

**HONG KONG INSTITUTE FOR MONETARY RESEARCH**

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SHAREHOLDERS: ARE THE PROFITS OF CHINESE  
STATE-OWNED ENTERPRISES REAL?**

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*HKIMR Working Paper No.16/2009*

April 2009



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# Honor Thy Creditors Beforan Thy Shareholders: Are the Profits of Chinese State-Owned Enterprises Real?

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April 2009

## Abstract

The Chinese state owned enterprises (SOEs) have become quite profitable recently. As the largest shareholder, the state has not asked SOEs to pay dividends in the past. Therefore, some have suggested that the state should ask SOEs to pay dividends. Indeed, the Chinese government has adopted this policy advice and started to demand dividend payment starting from 2008. While we do not question the soundness of the dividend policy, the point we raise is whether those profits are real if all costs owned by SOEs are properly accounted for. Among other things, we are interested in investigating whether the profits of SOEs would still be as large as they claim if they were to pay a market interest rate. Using a representative sample of corporate China, we find that the costs of financing for SOEs are significantly lower than for other companies after controlling for some fundamental factors for profitability and individual firm characteristics. In addition, our estimates show that if SOEs were to pay a market interest rate, their existing profits would be entirely wiped out. Our findings suggest that SOEs are still benefiting from credit subsidies and they are not yet subject to the market interest rates. In an environment where credit rights are not fully respected, dividend policy, though important, should come second and not first.

Keywords: State Owned Enterprises, Soft Budget Constraint, Dividend Policy

JEL Classification: G32, O16, O53

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## 1. Introduction

After many years of mounting losses, the latest data seem to indicate that Chinese SOEs are finally making profits. A World Bank (2005) study claims that SOE profit margins increased from 2.7 percent in 1999 to 5.7 percent in 2005, while growth in industrial profits averaged 36 percent over the same period. The study goes on to propose that the Chinese government should make an effort to cash in its dividends, which SOEs reportedly “forget” to pay out to their main shareholder. The study argues that this would be beneficial to China’s public finance and, more importantly, it would help rein in rapid investment growth in China by imposing more discipline on SOE managers.

These results have surprised many because the general impression has been that the majority of the Chinese SOEs has low performance by international standards, as evidenced by the limited appreciation these firms obtain when listed in both the Hong Kong and the overseas financial markets (Bai, Lu, and Tao, 2006; Shan, 2006). The World Bank study also appears to have ignored the fact that SOEs have not been consistent in honoring their obligations vis-à-vis bank debts, as SOE lending was perhaps the main source of non-performing loans (NPLs) at State Owned Commercial Banks (SOCBs) (Zhou, 2004).<sup>1</sup> Therefore, one may question whether the profits are as high as reported if the costs of capital (not only including paying dividends to shareholders but also market-based interest rates to creditors) are properly accounted for. In addition, there are issues as to how much dividend the SOEs would have to pay to the government and whether the dividend policy could be at the expense of the banking sector health as long as SOCB creditor rights are not respected. Finally, continued inferior creditor right protection could significantly impair the improvement of SOCB corporate governance deriving from their diversified ownership, recently obtained with the stock exchange listings, thus leading to repeated write-offs of bad loans as experienced in some other transition economies should the economy experience a large downturn.

Indeed, before accepting the favorable interpretation put forward by the World Bank study and discussing dividend policy, one has to ask whether these SOE profits are real. Specifically, two issues need to be addressed. First, even though various analyses concur that SOE profitability has improved, the assessment is not always as rosy as in the World Bank study. OECD (2005) documents that SOE returns are significantly improving. For example, on average, in 2002-2003, total factor productivity increased by 5 per cent, delivering a return on assets (ROA) of 10 per cent, twice as large as that in 1998-1999. But the report is cautious to state that large pockets of weak SOEs remain.<sup>2</sup>

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<sup>1</sup> Throughout the paper, for simplicity, we refer to the Industrial and Commercial Bank of China, the Bank of China, and the China Construction Bank and Agricultural Bank of China as the SOCBs, though we are aware that the former three have been listed and the state is no longer the single shareholder (even if it still holds the majority).

<sup>2</sup> Specifically, the report finds: (i) Performance is best where the state controls the company through a large minority stake; or where state ownership is intermediated (i.e. at indirectly state controlled firms, with state legal person controlling shareholders); and it is worst at directly state controlled companies. (ii) While private Chinese and listed SOE companies compare quite favourably (though there is a visible bias to listing best performing SOEs), an international comparison of

Second, another aspect deserving special attention is how bank debts are treated in calculating costs. It is well known that SOEs in China are quite reluctant to pay back their loans to SOCBs. This is because the relationship between SOEs and SOCBs was politically influenced and forbearance on debt has been the rule rather than the exception (Cull and Li, 2000, 2003; Brandt and Li, 2003). These considerations raise doubts on whether the profits currently posted by China's SOEs are effectively as high as reported or they could fade away once the generally accepted accounting principles are used.

Indeed, the preferential treatment accorded by SOCBs to SOEs can be grounded neither on SOEs' returns (which, as said and as we will document, are noticeably lower than at private companies) nor on SOEs being less leveraged. Thus, it seems that SOEs do not entirely respect creditor rights.

The objectives of this paper are thus twofold. First, we want to provide a careful assessment on Chinese SOEs' profits by adjusting for realistic interest service outlays. We first estimate the interest service outlays at market rates, benchmarking them also to Chinese private enterprises. We then use these estimates to impute what would be the "realistic" costs of bank debts for SOEs and compute the revised figures for profits. The resulting adjusted profits would provide a more credible assessment of SOE performance. As we will show, in spite of this adjustment, we still find that there has been an improvement in SOE profitability over recent years.

The second issue we address is a policy one. That is, whether China's government would be better served by encouraging SOCBs to improve their lending practices rather than just cashing in SOE profits. As it stands – even after the successful stock exchange listings of the China Construction Bank, the Bank of China and the ICBC – the government is the main shareholder at both SOEs and SOCBs. As such, the government might consider that stiffening credit policies by SOCBs may be more effective than simply cashing in SOE dividends. Indeed, as finance theory postulates, shareholders should be residual claimants on firms' profits only after all creditors are duly paid. In other words, SOCBs have a priority claim on SOE profits and the government could take this opportunity to encourage SOCBs to improve their credit management vis-à-vis SOEs. More importantly, by reasserting creditor rights, this would further improve the credit culture and the market economy in general in China.

