining and Dressing	267	68	25.5%
Garment and Other Fiber Products	235	59	25.1%
Ordinary Machinery	1484	358	24.1%
Papermaking and Paper Products	412	98	23.8%
Food Processing	2239	517	23.1%
Food Production	851	193	22.7%
Petroleum Refining and Coking	156	35	22.4%
Leather, Furs, Down and Related Products	105	23	21.9%
Plastic Products	380	81	21.3%
Smelting and Pressing of Ferrous Metals	111	23	20.7%
Special Purposes Equipment	1376	272	19.8%
Other Manufacturing	175	34	19.4%
Furniture Manufacturing	101	19	18.8%
Cultural, Educational and Sports Goods	128	24	18.8%
Metal Products	613	111	18.1%
Coal Mining and Processing	858	139	16.2%
Instruments, meters, Cultural and Clerical Machinery	362	57	15.7%
Transport Equipment	1424	222	15.6%
Nonmetal Mining and Dressing	329	50	15.2%
Logging and Transport of Timber and Bamboo	252	36	14.3%
Smelting and Pressing of Nonferrous Metals	317	45	14.2%
Petroleum and Natural Gas Extraction	38	5	13.2%
Printing and Record Medium Reproduction	1161	138	11.9%
Production and Supply of Gas	180	16	8.9%
Production and Supply of Power, Steam and Hot Water	2347	199	8.5%
Production and Supply of Tap Water	1737	62	3.6%
Logging and Transport of Timber and Bamboo	230	6	2.6%
Tobacco Processing	124	3	2.4%
Other Minerals Mining and Dressing	4	0	0.0%
Total	**25970**	**5318**	**20.5%**

Note: Sorted descending by the last column.

Table 1.2: State-owned enterprises privatized during 1999-2004, by region

Region	Number of SOEs	Number of SOEs privatized during 1999-2004	Percentage of privatization
Jiangsu	1451	613	42.2%
Shandong	1616	518	32.1%
Zhejiang	851	247	29.0%
Inner Mongolia	436	123	28.2%
Shanghai	1067	292	27.4%
Sichuan	862	228	26.5%
Hubei	873	216	24.7%
Henan	1501	322	21.5%
Jilin	682	146	21.4%
Guangdong	1836	390	21.2%
Anhui	525	111	21.1%
Ningxia	128	27	21.1%
Gansu	518	109	21.0%
Yunnan	941	197	20.9%
Heilongjiang	763	146	19.1%
Hebei	1733	324	18.7%
Qinghai	100	18	18.0%
Shanxi	997	164	16.4%
Xinjiang	767	118	15.4%
Liaoning	1115	171	15.3%
Chongqing	458	68	14.8%
Beijing	1063	155	14.6%
Hunan	1089	151	13.9%
Fujian	530	70	13.2%
Hainan	188	23	12.2%
Jiangxi	903	105	11.6%
Guangxi	814	84	10.3%
Tianjin	705	61	8.7%
Tibet	59	5	8.5%
Shannxi	767	65	8.5%
Guizhou	632	51	8.1%
Total	**25970**	**5318**	**20.5%**

Note: Sorted descending by the last column.

Table 1.3: Extent of privatization of these SOEs first privatized in 1999-2004

Panel A: first-time privatizations

Type of change in state ownership	1999	2000	2001	2002	2003	2004	2005	Total
100%-->0%	461	752	743	592	572	564		**3684**
	(64%)	(65%)	(67%)	(68%)	(72%)	(84%)		(69%)
100%-->0%<50%	64	124	113	63)	70	37		**471**
	(9%)	(11%)	(10%)	(7%)	(9%)	(5%)		(9%)
100%-->50%=<100%	197	274	253	218	147	74		**1163**
	(27%)	(24%)	(23%)	(25%)	(19%)	(11%)		(22%)
Total	**722**	**1150**	**1109**	**873**	**789**	**675**		**5318**

Panel B: Sequential privatizations

Type of change in state ownership	1999	2000	2001	2002	2003	2004	2005	Total
0%<50%-->0%		18	44	53	47	43	45	**250**
		(15%)	(25%)	(27%)	(25%)	(30%)	(31%)	(26%)
0%<50%-->0%<50%		10	19	21	15	12	13	**90**
		(8%)	(11%)	(11%)	(8%)	(8%)	(9%)	(9%)
50%=<100%-->0%		49	56	57	72	55	48	**337**
		(40%)	(32%)	(29%)	(38%)	(38%)	(33%)	(34%)
50%=<100%-->0%<50%		21	24	19	18	19	15	**116**
		(17%)	(14%)	(10%)	(10%)	(13%)	(10%)	(12%)
50%=<100%-->50%<100%		26	34	49	36	16	24	**185**
		(21%)	(19%)	(25%)	(19%)	(11%)	(17%)	(19%)
Total		**124**	**177**	**199**	**188**	**145**	**145**	**978**

Note: “100%” indicates 100% state ownership; “50%=<100%” indicates state ownership greater than or equal to 50%, but less than 100%; “0%<50%” indicates state ownership greater than 0, but less than 50%; “0%” indicates no state ownership.

