Measuring the impact of privatization in Nanjing, China

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Introduction

One of the most radical interventions in the Chinese corporate sector was the decision of implementing the Shareholding Enterprise system (SHE) to improve the troubling performance of the State-Owned Enterprises (SOE). Since 1978, China embraced unsuccessfully an economic modernization process under the new government of a reformist Deng Xiaoping. The industrial SOE's, for example, accumulated losses that increased by almost nineteen-fold during the 1978 to 1996 period. During the 90s decade the strategy changed by modifying the ownership nature of the Chinese firm; the shareholding system privatized the Chinese firms by allowing private investors buy ownership by acquiring stock [1].

The present analysis aims to determine, first, whether the shareholder enterprise system contributed to the improvement of China's SOE's performance measured in profit, and second, determine if there were other significant factors explaining the possible changes over the profit. This comparison intends to discern if privatization had a significant and strong effect at improving profits or in an opposite scenario other factors (like the total assets) contributed to changing the levels of profit.

Objectives

- **Determine the impact of privatizing (SHE system) for Nanjing firms' profit:** according to Naughton [1]: "during the 1990s, a de facto policy consensus emerged in China the public SOE had to focus on profit, and radical SOE reforms were necessary". In this sense, the SHE system was the most important tool to improve the performance of the SOE because it increased the firm's liquidity by receiving funding from private resources. Furthermore, the SHE system was a mechanism that created competitiveness through a market-oriented reform: letting the inefficient companies to exit the market and allocating the resources on the most promissory firms [1].

- **Compare if there were other significant factors that contributed with the firm's profit variation:** analyzing the variation on profits due only to the privatization type could lead omitting variable biases by not considering other factors that possible were inducing an effect over firm's performance. In this sense, it is necessary to account for those factors that possibly equip firms with a comparative advantage before the treatment (privatization) was implemented; the firms better prepared with resources (size, government grants, and assets) were probably better equipped to enter in a market competition.

Hypothesis: was the reform effective to improve SOE's performance?

Firm's size, the amount of assets, and the government investment contributed to improve the Nanjing's firms standing when the privatization period occurred. The foregoing statement is based on the considerations of the 15 Politburo Standing of "letting go the small firms" for being able to consolidate those big SOE. As a result, if big firms were benefited with greater number of privileges and resources, the impact of privatization over firm's performance is endogenous due to other factors [2].

Methods

It is used a panel data analysis to understand the relationship of firm's profit over and the shareholder privatization. Simultaneously, it is tested whether other factors described in the hypothesis have a larger effect than the privatization over Nanjing's firms profit. The following description shows how the variables were coded:

- It is used a binary variable equal to the unity for those in the treatment group. In this case, the treatment is the privatization from State-owned enterprise (SOE) toward a Shareholding Enterprise (SHE). The variable $dTprivat_{it}$ takes a value of zero when the ownership is different from Shareholding, and 1 when the ownership indicates that the SHE privatization occurred.

- It was also created a time binary variable name $dtime$ that takes a value of 1 to account all the years where the privatization occurred.

- It is coded a binary variable $size_i$ that identifies if the enterprise is large by taking a value of 1 and 0 otherwise.

- It is included a covariate named $govtinvest_{it}$ for measuring the level of government investment in each firm over time.

- It is included a variable to account for the total amount of assets over for each firm, over time $totalasset_{it}$.

- It is included the DID regressor by multiplying the variables $dtime$ and the variable $dprivat$.

- Finally, each year is included in the panel regression by coding several binary variables.

A priori, the following expression synthetizes the panel regression with all the above-mentioned regressors:

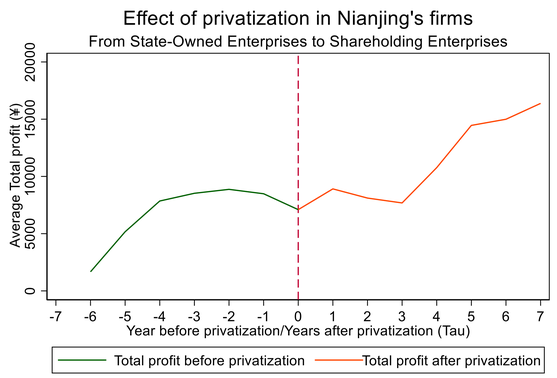
$$\boldsymbol{Total\ Profit_{it}} = \beta_0 + \beta_1 dTprivat_{it} + \beta_2 size_i + \beta_3 govinvest_{it} + \beta_4 totalinvest_{it} + \delta_0 dtime + \delta_0 dtime \times dTprivat_{it} + \delta_t + \alpha_i + u_{it}$$

Results

Shareholder privatization effect over the profit: the results of table No.1 shows that for the all the estimators (except FE), the effect of switching the ownership of Nanjing's firms (from SOE to SHE) increased the total profit in a statistically significant manner at 95% CI. However, one of the main limitation in this analysis is the binary nature of the main regressor; it is not possible to analyze this covariate using FE.

Year of treatment (time): this covariate provides some additional insight of the effect of privatization over the firm's profit. The between estimator seems to be providing a biased estimate considering the proximity between RE and FE; there is a possible correlation within firms which induces a bias in the cross-sectional estimators. Furthermore, the Pooled OLS estimator is closer to RE than to the BE, which shows that most of the variation comes from the time series component of the data. Finally, in the case of the FE estimator, once the unit-level observation endogeneity is controlled, the estimator shows that the immediate effect of the privatization reduced the profit in -2979 Renminbi .

