Do Share Issue Privatizations Really Improve Firm Performance in China?

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January 15, 2015

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This paper shows that the documented post-share issue privatization (SIP) decline in profitability of divested Chinese companies is not evidence *per se* that China's SIP program is ineffective or unsuccessful. Instead, the positive privatization effect is often outweighed by a negative listing effect. We employ a triple difference approach to separate these two effects, and examine a sample of 248 Chinese SIPs from 1999-2009 matched with otherwise comparable state-owned enterprises and privately-owned firms. We document a negative listing effect since ROS of privately-owned firms tends to decline after going public by 2.6% and their EBIT/Sales by 3.8%. After adjusting for this negative listing effect, however, we show that China's SIP program yields significantly improved profitability (ROS and EBIT/Sales), and find this result is robust to alternative specifications.

JEL Classification: G32, G38, G15
Keywords: Privatization, International financial markets, Government policy and regulation

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† We wish to thank William Mingyan Cheung, Joseph P.H. Fan, Veljko Fotak, Michael Firth, Edith Ginglinger, C.Y. Hwang, Patrick Jaslowitzer, Ping Jiang, Li Liao, Bibo Liu, Meijun Qian, Marc Steffen Rapp, Christo Shemtov, Wilson Tong, Oscar Varela, Hao Wang, Steven Wang, Donghui Wu, Yexiao Xu, Bohui Zhang, Chu Zhang and seminar participants at Tsinghua University, Fudan University, Université Paris Dauphine, Shanghai University of Finance and Economics, Renmin University of China, Zhejiang University, University of Oklahoma, Xiamen University, the 2015 Asian Finance Association Conference (Changsha), the 2015 Indonesia Financial Management Association Conference and the 2015 Auckland Finance Meeting for their helpful comments.

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The privatization of state-owned enterprises (SOEs) by governments has become a global phenomenon since its introduction by Margaret Thatcher's British government during the 1980s. The cumulative proceeds raised through privatization sales by governments selling their SOE shareholdings to private investors or by SOEs themselves selling new primary share issues reached $3.0 trillion (Megginson, 2014) in 2014, and over two-thirds of this total was raised through share issue privatizations (SIPs) rather than asset sales. Over the past five years, China has become the world's leading privatizing nation--overtaking the United States, Italy, and Great Britain--with $566 billion in cumulative privatization proceeds coming from SIPs (Gao and Megginson, 2015). Besides being larger than any other country's privatization program, China's also differs in that the vast majority of its SIPs have been primary, capital-raising share offerings by SOEs themselves, rather than secondary share offerings where sale proceeds flowed to the divesting government.

An even more distinctive feature of China's privatization program is the fact that existing empirical research examining Chinese SIPs finds either no profitability improvements or even outright declines in profitability for privatized firms, whereas privatization empirical studies examining other national experiences (surveyed in Megginson and Netter, 2001; Djankov and Murrell, 2002; and Estrin, Hanousek, Kòcenda and Svejnar 2009) typically document highly significant performance improvements after privatization. Sun and Tong (2003) find that several profitability measures do not improve after 634 SOEs list their shares on domestic stock exchanges during the 1994-1998 period. Subsequent studies that confirm these findings include Wei, Varela, D'Souza and Hassan (2003), Wang, Xu and Zhu (2004), Wang (2005), Chen, Firth and Rui (2006), Jiang, Yue and Zhao (2009), and Jia, Sun and Tong (2005), who find that there is no improvement in ROS for 53 SOEs listing their shares overseas over the 1993-2002 period. Despite this ambiguous evidence, the Chinese government decided to accelerate the national privatization program in the third plenum of the 18th Communist Party Congress in November 2013, making explicit the expectation that share issue privatization (SIP) will improve both the profitability and efficiency of divested companies. Why then does the Chinese government continue to privatize SOEs if privatization seemingly does not improve their performance?

We provide an explanation for this puzzling phenomenon by documenting that SIPs do in fact significantly improve divested firm operating and financial performance, but that the act of listing shares for trading induces declining firm performance that partially offsets the benefits of privatization. In other words, we argue that there are two separate effects on firm performance when firms are privatized through public share offering: "the pure privatization effect" which arises from privatization and "the listing effect" that is associated with going public. We use a triple difference (difference-in-differences-in-differences, or

DDD hereafter) approach to separate the pure privatization effect from the listing effect. DDD is the difference between two double differences (DD or difference-in-differences). The first double-difference compares the performance change of SIP firms before and after listing with the performance change of a control group of SOEs which remain fully state-owned and unlisted for the same period. This DD captures the *SIP effect*, which is a combined effect of going public and privatizing. The second double-difference compares the performance change of privately-owned (PO hereafter) firms before and after their listing with the performance change of a control group of PO firms that remain unlisted. The characteristics and listing years of these PO firms are closely matched to the SIP firms included in the computation of the first DD. This gives the *pure listing effect*. Finally, we take a difference between the two double differences to take away the listing effect from the SIP effect. This yields our estimate for the *pure privatization effect*.

This DDD approach explicitly addresses a number of econometric and empirical challenges described in existing studies. For example, our results are less likely driven by selection bias, since we construct a random sample in which 50% of SOEs and PO firms go public but the other 50% remain unlisted. Our results are also less likely driven by the tendency of governments to privatize better performing SOEs, first because our control group is chosen on the basis of sales and profitability in the pre-SIP period. Finally, our results are less vulnerable to the omitted variable problem since our approach also attempts to minimize potential effects on performance improvements for SIP firms due to unobservable changes in the macroeconomic, market-wide or industry-wide conditions over the 7–year event window. These effects, if any, will be removed from our first (second) DD when we include a control sample of SOEs (privately owned firms) that stay unlisted and use their performance changes for adjustments.

Our empirical analysis yields several interesting and important findings. First, consistent with Degeorge and Zeckhauser (1993), Jain and Kini (1993), and Pastor, Taylor and Veronesi (2009), we find evidence of a decline in profitability for privately-owned firms after going public. Relative to their pre-listing levels, the median ROS of PO firms declines by 2.6 percentage points after their IPOs, while median EBIT/Sales decreases by 3.8 percentage points. These findings strongly support a negative listing effect on profitability for firms going public through IPOs in China. Second, after adjusting for the negative listing effect, we find evidence that privatization generally improves profitability; the median improvement is 1.7 percentage points for ROS and 2.9 percentage points for EBIT/Sales, respectively. Third, after controlling for the listing effect, we find evidence that privatization improves real sales, real net profits, capital expenditure and productivity, consistent with findings in the existing ex-China privatization literature.

Our profitability results are robust to alternative matching specifications and alternative sample specifications. We complement the base-line results based on 30% matching accuracy with 20% and 40% as alternative matching requirements and find that the positive effect of privatization on profitability holds in both cases. We use multivariate regression analysis to account for more firm characteristics that might

affect the going public decision, and also use propensity score matching to alleviate the concern that firms choose to go public for reasons other than to increase sales and increase profitability--and again find that profitability for SIP firms improves relative to their levels in the pre-SIP period. Furthermore, we use a sample of unlisted SOEs which are not affected by the listing effect to complement our previous findings based on listed SIPs. We then compare profitability changes for privatized unlisted SOEs with profitability changes for non-privatized unlisted SOEs. We find that all median percentage profitability measures improve significantly.

This study contributes to both the privatization and initial public offering literatures as we identify an important effect of going public on a firm's performance, which is not well treated in the SIP literature due to the unavailability of data on unlisted private firms. Using the newly available NBS dataset and a DDD methodology we separate the pure privatization effect from the listing effect. We show that this listing effect on firm profitability is negative in the Chinese context, as predicted by Pastor, Taylor and Veronesi (2009), and that this negative listing effect dominates the positive privatization effect in magnitude such that overall profitability changes for SIP firms are negative. This study also provides an explanation why some SIP-based studies do not find significant improvements in percentage profitability (Sun and Tong, 2003; Jia, Sun and Tong, 2005) while others such as Dong, Putterman and Unel (2006) document a positive effect of partial privatization using non-SIP Chinese firms.

The rest of this article is organized as follows. Section 1 provides a brief description of relevant literature on the effects of privatization and going public before developing our two hypotheses. Section 2 outlines the empirical strategy used in this study. Section 3 describes our data and section 4 presents the main empirical results. Section 5 concludes.

1. Related Literature and Hypothesis Development

1.1. Post-IPO Operating performance and the listing effect

Our first hypothesis, the listing effect hypothesis, is motivated from existing empirical research documenting post-IPO declines in operating performance. Theoretical analyses predicting that public listings should improve firm performance because stock markets can play important monitoring and disciplinary roles include Scharfstein (1988), Stein (1988), and Holmstorm and Tirole (1993). However, the empirical literature--including Degeorge and Zeckhauser (1993), Jain and Kini (1993), Holthausen and Larcker (1996)--has found the opposite, that there is generally a significant decline in operating performance post-IPO.

Jain and Kini (1993) find that firms show disappointing operating performance, as measured by EBIT/total assets and operating cash flows/total assets, after their IPO relative to the year prior to going public. They also compare sales, asset turnover and capital expenditures before and after going public.