Table 1.4: Post-privatization ownership structure of 5,318 first privatizations in 1999-2004

Extent of state ownership	Year t	Year t+1	Year t+2	Year t+3	Year t+4	Year t+5	Year t+6
0%	3684	3147	2206	1466	863	390	117
	(69.3%)	(78.3%)	(83.3%)	(86.6%)	(87.6%)	(91.3%)	(92.1%)
(0%, 50%)	471	331	186	94	52	16	4
	(8.9%)	(8.2%)	(7.0%)	(5.6%)	(5.3%)	(3.7%)	(3.1%)
[50%, 100%)	1163	541	257	133	70	21	6
	(21.9%)	(13.5%)	(9.7%)	(7.9%)	(7.1%)	(4.9%)	(4.7%)

Note: Year t means the year of initial privatization.

Table 2: Non-parameter comparison of performance indicators

	SOEs privatized during 1999-2004		Always non-SOEs	Non-parameter comparisons	
Performance indicator	1	2	3	4	5
	Before	After		2 vs. 1	2 vs. 3
Logarithm of Labor	5.566	5.436	4.937	-0.131 ***	0.498 ***
	(5.561)	(5.407)	(4.868)	(-0.154) ***	(0.540) ***
Wage per Labor	9.423	11.916	11.827	2.493 ***	0.088
	(7.675)	(9.703)	(9.938)	(2.028) ***	(-0.236)
Price index	1.399	1.304	1.143	-0.095 ***	0.161 ***
	(1.143)	(1.116)	(1.097)	(-0.026) ***	(0.020) ***
Tax to sales ratio	0.023	0.024	0.017	0.001 ***	0.007 ***
	(0.011)	(0.012)	(0.010)	(0.001) ***	(0.002) ***
Logarithm of sales	9.708	10.051	9.959	0.343 ***	0.093 ***
	(9.681)	(9.965)	(9.789)	(0.284) ***	(0.175) ***
Sale per labor	0.109	0.185	0.252	0.075 ***	-0.067 ***
	(0.061)	(0.100)	(0.148)	(0.039) ***	(-0.049) ***
Liability to asset ratio	0.720	0.711	0.585	-0.008 **	0.127 ***
	(0.714)	(0.721)	(0.596)	(0.007)	(0.126) ***
Operating income to sales ratio	-0.056	-0.021	0.028	0.035 ***	-0.049 ***
	(0.002)	(0.006)	(0.025)	(0.004) ***	(-0.019) ***
Main profits to sales ratio	0.138	0.128	0.106	-0.010 ***	0.023 ***
	(0.131)	(0.113)	(0.090)	(-0.018) ***	(0.023) ***
Other profits to sales ratio	0.018	0.014	0.004	-0.003 ***	0.010 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Managerial expenses to sales ratio	0.161	0.133	0.064	-0.028 ***	0.069 ***
	(0.120)	(0.096)	(0.044)	(-0.023) ***	(0.052) ***
Financial expenses to sales ratio	0.050	0.030	0.018	-0.020 ***	0.013 ***
	(0.025)	(0.014)	(0.007)	(-0.011) ***	(0.007) ***

Note: This table presents the mean and median values of selected performance indicators in various samples, differences of mean and median values between selected samples, and t-statistics (Z-statistics) of differences in means (medians). * significant at 10%; ** significant at 5%; **** significant at 1%

Table 3: Non-parameter comparison of performance indicator growth rates

	SOEs privatized during 1999-2004		Always non-SOEs	Non-parameter comparisons	
Performance indicator	1	2	3	4	5
	Before	After		2 vs. 1	2 vs. 3
Logarithm of Labor	-0.017	-0.025	0.070	-0.008	-0.095 ***
	(-0.019)	(-0.021)	(0.000)	(-0.002)	(-0.021) ***
Wage per Labor	0.179	0.168	0.175	-0.011	-0.007
	(0.081)	(0.061)	(0.049)	(-0.021)	(0.012)
Price index	-1.096	-0.728	-0.637	0.368	-0.091
	(-0.744)	(-0.004)	(-0.218)	(0.740)	(0.213)
Tax to sales ratio	0.008	0.001	-0.005	-0.006	0.006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Logarithm of sales	0.132	0.138	0.192	0.006	-0.054 ***
	(0.061)	(0.066)	(0.105)	(0.005)	(-0.039) ***
Sale per labor	0.188	0.244	0.204	0.055 ***	0.039 ***
	(0.097)	(0.138)	(0.099)	(0.040) ***	(0.039) ***
Liability to asset ratio	1.108	0.126	-0.234	-0.983 ***	0.360 ***
	(0.650)	(0.217)	(0.000)	(-0.433) ***	(0.217) ***
Operating income to sales ratio	-0.030	0.118	-0.023	0.148 **	0.141 ***
	(0.017)	(0.027)	(0.000)	(0.009) **	(0.027) ***
Main profits to sales ratio	-0.465	-0.632	-0.270	-0.168 *	-0.363 ***
	(-0.433)	(-0.579)	(-0.162)	(-0.147) *	(-0.417) ***
Other profits to sales ratio	0.049	0.016	0.012	-0.033	0.004
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Managerial expenses to sales ratio	0.152	-0.385	-0.091	-0.537 ***	-0.294 ***
	(-0.009)	(-0.312)	(-0.057)	(-0.303) ***	(-0.255) ***
Financial expenses to sales ratio	-0.538	-0.349	-0.144	0.188	-0.205 ***
	(-0.190)	(-0.085)	(-0.013)	(0.106)	(-0.071) ***

