

The Impact of Private Shareholding on Corporate Performances during China's State-Owned Enterprises Reform: Pre-analysis Plan

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1. Introduction

This project focuses on one of China's most important ongoing economic reforms - the "mixed-ownership" reform to State-owned enterprises (SOEs) and its aggregate impact on their performances. In 2015, China released a series of policy plans that aimed to reform the SOEs, introducing "mixed ownership" to the companies' financial compositions. According to Chinese President Xi Jinping, the reform was expected to "promote strengthening, improvement, and expansion of state capital, effectively prevent [the] loss of state assets, deepen the reform of [SOEs], develop a mixed-ownership economy, and cultivate globally competitive world-class firms." (CNBC, 2017) Although the state acknowledged that SOEs should be more marketized and free market spaces to encourage competition, it remained hesitant to enforce privatization for political considerations. On the contrary, the latest round of SOE reform shows that the government has given SOE firms even greater roles as China's economic growth slowed down. In this sense, the implication of mixed-ownership reform stretches beyond enhancing SOE performances, as it has the potential to demonstrate how the Communist Party will maintain the balance between commercial interests and political will.

2. Motivation and Conceptual Framework

2.1 Motivation

China's SOEs have been the prominent engine of its economic miracle, and foreseeably, they are being given even more expectations to save the economy from a seemingly inevitable downward trajectory. The degree of success mixed-ownership reform achieves is thus going to largely determine if SOEs can become reliable pillars of not only China's domestic stability but also business competitiveness abroad.

2.2 Conceptual Framework

2.2.1 State-owned Enterprises: Historical Roles

State-owned enterprises (SOEs) are viewed to be the most significant yet mysterious powerhouses in China's economic miracle over recent decades. Nearly half a century ago, the country began its drastic transformation through its reform and opening up policy. However, unlike most former socialist countries, China's state-owned sector not only managed to survive from a planned economy to a market economy but now contributes to around 30% of China's industrial output. It continues to hold resources from critical strategic industries - defense, petrol, and electricity, where SOEs remain monopolistic - to more competitive sectors including automobile and shipping (Leutert, 2016). As of end-year 2022, 99 state-owned enterprises ranked in Fortune Global 500 list, holding more than \$40 trillion in total assets.

While it is obvious that SOEs hold absolute dominance over the Chinese economy, the mechanism through which the country achieved an economic miracle with SOEs is unprecedented. Some scholars argue that SOEs contribute to the "China Puzzle": while the country's economic reform is characterized by constant government interventions and a lack of market and legal

institutions, its economic growth ranks among the top of the world (Lin et al., 2019). SOEs in China are shown to have lower performance historically than private firms because of their production inefficiency, but by holding market entry and critical resources, they have been able to invest in longer-term and capital-intensive industries such as aviation, shipping, and infrastructure. These investments have become the backbone of the Chinese growth model, generating massive social mobility and maximizing resource allocations. Therefore, the strategic importance of SOEs explains the need for the Chinese government to revitalize them, despite their inherent defects.

2.2.2 State-owned Enterprises: The Need for Structural Reforms

The Chinese government is well aware of the SOEs' underperformance and has implemented multiple rounds of SOE reforms prior to the multi-ownership model. Before the country became a market economy, SOEs were still crucial parts of China's industrial composition, but in a very different fashion. Not only were the enterprises, most of which agricultural and industrial factories, owned and operated by the state, but the government also had full rights to make production plans, appoint personnel to lead the enterprises, and collect all products and profits that were produced. Under the planned economy, the SOEs were deprived of autonomy and acted as pure executors of state orders (Lin et al., 37). Initial rounds of SOE reforms targeted these deficiencies by first, recognizing SOEs as independent entities, and then holding individual production decisions responsible by binding them with business contracts. What turned SOEs into global conglomerates, however, was a more radical approach - consolidation. By merging regional and sub-industrial companies into centralized SOEs - also called 'yangqi' - the companies are able to gradually phase out the previously inefficient and redundant functionalities (Leutert, 88). The Chinese government soon found consolidation to be politically and economically beneficial, as the

merged SOEs often gained exponential growth in assets: land, capital, and human resources, all of which helped promote their competitiveness in the global market (Leutert, 88).

In the meantime, creating larger SOEs also amplifies the financial and organizational disadvantages. While merger cases provide concrete precedents of successful SOE reforms, other central and local SOEs that either remained in the public sector or lost competitiveness increasingly suffer from a lack of resources and business incentives. While its ongoing economic reform improves market conditions, these SOEs still remain closed doors to the global economy, sometimes even domestic investors. State capital tends to be most concentrated in industries that are considered to be the ‘lifeblood’ of the national economy (China Briefing, 2019). And consequently, more SOEs appeared to suffer from operational difficulties, including factory shutdowns and huge employee layoffs. In fact, it is found that SOEs accounted for nearly 60% debt of non-financial corporations. This creates a crucial threat to the Chinese economy: as economic growth slows, structural reforms to the SOEs have become the most pressing issue for the Chinese Communist Party to alleviate severe market inefficiencies and unleash new growth opportunities.