Mikkleson, Partch and Shah (1997) explore whether worsening managerial incentives can account for declining operating performance post-IPO, and find that changes in managerial ownership do coincide with changes in operating performance. While median operating returns on assets tends to decline from the year before going public to the first year after going public, the median stock ownership stake of officers and directors also declines from the year before the IPO to ten years after. Teoh, Welch and Wong (1998) explore whether accrual manipulation can account for the post-IPO decline in operating performance and, more generally, the long-run underperformance of IPOs. They find consistent evidence that the mean discretionary current accruals decline monotonically over time from a significant positive four percent of beginning assets in the IPO year to a level insignificantly different from zero by year 3. They also find consistent evidence of a negative relation between long-term stock performance and the extent of discretionary accruals. IPO firms in the most aggressive quartile of earnings management have a three-year aftermarket stock return of approximately 20 percent less than IPO issuers in the most conservative quartile.

Pastor, Taylor and Veronesi (2009) attempt to resolve this inconsistency by developing a dynamic model of the optimal IPO decision to explore whether the timing of IPO decisions by managers can account for inferior operating performance, profitability in particular. Central to their model is the novel learning mechanism which allows an under-diversified entrepreneur to learn about the average profitability of a private firm before she decides whether or not to go public. When expected profitability is sufficiently high, the diversification benefit from going public is greater than the benefit of retaining private control, thus it becomes optimal for the entrepreneur to take her firm public. The dynamic model in Pastor *et al.* (2009) predicts a decline in profitability, on average, for these privately-owned firms, which provides a strong theoretical foundation for a post-IPO decline in profitability documented in early studies of western companies, such as those from Degeorge and Zeckhauser (1993), Jain and Kini (1993), and Pagano, Panetta and Zingales (1998). Using a sample of 7,183 IPOs in the US over the 1975-2004 period, Pastor *et al.* (2009) find evidence consistent with their model predictions that ROE increases before the IPO but declines after the IPO due to reduced uncertainty and learning more about the firm's true profitability. While this drop in profitability can perhaps be explained in part by earnings management, asymmetric information, mean reversion in profitability, or behavioral stories, none of these alternative mechanisms can generate the same prediction, as the learning mechanism does--that the decline in profitability should be larger for firms with higher volatility and lower uncertainty.

We hypothesize that going public should lead to a decline in profitability in China. The findings obtained in prior studies seem to suggest that the positive impact of public listing on firm performance is outweighed by its negative impact. Using an early sample of IPOs issued in the 1993-1998 period in China, Chan, Wang and Wei (2004) examine their operating performance surrounding the IPO year. Their analysis suggests that relative to the pre-IPO year, both ROA and operating cash flow/total assets tend to decline

during the IPO and the three subsequent years. Kao, Wu and Yang (2009) and Shen, Coakley and Instefjord (2014) provide further evidence that accounting accruals in the IPO year are unusually high for IPO firms relative to non-IPO benchmarks, indicating that earnings management practices can at least partly explain disappointing operating performance and stock performance following IPOs. However, note that these studies do not use private firms, thus it is not clear whether the listing effect on profitability is negative in the Chinese context.

Hypothesis 1 (the listing effect): All things being equal, going public leads to a decline in profitability in China.

1.2. Post-privatization performance and the privatization effect

We derive our second hypothesis, the privatization hypothesis, from existing studies. There are a number of survey articles which assess previous empirical studies on the effect of privatization, including Megginson and Netter (2001), Djankov and Murrell (2002), Clark, Cull and Shirley (2005), Estrin, Hanousek, Kòcenda and Svejnar (2009), and Fan, Huang and Zhu (2011). Overall, empirical evidence indicates that privatization can—and usually does--improve firm performance when firms change from state to private ownership, except for China's SIP experience.

Megginson and Netter (2001) evaluate the findings of 38 empirical studies which use accounting and/or real output data to examine the impact of privatization for firms in both transition and non-transition economies in the 1980s and 1990s, and conclude that the surveyed evidence suggests privatization is associated with performance improvements. Djankov and Murrell (2002) focus on the impact of privatization on firms in transition economies, specifically the firms in Central and Eastern Europe and the former Soviet Union. They conclude that privately-owned firms appear to outperform state-owned firms, even in Russia and other Commonwealth of Independent States (CIS) countries, but the positive impact of privatization is more pronounced in non-CIS countries. Clark, Cull and Shirley (2005) summarize a subset of empirical studies which specifically focus on bank privatization in developing countries. Similar to results obtained using non-financial firms, their general conclusion is that bank privatization usually improves bank efficiency, but gains tend to be greater when the government relinquishes control completely, when banks are sold to strategic investors, when foreign banks are involved, and when the government does not impose any restriction on competition. Estrin, Hanousek, Kòcenda and Svejnar (2009) evaluate the effects of privatization using empirical findings obtained from 34 surveyed studies that focus on transition economies. They find that the effect of privatization is mostly positive in Central Europe, and that privatization to foreign owners yields a positive or insignificant effect in the CIS while sales to domestic owners generates a negative or insignificant effect.

Why do privatized firms tend to outperform non-privatized counterparts? One possible explanation

obtained from Eastern Europe and Russia is that the transfer of control rights from state to private owners improves managerial incentives to create value [Brown, Earle and Teledgy (2006)]. Another explanation is that stock market monitoring—and attendant financial rewards to managers for superior performance—can be another source of performance improvement for privatized firms. Using a sample of India's partial privatizations, where only non-controlling stakes are sold, Gupta (2005) finds consistent evidence that even partial divestment can positively impact firm profitability, productivity and investment.

We hypothesize that China's partial privatization program should improve firm performance, even though prior studies using samples of SIPs [Sun and Tong (2003); Jia, Sun and Tong (2005); Jiang, Yue and Zhao (2009)] offer at best limited support for this hypothesis. The most puzzling finding across these studies is that SIPs do not seem to improve profitability. We argue that the primary reason for this inconsistency is that they do not separate the (partial) privatization effect from the listing effect when they focus on performance changes for SIPs. To the extent that the listing effect is properly measured and taken into account, we expect that there is a positive effect of partial privatization on profitability. In fact, the empirical literature does lend support to this interpretation in cases where China's privatization does not involve issuing shares to stock market investors. For example, Dong, Putterman and Unel (2006) examine the impact of privatization on performance using 165 unlisted firms located in Nanjing and its outskirts. They employ standard treatment models to control for potential selection bias in these privatized firms and find robust evidence of improvement in profitability, measured by return on assets.

Another related question is why SIP can improve profitability almost everywhere, except in China. We argue that the difference in the extent and method of privatization across countries matters. In China, privatization is only partial for most SIP firms—especially the large, politically sensitive SOEs—and does not involve any transfer of corporate control. However in other countries, privatization is done completely, albeit often in multiple tranches spread over several years, and is eventually accompanied with the transfer of control. Given that less complete privatization should yield a smaller positive impact on profitability than would full divestment, it is not surprising that overall performance improvements in China are smaller than those in other countries, holding constant the listing effect. Additionally, almost all Chinese SIPs involve sales of newly-created primary shares, and are thus capital-raising events, whereas virtually all other national SIP program involve the secondary market sale of existing shares owned by the government. Finally, agency problems associated with listing may be worse for Chinese firms than firms in other countries. This may lead to more serious earnings management, market timing, cash diversion, and other problems. In fact, abundant anecdotal evidences show Chinese firms take listing as a way to obtain easy money, and managers frequently mis-use the proceeds obtained from equity issuances[1]. On the other hand,

[1] For example, evidence reported in Liu and Dai (2004), Zhang and Zhai (2005), Zhu, Wu, Wu and Rui (2009) suggest that some 60% of money raised from equity issuances by Chinese listed firms does not go to investment projects

the Chinese market is very speculative so that the price signal is noisier; hence, the monitoring effect resulting from the listing may not be as significant as it is in India (Gupta, 2005). Overall, we expect the stronger negative listing effect to out-weigh the weaker positive privatization effect and result in a negative SIP effect.

Hypothesis 2 (Privatization effect): After accounting for the negative listing effect, privatization through public share offering improves firm performance in China.

2. Empirical Strategy: the Triple Difference (DDD) Methodology

The implication of existing studies on the post-IPO decline in profitability is that if there is any tendency for performance to improve or degrade after firms go public, we should adjust for this listing effect to estimate the pure privatization effect. We use the DDD triple difference methodology outlined below to obtain estimates for the pure privatization effect. First, we estimate the double difference among SOEs before and after the SIP years, and between SOEs that go public and SOEs that never do (at least during the study period). Following the literature, we exclude the SIP year when estimating the first DD. Changes in performance *t* years before and after the SIP year for treated SOEs that go public and list their shares are calculated as:

$$\Delta Perform\left[-t,+t\right]_{SOEs}^{SIP} = Perform_{t}^{SIP} - Perform_{-t}^{SIP} \quad (1)$$

Here $Perform_{t}^{SIP}$ is the average performance over *t* years after the SIP and $Perform_{-t}^{SIP}$ is the average performance over *t* years before the SIP.