Note: This table presents the mean and median values of selected performance indicators in various samples, differences of mean and median values between selected samples, and t-statistics (Z-statistics) of differences in means (medians). Growth rates of price index, tax to sales ratio, profit margin, liability to asset ratio, profits from main products ratio, profits from other products ratio, managerial expenses to sales, and financial expenses to sales are multiplied by 100. * significant at 10%; ** significant at 5%; **** significant at 1%

Table 4: First-stage results on the probability of SOEs being privatized

	1	2	
	Probit model	Multiple logit model	
Dependent variable	Privatization dummy	Non-state minority	Non-state majority
Logarithm of sales t-1	0.976***	0.461***	2.422***
	(27.14)	(3.76)	(28.49)
Logarithm of sales squared t-1	-0.046***	-0.010*	-0.117***
	(25.87)	(1.64)	(27.98)
sales per labor t-1	0.091***	0.106***	0.214***
	(14.62)	(4.10)	(16.56)
sales per labor squared t-1	-0.003***	-0.002***	-0.007***
	(8.88)	(2.81)	(9.50)
liability to asset ratio t-1	0.624***	1.117***	1.433***
	(9.64)	(3.27)	(10.22)
liability to asset ratio squared t-1	-0.433***	-0.994***	-0.952***
	(11.31)	(4.36)	(11.02)
share of non-SOE in region t-1	0.002	1.022	0.860**
	(0.01)	(1.20)	(2.16)
share of non-SOE in 3-digit industry t-1	1.403***	1.353***	3.052***
	(26.88)	(6.71)	26.84
change of non-SOE in region t-1 to t	0.304	0.554	1.193**
	(1.29)	(0.59)	(2.46)
change of non-SOE in 3-digit industry t-1 to t	3.954***	6.393***	8.092***
	(19.34)	(8.34)	(19.20)
dummies of region	Yes		Yes
dummies of 3-digit industry	Yes		Yes
dummies of year	Yes		Yes
Number of observation	74,992		74,992
Pseudo R^2	0.213		0.209

Note: Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 5: The impacts of privatization

Dependent variable (y_{it}):								
Growth rate of	Logarithm of Labor		Wage per Labor		Price index		Tax to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	-0.002	-0.004	-0.01	-0.015	0.787	0.88	0.054	0.054
	(0.80)	(1.41)	(1.62)	(2.48)**	(3.42)***	(3.79)***	(3.46)***	(3.47)***
x_{it-1}	-0.025	-0.028	-0.02	-0.02	-3.692	-3.688	-16.38	-16.384
	(35.07)***	(38.27)***	(60.72)***	(60.80)***	(38.14)***	(38.10)***	(83.17)***	(83.07)***
Inverse Mill's ratio		-0.051		-0.045		0.819		0.006
		(16.51)***		(6.49)***		(3.12)***		(0.33)
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.03	0.03	0.05	0.05	0.06	0.06	0.09	0.09

Dependent variable (y_{it}):								
Growth rate of	Logarithm of Sales		Sale per labor		Liability to asset ratio		Operating income to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	0.043	0.048	0.047	0.056	-1.273	-1.126	0.803	0.856
	(9.85)***	(10.75)***	(8.58)***	(10.14)***	(9.59)***	(8.41)***	(11.02)***	(10.76)***
x_{it-1}	-0.013	-0.009	-0.022	-0.019	-5.22	-5.233	-15.876	-15.916
	(13.84)***	(8.14)***	(20.35)***	(17.15)***	(33.18)***	(33.27)***	(75.42)***	(74.98)***
Inverse Mill's ratio		0.049		0.084		1.263		-0.148
		(8.62)***		(13.31)***		(8.34)***		(1.45)
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.02	0.02	0.02	0.03	0.02	0.02	0.08	0.08

Dependent variable (y_{it}): Growth rate of	Main profit to sales ratio		Other profit to sales ratio		Managerial expenses to sales ratio		Financial expenses to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	-0.009	0.062	-0.045	-0.045	-0.816	-0.781	-0.041	-0.058
	(0.12)	(0.83)	(2.10)**	(2.10)*	(13.24)***	(12.60)***	(1.8)*	(2.53)**
x_{it-1}	-16.743	-16.785	-7.535	-7.534	-8.787	-8.993	-14.591	-14.624
	(80.80)***	(81.01)***	(46.47)***	(46.40)***	(49.26)***	(49.11)***	(98.62)***	(98.79)***
Inverse Mill's ratio		0.613		-0.004		0.357		-0.147
		(7.19)***		(0.15)		(4.97)***		(5.60)***
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.08	0.08	0.03	0.03	0.04	0.04	0.12	0.12

Note: OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 6: The long-run impacts of privatization