Graph No.1

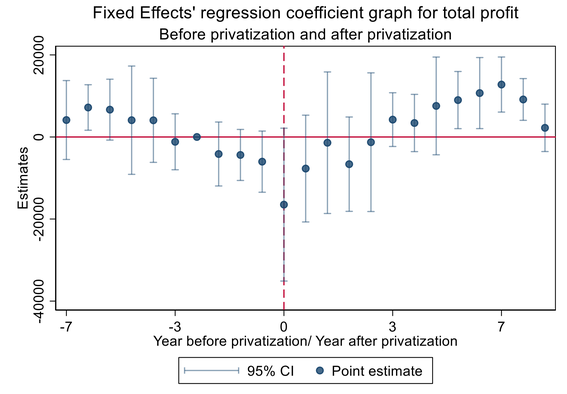


This is graph obtained through a locally weighted regression of average total profit and years before or after treatment (tau)

Table No.1

DV=Total profit	POLS	BE	RE	FE
Year of treatment (Time)	-802.4	7979.6	-2260.2	-2979.1
	(3021.5)	(6902.0)	(3149.9)	(2986.4)
Shareholder privatization (treatment)	14347.2***	27658.5***	10842.9*	0
	(5483.4)	(10100.8)	(6509.2)	(.)
Binary IV for large firm	-12127.1****	-17259.8****	-8774.3**	15815.2
	(3223.3)	(4997.5)	(4062.5)	(10008.8)
Government Investment	-0.180	-0.403	-0.133	0.0275
	(0.282)	(0.706)	(0.288)	(0.394)
Total assets	0.0288****	0.0297****	0.0280****	0.0204**
	(0.000785)	(0.00111)	(0.00103)	(0.00311)
DID (time*treatment)	8916.2	-12786.5	13375.1*	14343.4
	(6953.8)	(14813.6)	(7400.0)	(10695.3)
1995	3069.5	0	3113.9	3330.8
	(4095.6)	(.)	(3845.0)	(2708.6)
1996	-1352.2	0	-1125.7	-634.2
	(4116.4)	(.)	(3869.3)	(3178.7)
1997	-32.53	0	241.3	1059.9
	(4131.8)	(.)	(3887.9)	(5794.4)
1998	-377.5	0	51.41	756.9
	(4261.1)	(.)	(4040.4)	(4722.9)
1999	-655.5	0	9.179	1050.5
	(4398.1)	(.)	(4198.3)	(4254.9)
2000	1004.2	0	1881.8	2177.8
	(4753.7)	(.)	(4606.7)	(6235.3)
2001	-4893	0	-3938	-3603
	(4922)	(.)	(4800)	(4889)
Constant	-644.7	-4187.1	-795.7	-1856.3

Graph No.2



Results (continuation)

Total assets: this covariate shows significance in all estimators, but a low strength in the relationship with the DV (total profit). Every Renminbi of increment in the total assets increases the profit in 0.024 Renminbi for the FE estimator clustering at the firm's ID level. In other words, the level of assets of the firm did not display a strong role at increasing the profit. This makes sense with what was happening in China prior the privatization period: large firms that were subsidized by the Party were not efficient at creating profit.

DID: the coefficient of most of the regressors shows a positive association between privatizing and total profits. This measure shares certain commonalities with the other covariate's estimators: the between estimators is biased showing the opposite sign of the relationship between the DV and IV and the RE is closer to the FE showing a that there is not i.i.d. behavior in the residuals. This variable is not significant showing that there is not statistical evidence to affirm a relationship between total profit and privatization.

Binary IV for large: the FE shows a positive association between the profit and the size of the firm. It is important to notice how the FE contradicts the sign of all the other estimates indicating a possible biases due to correlations between the ai error and the covariates. Also, under the FE estimator, there is not significance which presents evidence of endogeneity at explaining how profits improved after the privatization.

Other covariates: the time covariates are not significant and their variation across estimators does not contribute to understand if there is a particular point in time creating autocorrelation. On the other hand, the government investment does not exhibit significance at any CI.

Graph #1 and Graph #2: The graph No.1 provides an important intuition of what happened historically regarding to the Chinese's SOE and their performance before and after the privatization period: the returns over the investments had a marginal decreasing behavior (green line). This is evident in the total average profit before the privatization period. Complementary, after the reform, it is easy to note the positive trend of total profits. Graph No.2 offers an interesting perspective: profits were decaying before the reform. During the year of the privatization (in the x-axis= 0) there was a large volatility in total profit judging by the extension of the whiskers in the boxplot; this is coherent because many inefficient firms were exiting the market, while other were adjusting to the SHE system. After the reform, profits were improving over time.

Conclusion

The present analysis provides an insight of how a policy intervention can improve the performance in the private sector. However, considering the significance of the treatment variable (SHE privatization) and the alternative covariates, there is not statistical evidence to affirm a causal relationship between the ownership reform or attributes of Nanjing's firms (total assets, size or government investment) over firms' profit.

References

[1] Naughton, Barry. The Chinese Economy: Transitions and Growth. MIT Press, 2007.

[2] Ma, Shu Y. "The Chinese Route to Privatization: The Evolution of the Shareholding System Option." Asian Survey, vol. 38, no. 4, Apr. 1998, pp. 379–97. DOI.org (Crossref), doi:10.1525/as.1998.38.4.01p03493.