Following Jiang, Yue, and Zhao (2009), we remove the potential impacts of common factors on firm performance by constructing a control group in which untreated SOEs do not go through SIP and thus are not listed during the sample period. We choose one otherwise comparable untreated SOE for each treated SOE. We require that untreated SOEs considered for inclusion in the control group should operate in the same industry as treated SOEs. We also require that sales revenues and ROS of untreated SOEs should be similar (within ± 30% based on revenue and ROS) to treated SOEs in the years before SIPs. In cases where there are multiple comparable untreated SOEs, we follow the nearest neighbor matching principle, choosing the one that matches best in absolute terms. Changes in performance *t* years before and after the SIP year for untreated SOEs that never go public are calculated using Equation (2):

$$\Delta Perform\left[-t,+t\right]_{SOEs}^{SIP-matched} = Perform_{t}^{SIP-matched} - Perform_{-t}^{SIP-matched} \quad (2)$$

mentioned in their official documents. Tunneling through intercorporate loans without any business transactions is unheard of outside China. See Lee, and Yue (2010), Jiang, Rao and Yue (2015) for more details about the case of Fenghua Co. (stock code 600615).

Here $Perform_t^{SIP-matched}$ is the average matched SOE performance over t years after the SIP and $Perform_{-t}^{SIP-matched}$ is the average matched SOE performance over t years before the SIP.

The first double difference compares the average performance improvement for treated and untreated SOEs:

$$DD_{SOEs}^{SIP} = \Delta Perform[-t,+t]\Big|_{SOEs}^{SIP} - \Delta Perform[-t,+t]\Big|_{SOEs}^{SIP-matched} \quad (3)$$

This gives the SIP effect which is a combination of the privatization and listing effects.

Second, we estimate the double difference among PO firms before and after the SIP years, and between PO firms that also go public in the SIP year and PO firms that never go public. Following a similar search procedure, we identify in the population of privately-owned firms one PO firm that goes public in the same year as the SIP firm, and another PO firm that never goes public in our sample period. We require that these two otherwise comparable PO firms should operate in the same industry over the sample period as the SIP firm, and that they should be the most similar to the treated SIP firm in terms of Sales and ROS.

Likewise, changes in performance *t* years before and after the SIP year for treated PO firms that go public and untreated PO firms that never go public are calculated using Equations (4) and (5), respectively. Comparing average performance improvements for treated and untreated POs yields another DD estimate which measures the listing effect in Equation (6):

$$\Delta Perform[-t,+t]\Big|_{POs}^{Listing} = Perform_t^{Listing} - Perform_{-t}^{Listing} \quad (4)$$

$$\Delta Perform[-t,+t]\Big|_{POs}^{Listing-matched} = Perform_t^{Listing-matched} - Perform_{-t}^{Listing-matched} \quad (5)$$

$$DD_{POs}^{Listing} = \Delta Perform[-t,+t]\Big|_{POs}^{Listing} - \Delta Perform[-t,+t]\Big|_{POs}^{Listing-matched} \quad (6)$$

Finally, we obtain our DDD estimate for the pure privatization effect by further taking a difference between the two DD estimates: DD_{SOEs}^{SIP} and $DD_{POs}^{Listing}$. Since the first double difference captures the combined effect of privatization and listing, while the second double difference only captures the listing effect, the DDD estimate in Equation (7) gives our estimate for the pure privatization effect:

$$DDD = DD_{SOEs}^{SIP} - DD_{POs}^{Listing} \quad (7)$$

3. Data

We obtain our IPO data and associated pre- and post-SIP financial data over the 1998–2010 period from CSMAR and NBS. While the CSMAR dataset is well known for providing financial information for all listed firms in mainland China, the NBS dataset is relatively new. This database is constructed and maintained by the National Bureau of Statistics, providing similar information for state- and privately-

owned firms in mainland China. Inclusion in the NBS dataset requires annual sales to be more than 5 million RMB. Additionally, included firms are geographically located in 31 province or province-equivalent autonomous regions and operate in 37 two-digit manufacturing industries. The earliest possible year for inclusion in the NBS dataset is 1998, with 165,119 observations, while the most recent year of commercially available data is 2010, with 463,579 observations. This NBS dataset has been used to complement the CSMAR in many studies to address research questions that could not have been properly explored in the past, including Cai and Liu (2009), Hsieh and Klenow (2009), Li, Yue and Zhao (2009), Liu and Siu (2011), Ding, Guariglia and Knight (2013), Fan, Huang and Zhu (2013), Piotroski and Zhang (2014), and Lin, Sun and Wu (2015).

Because we need at least one year of data before and after listing to estimate performance differences, we start with an initial sample of 915 IPOs issued between 1999 and 2009, 552 of which are identified as SIP firms. We retrieve financial data in the pre- and post-SIP years for these 552 SIP firms from the NBS dataset and the CSMAR dataset, respectively. Inspection of both datasets reveals that we can choose to construct our three control samples from 53,996 SOEs staying unlisted, 363 PO firms going public, and another 318,532 PO firms remaining unlisted over the sample period. We drop firm-year observations with negative sales, negative current assets (total assets minus total fixed assets), or negative fixed assets (total assets minus current assets). We require complete data for at least one of the past three years to be available for comparable PO firms that go public, and that complete data for at least one of three pre-SIP years and three post-SIP years to be available for comparable SOEs and PO firms that do not go public. Our final sample comprises 248 SIPs, for which we have also managed to identify the 248 most comparable SOEs that do not go public, the 248 most comparable PO firms that go public in the same SIP year, and the 248 most comparable PO firms that do not go public over the sample period, a total of 992 companies.

Table 1 reports the sample distribution by year. Our sample SIPs are, with one exception, distributed rather equally across the years in the sample period. There is no observation for the year of 2005. In fact, there are only 13 IPOs in 2005 due to the split share structure reform which started in early 2005 and ended in mid-2006 (Firth, Lin and Zou 2010; Li, Wang, Cheung and Jiang 2011; Liao, Liu and Wang 2014). The reform makes non-tradable shares tradable, hence CSRC stopped IPO activity to reduce the further increase in the supply of shares into the market. For these 13 IPOs, some are non-SOEs and others have no matched firms. The highest frequency occurs in 2000 with 45 SIP firms.

***** Insert Table 1 around here *****

4. Main Results

We examine whether there are significant performance improvements for SIP firms by comparing

performance measures three years before and after the SIP. We consider the following measures: real sales, defined as sales revenues adjusted with annual inflation rate and standardized by year 0 sales; real net profits, defined as net incomes adjusted with annual inflation rate standardized by year 0 net income; ROS, defined as net incomes over sales; EBIT/Sales, calculated as operating profits divided by sales; Turnover, estimated as sales over total assets; Net Income/Employees, defined as net incomes over the number of employees; Sales/Employees, defined as sales over the number of employees; and EBIT/Employee, defined as operating profits standardized by the number of employees. The net income, sales and EBIT measures are all adjusted for inflation before being divided by employee numbers. We employ these performance measures primarily to test whether SIP yields any improved profitability or efficiency. We do not consider real assets, ROA, ROE, and leverage because these measures themselves--or the denominator of these measures--mechanically increase due to going public through sales of primary shares.[2] We also do not use ROA or ROE to measure profitability because these are sensitive to inflation, accounting conventions, and management (D'Souza and Megginson, 1999; Fan, Wong Zhang 2007). However, we list these measures for reference, and draw inferences based on measures not affected by this measurement problem.

Tables 2 and 3 report performance changes for SIP firms and listed PO firms against their respective benchmarks. More specifically, we use non-SIP comparable SOEs as the control sample in Table 2, while PO firms that never go public are the control sample in Table 3. Both tables report mean and median improvements for most performance measures. We draw inferences from the median rather than the mean because the former are less affected by the presence of outliers. Prior studies report significant improvements in real net profits, real sales and productivity for SIP firms, but also find that profitability (measured as a return) and leverage do not improve (Sun and Tong, 2003; Jiang, Yue, Zhao, 2009). We find similar evidence that both real net profits and real sales improve after the SIP, while profitability and leverage decline.

***** Insert Table 2 about here *****

Jiang, Yue and Zhao (2009) adjust ROS for contemporaneous improvements in non-SIP SOEs' profitability. Although they show a tendency for ROS to decline after the SIP, which is true for both SIP firms and non-SIP SOE firms, their results show that the decline is smaller for SIPs than for non-SIPs, such that adjusted ROS is significantly positive. However, our larger sample over a longer period of time does not generate similar results in Table 2. We find that the median ROS declines from 10.2% in the three pre-

[2] As noted in the introduction, unlike all other major privatizing countries the vast majority of Chinese SIPs were capital-raising primary share offerings. Firms completing a primary offering will increase total equity and total assets in the IPO year thus their ROA and ROE will drop mechanically even if their profit margin remains pretty much the same relative to pre-IPO levels. More important, we do not use ROA or ROE because their performance changes can be caused by government subsidies in terms of concessionary loans and tax rebates. In comparison, EBIT/Sales is not impacted by this concern.

SIP years to 6.3% in the three post-SIP years for SIP firms, and the decrease is statistically significant at the 1% level. After adjusting for changes in ROS of non-SIP SOEs over the same period, the median change in ROS is still -0.9% percentage points, which is significant at the 5% level. This finding is obtained not only for this ROS-based measure, but also for alternative profitability measures such as EBIT/Sales.