The rest of the paper proceeds as follows. Section 2 recaps the relevant literature at the heart of the debate on whether and to what extent Chinese SOEs have become profitable. Here, we also summarize the issue of policy influenced loans to induce SOCBs to keep lending on favorable terms to SOEs. Section 3 outlines the methodology we employed to build a representative sample. Section 4 is devoted to the empirical analysis by first presenting some preliminary descriptive findings and then performing our

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enterprise rates of return on assets still ranks the Chinese median firm return the lowest in a group of the worst performing OECD and non-OECD economies. (iii) Two-thirds of state held firms in the industrial sector earn less than a 5% rate of return on assets prior to payment of interest and nearly 15 percent of state controlled industrial companies trade with negative equity funds. (iv) Distressed companies now represent 7 per cent of firms, 11 per cent of workers, 23 per cent of assets, and 22 per cent of outstanding debts.

regression analysis to come up with accurate estimates of the loan rate subsidy SOEs appear to enjoy. Section 5 computes the adjusted profits for SOEs and shows that, after making SOEs pay loan rates on par with otherwise equivalent private enterprises, SOE profits are entirely wiped out on the average of the reference period. Based on these calculations, Section 6 discusses policy implications and concludes.

## 2. The Landscape of Chinese Corporate Sector and Literature Review

Since the mid-1990s, the landscape of the Chinese corporate sector has experienced significant changes. From a database of firms with annual sales of 5 million yuan maintained by the National Bureau of Statistics of China, we find that the share of private enterprises in the total number of enterprises has increased from 6.5 to 45% and the share in total value added from 2.6 to 18% from 1998 to 2005. The SOE share and its share in total value added decreased rapidly, respectively, from 39.2% to 10% and from 57% to 37.6%. An OECD (2005) study shows that, according to pre-tax returns on equity (ROE), private firms are generally more profitable than SOEs, although SOEs' profitability is also on the rise. In addition, private firms have a lower level of indebtedness (measured as a percent of their assets) and a lower debt/equity ratio as compared to state firms. Nonetheless, debt equity ratios are decreasing for both private and state owned enterprises.

Despite being more profitable, private companies continue to face difficulties in their access to bank credit. According to the same OECD study, about 41% of private enterprises have no access to credit and 56% have no access to bank credit. Smaller private enterprises are even more constrained than other firms. For private firms, the lack of collateral, together with ownership discrimination, is reported to be the major hurdles. Even though their access to bank financing is improving with a 67% increase in lending between 1998 and 2003, private companies are still financially constrained.

Public ownership in the banking and industrial sectors appears to be one of the key factors behind the fragility of Chinese banking. Two statistics are revealing. Although SOEs' contribution to the Chinese GDP was around 25%, they received about 65% of total loans (Pitsilis *et al.*, 2004). In addition, the ROA and ROE of private companies are higher than those of public enterprises (Table 1A).

Another aspect deserving special attention among the factors determining SOE profits is how bank debts are treated in calculating costs. It is well known that SOEs in China are quite reluctant to pay back their loans to SOCBs. This is because the relationship between SOEs and SOCBs was politically influenced and forbearance on debt has been the rule rather than the exception (Cull and Li, 2000, 2003; Brandt and Li, 2003). These considerations raise doubts about whether the profits currently posted by China's SOEs are effectively as high as reported or whether they could fade away once the generally accepted accounting principles are used. A simple calculation using the data published by OECD (2005) helps

exemplify this point. By taking the ratio of the interest outlays to debt outstanding, we impute the implicit interest rate companies pay to creditors. Imputed interest rates on debt are significantly lower for SOEs with respect to private companies and the difference does not disappear over the years (Table 1B).

Indeed, such preferential treatment accorded by creditors to SOEs can be grounded neither on SOEs' returns (which, as seen, are noticeably lower than at private companies) nor on SOEs being less leveraged (the debt gearing ratio measured as stock of debt over value added is visibly larger at SOEs and the difference is, if anything, increasing: Table 1B). Although requiring more careful study, this evidence seems to be consistent with the hypothesis that SOEs do not entirely respect creditors' rights.

These descriptive analyses are also confirmed by more rigorous statistical analyses. Xiao (2006), using the National Bureau of Statistics (NBS) dataset of over 20,000 large and medium-sized firms for the period between 1995 and 2002 and adjusting for firm characteristics and fundamentals, finds that despite the fall in non-performing debts of SOEs since 2000, SOEs are still much more likely to generate bad debts for the banking system than non-state enterprises. Bai, Lu, and Tao (2006) use the same database but a different sample period ranging from 1998 to 2003 to investigate whether privatization or ownership change brings about economic and social efficiency. They find that ownership reform helps increase economic efficiency in those reformed firms. Specifically, Bai *et al.* attribute the reduction of agency costs, measured by the ratio of administrative costs, to the improvement of economic efficiency. Using a different survey database with 12,400 firms in 120 Chinese cities conducted by the World Bank, Dollar and Wei (2007) also find that state-owned firms have low marginal returns to capital relative to private and foreign firms. Such efficiency losses amount to 5% of GDP if SOEs can improve financial controls and corporate governances further.

While these existing studies shed lights on SOE performance, they do not address the issue of whether the profits of SOEs are real after other costs, especially interest rate costs, are accounted for. This is the issue we shall focus in the following sections.

### 3. Data, Sampling Methodology, and Descriptive Statistics

Our data sample is obtained from a large database of the NBS that contains more than 280,000 industrial firms with annual sales of more than 500 million yuan. The NBS started to conduct a census on this category of firms in 1998 with an initial firm number of 160,000 and gradually increased to the current number. It is estimated that the firms included in this census represent about 80 percent of all industrial value-added activities among the total Chinese firms. The yearly data we use contains about 69 financial indicators including, in particular, asset, liability, revenue of major activities, profits, value-added taxes, intermediate industrial input, cash flows, debt payments, and other indicators that allow us to carry out our analysis. Given there are some major discrepancies in certain financial indicators for data before 2000,

we start our data sample from 2001 in order to avoid such problems. In addition, given that it is impossible to obtain the whole database, we use a sampling methodology to construct a representative sample to reflect the NBS database.

Our sample was constructed by following two methodological rules. First, we extracted a random component designed to make a closed sample of Chinese enterprises. Second, because of a large number of drop outs of firms resulting from enterprises' birth and disappearance and/or to M&A activity and also to statistical discontinuities by China's National Bureau of Statistics, we superimposed on the closed sample component an open sample component. The latter component was randomly extracted from the universe.