Dependent variable (y_{it}):												
Growth rate of	Logarithm of Labor		Wage per Labor		Price index		Tax to sales ratio		Logarithm of Sales		Sale per labor	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
Dyear_after0	-0.01	-0.015	0.032	0.027	0.031	0.128	0.047	0.047	0.058	0.063	0.088	0.098
	(2.30)**	(3.73)***	(3.37)***	(2.79)***	(0.08)	(0.35)	(1.88)*	(1.9)*	(8.28)***	(8.92)***	(10.13)***	(11.19)***
Dyear_after1	0.011	0.005	-0.014	-0.019	0.037	0.133	0.063	0.064	0.037	0.041	0.021	0.03
	(2.30)**	(0.99)	(1.30)	(1.79)*	(0.09)	(0.32)	(2.31)**	(2.33)**	(4.72)***	(5.27)***	(2.14)**	(3.07)***
Dyear_after2	0.008	0.002	-0.035	-0.04	1.306	1.399	0.06	0.061	0.038	0.042	0.026	0.034
	(1.47)	(0.40)	(2.75)***	(3.17)***	(2.69)***	(2.87)***	(1.84)*	(1.86)*	(4.07)***	(4.51)***	(2.23)**	(2.99)***
Dyear_after3	0.011	0.006	-0.031	-0.036	2.507	2.594	0.055	0.056	0.011	0.015	-0.008	0
	(1.70)*	(0.88)	(2.03)**	(2.38)**	(4.25)***	(4.39)***	(1.39)	(1.41)	(0.98)	(1.32)	(0.55)	(0.03)
Dyear_after4	-0.007	-0.011	-0.07	-0.074	1.46	1.527	0.045	0.046	0.029	0.032	0.034	0.041
	(0.83)	(1.34)	(3.62)***	(3.85)***	(1.97)*	(2.06)*	(0.91)	(0.92)	(2.05)**	(2.24)**	(1.94)*	(2.31)**
Dyear_after5	0.012	0.008	-0.058	-0.063	2.951	3.011	0.076	0.077	0.005	0.008	-0.019	-0.012
	(1.05)	(0.67)	(2.21)**	(2.39)**	(2.91)***	(2.97)***	(1.12)	(1.12)	(0.28)	(0.43)	(0.77)	(0.51)
Dyear_after6	0.024	0.019	-0.113	-0.118	2.748	2.806	0.015	0.015	0.017	0.021	-0.039	-0.033
	(1.30)	(1.05)	(2.70)***	(2.82)***	(1.71)*	(1.74)*	(0.14)	(0.14)	(0.55)	(0.67)	(1.03)	(0.86)
x_{it-1}	-0.025	-0.028	-0.02	-0.02	-3.694	-3.69	-16.381	-16.385	-0.013	-0.009	-0.022	-0.019
	(35.05)***	(38.24)***	(60.87)***	(60.95)***	(38.16)***	(38.13)***	(83.16)***	(83.05)***	(13.75)***	(8.09)***	(20.18)***	(16.99)***
Inverse Mill's ratio		-0.05		-0.045		0.8		0.006		0.049		0.084
		(16.49)***		(6.47)***		(3.05)***		-0.34		(8.56)***		(13.22)***
Observations	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.03	0.03	0.05	0.05	0.06	0.06	0.09	0.09	0.02	0.02	0.03	0.03

Table 6: The long-run impacts of privatization (cont')

Dependent variable (y_{it}):	Liability to		Operating income to		Main profit to		Other profit to		Managerial expenses to		Financial expenses to	
Growth rate of	asset ratio		sales ratio		sales ratio		sales ratio		sales ratio		sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
Dyear_after0	-0.516	-0.361	1.052	1.105	0.126	0.201	-0.056	-0.056	-0.788	-0.749	-0.194	-0.211
	(2.43)**	(1.69)*	(8.32)***	(8.18)***	(1.05)	(1.67)*	(1.62)	(1.63)	(8.01)***	(7.59)***	(5.27)***	(5.73)***
Dyear_after1	-1.511	-1.357	0.953	1.01	0.11	0.185	-0.02	-0.02	-0.876	-0.84	0.013	-0.005
	(6.43)***	(5.76)***	(7.21)***	(7.08)***	(0.83)	(1.39)	(0.52)	(0.53)	(8.06)***	(7.71)***	(0.31)	(0.12)
Dyear_after2	-1.407	-1.256	0.662	0.716	-0.076	-0.003	-0.06	-0.06	-0.861	-0.825	0.063	0.046
	(5.02)***	(4.47)***	(4.51)***	(4.42)***	(0.48)	(0.02)	(1.32)	(1.33)	(6.63)***	(6.35)***	(1.30)	(0.94)
Dyear_after3	-1.496	-1.354	0.449	0.502	-0.057	0.011	-0.033	-0.033	-0.657	-0.625	0.118	0.101
	(4.39)***	(3.97)***	(2.87)***	(2.80)***	(0.30)	(0.06)	(0.59)	(0.60)	(4.17)***	(3.96)***	(2.00)**	(1.72)*
Dyear_after4	-2.284	-2.169	0.488	0.533	-0.416	-0.361	-0.094	-0.094	-0.952	-0.929	-0.046	-0.059
	(5.32)***	(5.06)***	(2.48)**	(2.44)**	(1.72)*	(1.50)	(1.35)	(1.36)	(4.80)***	(4.68)***	(0.62)	(0.80)
Dyear_after5	-2.214	-2.107	-0.162	-0.12	-0.574	-0.523	0.005	0.004	-0.589	-0.569	0.182	0.17
	(3.78)***	(3.60)***	(0.20)	(0.17)	(1.74)*	(1.59)	(0.05)	(0.05)	(2.17)**	(2.10)**	(1.80)*	(1.68)*
Dyear_after6	-1.729	-1.62	-0.118	-0.075	0.342	0.391	-0.026	-0.026	0.346	0.365	0.088	0.075
	(1.86)*	(1.74)*	(0.28)	(0.27)	(0.65)	(0.75)	(0.17)	(0.17)	(0.80)	(0.85)	(0.55)	(0.47)
x_{it-1}	-5.22	-5.233	-15.863	-15.902	-16.743	-16.785	-7.534	-7.533	-8.775	-8.982	-14.585	-14.619
	(33.17)***	(33.27)***	(75.36)***	(74.92)***	(80.80)***	(81.01)***	(46.46)***	(46.39)***	(49.18)***	(49.05)***	(98.60)***	(98.77)***
Inverse Mill's ratio		1.279		-0.147		0.618		-0.003		0.36		-0.146
		(8.45)***		-1.44		(7.25)***		-0.14		(5.00)***		(5.59)***
Observations	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.02	0.02	0.08	0.08	0.08	0.08	0.03	0.03	0.04	0.04	0.12	0.12