3. Intervention

3.1 Mixed-Ownership Reform

In this study, we will propose the impacts of the mixed-ownership reform, a government-led initiative that introduces private shareholders, on the market performance of China's SOEs. In response to the aforementioned economic challenges, China released a series of policy plans that aim to reform the SOEs, introducing the idea of "mixed ownership" to the companies' financial compositions. Previously, the government had promoted other reforms, which include supply-side restructuring to curtail excess capacity, but the mixed-ownership reform was the first in years to directly touch the base of company performances in the long term. Under new regulations, private investors would be given opportunities to hold SOE stakes, buy SOE-issued convertible bonds, or swap shares between the two parties.

3.2 Theory of change

First, ownership reform is an important means to integrate the advantages of state-owned capital and private capital. From the perspective of long-term development, the comprehensive integration and utilization of current resources by enterprises represent the potential for future development of enterprises. It is difficult to achieve the strategic goal of becoming bigger, better, and stronger if relying on the company's own development. Secondly, the mixed ownership reform of state-owned enterprises is an effective path to introduce social capital and enlarge the function of state-owned capital. Through the reform of the mixed ownership of state-owned enterprises, the cooperation between state-owned capital and non-state-owned capital can be realized, the positioning of state-owned enterprises in the capital market will be clearer, and state-owned capital will play a leading and guiding role in the capital market. Healthy development injects new vitality. In addition, another impetus for the reform of mixed ownership of state-owned enterprises is to

improve the distribution of rights in state-owned enterprises and other issues. It can change the dominance of one company, allow more shareholders to participate in decision-making, and enable shareholders to supervise and restrict each other. It can also reduce the company's management costs and improve the company's internal supervision system.

3.3 Relevance

In addition to examining the effect of this ownership reform in China, the conclusions of this study can also reveal to a certain extent the sensitivity of different industries and enterprises of different natures to the ownership reform. Through cluster analysis or some visualization, we can try to discover the relationship and change trend between short-term benefits and long-term benefits of different industries and ownership reforms. The research conclusions of China's ownership reform can be used as a reference for all economies that use a planned economy or state-owned enterprises to account for the main body of the economy. The industry characteristics and changing trends can be specifically applied to the economic transformation of those industries and the reconstruction of the organizational framework. For example, to achieve the goal of carbon neutrality, the governments of various countries need to redirect the development of their own heavy industry enterprises, and the effect of this part of the ownership reform (the effect of the free market guidance) can be regarded as an early reference.

4. Measurement

4.1 Data

The data of this research comes from the CSMAR database, which contains the stock data of all companies listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange. All collected data (all required variables in the model) will form panel data spanning from 2004 to 2019. Considering that the 2020-2022 Covid-19 epidemic in China will seriously bias the analysis of policy effects, we will choose to ignore the data for these three years. The data range includes all companies listed on the two major stock exchanges, which will ensure that we have a large enough sample set to support our final conclusions. After simple processing of the data, we found that there are 2,386 companies listed on the Shanghai and Shenzhen stock exchanges with state-owned shares, of which 670 belong to the treatment group if the threshold is 0.5. The time span of the panel data is in units of year.

4.2 Hypotheses

H0: China's 2015 SOE/Ownership Reforms has no effect on company performances: $\beta_3 = 0$

H1: China's 2015 SOE/Ownership Reforms has an effect on company performances: $\beta_3 \neq 0$

Our main hypothesis is that China's 2015 Mixed-Ownership reform has no effect on aggregate firm-level performances. In the short run, introducing private shareholders can boost the companies' stock prices due to positive market sentiment and future prospects. However, whether private investment substantially reduces the gap in operating efficiency between non-state and state-controlled entities depends on a number of factors, and some long-term effects may not be reflected in the corporate performance metrics immediately. Furthermore, the fact that enterprises undergo an increase in private ownership may not be directly related to the actual amount of control

private shareholders have over the companies. The state, for example, can hold a minority position or even no shares at all in an enterprise and yet retain full control through rather indirect means (Meyer and Wu, 2014). The permissible forms and scope of investment are also questionable, and variations in these intangible aspects may further neutralize the effects of private ownership on SOE performances as well.