The closed sample component was built according to the following considerations and methodology. In order to respect the bounds represented by the necessity to minimize costs and time, we determined the dimension of the sample (n) on the basis of the financial resources of the research/project and of the tolerable error, with a confidence level of 95%. We obtained a sample composed of 5,497 units based on the following formula:

$$n = \frac{z^2_{\alpha/2} N}{\{[(N-1) \theta^2 / P (1-P)] + z^2_{\alpha/2}\}}$$

where n is the number selected for the sample size; z is a standardized variable with mean 0 and variance 1;  $1 - \alpha$  is the degree of trust; N is the total number of units in the population to be sampled;  $\theta$  is the allowed error size; P is the unknown proportion (which we set at 0.5).

To select the statistical units, we used a stratified random sampling method that provides greater precision and gives a better representation – of the original population – than a simple random sample of the same size. Moreover, providing greater precision, a stratified sample generally requires a smaller sample numerosity, although this advantage is achieved at the cost of more administrative and operative efforts vis-à-vis the simple random sample.

In this perspective, with reference to the 2001 data, we divided the population of 211,181 firms (N) into 14,250 strata, deriving from the combination of four stratification variables that we considered the most relevant for the aims of the research; the stratification variables are:

- Province (30 sub-strata);
- Ownership (5 sub-strata: SOE; Cooperatives; Private Enterprises; Enterprises with Capital from Hong Kong and/or Macau and/or Taiwan; Foreign Owned Enterprises);

- SITC Sectors (19 sub-strata);
- Size of employment (5 sub-strata: 0-99 Employees; 100-299 Employees; 300-499 Employees; 500-999 Employees; > 1000 Employees).

On the basis of these stratification variables, starting from the distribution of the population of the firms (N), we defined the sample design following the technique of the proportional to size allocation. According to this method, the frequencies of the statistical units in each stratum of the stratified sample are proportional to those of the stratified population. In other words, with proportional stratification, the sample size of each stratum is proportional to the population size of the stratum and this means that each stratum has the same sampling fraction. This technique is based on the assumption that selection costs and variances are about equal across strata.<sup>3</sup>

To overtake the practical problem of the proportional selection from the population strata containing a low number of firms, we introduced a cut-off value that excludes from the selection all the cells with a frequency less than 14 units (that means the 0.008% of the population). The allocation of the 5,497 units of the sample among the strata is shown in Table 1.<sup>4</sup> The final sample (n) is formed by summing the random samples obtained from each stratum. Finally, since our research question regards the specificity of SOEs, we oversampled SOEs within each stratum.

The open sample component was then added to the observations extracted to form the closed sample. The superimposition of this additional component should also help minimize our sampling error.

The composition of the total sample by ownership class is described in Table A in Appendix I. The second column reports the percentage shares in the a priori base closed sample while the third column shows the shares in the a priori total sample, i.e. after oversampling SOEs and after superimposing the open sample component. Columns 4 to 8 report the actual shares in the ex post total sample. It is possible to notice that the ex post shares are reasonably close to the a priori ones. Only the SOEs are slightly under represented. Finally, the numerosity of the sample is on average near that of the a priori desired number, however observations in year 2004 (2005) are somewhat undersampled (oversampled).

## 4. Empirical Analysis

Our empirical analysis hinges on estimating the costs of debt for SOEs and comparing them to what we found for the other ownership classes, particularly for private enterprises. We construct two different proxies to measure the costs of debt:

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<sup>3</sup> The advantages of proportionate stratification are the following: i) it provides equal or better precision than a simple random sample of the same size; ii) the gains in precision are greatest when values within strata are homogeneous; iii) the gains in precision accrue to all survey measures.

$$\text{intrate}_{it} = \text{intpay}_{it} / \text{totdebt}_{it} \quad (1)$$

$$\text{intrate1}_{it} = \text{fincost}_{it} / \text{totdebt}_{it} \quad (2)$$

where  $\text{intpay}_{it}$  is the interest payment for firm  $i$  in year  $t$ ;  $\text{totdebt}_{it}$  is the total debt for firm  $i$  outstanding at the end of year  $t$ ; and  $\text{fincost}_{it}$  is the total financial costs for firm  $i$  in year  $t$ .

Even though the proxy in equation (1) is, strictly speaking, the appropriate measure of the interest rate, the proxy in equation (2) may be a better measure of the total costs of debt because it also includes non-interest costs. For our purposes, it makes sense to consider both proxies.

Before moving to the econometric analysis, we present some descriptive evidence on the two proxies and on other basic performance measures. According to our interest, all of these measures are broken down by ownership class.

#### 4.1 Descriptive Statistics

The perception that SOEs pay lower rates is confirmed at the descriptive level. This is true irrespective of whether we consider  $\text{intrate}$  or  $\text{intrate1}$ . The average data for  $\text{intrate}$  are reported in Table 2A, while those for  $\text{intrate1}$  are shown in Table 2B.

With respect to  $\text{intrate}$ , on the average of 2001-2005, SOEs pay 133 basis points less than the total sample average. The SOE gap amounts to 265 basis points with respect to cooperative enterprises and to 198 basis points vis-à-vis private enterprises. However,  $\text{intrate}$  for SOEs does not seem to differ significantly from two other special classes of enterprises, those with ownership located in Hong Kong, Macau and Taiwan, and those with ownership located out of greater China. It is worth pointing out that the difference favorable to SOEs decreases somewhat comparing the sub-period of 2001-03 and that of 2004-05. In the former sub-period the gap vis-à-vis private enterprises is 223 basis points, while SOEs pay 31 and 16 basis points less than, respectively, the Hong Kong-Macau-Taiwan firms and the foreign ones. In the sub-period of 2004-05, the gap shrinks to 159 basis points vis-à-vis private enterprises, while SOEs pay 47 and 50 basis points more than, respectively, the Hong Kong-Macau-Taiwan firms and the foreign ones. It is also worth remarking that, though somewhat decreasing as time passes, the lower costs of debt for SOEs – especially with respect to private firms – is systematic across the years.

