The Role of Chinese State-owned Enterprises in Implementing Five-Year Plans

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Extended Abstract

Running a worldwide comparison of corporations' revenues, one can observe that Chinese State-Owned Enterprises (SOEs) have never been this important. In 2022, China was the first country in terms of the number of firms in the global 500 rankings. Among the Chinese firms ranked, half of them were SOEs (the 5 largest are all SOEs). The number of Chinese firms and SOEs in the global 500 has remarkably increased over the past decade (figure 1). In 2014, Chinese SOEs belonging to the Fortune Global 500 were already generating a revenue five times higher than the other Asian SOEs in the top 500. At the same time, the economic press and literature have frequently described SOEs as a brake to Chinese development and recommended diminishing their size and their number. In this paper, we explore the role that SOEs have in the Chinese economy to provide an answer to the question "why China continues to have so many big SOEs?".

In this article, we study the role of SOEs in achieving China's economic objectives in the context of Five-Year Plans (FYP). We hypothesize that SOEs are used by the Chinese government to implement the priorities specified in the FYP, strategy documents produced by the government. SOEs are closely connected to the Chinese government, making them often an instrument to facilitate the implementation of government policy. In contrast, private sector firms are informed about the government's priorities by the FYP and are incentivized to implement these priorities. Private firms can thus choose to implement the government's industrial priorities more freely. We empirically test this hypothesis using firm-level data and information about the priorities for the manufacturing sector in the 10th FYP. Between 2000 and 2005, the Chinese government targeted industries to develop to "optimize and upgrade

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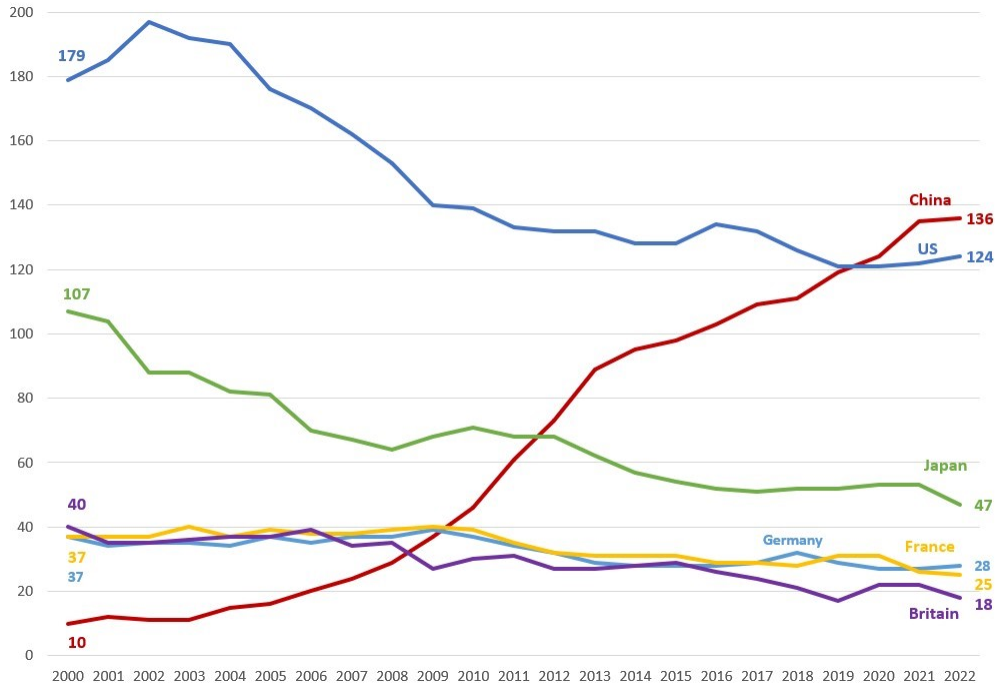[§]University of Groningen

Figure 1: Number of firms in Fortune Global 500 by country

the industrial structure"[1] of China. During this period, the targeted industries are supported through subsidies, public loans, or by tax reductions.