Note: OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 7: Differences between majority and minority privatization

Dependent variable (y_{it}):								
Growth rate of	Logarithm of labor		Wage per labor		Price index		Tax to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	-0.002	-0.004	-0.014	-0.017	0.878	0.967	0.056	0.068
	(0.75)	(1.48)	(2.16)**	(2.67)***	(3.58)***	(3.91)***	(3.37)***	(4.12)***
$Dnns\min_{itp}$	-0.002	-0.002	0.014	0.006	0.269	0.367	0.042	0.041
	(0.35)	(0.28)	(0.98)	(0.40)	(0.50)	(0.68)	(1.16)	(1.15)
x_{it-1}	-0.025	-0.034	-0.02	-0.021	-3.692	-3.692	-16.38	-18.701
	(35.01)***	(30.17)***	(60.73)***	(61.13)***	(38.14)***	(38.00)***	(83.17)***	(88.40)***
Inverse Mill's ratio		-0.023		-0.005		0.477		0.056
of $Dnnsmaj_{itp}$		(7.31)***		(0.68)		(1.82)*		(3.19)***
Inverse Mill's ratio		-0.076		-0.094		0.755		-0.136
of $Dnns\min_{itp}$		(8.69)***		(7.13)***		(1.51)		(4.09)***
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.03	0.03	0.05	0.05	0.06	0.06	0.09	0.1

Dependent variable (y_{it}):								
Growth rate of	Logarithm of sales		Sale per labor		Liability to asset ratio		Operating income to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	0.042	0.048	0.046	0.056	-1.398	-1.283	0.848	0.914
	(9.01)***	(10.09)***	(7.87)***	(9.54)***	(9.88)***	(8.98)***	(10.96)***	(10.84)***
$Dnns\min_{itp}$	0.049	0.049	0.053	0.058	-0.559	-0.359	0.561	0.571
	(4.82)***	(4.76)***	(4.14)***	(4.53)***	(1.80)*	(1.16)	(3.12)***	(2.95)***
x_{it-1}	-0.013	-0.014	-0.022	-0.02	-5.217	-5.502	-15.88	-15.938
	(13.86)***	(9.66)***	(20.34)***	(17.76)***	(33.15)***	(33.50)***	(75.43)***	(74.82)***
Inverse Mill's ratio		0.051		0.078		0.348		0.053
of $Dnnsmaj_{itp}$		(10.08)***		(12.29)***		(2.27)**		-0.52
Inverse Mill's ratio		-0.053		-0.005		2.135		-0.468
of $Dnns\min_{itp}$		(4.03)***		(0.41)		(7.12)***		(2.42)**
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.02	0.02	0.02	0.03	0.02	0.02	0.08	0.08

Dependent variable (y_{it}):								
Growth rate of	Main profit to sales ratio		Other profit to sales ratio		Managerial expenses to sales ratio		Financial expenses to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	-0.053	0.028	-0.041	-0.043	-0.903	-0.874	-0.039	-0.055
	(0.66)	(0.35)	(1.81)*	(1.85)*	(13.74)***	(13.19)***	(1.58)	(2.23)**
$Dnns\min_{itp}$	0.243	0.265	-0.065	-0.068	-0.326	-0.292	-0.057	-0.082
	(1.40)	(1.52)	(1.29)	(1.36)	(2.27)**	(2.03)**	(1.06)	(1.52)
x_{it-1}	-16.746	-16.848	-7.534	-7.491	-8.801	-8.979	-14.59	-14.617
	(80.82)***	(80.94)***	(46.47)***	(46.14)***	(49.33)***	(49.07)***	(98.61)***	(98.56)***
Inverse Mill's ratio		0.611		0		0.188		-0.056
of $Dnnsmaj_{itp}$		(7.16)***		(0.02)		(2.64)***		(2.14)**
Inverse Mill's ratio		-0.271		-0.039		0.28		-0.243
of $Dnns\min_{itp}$		(1.67)*		(0.83)		(2.10)**		(4.88)***
Observations	74992	74992	74992	74992	74992	74992	74992	74992
R-squared	0.08	0.08	0.03	0.03	0.04	0.04	0.12	0.12