4.3 Methodology

Our research plans to use Difference in Difference (DID) to conduct research. The basic idea is to construct a double difference statistic reflecting the effect of the policy by comparing the difference between the control group and the treatment group before and after the implementation of the policy.

4.4 Model Specification

The model is as follows:

$$\begin{aligned} \text{CAR} = & \beta_0 + \beta_1 \times \text{post} + \beta_2 \times \text{treatment} + \beta_3 \times \text{post_treatment} + \beta_4 \times \text{SalesGrowth} + \\ & \beta_5 \times \text{LossIndicator} + \beta_6 \times \text{log_mktvalue} + \beta_7 \times \text{Change_in_EPS} + \beta_8 \times \text{Debt_to_Assets} + \beta_9 \\ & \times \text{Book_to_market} + \varepsilon \end{aligned}$$

Since the policy was promulgated in September 2015, considering the lag effect, we set the node of the post to 2016. The post is set to 1 for 2016-2019, and 0 for the rest of the years. The control group and treatment group will be classified according to whether the target enterprises have implemented the ownership reform after 2015. To this end, we designed a corresponding reform index. This index is equal to the proportion of the company's state ownership in that year divided by the status in 2015. For example, in 2015, the state-owned shareholding ratio of company A was 80%, and it was reduced to 40% in 2017. Then the index of company A in 2017 is equal to

40% divided by 80%, which is equal to 0.5. The index has been updated annually since 2016. As of 2019, when a company's reform index exceeds the threshold in any year, it will be assigned to the treatment group. The design of the threshold needs to be set in combination with specific data, such as 0.5. As long as each company's index is lower than 0.5 for one year from 2016 to 2019, we all think that the company should be classified into the treatment group. No matter what the current ownership structure is, if a company has made efforts to deepen reforms in the process, it will be reflected in the reform index, so it will be regarded as a sample that has undergone reforms.

In order to prevent endogenous problems caused by the lack of necessary control variables in the DID model, we can perform cluster analysis based on variables outside the model when selecting sample companies, and select the companies in our research according to the clustering results. This ensures that the firms in the study have no significant sample differences other than the reform index to interfere with the study's results. Since the DID model is used, we only need to pay attention to the coefficient of the interaction term in the model to get the desired net effect of the policy under the DID model.

4.5 Primary Outcome: CAR

The Cumulative Abnormal Return (CAR) of each enterprise in a specific period of time will be selected as the dependent variable as the standard to measure the actual effect of the reform. CAR of stocks is the value used to judge whether the company has changed in the event study method. Research scholars in the financial field often use the analysis framework of Event Study to study the impact of a specific event on a company's stock price or yield, and to test the financial market's response to new information disclosure. The short-term event research method relies on three basic assumptions: first, according to the efficient market hypothesis, the financial market is efficient; second, the event under study is not expected by the market; third, there is no mixed

effect of other events during the window period of event occurrence. Some other stock market indicators will be added to the model as control variables, including firm size, book-to-market ratio, debt-to-asset ratio, loss indicator, and sales growth. After performing correlation regression analysis using Stata and doing tests and adjustments such as dealing with heteroscedasticity and multicollinearity, we also plan to use a placebo to test the robustness of the model.

This study computationally designed two different regressions using the same model. The first set of regressions will ensure that each firm has only two different CAR values, one for the entire pre-treatment period and one for the entire post-treatment period. The second set of regressions has each firm have their annual CAR for each year. The first set of designs allows us to better capture the overall long-term impact of policies, while the second set focuses on observing short-term fluctuations in policy impacts. Their results will complement each other's analyses, and reduce the bias of the studies. For example, suppose that in 2018, due to the throes of reform, the overall abnormal return of the treatment group was significantly lower than that of the control group, and this situation was reversed in 2019 due to the positive effect, and this effect is expected to continue. If we only look at the overall changes before and after, it is difficult for us to think that the reform policy is effective because the CARs of the two years will cancel each other out when summed. We can detect this hidden trend only by calculating the short-term annual CAR. Another example is assuming that the policy has a strong lag effect, with no large positive effect until 2019. If we only perform regressions on the annual CAR, we are likely to conclude that the reform has no significant effect, because the treatment group and the control group of the sample before 2019 are not significantly different. While this policy effect will be significant in the regression of the first design.

It is worth noting that CAR is not data that can be queried directly. To calculate CAR, we first calculate the expected return of the stock through the Capital Asset Pricing Model (CAPM):

$$r = R_f + \text{beta} \times (R_m - R_f).$$

- r is the expected return on the investment
- R_f is the risk-free rate of return (usually estimated as the yield on government bonds)
- Beta is the asset's sensitivity to market risk, which measures how much the asset's returns are expected to move in response to changes in the overall market.
- R_m is the expected return of the overall market
- $R_m - R_f$ is the market risk premium, which represents the additional return that investors demand taking on market risk.