We use the Annual Survey of Industrial Firms (ASIF) dataset. It is collected by China's National Bureau of Statistics and goes from 1998 to 2005. It is a firm-level data including non-SOEs with nominal revenues exceeding 5 million yuan (around \$700,000) and all SOEs. The number of observations (establishments) ranges from about 165,000 in 1998 to about 269,000 in 2005. The data set includes information on the firm's industry (at the four-digit level), and financial statements including information on value-added, export revenues, capital stock, the number of employees, wage payments, ownership, age, interest payment, liabilities, taxes paid, and subsidies received.

We follow Chen et al. (2022 [1]) and use a difference-in-difference approach with high-dimensional fixed effects to study the average treatment effect. We derived two proxies for the economic goal of the 10th FYP. The first one is the productivity measured through the total factor productivity. This is derived from the "increase competitiveness" part of the goal of the $10th$ FYP. This proxy has been also used by Chen et al. who assess the effect of the same policy (but from a different perspective). The second proxy is fixed-asset. In the outline of the 10th FYP published by the CCP, it is explicitly specified that the aim is to "promote the rapid growth of investment in fixed assets". In the DID setting (equation 2) the coefficient of interest captures the effect of being a supported industry after the implementation of the 10th FYP on productivity. The DiD setting includes time and industry fixed effects and control

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[1]Source: Outline of the 10 FYP

variables. We then extend the DiD to a heterogeneity analysis with a triple interaction (equation 3). In the heterogeneity analysis, the coefficient of interest captures the difference in treatment effect between SOEs and non-SOEs. The heterogeneity analysis includes SOE linear trend, supported linear trend, and control variables. We also include an event-study analysis (equation 1)

We find that the Chinese government has relied heavily on SOEs to achieve the objective of the 10th FYP. Overall, The 10th FYP has led to an increase in fixed asset and productivity for the supported industries (figure 2 and column 1 of table 1). This increase has been higher for SOEs belonging to supported industries (column 5 of table 1). We also find evidence for spillover effects from SOEs' productivity and the private sector's productivity within the supported industry. These results thus provide evidence that SOEs are a "tool" of economic state-craft (as it was during Mao's era) for the Chinese government to implement its industrial policies.

Our paper contributes to the literature about the role of SOEs in the Chinese economy and provides a reason behind the paradox of the weight of SOEs in the Chinese and global economy. The literature has frequently criticized the weight of SOEs in the Chinese economy. Research shows that SOEs are less productive (Borensztein and Ostry, 1996 [2]; Lin et al., 1998 [3]; Yu, 2014 [4]), less innovative (Fang et al., 2017 [5]), and deeply indebted (Molnar and Lu; 2019 [6]). SOEs also prevent the expansion of the private sector (Du, Liu, Zhou, 2014 [7]), which was the root of the spectacular Chinese growth from the 80s to the first decade of the 21st century (Zhu, 2012 [8]). Even the Chinese government, since the end of the 20th century, has frequently expressed its desire to reform the economic system and establish a socialist market economy (sometimes called "state capitalism") where the State keeps the ownership but reduces its influence on SOEs' management decision [2]. Still, the literature has shown that SOEs are preserved from market competition and received favorable treatment by the state (García-Herrero and Ng, 2021 [9]). In this paper, we show that SOEs may have a political role in explaining their unconventional size.