Note: OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 4a: First-stage results on the probability of SOEs being privatized

	1	2	
	Probit model	Multiple logit model	
Dependent variable	Privatization dummy	Non-state minority	Non-state majority
log sales $_{t-1}$	0.212***	0.731***	0.869***
	(3.19)	(4.57)	(6.77)
log sales squared $_{t-1}$	-0.124***	-0.042***	-0.049***
	(3.81)	(5.51)	(7.78)
sales per labor $_{t-1}$	0.083***	0.148***	0.203***
	(7.11)	(3.84)	(9.42)
sales per labor squared $_{t-1}$	-0.030***	-0.001	-0.006***
	(5.04)	(0.83)	(5.67)
liability to asset ratio $_{t-1}$	0.367***	0.496	0.717***
	(3.52)	(1.41)	(3.83)
liability to asset ratio squared $_{t-1}$	-0.182***	-0.403*	-0.327***
	(3.01)	(1.78)	(3.00)
share of non-SOE in region $_{t-1}$	0.221	-0.800	1.287*
	(0.53)	(0.70)	(1.66)
share of non-SOE in 3-digit industry $_{t-1}$	1.015***	0.730***	2.048***
	(11.76)	(3.13)	(12.78)
change of non-SOE in region $_{t-1 \text{ to } t}$	0.344	-0.384	1.141
	(0.81)	(0.33)	(1.40)
change of non-SOE in 3-digit industry $_{t-1 \text{ to } t}$	3.772***	6.059***	6.862***
	(10.55)	(6.39)	(10.42)
dummies of region	Yes		Yes
dummies of 3-digit industry	Yes		Yes
dummies of year	Yes		Yes
Number of observation	18,251		18,251
Pseudo R^2	0.211		0.194

Note: We restrict the sample period to 1999-2004, and focus on the subsample of 5,318 SOEs using SOEs privatized in 2005 as the control group.

Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%.

Table 5a: The impacts of privatization

Dependent variable (y_{it}):								
Growth rate of	Logarithm of labor		Wage per labor		Price index		Tax to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	-0.022	-0.023	-0.007	-0.008	-0.002	-0.006	0.043	0.047
	(5.29)***	(5.52)***	(0.69)	(0.86)	(0.01)	(0.02)	(1.79)*	(1.93)*
x_{it-1}	-0.035	-0.034	-0.023	-0.023	-8.82	-8.82	-17.106	-17.135
	(21.18)***	(19.67)***	(33.11)***	(33.13)***	(30.59)***	(30.59)***	(39.69)***	(39.71)***
Inverse Mill's ratio		-0.036		-0.047		-0.136		0.105
		(2.40)*		(1.45)		(0.12)		(1.28)
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.04	0.04	0.06	0.06	0.08	0.08	0.08	0.08

Dependent variable (y_{it}):								
Growth rate of	Logarithm of sales		Sale per labor		Liability to asset ratio		Operating income to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	0.016	0.015	0.018	0.018	-0.413	-0.337	0.485	0.606
	(2.16)**	(2.02)**	(1.99)**	(2.04)**	(1.81)*	(1.46)	(4.87)***	(4.88)***
x_{it-1}	-0.03	-0.03	-0.033	-0.033	-11.476	-11.359	-24.11	-24.076
	(12.15)***	(12.19)***	(14.56)***	(14.17)***	(29.97)***	(29.50)***	(48.17)***	(48.08)***
Inverse Mill's ratio		0.027		0.017		2.215		0.209
		(1.06)		(0.56)		(2.81)***		(0.49)
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.03	0.03	0.03	0.03	0.05	0.05	0.12	0.12

Dependent variable (y_{it}):								
Growth rate of	Main profit to sales ratio		Other profit to sales ratio		Managerial expenses to sales ratio		Financial expenses to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dpriv_{itp}$	-0.006	0.034	-0.033	-0.028	-0.500	-0.474	-0.024	-0.032
	(0.06)	(0.32)	(1.14)	(0.96)	(5.90)***	(5.56)***	(0.69)	(0.91)
x_{it-1}	-20.243	-20.299	-9.119	-9.141	-14.068	-14.214	-22.03	-22.042
	(44.63)***	(44.73)***	(23.90)***	(23.94)***	(33.12)***	(33.19)***	(59.66)***	(59.69)***
Inverse Mill's ratio		1.181		0.152		0.787		-0.23*
		(3.20)***		(1.52)		(2.68)***		(1.94)
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.11	0.11	0.03	0.03	0.07	0.07	0.18	0.18

Note: We restrict the sample period to 1999-2004, and focus on the subsample of 5,318 SOEs using SOEs privatized in 2005 as the control group. OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 6a: The long-run impacts of privatization