We reach similar results after examining  $\text{intrate1}$ . With respect to the entire period, SOEs pay 157 basis points less than the average company, 225 basis points less than private enterprises, 4 basis points less than Hong Kong-Macau-Taiwan companies, and 75 basis points less than foreign capital firms. Note that

<sup>4</sup> The number of observations within each stratum  $N_h$  is known, and  $N = N_1 + N_2 + N_3 + \dots + N_{H-1} + N_H$ .

the gap in favor of SOEs does not reduce visibly over time. In the sub-period 2001-03 it amounts to 159 basis points vis-à-vis the sample average, 234 basis points compared to private firms, 5 basis points vis-à-vis Hong Kong-Macau-Taiwan companies and 70 basis points compared to foreign capital firms. In the sub-period 2004-05 the gap amounts to 152 basis points against the sample average, 211 vis-à-vis private firms, 29 basis points compared to Hong Kong-Macau-Taiwan companies, and 83 basis points vis-à-vis foreign capital firms.

The low costs of debt for SOEs seem to be neither justified on the grounds of better profitability nor on the basis of lower leverage, where both variables affect – negatively the former, positively the latter – the probability of default. The basic measure of profitability we consider is returns on assets (ROA), given by the ratio of total profits to total assets. From Table 3A, we notice that average ROA increases by approximately 1 percentage point – from 6.26% in 2001-03 to 7.24% in 2004-05 – while reaching 6.66% on average, a relatively low value by international standards. However, profitability varies noticeably across ownership classes from the highest levels reached by private firms (9.23% and increasing between the two sub-periods) and cooperative enterprises (10.88%), to the intermediate values for Hong Kong-Macau-Taiwan companies (3.70% and slightly decreasing between the two sub-periods) and foreign capital firms (5.82% and stable), to the minimum of SOEs which record persistently negative levels (-1.23% for the entire period, worsening from -1.05 to -1.54% across the two sub-periods). Nevertheless, judging the SOE sector performance on this per capita level would be misleading if, as it happens, the improvement in performance is achieved mostly by the larger SOEs.

To be sure, we should remark that if we use weighted average, the ROA for SOEs is no longer negative: it is 0.92% over 2001-05 and, even though remaining well below those for the other ownership classes, shows some improvement from 0.77% in 2001-03 to 1.14% in 2004-05 (Table 3B).

Table 3C reports the leverage ratio, defined as the ratio of total debts over total liabilities. The sample average suggests that leverage increases only slightly from 59.46 in 2001-03 to 59.93% in 2004-05 and it is 59.65% over the entire period, a relatively high value by international standards. In addition, leverage is systematically higher for SOEs and has increased over the years. Foreign funded firms have the lowest leverage at 52.59% and stable, followed by the Hong Kong-Macau-Taiwan companies (55.13% with an increase from 54.49 to 56.16% across the two sub-periods), private firms (60.25% and stable), and cooperative enterprises (60.86% and decreasing), and SOEs (68.49% for the entire period, worsening from 67.68 to 69.64% between the two sub-periods).

Obviously, the low costs of debt for SOEs might be explained by other factors. For instance, a major expected difference between the SOEs and private enterprises is asset size, whereby creditors might grant lower borrowing rates to SOEs since their large asset size can be utilized for collateral and makes them less likely to default. Indeed, asset size differs noticeably across ownership classes (Table 4A). Typically, SOEs are more than twice as large as foreign owned firms, almost four times as large as

enterprises receiving capital from Hong Kong-Macau-Taiwan, and more than ten times as large as cooperatives or private firms.

The number of employees may be another indicator. As shown in Table 4B, against the overall average number of 208 per-firm employees, SOEs are twice as high as the average (453), while Hong Kong-Macau-Taiwan and foreign funded companies are in the intermediate ranking (with, respectively, 306 and 273 employees) and cooperatives (144 employees) and private enterprises (114 employees) are placed at the bottom of the ladder.

Indeed, the data confirm that the costs of debt are noticeably lower as firm size increases. Table 4C reports the interest rates according to our two definitions. The drop in the costs of debt is particularly visible as firm size moves beyond 85 employees, the median value in the sample.

Another consideration is industrial sector. SOEs are traditionally concentrated in sectors that may require economies of scale as a natural monopoly. Specialization in these sectors might also induce lenders to perceive lower probabilities of default for SOEs. Indeed, as shown in Table 5, the degree of over-representation of SOEs is largest in Tap water production and supply and in Electric power, steam, and hot water. The two sectors count about one third of the total SOEs in our sample and it is worth noting that the cost of debt in these two sectors – being respectively, 2.76 and 2.94% – is by far below the average (3.88%).

Finally, the costs of debt may also vary across provinces where, at times, the level of economic development is low, the degree of privatization is small, the industrial structure is highly concentrated in heavy or resource oriented industries, and foreign presence is minimal. As shown in Table 6, SOEs are at least twice as represented with respect to the overall sample in 17 provinces, in decreasing order: Xizang, Qinghai, Xinjiang, Shaanxi, Gansu, Heilongjiang, Guangxi, Guizhou, Jilin, Shanxi, Beijing City, Yunnan, Jiangxi, Tianjin, Liaoning, Hunan and Nei Mongol, mostly in the Western and Northeastern heavy industry hinterland. It is important to highlight that in 13 of these 17 provinces the average cost of debt is below – often much below – the national average.

While these simple statistical analyses may be revealing, an econometric framework is still required to show whether this is indeed the case empirically. Specifically, we need to control for profitability, asset size, firm size, industrial sector, and the location of each enterprise. We turn to the empirical framework in the following sub-section.

## 4.2 Econometric Results

In line with the discussion above, the regressions we estimate have the following form:

$$y_{it} = \alpha + \beta_1 \text{SOE}_{it} + \beta_2 \text{COOP}_{it} + \beta_3 \text{HKMTW}_{it} + \beta_4 \text{FORK}_{it} + \beta_5 \text{SECTOR}_{it} + \beta_6 \text{PROVINCE}_{it} + \beta_7 X_{it} + \varepsilon_{it} \quad (3)$$

where the dependent variable  $y_{it}$  will alternatively be  $\text{intrate}_{it}$  or  $\text{intrate1}_{it}$ ; SOE, COOP, HKMTW and FORK are dummies taking the value 1, respectively, for SOEs, cooperatives, companies owned from Hong Kong-Macau-Taiwan, and enterprises with ownership out of greater China, and taking the value 0 otherwise. Here the omitted variable is PRIV, the dummy for private enterprises. SECTOR is a vector of 0-1 sectoral dummies and PROVINCE is a vector of 0-1 locational dummies. Here, several insignificant sectors (provinces) are omitted.  $X_{it}$  is a vector of variables that control for economic fundamentals that may affect the costs of debt. These variables include asset size or employment size, and history of the enterprise.<sup>5</sup> Index  $i$  refers to the firm, while  $t$  runs from 2001 to 2005 for the estimation on the entire sample, from 2001 to 2003 for the estimation on the first sub-sample and from 2004 to 2005 for the estimation on the second sub-sample.