Another new insight when we consider adjustments is that there is now strong evidence of efficiency gains across all three measures. Results based on Net Income/Employees, Sales/Employees, and EBIT/Sales suggest that profits per person typically increase following the SIP. Overall, the results in Table 2 show that the SIP effect is positive in terms of real sales, real profit, capital expenditures, and productivity, but negative for percentage profitability in terms of ROS and EBIT/Sales.

***** Insert Table 3 about here ******

Table 3 reports performance changes for PO firms only, which are not well examined in the Chinese finance literature. Compared to performance changes before and after the SIP year, several observations are clear. First, similar to SIP firms, PO firms going public seem to experience an increase in real sales, real net profits, capital expenditure and labor productivity, as well as a decline in percentage profitability. For example, the median ROS for those comparable listed PO firms drops from 11.0% in the pre-SIP period to 5.7% in the post-SIP period. Ever after taking account of the decline that unlisted PO firms experience over the same period, this decline is still 2.6 percentage points, which is significant at the 1% level. Second, evidence of improved efficiency appears to be strong for PO firms going public, since all three measures of labor efficiency improve significantly compared to their levels in the pre-IPO period. Third, when we adjust for performance changes using unlisted PO firms, we still find a very strong decline in percentage profitability for listed PO firms. The median declines in ROS and EBIT/Sales are 2.6 and 3.8 percentage points, respectively. Note that performance changes for PO firms are thus similar to, but even greater than, those for SIP firms, which strengthens our belief that the privatization effect might have been hiding behind the listing effect.

***** Insert Table 4 about here *****

To directly explore the privatization effect, we now compare adjusted performance improvements for 248 SIP firms and PO firms that go public in the same year, which yields the interesting findings presented in Table 4. First, the increases in real sales for SIP firms and listed PO firms are so similar in magnitude that there seems no significant improvement left for the effect of privatization, measured as the difference between the first DD estimate for SIP firms and the second DD estimate for comparable listed PO firms. This finding suggests that the improvements in real sales documented in prior studies are primarily driven by the corporate event of going public. When the positive effect of going public on real sales and profits is properly controlled for, there is little difference privatization can make to these performance measures, at least for our SIP samples. However, the same cannot be said to the real profits,

as listing does not significantly improve real profits. The improvements in real profits before and after the SIP seem to be explained more by privatization. Second, we find that the post-IPO decline in percentage profitability appears to be smaller for SIP firms than for PO firms. The implication is that, even if there is a tendency for SIP firms' profitability to decrease following an IPO, the overall improvement in percentage profitability due to privatization is positive. Since going public will mechanically increase total assets and equity, we rely more on ROS and EBIT/Sales. We find that changes in both ROS and EBIT/Sales are significantly positive and, more importantly, it is clear that the improvement in ROS by 1.7 percentage points and in EBIT/Sales by 2.9 percentage points is not associated with going public, but is purely due to privatization. Third, given that our three DDD measures for labor efficiency are not significantly different from zero, it seems that privatization does not materially enhance labor productivity. It is possible that our matching is not accurate or we do not control of the listing effect well enough. We will address these issues in robustness checks using, arguably, a more accurate matching procedure and a less noisy sample in the following analyses.

5. Robustness Checks

This section presents several robustness checks for our main empirical results. First, we use both more and less accurate matching requirements to examine whether our findings are sensitive to our base-line matching specifications. Second, to the extent that sales and ROS may not be sufficient to define a control firm, we use the multivariate regression approach and the propensity score matching to control for other firm-level characteristics. Third, we use an unlisted, but privatized, sample of SOEs to examine whether the privatization effect is also positive for companies privatized through direct (asset) sales or other non-SIP method.

5.1. Alternative matching specifications

Following previous studies such as Jiang, Yue and Zhao (2009), our matching requirement for untreated firms is that they should be within approximately 30% of treated firms with respect to sales and profits. More accurate matching can increase the similarity between treated and untreated firms and potentially improve the precision of our DDD estimate for the privatization effect, but this also reduces the number of observations available to estimate the results, thus reducing test power. For the same reason, less accurate matching can increase the number of observations, increasing the likelihood of capturing small probability events, but this benefit comes at the cost of precision. To examine whether our results are sensitive to this particular choice of matching specification, we re-estimate empirical results using -/+20% and -/+ 40% as alternative matching specifications, and find qualitatively similar results.

Table 5 summarizes the results with the two alternative matching specifications. Note that the sample size declines from 248 to 142 when we use a more accurate specification of 20%, while the sample

size increases slightly from 248 to 261 when we use a less accurate matching specification of 40%. We do not use a more accurate matching requirement, such as 10%, because the sample size becomes too small.

***** Insert Table 5 about here *****

Our main finding on profitability is robust to alternative matching specifications. First, we find that the listing effect on profitability is negative on average across both alternative matching specifications. Specifically, under the 20% requirement, the median decline in ROS for SIP firms due to listing is 2.0 percentage points, and the median decline in EBIT/Sales for SIP firms due to listing is 3.7 percentage points. Under the 40% requirement, the median decline in ROS for SIP firms due to privatization is 3.9% percentage points, and the median decline in EBIT/Sales for SIP firms due to listing is 4.6% percent. Second, we find robust evidence of a positive privatization effect on profitability across both alternative matching specifications. Under the 20% requirement, the median improvement in ROS for SIP firms due to privatization is 1.4 percent, and median improvement in EBIT/Sales for SIP firms due to privatization is 3.1 percent. Under the 40% requirement, the median improvement in ROS for SIP firms due to privatization is 2.2 percent, and the median improvement in EBIT/Sales for SIP firms due to privatization is 3.3 percent, Third, we still find no evidence that privatization improves labor efficiency. Under the 20% requirement, median changes in all three efficiency measures are positive but insignificant. Under the 40% requirement, median changes in the three efficiency measures are insignificant and not consistently positive.

5.2. Multivariate regression analysis

We use sales and ROS to construct our control samples for assessing base-line results. In order to control for more firm-specific characteristics relevant to going public, a regression approach is used to complement the previous analyses. More specifically, we estimate the following multivariate regression model to examine whether there is any privatization effect:

$$\Delta Perform = \beta_0 + \beta_1 \cdot D\_SO + \beta_2 \cdot D\_Listing + \beta_3 \cdot ControlV + \beta_4 \cdot D\_SO \cdot D\_Listing + \varepsilon \quad (8)$$

where *ΔPerformance* is defined as performance after the SIP year minus performance before the SIP year; *D_SO* is a dummy variable, which is equal to 1 if firms are state-owned and 0 otherwise; *D_listing* is another dummy variable, which is equal to 1 for post-listing years of all listed firms, and 0 otherwise; *ControlV* is a set of firm specific variables which are relevant for performance improvements. We also include assets in the pre-SIP year (*Pre_logAssets*), ROA in the pre-SIP year (*Pre_ROA*), growth opportunities in the pre-SIP year (*Pre_GROWTH*), capital investment in the pre-SIP year (*Pre_CAPINV*), and firm age (*Age*).[3]

For discussion purposes, we assume that these control variables are unrelated to performance

[3] We use pre-listing sales and ROS in forming control groups in our DDD analysis. Here we further control for the possible differences in pre-listing total assets and ROA across firms in our sample.

improvement and E(ε|D_SO, D_Listing) = 0 at the moment, where ε is the error term from Equation (8). We consider four possible combinations of values for the two dummy variables in Equation (8) and their conditional mean expectations:

$$E\left(\Delta Perform \middle| D\_SO = 1, D\_Listing = 1\right) = \beta_0 + \beta_1 + \beta_2 + \beta_4 \quad (9)$$

$$E\left(\Delta Perform \middle| D\_SO = 1, D\_Listing = 0\right) = \beta_0 + \beta_1 \quad (10)$$

$$E\left(\Delta Perform \middle| D\_SO = 0, D\_Listing = 1\right) = \beta_0 + \beta_2 \quad (11)$$

$$E\left(\Delta Perform \middle| D\_SO = 0, D\_Listing = 0\right) = \beta_0 \quad (12)$$

Recall that the effect of privatization and listing on performance for SOEs before and after the SIP year is defined in Equation (3) as the difference in performance improvement for treated SOEs and untreated SOEs. Substituting Equations (9) and (10) into Equation (3) gives the difference as:

$$DD_{SOEs}^{SIP} = \left(\beta_0 + \beta_1 + \beta_2 + \beta_4\right) - \left(\beta_0 + \beta_1\right) = \beta_2 + \beta_4 \quad (13)$$

Likewise, substituting Equations (11) and (12) into Equation (6), which defines the listing effect, yields:

$$DD_{POs}^{Listing} = \left(\beta_0 + \beta_2\right) - \beta_0 = \beta_2 \quad (14)$$

Replacing the first and the second DD variables with Equations (13) and (14), Equation (7) is now given as:

$$DDD = \left(\beta_2 + \beta_4\right) - \beta_2 = \beta_4 \quad (15)$$

To test for the first hypothesis about the listing effect, we focus on the coefficient on *D_Listing*. A negative β_2 implies that going public will lead to a decline in performance, while a positive β_2 implies that going public will enhance performance. To test the second hypothesis about the pure privatization effect, the variable of interest is the interaction term *D_Listing*D_SO* and its coefficient β_4. A negative β_4 means that pure privatization can decrease firm performance while a positive β_4 suggests that privatization can enhance firm performance. While our regression analysis is similar to the DDD analysis, it can control for more variables than DDD does. Table 6 presents regression results.