Dependent variable (y_{it}):												
Growth rate of	Logarithm of labor		Wage per labor		Price index		Tax to sales ratio		Logarithm of sales		Sale per labor	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
Dyear_after0	-0.032	-0.033	0.021	0.02	-0.028	-0.037	0.034	0.039	0.002	0.001	0.055	0.056
	(6.29)***	(6.54)***	(1.90)*	(1.74)*	(0.07)	(0.09)	(1.20)	(1.35)	(0.18)	(0.02)	(5.16)***	(5.24)***
Dyear_after1	-0.011	-0.012	-0.024	-0.025	-0.537	-0.544	0.058	0.062	0.021	0.019	0.011	0.01
	(1.81)*	(1.99)**	(1.81)*	(1.90)*	(1.15)	(1.16)	(1.74)*	(1.85)*	(1.99)**	(1.87)*	(0.91)	(0.83)
Dyear_after2	-0.014	-0.014	-0.04	-0.041	0.595	0.588	0.062	0.065	0.029	0.028	0.015	0.014
	(1.93)*	(2.06)**	(2.54)**	(2.60)***	(1.06)	(1.05)	(1.53)	(1.61)	(2.32)**	(2.24)**	(1.00)	(0.95)
Dyear_after3	-0.016	-0.017	-0.038	-0.038	1.571	1.569	0.029	0.031	0.06	0.06	0.049	0.049
	(1.90)*	(1.94)*	(1.94)*	(1.96)**	(2.28)**	(2.27)**	(0.59)	(0.62)	(3.92)***	(3.89)***	(2.67)***	(2.66)***
Dyear_after4	-0.041	-0.041	-0.091	-0.091	-1.467	-1.467	-0.042	-0.041	0.052	0.052	0.004	0.003
	(3.39)***	(3.40)***	(3.38)***	(3.38)***	(1.53)	(1.53)	(0.61)	(0.60)	(2.45)**	(2.45)**	(0.14)	(0.14)
Dyear_after5	-0.032	-0.032	-0.027	-0.027	1.16	1.165	-0.151	-0.152	0.112	0.112	0.101	0.101
	(1.58)	(1.56)	(0.58)	(0.57)	(0.71)	(0.71)	(1.29)	(1.29)	(3.07)***	(3.09)***	(2.32)**	(2.33)**
x_{it-1}	-0.035	-0.034	-0.023	-0.023	-8.816	-8.817	-17.101	-17.131	-0.03	-0.03	-0.033	-0.032
	(21.16)***	(19.63)***	(33.22)***	(33.23)***	(30.59)***	(30.59)***	(39.66)***	(39.68)***	(12.10)***	(12.17)***	(14.49)***	(14.02)***
Inverse Mill's ratio		-0.037		-0.038		-0.215		0.112		0.035		0.03
		(2.45)**		(1.18)		(0.19)		(1.36)		(1.36)		(0.97)
Observations	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.04	0.04	0.06	0.07	0.08	0.08	0.08	0.08	0.03	0.03	0.04	0.04

Table 6a: The long-run impacts of privatization (cont')

Dependent variable (y_{it}): Growth rate of	Liability to asset ratio		Operating income to sales ratio		Main profit to sales ratio		Other profit to sales ratio		Managerial expenses to sales ratio		Financial expenses to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
Dyear_after0	-0.026	0.071	0.586	0.623	0.015	0.066	-0.04	-0.033	-0.467	-0.435	-0.144	-0.155
	(0.09)	(0.26)	(4.50)***	(4.55)***	(0.12)	(0.51)	(1.14)	(0.94)	(4.61)***	(4.27)***	(3.51)***	(3.75)***
Dyear_after1	-0.842	-0.766	0.632	0.662	0.093	0.133	-0.013	-0.008	-0.621	-0.597	0.069	0.06
	(2.64)***	(2.39)**	(4.43)***	(4.46)***	(0.62)	(0.88)	(0.32)	(0.19)	(5.25)***	(5.03)***	(1.44)	(1.25)
Dyear_after2	-0.632	-0.568	0.221	0.248	-0.115	-0.08	-0.037	-0.032	-0.475	-0.455	0.102	0.095
	(1.65)*	(1.48)	(1.86)*	(1.89)*	(0.64)	(0.44)	(0.75)	(0.66)	(3.35)***	(3.21)***	(1.78)*	(1.64)
Dyear_after3	-0.768	-0.743	-0.131	-0.118	-0.174	-0.16	-0.046	-0.044	-0.262	-0.256	0.173	0.17
	(1.63)	(1.58)	(0.31)	(0.31)	(0.78)	(0.72)	(0.77)	(0.73)	(1.50)	(1.46)	(2.44)**	(2.40)**
Dyear_after4	-0.941	-0.931	-0.016	-0.014	-0.535	-0.532	-0.081	-0.081	-0.578	-0.576	-0.022	-0.023
	(1.44)	(1.43)	(0.46)	(0.45)	(1.75)*	(1.74)*	(0.98)	(0.97)	(2.39)**	(2.38)**	(0.22)	(0.24)
Dyear_after5	-0.554	-0.574	-0.857	-0.875	-0.463	-0.485	-0.232	-0.233	-0.176	-0.183	0.338	0.34
	(0.50)	(0.51)	(1.12)	(1.15)	(0.88)	(0.92)	(1.62)	(1.63)	(0.42)	(0.44)	(2.01)**	(2.02)**
x_{it-1}	-11.47	-11.347	-24.081	-24.043	-20.243	-20.303	-9.115	-9.139	-14.061	-14.207	-22.023	-22.038
	(29.96)***	(29.46)***	(48.09)***	(47.98)***	(44.62)***	(44.73)***	(23.88)***	(23.92)***	(33.07)***	(33.13)***	(59.68)***	(59.71)***
Inverse Mill's ratio		2.316		0.295		1.23		0.159		0.774		-0.264
		(2.93)***		(0.70)		(3.33)***		(1.58)		(2.63)***		(2.23)*
Observations	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.05	0.05	0.12	0.12	0.11	0.11	0.03	0.03	0.07	0.07	0.18	0.18