We ran three panel regressions – similarly for  $\text{intrate}$  and  $\text{intrate1}$  – with the first one estimated over the entire period 2001-05, the second focusing on the earlier sub-period 2001-03, and the third estimated over the later sub-period 2004-05. All estimates were performed using a generalized least squares panel specification with random effects and robust standard errors. The choice of the random effects estimation must be justified since if we were to adopt it for a sample which should instead be estimated via fixed effects our estimates would be inconsistent. Our choice is motivated by three considerations. Firstly, the number of observations in the sample for each year is rather large (the minimum is 5597, in 2004, while the maximum of 9276 is reached in 2005). Secondly, under the alternative fixed effects specification regressors other than the constant term showed generally insignificant and the fit of the model was really poor. Thirdly, the Hausman test often suggested that the fixed effects model should be rejected.<sup>6</sup>

The results for  $\text{intrate}$  – for simplicity, reported in Table 7 only for all the independent variables excluding province and sector dummies – confirm our expectations. Larger enterprises have lower costs of debt. In addition, as regards ownership, even after controlling for size, location and productive specialization,

<sup>5</sup> We also attempted specifications by including profitability (ROE and ROA) and leverage but the results turned out to be the “wrong” sign, i.e. negative on profitability and positive on leverage. This would seem to imply a soft budget constraint whereby creditors are enforcing higher payments on enterprises that can afford them. While postponing further analysis to future work, for the moment, we decided to discard these performance variables.

<sup>6</sup> As the values of the Hausman tests reported in the tables will show, rejection was achieved at rather comfortable confidence levels for  $\text{intrate}$  regressions. This was not the case for the  $\text{intrate1}$  regressions where the Hausman test suggested rejection of the fixed effects model at a comfortable level for the 2001-03 sub-period but neither for the later sub-period nor for the total 2001-05 sample. Nevertheless, we opted for the random effects model also for the  $\text{intrate1}$  regressions in light of the fact that the Hausman test can be misleading when the fixed effects model has a poor fit since the matrix may not be positive definite.

SOEs, Hong Kong-Macau-Taiwan firms and foreign owned companies still pay lower loan rates vis-à-vis private companies (i.e. the omitted ownership dummy), while no significant difference is detected for the cooperatives. To be sure, the debt costs gap vis-à-vis private enterprises is largest for SOEs, intermediate for foreign owned companies and lowest for Hong Kong-Macau-Taiwan firms. The cost of debt for SOEs is lower than for otherwise equivalent private companies by 221 basis points over the entire period. While this gap decreases somewhat – by 54 basis points – between the first sub-period 2001-03 and the second one 2004-05, it runs still at 188 basis points in the later sub-period. Thus, the distortion coming from the credit market is certainly not trivial.

The results for *intrate1* – see abridged results in Table 8 – are also consistent with our a priori. Firm size implies lower interest rates while SOEs, Hong Kong-Macau-Taiwan firms and foreign owned companies enjoy a lower cost of debt with respect to private companies. Finally, here the gap vis-à-vis private enterprises is largest for SOEs, intermediate for Hong Kong-Macau-Taiwan firms and lowest for foreign owned companies. Interestingly, the results obtained for *intrate1* in terms of the dynamics of the gap – which is on average 254 basis points – show no evidence of a reduction over time, something that was instead observed for the estimates on *intrate*.

## 5. Revised SOE Profitability: An Estimate

Revised SOE profits were computed according to the following methodology. In practice, we augmented the interest payment (financial cost) variable by means of the value of the coefficients estimated in the regression. In turn, we considered two types of corrections. One applies to SOEs the interest rate estimated for private enterprises; the other applies to SOEs the interest rate estimated for foreign capital enterprises. Thus, for instance, according to the private enterprise correction, SOEs' interest payments (according to the *intpay* method) are increased for the entire 2001-05 period by 86.5% since the estimated coefficient is -0.02209 which is exactly 86.5% of SOEs' actual cost of debt (0.02552); in turn, referring to the foreign capital enterprise correction, SOEs' interest payments (according to the *intpay* method) are increased for the entire 2001-05 period by 32.0% since the coefficient estimated for the foreign capital enterprises (-0.01391) is subtracted from the coefficient estimated for the SOEs (-0.02209) thus delivering 0.00818 which is exactly 32.0% of SOEs' actual cost of debt. The same method is applied to the other sub-periods and also, *mutatis mutandis*, to *intrate1*. By doing this, we are putting SOEs on the same par with private companies or with foreign capital enterprises.

Next, we calculate the ratio of the additional interest payment (financial cost) – what SOEs should pay if they were they treated as private firms – to the observed SOEs' total profits. The results of these calculations are reported in Table 9.

According to our calculations, SOEs' profits would have been entirely wiped out if SOEs were made to pay the same interest rates as otherwise equivalent private enterprises. Over the entire sample period, the percentage of SOE profits dented by the correction to their cost of debt is 155.9 and 171.8% of profits, respectively, depending on whether we refer to *intrate* or *intrate1*. The only good news is the observation that the percentage drops significantly moving from the first sub-period 2001-03 to the second. Nevertheless, even in the second sub-period, 92.5% of the profits would be cancelled according to the *intrate* method and even more following the *intrate1* method.

If, instead of imputing private enterprise interest rates, we charge SOEs the interest rates estimated for foreign capital enterprises the drop in SOE profits is still huge. Over the entire 2001-05 period, the drop amounts to 57.7% and 112.5% according to the *intpay* and *finco* methods respectively.

## 6. Conclusions

This paper investigates whether the profits of SOEs in China are real using a dataset representative of corporate China – i.e. about 250,000 firms with annual sales over 50 million yuan – for the period of 2001 to 2005 by China's National Bureau of Statistics. Our empirical findings suggest that SOE profits might be overstated since SOEs have historically benefited from subsidized bank credit. Owing to political interference inducing State Owned Commercial Banks (SOCBs) to lend to them, SOEs were hardly disciplined by lenders. While SOE losses were the major source of SOCB NPLs, it is common knowledge that even those SOEs repaying their loans do so on favorable terms. Thus, subsidized loans to SOEs contribute to a large extent to keep SOCBs' poor profitability track record and, through that, cause repeated capital injections in the SOCBs by the government.