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[2]for instance, in the 11th FYP outline, "adhere to the separation of governmental functions from enterprises, release access, introduce competition, supervise and control by law and push the reform of monopoly industry management system and property right system
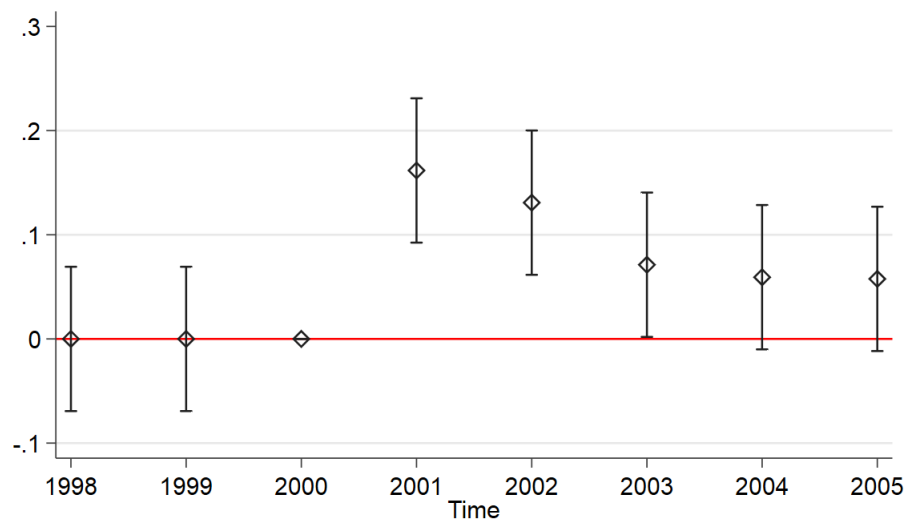
Figure 2: The effects of FYP on fixed assets of supported industries: event study results

The figure plot the result of the event study (equation 1). The log of fixed assets in the industry s at year t is the outcome variable. The outcome variable is de-trended following Goodman-Bacon (2021 [10]). The variable of interest (Supported) is a dummy equal to 1 if the industry was supported by the $10th$ FYP. The coefficients of interest trace out the changes in the relationship between the log of fixed assets and Supported across the supported industries relative to the not supported. The estimation includes time and industry fixed effects. The lines refer to 90% confidence intervals. The year 2000 is set to zero.

$$\log(\text{Fixed Asset})_{s,t} = \alpha_s + \rho_t + \sum_{m-4}^{3} \beta_m \text{Supported}_{s,t-m} + u_{s,t} \qquad (1)$$

Table 1: The effects of FYP on the productivity of supported industries and the role of SOEs: Difference-in-Differences estimation results

| | (1) | (2) | (3) | (5) |
| | DiD | DiD | DiD | h.a. |
		(Non-SOE)	(SOE)	
Supported*Post2000	0.038***	0.033***	0.063***	
	(0.007)	(0.007)	(0.017)	
Supported*Post2000*SOE				0.040**
				(0.018)
Industry FE	✓	✓	✓	
Ownership FE		✓		
Time FE	✓	✓	✓	
Ownership×Industry FE				✓
Ownership×Time FE				✓
Supported×Time FE				✓
N	2,415	2,413	2,365	4,689
R2	0.970	0.971	0.969	0.997

The three first columns present the result of a difference in difference (DiD) regression (equation 2). It is run at the industry level, the sample goes from 1998 up to 2005. We run the regression on a sample excluding entering and exciting firms. The outcome variable is the log of the total factor productivity (log(TFP)) of the industry s in year t. The coefficient of interest captures the impact of being an industry supported by the 10th FYP (supported) after the implementation of the 10th FYP (Post2000). Columns 2 and 3 present the results of the regression when it is run on SOEs and non-SOEs only respectively. Column 4 presents the output of the heterogeneity analysis (h.a, equation 3). The regression in (4) is run at the ownership-industry level. For every industry, I have 2 observations, one for SOEs and one for non-SOEs. The coefficient of interest captures the effect of a triple interaction by adding a dummy SOE ($j = 1$ if the observation is made for SOEs). The covariates include the average age of the firms and the ratio of exports to value-added by industry and by year, and the proportion of SOEs in the industry by year. FE are indicated at the bottom. SE in parenthesis, p-values: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

$$\log(\text{TFP})_{s,t} = \alpha_s + \rho_t + \beta_1(\text{Supported} \times \text{Post2000})_{s,t} + X_{s,t}\gamma + \varepsilon_{s,t} \tag{2}$$

$$\log(\text{TFP})_{s,j,t} = \beta_2(\text{Supported} \times \text{Post2000} \times \text{SOE})_{s,j,t} + X_{s,j,t}\gamma \tag{3}$$
$$+ \sigma_{s,j} + \lambda_{s,t} + \eta_{j,t} + \epsilon_{s,j,t}$$

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