Note: We restrict the sample period to 1999-2004, and focus on the subsample of 5,318 SOEs using SOEs privatized in 2005 as the control group. OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%

Table 7a: Differences between Majority and Minority Non-state Ownership

Dependent variable (y_{it}):								
Growth rate of	Logarithm of labor		Wage per labor		Price index		Tax to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	-0.024	-0.024	-0.009	-0.009	-0.016	-0.018	0.048	0.059
	(5.38)***	(5.39)***	(0.93)	(0.90)	(0.05)	(0.05)	(1.92)*	(2.31)**
$Dnns\min_{itp}$	-0.016	-0.014	0.005	0.005	0.058	0.068	0.02	0.012
	(2.23)**	(2.02)**	(0.32)	(0.31)	(0.10)	(0.12)	(0.49)	(0.28)
x_{it-1}	-0.035	-0.03	-0.023	-0.023	-8.82	-8.798	-17.107	-17.255
	(21.16)***	(13.01)***	(33.11)***	(33.11)***	(30.59)***	(30.50)***	(39.69)***	(39.93)***
Inverse Mill's ratio of $Dnnsmaj_{itp}$		0.015		0.002		0.378		0.045
		(1.17)		(0.08)		(0.37)		(0.62)
Inverse Mill's ratio of $Dnns\min_{itp}$		0.064		-0.003		0.399		-0.176
		(4.14)***		(0.12)		(0.39)		(2.38)**
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.04	0.04	0.06	0.06	0.08	0.08	0.08	0.08

Dependent variable (y_{it}):								
Growth rate of	Logarithm of sales		Sale per labor		Liability to asset ratio		Operating income to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	0.018	0.014	0.018	0.02	-0.485	-0.439	0.573	0.617
	(2.33) **	(1.82)*	(1.95)*	(2.09) **	(2.03) **	(1.82)*	(5.47)***	(5.59)***
$Dnns\min_{itp}$	-0.007	-0.012	0.016	0.015	-0.1	-0.028	0.107	0.116
	(0.53)	(0.92)	(1.06)	(0.99)	(0.26)	(0.07)	(0.67)	(0.74)
x_{it-1}	-0.03	-0.037	-0.033	-0.032	-11.466	-11.424	-24.148	-24.113
	(12.19)***	(13.67)***	(14.55)***	(12.63)***	(29.94)***	(29.39)***	(48.24)***	(48.16)***
Inverse Mill's ratio of $Dnnsmaj_{itp}$		0.011		0.022		1.732		0.537
		(0.48)		(0.82)		(2.50) **		(1.44)
Inverse Mill's ratio of $Dnns\min_{itp}$		-0.124		-0.017		1.617		0.322
		(5.15)***		(0.59)		(2.29) **		(0.85)
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.03	0.03	0.03	0.03	0.05	0.05	0.12	0.12

Dependent variable (y_{it}):								
Growth rate of	Main profit to sales ratio		Other profit to sales ratio		Managerial expenses to sales ratio		Financial expenses to sales ratio	
	OLS	Heckit	OLS	Heckit	OLS	Heckit	OLS	Heckit
$Dnnsmaj_{itp}$	-0.044	0.018	-0.029	-0.023	-0.615	-0.589	-0.031	-0.033
	(0.39)	(0.15)	(0.95)	(0.76)	(6.92)***	(6.57)***	(0.87)	(0.92)
$Dnns\min_{itp}$	0.158	0.142	-0.052	-0.051	-0.011	-0.015	0.01	-0.01
	(0.88)	(0.78)	(1.07)	(1.04)	(0.08)	(0.10)	(0.17)	(0.17)
x_{it-1}	-20.25	-20.353	-9.114	-9.13	-14.161	-14.262	-22.035	-22.103
	(44.64)***	(44.75)***	(23.87)***	(23.89)***	(33.31)***	(33.29)***	(59.66)***	(59.77)***
Inverse Mill's ratio of $Dnnsmaj_{itp}$		0.861		0.124		0.437		-0.267
		(2.65)***		(1.40)		(1.70)*		(2.56) **
Inverse Mill's ratio of $Dnns\min_{itp}$		-0.257		0.042		-0.03		-0.423
		(0.78)		(0.47)		(0.12)		(3.98)***
Observations	18251	18251	18251	18251	18251	18251	18251	18251
R-squared	0.11	0.11	0.03	0.03	0.07	0.07	0.18	0.18

Note: We restrict the sample period to 1999-2004, and focus on the subsample of 5,318 SOEs using SOEs privatized in 2005 as the control group.OLS stands for Ordinary Least Square regression, while Heckit stands for the second stage of Heckman two-stage regression. Absolute value of t statistics in parentheses; * significant at 10%; ** significant at 5%; **** significant at 1%.