Within the above framework, the paper made three contributions. First, we constructed a representative sample of corporate China where SOEs are deliberately oversampled to allow more precise identification of their peculiarities vis-à-vis the other Chinese enterprises. Second, using that sample, we proved that, indeed, the cost of debt is significantly lower for SOEs, even after controlling for individual firm features. Third, we estimated that should SOEs pay the same loan rates as otherwise equivalent private enterprises, their additional interest outlays would be larger than SOE profits on average in 2001-2005 and – even though relatively decreasing – the additional interest payment would still wipe out all SOE profits over 2004-2005, the two most recent years in our sample. And even charging SOEs the same interest rates estimated for foreign capital enterprises – thus making the hardly tenable assumption that the ability/willingness to honour debt obligations is the same for the two classes of companies – the SOE profits would at least halve if not vanish.

Accordingly, it seems that safeguarding creditors' rights should be the utmost priority. This means inducing SOEs to pay market interest rates on (and to service scrupulously) their loans. Through that,

SOCB performance would greatly improve – in a way consistent with the new incentives after the stock exchange listing of three of the four SOCBs – and the state would save further recapitalization. In addition, in this case, SOE managers would undergo creditors' discipline, to which the discipline exerted by dividends could be added should profits still remain positive after adequate loan servicing.

Overall, our results suggest that strengthening creditors' rights should be the primary step in the process to complete transition to a market economy in China by bringing SOEs under more strict discipline. Dividends policy should come second and not first.

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**Table 1A. Profitability of Chinese Enterprises by Ownership**

	ROA		ROE	
	1998	2003	1998	2003
All Enterprises	6.1	12.2	3.8	12.2
State Owned Enterprises	4.8	10.2	2.0	10.2
Collective Enterprises	11.2	16.5	10.8	16.5
Private Enterprises	7.8	15.0	6.0	14.4

Source: OECD, Economic Surveys, China

**Table 1B. Imputed Interest Rates on Debt and Gearing Ratios of Enterprises by Ownership**

	1999	2000	2001	2002	2003
<b>IMPUTED INTEREST RATES ON DEBT</b>					
SOEs (a)	5.06	4.68	4.31	4.26	3.92
Private Enterprises (b)	6.44	5.83	5.65	5.49	5.23
Difference (a) - (b)	-1.38	-1.15	-1.34	-1.23	-1.31
<b>GEARING RATIOS</b>					
SOEs (c)	302.20	252.20	238.90	222.90	193.90
Private Enterprises (d)	122.70	108.00	92.00	80.10	72.70
Ratio (c) / (d)	2.46	2.34	2.60	2.78	2.67

Source: our calculations on data from OECD, Economic Surveys, China.

**Table 2A. Estimated Interest Rate by Year and Ownership – Intrate = Intpay/ Debt**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	2.46	4.94	4.84	2.89	2.98	4.13
2002	2.23	4.65	4.64	2.81	2.61	3.92
2003	2.67	5.38	4.61	2.59	2.28	3.93
2004	2.86	—	3.81	2.17	1.92	3.31
2005	2.61	10.46	4.57	2.29	2.38	3.93
2001-05	2.55	5.20	4.53	2.57	2.47	3.88
2001-03	2.46	4.96	4.69	2.77	2.62	3.99
2004-05	2.72	10.46	4.31	2.25	2.22	3.70

Note: Interest rates are calculated as the ratio of interest payments in the year to total debts outstanding at the end of the year. We excluded outlying firms with negative interest payments or with intrate > 100%.

**Table 2B. Estimated Interest Rate by Year and Ownership – Intrate1 = Fincost/ Debt**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	2.55	10.09	7.14	3.19	3.56	4.37
2002	2.66	5.79	10.76	3.34	3.41	4.18
2003	2.73	12.10	13.35	3.01	3.12	4.17
2004	2.67	—	7.12	2.49	2.60	3.57
2005	2.51	12.45	7.26	4.37	3.90	4.41
2001-05	2.62	5.96	4.87	2.76	3.37	4.19
2001-03	2.65	5.70	4.99	2.70	3.35	4.24
2004-05	2.58	12.45	4.69	2.87	3.41	4.10

Note: Interest rates are calculated as the ratio of finance costs in the year to total debts outstanding at the end of the year. We excluded outlying firms with negative finance costs or with intrate1 > 100%.

**Table 3A. ROA by Year and Ownership**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	-1.09	9.67	8.54	3.49	5.62	6.05
2002	-0.98	9.44	8.13	3.66	5.24	5.86
2003	-1.07	13.48	9.04	4.26	6.54	6.80
2004	-0.33	—	8.89	3.26	4.94	6.34
2005	-2.50	15.21	10.76	3.67	6.31	7.78
2001-05	-1.23	10.88	9.23	3.70	5.82	6.66
2001-03	-1.05	10.72	8.59	3.82	5.82	6.26
2004-05	-1.54	15.21	10.08	3.52	5.82	7.24

Note: ROA is calculated as the ratio of profits to total assets at the end of the year.

**Table 3B. Weighted ROA by Aggregated Ownership Class**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001-05	0.92	4.59	6.05	3.94	8.25	3.61
2001-03	0.77	4.50	5.46	3.91	6.55	2.95
2004-05	1.14	7.46	6.66	3.99	10.12	4.50

Note: ROA is calculated as the ratio of the sum of profits within the class to the sum of total assets within the class.

**Table 3C. Leverage Ratio by Year and Ownership**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	67.80	62.95	62.25	55.72	53.92	61.01
2002	68.61	62.12	61.05	55.91	51.84	60.18
2003	69.13	60.13	58.64	52.47	52.59	58.38
2004	72.17	—	61.45	54.76	54.54	61.34
2005	69.12	52.38	60.05	57.17	51.54	59.54
2001-05	68.49	60.86	60.25	55.13	52.59	59.65
2001-03	67.68	61.18	60.20	54.49	52.63	59.46
2004-05	69.64	52.38	60.30	56.16	52.53	59.93

Note: Leverage is calculated as the ratio of total debts to total liabilities both at the end of the year. To come up with the average values reported in the table, we excluded some outlying firms with negative debts.