***** Insert Table 6 about here *****

Overall, the results are similar to those reported in Table 4. First, there is a negative effect of listing on ROS and EBIT/Sales, as the coefficients for *D_Listing* are -0.059 and -0.072, respectively, both significant at the 1% level. This means that listing is associated on average with a 5.9 percent decline in ROS and a 7.2 percent decline in EBIT/Sales. Second, there is a positive effect of privatization on ROS and EBIT/Sales because the coefficients for the interaction terms *D_SO*D_Listing* are 0.028 and 0.034, respectively. Note that 0.028 is marginally insignificant while 0.034 is significant at the 10% level. This

seems to imply that pure privatization is associated on average with a 2.8 percent improvement in ROS and a 3.4 percent improvement in EBIT/Sales. Third, there is a positive effect of listing on labor efficiency since the *D_Listing* coefficients on three alternative measures are all positive and statistically significant. Finally, privatization's effect on labor efficiency is insignificant as the regression coefficients across three measures are all insignificant.

5.3. Propensity Score Matching

To further alleviate the concern that matching entirely based on sales and ROS may not be accurate enough to yield an unbiased DDD estimate, we follow the propensity score matching (PSM) procedure to construct our multiple control samples. Specifically, we first estimate the following logistic regression:

$$List = \alpha_1 + \alpha_2 \log(Assets) + \alpha_3 ROS + \alpha_4 Growth + \alpha_5 Leverage + \alpha_6 CapExp + \alpha_7 SOE + \varepsilon \quad (16)$$

where *List* is a dummy for public listing, equal to 1 when the firm is listed and 0 otherwise; *Assets* is total assets; *ROS* is the return on sales; *Growth* is defined as sales growth; *Leverage* is calculated as total liabilities over total assets; *CapExp* is capital expenditure; and *SOE* is a dummy variable, equal to 1 when the firm is an state-owned enterprise. These variables are motivated from Pagano, Panetta and Zingales (1998) and Liu and Siu (2011).

We use all listed firms that went public over the 1999-2009 period and all unlisted firms contained in the NBS dataset over the same period to generate coefficients for the logistic model and obtain propensity scores for firms under analysis. For each SIP firm, we choose a match among those sample firms in the same SIP year and in the same industry. We also require that the propensity score of matching firms should not be 0.1 away from the paired SIP firm. This procedure yields a large sample of 320 SIPs.[4] Likewise, we also find 320 comparable unlisted SOEs, 320 comparable listed PO firms and 320 comparable unlisted PO companies to match with these SIP firms. Using these SIP firms and their matches, we re-estimate our DDD results. The difference between PSM and the regression analysis described in section 5.2 is that the PSM methodology uses a new sample and a new control group, while the enhanced regression methodology uses the same sample as used in DDD but adds more controls.

Table 7 summarizes the main results using propensity score matching. Overall we find that results for profitability using PSM to construct control samples are quantitatively similar to or even better than those results obtained using sales and profitability to define comparable firms. Specifically, the DDD estimates for the four profitability measures are all positive and significant, including ROA and ROE. This

[4] This total exceeds the number of SIPs in the main sample because, based on the DDD matching criteria of a 30% deviation in sales and ROS, we could only find matching firms for 248 SIP firms. Here, using PSM methods to match based on closest predicted scores, we can find matched firms for 320 SIP firms. The full initial sample includes 552 SIP firms.

evidence complements our previous finding that there is a positive effect associated with privatization on profitability. We also find that results based on propensity score matching and on two firm characteristics matching are not conclusive for the effect of privatization on labor efficiency. Using sales and profitability to match control firms, we find that efficiency does not improve across any of the three measures. There is literally no sign of efficiency gains when we use the range of 20%, 30% or even 40% to find most comparable firms. However, things change when we use the matched sample based on propensity scores instead. In sharp contrast to our previous results, the DDD estimate for three efficiency measures become positive and significant at the 1% level, indicating that there can be a positive effect of privatization on efficiency. Although this result is consistent with previous findings--for example, Sun and Tong (2003)--the difference is that our study takes account of the listing effect on efficiency while their study does not.

***** Insert Table 7 about here *****

Why can our previous analysis not find a positive effect of privatization on labor efficiency while the analysis based on PSM can? One possibility is that matching based on sales and ROS in the previous analyses do not provide accurate enough matches, or at least these do not control well enough for efficiency before the SIP year. Matching based on propensity scores does not directly control for efficiency before the SIP years, but does so indirectly by including more firm characteristics. Once this measurement error is corrected, we find strong evidence of a positive effect of privatization on efficiency.

5.4. Privatized and Non-privatized Unlisted SOEs

We have thus far focused on a sample of SIP firms and discussed several empirical methods of separating the privatization effect from the listing effect. In what follows, we complement our previous analysis using a sample of 3,702 unlisted firms which were privatized by means other than public share offerings; they were divested through direct/asset sales or MBOs, but did not go public to. It is worth pointing out that using this unlisted sample of SOEs does not necessarily provide sharper tests, for two reasons. First, this sample does not allow us to directly test whether the listing effect is negative. Second, the extent of partial privatization is not directly comparable.

We define unlisted SOE firms as being privatized if state ownership declines from above 50% to below 50%. We choose this cutoff point because unlisted privatized firms are not subject to stock market monitoring. Hence, the managerial effect (see Gupta, 2005) associated with partially privatizing a company through a SIP should be lacking. Following prior methodology, we define the year of privatization as that when the fraction of state ownership falls below 50%, and estimate performance three years before and after divestment for the privatized SOEs. We also estimate similar performance changes over the same period for a sample of 3,702 comparable unlisted SOEs that were not privatized. We require that sales revenues and ROS of comparable SOEs at the divestment date should not be more than 30% larger or

smaller than those of matched unlisted SOEs. By comparing performance improvements for privatized unlisted SOEs and for non-privatized unlisted SOEs, we can draw inferences on whether privatization improves firm performance. Table 8 summarizes relevant results.

***** Insert Table 8 about here *****

We draw three main conclusions from the results in Table 8. First, there is a significantly positive effect of privatization on profitability in the unlisted sample. Specifically, the median improvement in ROS for privatized unlisted SOEs is 1.8 percentage points after adjusting for the median improvement in non-privatized unlisted SOEs over the same period, and the median improvement in EBIT/Sales for privatized unlisted SOEs is 2.2 percent after adjusting for the median improvement in non-privatized unlisted SOEs over the same period. This finding of a positive impact on profitability is consistent with Dong, Putterman and Unel (2006) who also use a sample of 165 unlisted SOEs. The difference is that our sample of firms is drawn from 31 provinces or province-equivalent municipal regions across China and is much larger and more geographically diverse than theirs, which focuses on one provincial area. Second, there is also a significantly positive effect of privatization on efficiency. Median improvements in Net Incomes/Employee, Sales/Employee, EBIT/Employee for privatized unlisted SOEs are 0.295, 3.450, and 0.316, respectively, after adjusting for median improvements for non-privatized unlisted SOEs over the same period. Third, real sales, real net profits, and capital expenditure all improve significantly after privatization.

5. Conclusion

Prior research suggests that China's share issue privatization program does not lead to significant improvements in most measures of profitability. This article explores whether the positive effect of privatization on profitability can be overwhelmed by the negative effect of public listing. Using a sample of Chinese firms privatized via public share offerings of newly-issued primary shares over the 1999-2009 period, we find consistent evidence that there is a negative listing effect on profitability and, more importantly, there is a positive privatization effect after adjustment for the negative listing effect.

Prior studies also document that Chinese privatization is effective in improving labor efficiency. While we do not find consistent evidence supporting this when we employ an initial triple difference methodology, we do find some evidence of improved labor efficiency when we use the propensity scores matching approach and when we use a sample of unlisted SOEs. Since it is not clear whether more firm characteristics other than sales and ROS should be considered when identifying comparable firms, and to what extent the privatizing effect is sensitive to adding more firm characteristics, we believe this is a promising area to be explored in future research.

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Table 1: Sample distribution by year

This table presents the distribution of share issue privatization firms by year of initial listing.