We need to use a benchmark or market index as a proxy for the overall market and calculate the return of the benchmark or market index for that period (usually a few days before and after the event that is being analyzed). To calculate beta for a stock, the most commonly used method is regression analysis, which involves running a regression of the stock's returns against the returns of a market index, such as the S&P 500. This method is considered the most accurate way to estimate beta because it takes into account the stock's volatility and its correlation with the overall market. Next, we need to calculate the actual return of the stock. Then, we could subtract the expected return from the actual return to get the abnormal return. Finally, summing the abnormal returns over the period we are interested in is the CAR we need. In the first design the period is 2004-2015 and 2016-2019, in the second design it is every year from 2004-2019. After the calculation, we can use the merge command to merge the CAR data with the previously processed independent variable data according to the same stock symbol and transaction time and start our regression analysis.

4.6 Control Variables

To build the DID regression model, we calculated our target outcome variable along with other control variables based on the available metrics offered by the CSMAR dataset. After editing, we process the data using several steps listed as follows:

1. Convert the listing date of our sample companies and establishment date variables into date formats and extract the corresponding year information.
2. Exclude observations where the establishment year is before 2005.
3. Analyze the industry variables by creating tables and dropping specific industry codes and names, with a concentration on key industries where SOEs and other mixed-owned companies operate. We also import additional data from an Excel file for further analysis.
4. Edit various control variables by generating and cleaning relevant variables. For the pre-disclosure variable, we convert the disclosure date into a date format and exclude missing values. To conduct an event study, we use the "estudy" command in Stata and import additional data files.
5. Calculate several control variables such as debt-to-asset ratio, book-to-market ratio, firm size, sales growth, loss indicator, and change in earnings per share (EPS) using relevant variables and transformations. These steps ensure that we have clean and processed data for our research analysis.

In the research proposal, we consider several control variables. Here is a list of the control variables and how they are computed:

- Debt-to-Asset Ratio (Debt_to_Assets): The debt-to-asset ratio is computed by dividing the total liabilities (variable a002000000) by the total assets (variable a001000000) obtained from the balance sheet data.
- Book-to-Market Ratio (BookToMarket): The book-to-market ratio is computed by dividing the book value of equity (variable a003000000) obtained from financial statements data by the market value of the firm (variable TRD_YearYsmvttl).
- Firm Size (log_mktvalue): The firm size variable is derived from the market value of the firm (variable TRD_YearYsmvttl), which represents the total market capitalization of the company.
- Sales Growth (SalesGrowth): The sales growth variable is calculated by taking the difference between the current year's revenue (variable b001100000) and the lagged year's revenue, and then dividing it by the lagged revenue. This measures the percentage change in sales from the previous year.
- Loss Indicator (LossIndicator): The loss indicator variable is a binary variable that takes the value of 1 if the net profit (variable b002000000) is negative, indicating a loss, and 0 otherwise.
- Change in Earnings per Share (Change_in_EPS): The change in EPS variable is calculated by taking the difference between the current year's earnings per share (variable f090701b) and the lagged year's EPS, and then dividing it by the lagged EPS. This measures the percentage change in EPS from the previous year.

These control variables help account for potential confounding factors and provide a more comprehensive analysis of the relationship between the independent and dependent variables in the research study.

5. Threats

There are several potential problems in this research:

- Selection bias: If companies in the treatment and control groups are systematically different, the DID estimates may be biased. While the DID approach attempts to control for unobserved time-invariant factors, it cannot control for time-varying unobserved factors that may affect both the treatment assignment and the outcome variable (CAR).
- Parallel trends assumption: The DID approach relies on the assumption that the treatment and control groups would have followed parallel trends in the outcome variable in the absence of the treatment. If this assumption is violated, the DID estimates may be biased. We may conduct placebo tests or visually inspect pre-treatment trends to assess the plausibility of the parallel trends assumption.
- Policy spillover effects: If the new policy has spillover effects on companies in the control group, the DID estimates may not accurately capture the true treatment effect. For example, the policy might lead to changes in industry dynamics or market structure that indirectly affect companies without significant changes in state-owned shareholding.
- External validity: The findings of this study may not be generalizable to other countries, industries, or time periods. The results may also depend on the specific policy being studied and its implementation. Caution should be exercised when extrapolating the findings to other contexts.
- Limited time frame: If the effects of the policy take longer to materialize than the time period considered in the study, the DID estimates may not fully capture the long-term impact of the policy. Expanding the post-treatment period or considering longer-term outcome measures in the future may help address this limitation.

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