**Table 4A. Asset Size (Billion CNY) by Year and Ownership Class**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	259.2	18.8	14.7	60.4	82.7	67.1
2002	237.4	19.2	16.3	62.2	83.1	63.5
2003	183.7	21.9	16.2	57.1	86.4	54.1
2004	234.7	---	16.5	53.9	78.5	63.6
2005	259.0	16.9	22.5	67.9	133.8	69.9
2001-05	234.5	20.6	17.7	61.0	96.0	63.8

**Table 4B. Firm Average Number of Employees by Year and Ownership Class**

	SOE (tot)	Coop	Private	HK-Macau-Taiwan	Foreign Capital	Total
2001	473	149	117	296	266	217
2002	476	143	118	303	264	216
2003	477	146	115	319	267	213
2004	321	---	105	288	260	179
2005	495	86	113	314	296	207
2001-05	453	144	114	306	273	208

**Table 4C. Intrate and Intrate1 by Size Class (Average Number of Employees, N)**

	N<17 [5%]	16<N<26 [10%]	25<N<48 [25%]	47<N<86 [50%]	85<N<171 [75%]	170<N<313 [90%]	312<N<493 [95%]
Intrate	4.64	4.85	4.41	4.29	3.83	3.35	2.81
Intrate1	5.08	4.70	4.78	4.68	4.07	3.71	3.18

Note: Interest rates are calculated as the ratio of interest payments (finance costs) in the year to total debts outstanding at the end of the year. To come up with the average values reported in the table, we excluded some outlying firms with negative interest payments (finance costs).

**Table 5. Distribution by Sector and Presence of SOEs**

By Sector	A PRIORI COMPOSITION OF THE TOTAL SAMPLE		EX POST COMPOSITION OF THE TOTAL SAMPLE		SOEs
		% Share		% Share	% Share
06-Coal mining and dressing		1.22		1.10	2.74
08-Ferrous metals mining and dressing		0.41		0.35	0.00
09-Nonferrous metals mining and dressing		0.17		0.08	0.00
07-Petroleum and natural gas extraction		0.00		0.00	0.00
10-Nonmetal minerals mining and dressing		0.39		0.45	0.00
11-Logging and transport of timber and bamboo		0.00		0.00	0.00
12-Fishing		---		0.00	0.02
13-Food processing		6.16		5.62	9.15
14-Food production		1.89		1.95	3.90
15-Beverage production		0.81		0.75	1.56
16-Tobacco processing		0.00		0.01	0.00
17-Textile industry		10.32		9.93	2.54
18-Garments and other fiber products		5.30		5.58	0.28
19-Leather, furs, down, and related products		2.64		2.67	0.12
20-Timber, bamboo, cane, palm fiber and straw		1.95		1.86	0.53
21-Furniture manufacturing		1.03		1.07	0.02
22-Papermaking and paper products		2.42		2.45	0.81
23-Printing and record medium reproduction		2.25		2.13	7.75
24-Cultural, educational, and sports goods		1.33		1.41	0.02
25-Petroleum processing and coking		0.39		0.41	0.00
26-Raw chemical materials and chemicals		6.52		6.34	5.23
27-Medical and pharmaceutical products		0.88		0.93	0.49
28-Chemical fiber		0.43		0.43	0.00
29-Rubber products		0.82		0.88	0.26
30-Plastic products		4.66		4.68	0.97
31-Nonmetal mineral products		7.19		6.97	7.16
32-Smelting and pressing of ferrous metals		2.15		2.02	0.26
33-Smelting and pressing of nonferrous metals		1.39		1.21	0.00
34-Metal products		5.37		5.45	1.93
35-Ordinary machinery manufacturing		7.98		7.55	7.02
36-Special purposes equipment manufacturing		4.06		3.89	4.97
37-Transport equipment manufacturing		4.44		4.35	8.18
39-Electronic equipment		5.88		3.62	1.36
40-Electric equipment and machinery		3.58		4.57	1.46
41-Electronic and telecom equipment		1.25		2.21	0.83
42-Instruments, cultural, and office machinery		1.95		1.76	0.85
43-Other manufacturing		0.06		0.87	0.32
44-Electric power, steam, and hot water		3.00		2.77	19.78
45-Gas production and supply		0.00		0.00	0.00
46-Tap water production and supply		1.93		1.68	12.23

Table 6. Distribution by Province and Presence of SOEs

By Province	A PRIORI COMPOSITION OF THE TOTAL SAMPLE		EX POST COMPOSITION OF THE TOTAL SAMPLE		SOEs
		% Share		% Share	% Share
Zhejiang		16.40		16.58	2.52
Guangdong		15.10		16.47	7.09
Jiangsu		17.00		16.47	1.64
Shandong		8.60		8.81	3.98
Shanghai City		5.80		5.99	2.09
Fujian		4.50		4.75	1.95
Liaoning		4.80		4.33	12.24
Henan		3.60		3.44	5.42
Hebei		2.80		2.97	4.75
Tianjin		2.50		2.34	6.98
Hunan		2.40		2.31	4.67
Beijing City		2.40		2.20	7.25
Sichuan		2.00		1.86	1.85
Hubei		1.70		1.60	2.88
Jiangxi		1.50		1.23	3.78
Shanxi		1.10		1.22	4.99
Anhui		1.20		1.16	0.83
Guangxi		1.00		0.95	4.53
Jilin		1.10		0.95	3.90
Heilongjiang		0.90		0.83	4.02
Guizhou		0.80		0.78	3.31
Shaanxi		0.70		0.56	3.15
Chongqing		0.50		0.52	0.04
Nei Mongol		0.50		0.48	0.97
Gansu		0.50		0.43	2.11
Yunnan		0.40		0.43	1.36
Xinjiang		0.20		0.19	1.06
Xizang		0.10		0.07	0.49
Ningxia		0.10		0.07	0.00
Qinghai		0.00		0.03	0.16

Table 7. Random Effects Panel Estimates for *Intrate*

Explanatory variables	Entire sample 2001-05	Sub-sample 2001-03	Sub-sample 2004-05
SOE	-0.02209 (-14.41***)	-0.02423 (-14.43***)	-0.01880 (-7.20***)
Coop	0.00140 (0.33)	0.00120 (0.23)	0.02838 (1.18)
HK-Macau-Taiwan	-0.01041 (-8.01***)	-0.01056 (-6.02***)	-0.01086 (-7.02***)
Foreign Capital	-0.01391 (-11.49***)	-0.01425 (-9.25***)	-0.01396 (-8.23***)
Log(employees)	-0.00407 (-7.18***)	-0.00518 (-6.95***)	-0.00304 (-4.11***)
Constant	0.05815 (20.59***)	0.06607 (17.47***)	0.04899 (13.58***)
Number of obs	20861	12788	8073
R-square between	0.0645	0.0600	0.0803
R-square overall	0.0609	0.0563	0.0775
Wald $\chi$ square	705.17***	525.28***	312.18***
Hausman test <sup>(1)</sup>	25.43 [0.1135]	12.15 [0.7334]	25.74 [0.0409]
Province dummies	YES	YES	YES
Sector dummies	YES	YES	YES

(1) The values reported in square brackets is the confidence level at which the hypothesis that the fixed effects model should be used may be accepted. Thus, in this case, the hypothesis that the fixed effects model should be used is accepted, respectively, at the 11%, 73% and 4% level.