Year	Number of SIP firms	% of Total
1999	36	14.52
2000	45	18.15
2001	24	9.68
2002	20	8.06
2003	24	9.68
2004	35	14.11
2005	0	0.00
2006	16	6.45
2007	25	10.08
2008	12	4.84
2009	11	4.44
Total	248	100%

Table 2: Performance improvements for SIPs and their comparable non-SIP SOEs after the SIP

This table compares performance for 248 SIP SOEs and their comparable non-SIP three years before and after the SIP. Real sales and real net profits are sales revenues and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

Variable	Sample	Median /mean	3 Years Before SIP	3 Years After SIP	Difference (= After – Before)	Wilcoxon		(+/-) Proportion Z-test	
						Z-value	P-value	Z-value	P-value
Real Sales	SIP SOEs	Median Mean	0.745 0.753	1.488 1.708	0.743	(12.581)***	0.000	(11.432)***	0.000
	Non-SIP SOEs	Median Mean	0.804 0.907	1.206 1.400	0.419	(10.186)***	0.000	(8.954)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-0.060 (-3.390)*** 0.000	0.311 (6.058)*** 0.000	0.327	(6.838)***	0.000	(5.688)***	0.000
Real Net Profits	SIP SOEs	Median Mean	0.790 0.954	1.020 0.896	0.188	(2.934)***	0.003	(2.196)**	0.011
	Non-SIP SOEs	Median Mean	0.869 2.411	0.975 2.405	0.101	(0.639)	0.524	(1.295)	0.135
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-0.110 (-3.353)*** 0.001	0.044 (0.019) 0.985	0.178	(1.955)**	0.050	(1.295)	0.135
Capital Expenditure /Total Assets	SIP SOEs	Median Mean	0.064 0.094	0.075 0.090	0.012	(0.942)	0.347	(1.858)**	0.032
	Non-SIP SOEs	Median Mean	0.032 0.070	0.009 0.031	-0.013	(-3.819)***	0.000	(-4.561)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.029 (3.431)*** 0.001	0.060 (8.108)*** 0.000	0.024	(2.827)***	0.004	(-0.169)	0.846
Capital Expenditure /Sales	SIP SOEs	Median Mean	0.071 0.127	0.148 0.195	0.063	(5.216)***	0.000	(3.998)***	0.000
	Non-SIP SOEs	Median Mean	0.044 0.102	0.010 0.054	-0.011	(-3.285)***	0.001	(-4.111)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.036 (2.828)*** 0.004	0.121 (8.815)*** 0.000	0.116	(5.206)***	0.000	(1.520)*	0.079

ROA	SIP SOEs	Median Mean	0.078 0.085	0.033 0.034	-0.044	(-12.443)***	0.000	-(11.432)***	0.000
	Non-SIP SOEs	Median Mean	0.081 0.099	0.051 0.074	-0.025	(-6.630)***	0.000	(-5.575)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.000 (-1.196) 0.233	-0.021 (-6.340)*** 0.000	-0.025	(-5.678)***	0.000	(-4.449)***	0.000
ROE	SIP SOEs	Median Mean	0.193 0.202	0.067 0.056	-0.136	(-13.029)***	0.000	(-12.558)***	0.000
	Non-SIP SOEs	Median Mean	0.164 0.221	0.102 0.156	-0.042	(-6.892)***	0.000	(-6.026)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.027 (1.845)* 0.065	-0.047 (-6.799)*** 0.000	-0.086	(-7.440)***	0.000	(-6.701)***	0.000
ROS	SIP SOEs	Median Mean	0.102 0.116	0.063 0.049	-0.041	(-10.286)***	0.000	(-8.954)***	0.000
	Non-SIP SOEs	Median Mean	0.102 0.221	0.072 0.156	-0.031	(-8.024)***	0.000	(-6.476)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.000 (-0.220) 0.826	-0.009 (-2.225)** 0.026	-0.009	(-2.240)**	0.025	(-1.520)*	0.079
EBIT/Sales	SIP SOEs	Median Mean	0.135 0.149	0.084 0.071	-0.049	(-10.248)***	0.000	(-8.729)***	0.000
	Non-SIP SOEs	Median Mean	0.120 0.139	0.087 0.094	-0.036	(-7.905)***	0.000	(-6.476)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	0.009 (5.516)*** 0.000	-0.005 (-1.220) 0.223	-0.014	(-3.004)***	0.002	(-2.309)***	0.007
Turnover	SIP SOEs	Median Mean	0.752 0.817	0.546 0.596	-0.202	(-10.692)***	0.000	(-9.066)***	0.000
	Non-SIP SOEs	Median Mean	0.728 0.944	0.780 0.953	-0.007	(0.346)	0.730	(-0.507)	0.560
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-0.008 (-0.899) 0.370	-0.187 (-6.864)*** 0.000	-0.219	(-7.143)***	0.000	(-6.701)***	0.000
Net Incomes /Employees	SIP SOEs	Median Mean	2.403 3.432	2.222 3.944	0.016	(0.632)	0.528	(0.056)	0.948

	Non-SIP SOEs	Median Mean	8.118 14.081	2.888 6.343	-2.088	(-7.225)***	0.000	(-4.561)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-4.705 (-9.987)*** 0.000	-0.682 (-3.340)*** 0.001	3.992	(7.436)***	0.000	(4.449)***	0.000
Sales /Employees	SIP SOEs	Median Mean	24.264 33.243	43.318 63.712	16.095	(11.836)***	0.000	(9.968)***	0.000
	Non-SIP SOEs	Median Mean	82.917 184.140	41.985 79.680	0.290	(-4.253)***	0.000	(-0.169)	0.846
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-39.205 (-9.940)*** 0.000	-3.133 (-1.395) 0.163	42.686	(8.612)***	0.000	(4.899)***	0.000
EBIT /Employees	SIP SOEs	Median Mean	3.248 4.373	3.194 5.373	0.025	(1.210)	0.227	(0.169)	0.846
	Non-SIP SOEs	Median Mean	9.387 16.146	3.722 7.671	-2.236	(-6.967)***	0.000	(-4.224)***	0.000
	Difference (= SIP – Non-SIP) Wilcoxon Z P-value	Median	-5.296 (-9.594)*** 0.000	-0.861 (-2.744)*** 0.006	4.589	(7.396)***	0.000	(3.773)***	0.000

Table 3: Performance improvements for comparable listed PO firms and comparable unlisted PO firms after the SIP

This table compares performance for 248 comparable listed PO firms and comparable unlisted PO firms before and after the SIP. Real sales and real net profits are sales revenues and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

Variable	Sample	Median /mean	3 Years Before SIP	3 Years After SIP	Difference= (After – Before)	Wilcoxon		(+/-) Proportion Z-test	
						Z-value	P-value	Z-value	P-value
Real Sales	Listed PO firms	Median Mean	0.727 0.776	1.428 1.509	0.762	(11.021)***	0.000	(10.981)***	0.000
	Unlisted PO firms	Median Mean	0.809 1.136	1.215 1.386	0.344	(7.968)***	0.000	(7.828)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-0.109 (-4.607)** 0.000	0.262 (4.428)*** 0.000	0.378	(5.797)***	0.000	(4.224)***	0.000
Real Net Profits	Listed PO firms	Median Mean	0.786 0.869	0.881 0.541	0.143	(1.680)*	0.093	(2.421)***	0.005
	Unlisted PO firms	Median Mean	0.880 5.920	1.006 3.721	0.197	(2.790)***	0.005	(3.323)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-0.133 (-4.522)*** 0.000	-0.318 (-4.082)*** 0.000	-0.270	(-1.078)	0.282	(-0.507)	0.560
Capital Expenditure /Total Assets	Listed PO firms	Median Mean	0.051 0.098	0.083 0.088	0.024	(0.548)	0.584	(1.520)*	0.079
	Unlisted PO firms	Median Mean	0.022 0.061	0.005 0.022	-0.006	(-1.554)	0.120	(-2.759)***	0.001
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	0.040 (4.558)*** 0.000	0.081 (9.356)*** 0.000	0.036	(2.409)**	0.016	(0.394)	0.650
Capital Expenditure /Sales	Listed PO firms	Median Mean	0.068 0.121	0.144 0.162	0.057	(4.053)***	0.000	(3.773)***	0.000
	Unlisted PO firms	Median Mean	0.010 0.043	0.006 0.043	0.000	(-0.343)	0.732	(-1.971)***	0.023
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	0.047 (4.886)*** 0.000	0.117 (7.937)*** 0.000	0.081	(3.214)**	0.001	(0.619)	0.476

ROA	Listed PO firms	Median Mean	0.089 0.096	0.034 0.030	-0.054	(-12.968)***	0.000	(-12.333)***	0.000
	Unlisted PO firms	Median Mean	0.098 0.124	0.085 0.094	-0.019	(-5.700)***	0.000	(-5.688)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-0.012 (-3.663)*** 0.000	-0.062 (-9.312)*** 0.000	-0.035	(-5.841)***	0.000	(-5.575)***	0.000
ROE	Listed PO firms	Median Mean	0.225 0.233	0.066 0.042	-0.161	(-13.346)***	0.000	(-13.346)***	0.000
	Unlisted PO firms	Median Mean	0.207 0.257	0.171 0.183	-0.038	(-6.797)***	0.000	(-6.701)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	0.000 (0.040) 0.968	-0.111 (-9.702)*** 0.000	-0.141	(-8.478)***	0.000	(-5.575)***	0.000
ROS	Listed PO firms	Median Mean	0.110 0.118	0.057 0.022	-0.047 -	(-11.744)***	0.000	(-9.968)***	0.000
	Unlisted PO firms	Median Mean	0.111 0.257	0.081 0.183	-0.027	(-8.009)***	0.000	(-7.490)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	0.000 (0.779) 0.437	-0.026 (-5.553)*** 0.000	-0.026	(-5.573)***	0.000	(-5.350)***	0.000
EBIT/Sales	Listed PO firms	Median Mean	0.135 0.149	0.075 0.042	-0.060	(-11.557)***	0.000	(-10.418)***	0.000
	Unlisted PO firms	Median Mean	0.123 0.134	0.103 0.095	-0.031	(-7.006)***	0.000	(-5.012)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	0.013 (8.767)*** 0.000	-0.026 (-4.340)*** 0.000	-0.038	(-6.350)***	0.000	(-5.462)***	0.006
Turnover	Listed PO firms	Median Mean	0.793 0.884	0.596 0.604	-0.243	(-12.239)***	0.000	(-10.531)***	0.000
	Unlisted PO firms	Median Mean	0.899 1.118	1.079 1.119	0.075	(1.719)*	0.086	(1.633)*	0.059
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-0.054 (-3.881)*** 0.000	-0.451 (-10.324)*** 0.000	-0.307	(-7.749)***	0.000	(-6.701)***	0.000
Net Incomes /Employees	Listed PO firms	Median Mean	3.048 4.175	2.032 3.952	-0.211	(-3.176)***	0.001	(-1.971)**	0.023