Table 8. Random Effects Panel Estimates for *Intrate1*

Explanatory variables	Entire sample 2001-05	Sub-sample 2001-03	Sub-sample 2004-05
<b>SOE</b>	-0.02543 (-13.79***)	-0.02556 (-11.28***)	-0.02525 (-10.31***)
<b>Coop</b>	0.00082 (0.19)	0.00249 (0.42)	0.03493 (1.18)
<b>HK-Macau-Taiwan</b>	-0.01071 (-7.12***)	-0.01410 (-8.17***)	-0.00650 (-2.80***)
<b>Foreign Capital</b>	-0.00878 (-5.77***)	-0.00960 (-5.41***)	-0.00682 (-2.68***)
<b>Log(employees)</b>	-0.00404 (-6.90***)	-0.00532 (-7.23***)	-0.00311 (-3.76***)
<b>Constant</b>	0.06097 (21.20***)	0.06981 (19.03***)	0.05265 (13.10***)
<b>Number of obs</b>	26591	16122	10469
<b>R-square between</b>	0.0554	0.0522	0.0683
<b>R-square overall</b>	0.0512	0.0491	0.0629
<b>Wald <math>\chi</math> square</b>	635.46***	497.12***	290.62***
<b>Hausman test<sup>(1)</sup></b>	51.05 [0.0001]	21.40 [0.2090]	38.79 [0.0007]
<b>Province dummies</b>	YES	YES	YES
<b>Sector dummies</b>	YES	YES	YES

(1) The values reported in square brackets is the confidence level at which the hypothesis that the fixed effects model should be used may be accepted.

Table 9. Percentage of SOE Profits Dented by Applying their Private Enterprise or Foreign Capital Enterprise Interest Rates\*

Year	Private Enterprise Interest Rates		Foreign Capital Enterprise Interest Rates	
	intpay method (Intrate)	finco method (Intrate1)	intpay method (Intrate)	finco method (Intrate1)
2001-2005	155.9	171.8	57.7	112.5
2001-2003	221.7	214.8	91.3	134.2
2004-2005	92.5	127.7	23.8	93.2

(\*) Based on panel random effects estimates with robust standard errors.

## Appendix 1

We report here the a priori and ex post composition of the extracted sample.

By Ownership Class	A PRIORI COMPOSITION OF THE SAMPLE		EX POST COMPOSITION OF THE TOTAL SAMPLE				
	BASE CLOSED SAMPLE % Share	TOTAL SAMPLE % Share	2001 % Share	2002 % Share	2003 % Share	2004 % Share	2005 % Share
SOE (110+141+143+151)	9.1	16.2	15.1	14.4	13.8	15.8	11.4
Private (from 159 to 190)	64.2	59.0	54.8	56.0	57.6	59.8	62.2
Hong Kong, Macau, Taiwan (from 200 to 240)	13.1	12.0	14.6	14.2	13.8	12.1	13.1
Foreign owned (300 or larger)	13.1	12.0	13.0	13.1	13.0	12.3	13.1
Cooperatives (120+130+140+142+149)	0.5	0.8	2.6	2.3	1.8	0.0	0.2
Total	100	100	100	100	100	100	100
Total number of enterprises	5,000	7,500	6,814	7,165	7,790	5,597	9,276

## Appendix 2

We report here the full output of the regressions, including also the province and sector dummies.

*Legenda:*

PROVINCES: 11 Beijing City; 12 Tianjin; 13 Hebei; 14 Shanxi; 15 Nei Mongol; 21 Liaoning; 22 Jilin; 23 Heilongjiang;  
31 Shanghai City; 32 Jiangsu; 33 Zhejiang; 34 Anhui; 35 Fujian; 36 Jiangxi; 37 Shandong;  
41 Henan;  
42 Hubei; 43 Hunan; 44 Guangdong; 45 Guangxi; 46 Hainan; 50 Chongqing; 51 Sichuan;  
52 Guizhou;  
53 Yunnan; 54 Xizang; 61 Shaanxi; 62 Gansu; 63 Qinghai; 64 Ningxia; 65 Xinjiang.

SECTORS: 06 - Coal mining and dressing; 07 - Petroleum and natural gas extraction; 08 - Ferrous metals mining and dressing; 09 - Nonferrous metals mining and dressing; 10 - Nonmetal minerals mining and dressing; 11 - Logging and transport of timber and bamboo; 13 - Food processing; 14 - Food production; 15 - Beverage production; 16 - Tobacco processing; 17 - Textile industry; 18 - Garments and other fiber products; 19 - Leather, furs, down, and related products; 20 - Timber, bamboo, cane, palm fiber and straw; 21 - Furniture manufacturing; 22 - Papermaking and paper products; 23 - Printing and record medium reproduction; 24 - Cultural, educational, and sports goods; 25 - Petroleum processing and coking; 26 - Raw chemical materials and chemicals; 27 - Medical and pharmaceutical products; 28 - Chemical fiber; 29 - Rubber products; 30 - Plastic products; 31 - Nonmetal mineral products; 32 - Smelting and pressing of ferrous metals; 33 - Smelting and pressing of nonferrous metals; 34 - Metal products; 35 - Ordinary machinery manufacturing; 36 - Special purposes equipment manufacturing; 37 - Transport equipment manufacturing; 39 - Electronic equipment; 40 - Electric equipment and machinery; 41 - Electronic and telecom equipment; 42 - Instruments, cultural, and office machinery; 43 - Other manufacturing; 44 - Electric power, steam, and hot water; 45 - Gas production and supply; 46 - Tap water production and supply.