	Unlisted PO firms	Median Mean	12.509 17.351	4.216 7.812	-2.697	(-6.371)***	0.000	(-3.773)***	0.000
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-10.698 (-10.847)*** 0.000	-2.101 (-6.271)*** 0.000	3.576	(5.871)***	0.000	(2.309)***	0.007
Sales /Employees	Listed PO firms	Median Mean	27.789 40.149	39.524 62.769	11.942	(9.663)***	0.000	(7.715)***	0.000
	Unlisted PO firms	Median Mean	138.402 237.458	58.934 93.424	-0.232	(-4.657)***	0.000	(-0.282)	0.746
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-97.621 (-10.821)*** 0.000	-9.645 (-4.917)*** 0.000	38.400	(7.282)***	0.000	(3.548)***	0.000
EBIT /Employees	Listed PO firms	Median Mean	3.748 5.148	2.626 5.007	-0.275	(-2.865)***	0.004	(-2.534)***	0.003
	Unlisted PO firms	Median Mean	16.030 19.804	5.313 9.329	-2.621	(-5.924)***	0.000	(-2.647)***	0.002
	Difference (= Listed – Unlisted) Wilcoxon Z P-value	Median	-10.619 (-10.589)*** 0.000	-2.458 (-5.907)** 0.000	3.379	(5.639)***	0.000	(2.647)***	0.002

Table 4: Effects of Privatization on Performance

This table reports median improvement in performance that arises from SIP (DD_{SOEs}^{SIP}), from going public ($DD_{POs}^{Listing}$), and from privatization (DDD) for 248 SIPs when we use -/+ 30% as our primary matching criteria to identify their comparable SOEs and PO firms. Real sales and real net profits are sales revenues and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

Variable	DD_{SOEs}^{SIP}	$DD_{POs}^{Listing}$	**DDD**
Real Sales	0.327 (6.838)***	0.378 (5.797)***	-0.084 (-0.111)
Real Net Profits	0.178 (1.955)*	-0.270 (-1.078)	0.163 (1.834)*
Capital Expenditure/Total Assets	0.024 (2.827)***	0.036 (2.409)**	0.004 (0.634)
Capital Expenditure/Sales	0.116 (5.206)***	0.081 (3.214)***	0.054 (2.291)**
ROA	-0.025 (-5.678)***	-0.035 (-5.841)***	0.011 (1.405)
ROE	-0.086 (-7.440)***	-0.141 (-8.478)***	0.040 (2.348)**
ROS	-0.009 (-2.240)**	-0.026 (-5.573)***	0.017 (2.017)**
EBIT/Sales	-0.014 (-3.004)***	-0.038 (-6.305)***	0.029 (2.572)***
Turnover	-0.219 (-7.143)***	-0.307 (-7.749)***	0.053 (1.442)
Net Incomes/Employees	3.992 (7.436)***	3.576 (5.871)***	-0.212 (-0.545)
Sales/Employees	42.686 (8.612)***	38.400 (7.282)***	-4.164 (-1.043)
EBIT/Employees	4.589 (7.396)***	3.379 (5.639)***	0.6298 (0.155)

Table 5: Robustness checks using alternative matching specifications

This table reports median improvement in performance that arises from SIP (DD_{SOEs}^{SIP}), from going public ($DD_{POs}^{Listing}$), and from privatization (DDD) for 142 SIPs, 248 SIPs and 261 SIPs, respectively when we use -/+ 20%, -/+ 30%, -/+ 40% to identify their comparable SOEs and PO firms. Real sales and real net profits are sales revenues and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

Variable	Matched by Sales and ROS -/+ 20% (142 SIPs)			Matched by Sales and ROS -/+ 30% (248 SIPs)			Matched by Sales and ROS -/+ 40% (261 SIPs)		
	DD_{SOEs}^{SIP}	$DD_{POs}^{Listing}$	**DDD**	DD_{SOEs}^{SIP}	$DD_{POs}^{Listing}$	**DDD**	DD_{SOEs}^{SIP}	$DD_{POs}^{Listing}$	**DDD**
Real Sales	0.310 (5.939)***	0.300 (4.457)***	0.115 (0.632)	0.327 (6.838)***	0.378 (5.797)***	-0.084 (-0.111)	0.281 (6.193)***	0.354 (6.730)***	-0.014 (0.209)
Real Net Profits	0.349 (2.895)***	0.090 (1.005)	0.425 (1.025)	0.178 (1.955)*	-0.270 (-1.078)	0.163 (1.834)*	0.143 (1.839)*	-0.304 (-0.739)	0.365 (2.619)***
Capital Expenditure/Total Assets	0.060 (3.690)***	0.036 (2.430)**	0.031 (1.705)*	0.024 (2.827)***	0.036 (2.409)**	0.004 (0.634)	0.027 (3.358)***	0.036 (3.136)***	0.007 (0.085)
Capital Expenditure/Sales	0.123 (4.617)***	0.067 (3.153)***	0.079 (2.312)**	0.116 (5.206)***	0.081 (3.214)***	0.054 (2.291)**	0.124 (6.423)***	0.074 (4.232)**	0.064 (2.422)**
ROA	-0.022 (-4.267)***	-0.024 (-3.711)***	0.011 (0.618)	-0.025 (-5.678)***	-0.035 (-5.841)***	0.011 (1.405)	-0.028 (-7.171)***	-0.035 (-5.156)***	0.002 (0.009)
ROE	-0.082 (-5.864)***	-0.093 (-5.402)***	0.024 (0.056)	-0.086 (-7.440)***	-0.141 (-8.478)***	0.040 (2.348)**	-0.106 (-8.622)***	-0.146 (-7.115)***	0.025 (0.995)
ROS	-0.006 (-0.995)	-0.020 (-2.712)***	0.014 (1.820)*	-0.009 (-2.240)**	-0.026 (-5.573)***	0.017 (2.017)***	-0.014 (-2.904)***	-0.032 (-6.367)***	0.022 (2.354)**
EBIT/Sales	-0.017 (-1.553)	-0.037 (-3.821)***	0.031 (2.343)**	-0.014 (-3.004)***	-0.038 (-6.305)***	0.029 (2.572)***	-0.018 (-3.731)***	-0.046 (-7.525)***	0.033 (3.288)***
Turnover	-0.202 (-4.862)***	-0.329 (-6.106)***	0.069 (1.765)*	-0.219 (-7.143)***	-0.307 (-7.749)***	0.053 (1.442)	-0.293 (-9.329)***	-0.264 (-6.506)***	-0.070 (-1.880)*
Net Incomes/Employees	1.969 (4.687)***	2.491 (3.701)***	0.438 (0.057)	3.992 (7.436)***	3.576 (5.871)***	-0.212 (-0.545)	4.098 (7.729)***	3.343 (6.390)***	0.511 (0.751)
Sales/Employees	20.282 (5.202)***	11.791 (4.013)***	3.245 (0.544)	42.686 (8.612)***	38.400 (7.282)***	-4.164 (-1.043)	39.640 (8.815)***	29.985 (8.411)***	-10.432 (-2.713)***
EBIT/Employees	2.569 (4.706)***	2.401 (3.496)***	0.591 (0.386)	4.589 (7.396)***	3.379 (5.639)***	0.630 (0.155)	4.535 (7.719)***	3.251 (6.136)***	1.071 (0.272)

Table 6: Regression results for multivariate analysis

This table report regression results for the listing effect and the privatization effect. The dependent variables are measures for profitability and efficiency, including ROA, ROE, ROS, EBIT/Sales, Net Incomes/Employees, Sales/Employees, and EBIT/Employees. ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Employees is the number of employees for the corresponding firm; D_SO is a dummy for SOEs, equal to 1 if a firm is an SOE firm and 0 otherwise; D_List is a dummy variable, equal to 1 if a firm is listed and 0 otherwise. Control variables include the logarithm of sales revenues before the SIP year (Pre_LogSales,) the ROS before the SIP year (Pre_LogSales), sales growth before the SIP year (Pre_GROWTH), capital expenditure before the SIP year (Pre_CAPINV is), and firm age (Age). *t* values reported in the parentheses are estimated using White's (1980) heteroskedasticity-consistent standard errors. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

	Dependent Variables						
Variable	**ROA**	**ROE**	**ROS**	**EBIT/Sales**	**Net Incomes /Employees**	**Sales/Employees**	**EBIT/Employees**
D_SO	0.008 (1.313)	0.027 (1.349)	0.000 (0.023)	-0.006 (-0.412)	0.915 (0.831)	22.459 (1.443)	0.951 (0.743)
D_Listing	-0.035 (-6.050)***	-0.108 (-5.573)***	-0.059 (-4.639)***	-0.072 (-5.497)***	9.354 (8.739)***	165.359 (10.937)***	10.290 (8.280)***
D_SO*D_Listing	0.003 (0.424)	0.014 (0.517)	0.028 (1.601)	0.034 (1.867)*	-0.163 (-0.109)	-16.504 (-0.778)	0.225 (0.129)
Controls Observations Adjusted R^2	YES 992 0.160	YES 992 0.129	YES 992 0.066	YES 992 0.080	YES 992 0.182	YES 992 0.230	YES 992 0.177

Table 7: Propensity score matching

This table reports median improvement in performance that arises from SIP (DD_{SOEs}^{SIP}), from going public ($DD_{POs}^{Listing}$), and from privatization (DDD) for 320 SIPs respectively when we use propensity scores to identify their comparable SOEs and PO firms. Real assets, real sales, real net profits are book assets, sales revenues, and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Leverage is measured as total liabilities over total assets; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10% respectively.

Variable	DD_{SOEs}^{SIP}	$DD_{POs}^{Listing}$	**DDD**
Real Sales	0.385 (8.402)***	-0.161 (-4.427)***	0.614 (8.854)***
Real Net Profits	0.212 (2.158)**	-0.690 (-4.276)***	0.498 (3.578)***
Capital Expenditure/Total Assets	0.049 (5.254)***	0.011 (2.560)***	0.045 (2.918)***
Capital Expenditure/Sales	0.116 (7.763)***	0.029 (1.427)	0.196 (6.983)***
ROA	-0.034 (-9.068)***	-0.074 (-12.788)***	0.037 (5.990)***
ROE	-0.095 (-9.815)***	-0.175 (-8.770)***	0.111 (4.472)***
ROS	-0.020 (-3.584)***	-0.087 (-9.813)***	0.065 (7.067)***
EBIT/Sales	-0.030 (-4.203)***	-0.102 (-10.698)***	0.076 (7.367)***
Turnover	-0.230 (-10.099)***	-0.416 (-13.458)***	0.202 (5.994)***
Net Incomes/Employees	3.352 (8.204)***	-0.816 (2.172)**	4.031 (1.770)*
Sales/Employees	82.759 (11.228)***	9.229 (4.390)***	32.283 (3.706)***
EBIT/Employees	4.212 (8.261)***	-0.722 (2.868)***	4.794 (1.998)**

Table 8: Performance improvements for privatized and their non-privatized comparables

This table compares performance for 3,702 privatized unlisted SOEs that their fraction of state ownership reduces from above 50% to below 50%, and their non-privatized comparables three years before and after the privatization. Real sales and real net profits are sales revenues and net incomes adjusted with annual inflation rate; ROA, ROE, ROS are net incomes deflated by total assets, total equities, and sales, respectively; EBIT/Sales is defined as operating profits divided by sales; Turnover is calculated as sales over total assets; Employees is the number of employees for the corresponding firm. Wilcoxon Z-statistics are reported in the parentheses to examine if there is any significant difference in the median value of performance measures. ***, **, and * represent significance at the 1%, 5% and 10%, respectively.

Variable	Sample	Median /mean	3 Years Before SIP	3 Years After SIP	Difference= (After – Before)	Wilcoxon		(+/-) Proportion Z-test	
						Z-value	P-value	Z-value	P-value
Real Sales	Privatized unlisted SOEs	Median Mean	0.817 2.146	1.259 5.720	0.433	(35.788)***	0.000	(29.636)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.861 3.694	1.170 1.509	0.303	(26.672)***	0.000	(23.031)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	-0.048 (-6.303)*** 0.000	0.095 (9.488)*** 0.000	0.152	(11.413)***	0.000	(8.028)***	0.000
Real Net Profits	Privatized unlisted SOEs	Median Mean	0.529 -0.865	0.996 2.360	0.432	(13.229)***	0.003	(11.558)**	0.011
	Non-privatized unlisted SOEs	Median Mean	0.677 -3.127	0.874 -6.261	0.205	(5.535)***	0.000	(7.430)***	0.135
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	-0.079 (-2.361)** 0.018	0.211 (5.918)*** 0.000	0.292	(6.372)***	0.000	(4.441)***	0.000
Capital Expenditure /Total Assets	Privatized unlisted SOEs	Median Mean	-0.002 0.027	0.001 0.037	0.006	(4.854)***	0.000	(3.445)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.000 0.028	-0.002 0.013	-0.002	(-5.443)***	0.000	(-2.278)***	0.009
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	-0.006 (3.901)*** 0.000	0.007 (7.590)*** 0.000	0.017	(8.174)***	0.000	-(6.406)***	0.000
Capital Expenditure /Sales	Privatized unlisted SOEs	Median Mean	-0.004 0.035	0.000 0.033	0.005	(2.932)***	0.003	(3.075)***	0.000
	Non-privatized unlisted SOEs	Median	0.000	-0.004	-0.005	(-6.262)***	0.000	(-2.961)***	0.001

		Mean	0.047	0.008					
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	-0.010 (-3.530)*** 0.000	0.010 (6.226)*** 0.000	0.024	(6.483)***	0.000	(5.779)***	0.000
ROA	Privatized unlisted SOEs	Median Mean	0.006 0.009	0.013 0.026	0.007	(13.444)***	0.000	(10.163)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.004 0.008	0.002 0.003	-0.003	(-7.468)***	0.000	(-5.267)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.000 (2.617) 0.009	0.016 (17.086)*** 0.000	0.015	(15.865)***	0.000	(12.014)***	0.000
ROE	Privatized unlisted SOEs	Median Mean	0.021 0.013	0.047 0.063	0.017	(8.761)***	0.000	(3.189)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.016 -0.003	0.013 -0.016	-0.008	(-8.247)***	0.000	(-12.099)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.004 (6.490)*** 0.000	0.047 (14.276)*** 0.000	0.038	(10.025)***	0.000	(-1.082)	0.212
ROS	Privatized unlisted SOEs	Median Mean	0.007 -0.022	0.014 -0.005	0.006	(9.614)***	0.000	(7.032)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.007 -0.003	0.003 -0.016	-0.005	(-10.430)***	0.000	(-7.003)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.000 (1.525) 0.126	0.018 (16.042)*** 0.000	0.018	(16.075)***	0.000	(12.242)***	0.000
EBIT/Sales	Privatized unlisted SOEs	Median Mean	0.010 -0.014	0.019 0.004	0.007	(9.663)***	0.000	(6.975)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.010 -0.014	0.005 -0.053	-0.006	(-10.595)***	0.000	(-7.459)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.000 (5.140)*** 0.000	0.022 (16.134)*** 0.000	0.021	(16.010)***	0.000	(11.160)***	0.000
Turnover	Privatized unlisted SOEs	Median Mean	0.638 0.879	0.786 1.626	0.112	(21.385)***	0.000	(16.170)***	0.000

	Non-privatized unlisted SOEs	Median Mean	0.528 0.707	0.580 0.820	0.051	(13.742)***	0.000	(9.651)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.085 (12.040)*** 0.000	0.171 (15.878)*** 0.000	0.068	(8.658)***	0.000	(6.633)***	0.000
Net Incomes /Employees	Privatized unlisted SOEs	Median Mean	0.184 1.224	0.240 1.141	0.069	(4.437)***	0.000	(3.359)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.144 1.017	0.038 0.534	-0.093	(-6.323)***	0.000	(-5.922)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.005 (2.169)** 0.030	0.310 (14.918)*** 0.000	0.295	(9.025)***	0.000	(8.000)***	0.000
Sales /Employees	Privatized unlisted SOEs	Median Mean	24.817 66.943	17.625 33.577	0.251	(-11.413)***	0.000	(0.370)	0.669
	Non-privatized unlisted SOEs	Median Mean	22.101 63.808	12.238 25.494	-0.719	(-16.087)***	0.000	(-2.050)**	0.018
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.819 (4.436)*** 0.000	3.856 (15.812)*** 0.000	3.450	(9.178)***	0.000	(9.224)***	0.000
EBIT /Employees	Privatized unlisted SOEs	Median Mean	0.257 1.694	0.312 1.469	0.065	(3.762)***	0.000	(3.217)***	0.000
	Non-privatized unlisted SOEs	Median Mean	0.193 1.464	0.056 0.756	-0.106	(-6.727)***	0.000	(-6.377)***	0.000
	Difference (= privatized – Non-privatized) Wilcoxon Z P-value	Median	0.014 (3.178)*** 0.001	0.352 (15.300)*** 0.006	0.316	(9.107)***	0.000	(8.284)***	0.000