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Abstract

We examine the nationalization of listed firms in China. Using a manually collected data set of 115 cases of ownership transfer from private to state control, we find that nationalization is positively associated with firm performance. When we analyze potential mechanisms through which nationalization may affect firm performance, we find a positive effect on benefits in the form of market power, government subsidies and bank financing. We also identify significant costs in the form of a higher tax burden, higher employment costs, and higher levels of corporate donations following nationalization. Finally, we show that weak local institutions exacerbate the influence nationalization has on firm performance and the benefits and costs tied to a shift to state control. These findings shed light on the effects when the government actively takes a more prominent role in the economy by becoming a controlling shareholder in large companies.

JEL Classification: G32; G34; H11; P26; P31

Keywords: Nationalization; Political economy; Firm performance; Local institutions; China

1 Introduction

In 2004, D'Long Group, one of the largest private companies in China, went bankrupt. As a result, its holding subsidiary Xinjiang Tunhe Investment sold off its 29.42% ownership in Xinjiang Tianshan Cement (TSC) to China National Non-metallic Materials Corporation, a subsidiary of a state-owned company named China National Materials Group Corporation (SINOMA). SINOMA was established by the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) in 1983. SINOMA continued to purchase shares in TSC until it became the controlling shareholder. The de facto nationalization of TSC was followed by significant changes to its operations. Bank loans and government subsidies increased markedly, as did employment costs, tax burden and donations. Some of these changes were de facto benefits, while others represented increases in costs. Overall, the economic effect on the company turned out to be positive; firm performance as measured by return on equity (ROE) jumped from -21.24% the year before nationalization to 23.80% in the third year after the change.

TSC's case is far from unique. In fact, a large number of Chinese privately controlled firms have transferred ownership to such an extent that they are now effectively controlled by the state. Huang et al. (2018) examine the Annual Survey of Industrial Firms from the National Bureau of Statistics that covers all firms with sales over RMB 5 million between 1998 and 2007. They find that as many as 25.6% of the firms that were privatized in the sample experienced so-called re-nationalization, defined by the authors as the state increasing its ownership stake. In this paper, we look at more recent data of listed companies and find that a significant number of listed companies in China were nationalized during the period 2000-2013. While a lot

of attention has been given to the private sector and its role in the Chinese economy (e.g. Lardy, 2012, 2014), the process of nationalization and the prominent role of the state in the economy are set to continue. As noted by Economy (2018), Xi Jinping has strengthened the position of state-owned enterprises (SOEs) in the Chinese economy, and they are given a leading role in various campaigns for economic development. In line with this, the Chinese government has begun to push large tech companies to offer it a stake and influence in the corporate decision-making process (Yuan, 2017). Observers have even called recent developments in the Chinese tech sector “quasi-nationalization” (Balding, 2018). Committees for the Chinese Communist Party (CCP) are installed in all companies, including privately controlled as well as foreign firms. While all companies in China have long been required by law to establish internal Party organizations, their role is evolving from being symbolic to influencing decisions (Martina, 2017). The Party is also playing an increasingly important role in the SOEs themselves, where it now carries out a stricter oversight (Mitchell, 2017). The overall theme is an increased level of control by the CCP over the economy and in that process, nationalization is playing a significant role.

This paper examines nationalization in a data set comprised of listed firms on the Shanghai and Shenzhen stock exchanges. Our aim is to shed light on three fundamental issues. First, we want to analyze the effect nationalization has on firm performance. Existing studies show that private ownership and thus privatization of state firms is associated with better firm performance. Conversely, this would suggest that nationalization is associated with a deterioration in performance. We argue that this may not be the case as firms under state control in China receive significant preferential treatment, which in turn may have an overall positive effect on their

performance, at least during a limited period after the nationalization event. Second, we take a closer look at potential channels through which nationalization may affect firms and their performance in the form of added benefits or costs. If several of these channels turn out to be significant, it is their aggregate effect that determines the final relationship between nationalization and firm performance. Third, we examine the potential effect local institutions have on the relationship between nationalization and firm performance, benefits, and costs.

Based on a data set with 115 cases of privately controlled listed firms that are nationalized, our analysis shows a strong and positive relationship between nationalization and firm performance. This finding contradicts studies on privatization which have shown that private ownership brings with it improvements to firm performance. We then find that nationalized firms receive benefits in the form of greater market power, more government subsidies and better access to bank loans. We also find that nationalized firms have to undertake additional costs in the form of a heavier tax burden, higher employee costs, and more corporate donations. These results hold up when we run tests to alleviate concerns for omitted variables and endogeneity. Finally, we show that local institutions are important as they amplify the effect nationalization has on performance as well as the benefits and costs firms experience when they are nationalized.

This study contributes to the discussion and research on state capitalism in China. While some have argued that the state's role in China's economy has decreased in significance and is continuing to do so (e.g., Lardy, 2012, 2014), others have emphasized the continued important role of the state in China's economy (e.g., Naughton, 2011). It has been argued that the Chinese state is advancing, typically at

the cost of the private sector. This phenomenon, often labelled *guo jin min tui* ('the state advances, the private sector retreats'), has received increasing attention internationally. Several studies have shown that economic policy indeed favors the state sector at the expense of the private sector (e.g., Du et al., 2014; Feng and Johansson, 2016). Our study contributes to this ongoing debate by highlighting and analyzing the state's continued active role in the economy through direct control of listed firms in China.

This paper also contributes to a large literature on state ownership and state intervention in the corporate sector. In particular, it builds on previous studies on differences and shifts between state and private ownership. In this literature, a few studies have examined nationalization (e.g., Langohr and Viallet, 1986; Ang and Boyer, 2007; Chernykh, 2011; Guriev and Kolotilin, 2011). A much larger body of research has focused on privatization and the effects it has on firm performance (e.g. Perotti, 1995; Lopez-de-Silanes et al., 1997; D'Souza and Megginson, 1999; Megginson and Netter, 2001; Djankov and Murrell, 2002; Estrin et al., 2009). We contribute to this field of research by highlighting the effects nationalization has on firm performance and, more importantly, identifying several channels through which nationalization affects performance. Indirectly, this paper also adds to a literature on state-controlled firms. A large number of studies have examined how state firms operate and perform (e.g., Aghion et al., 1994; Dewenter and Malatesta, 2001; Aivazian et al., 2005; Nguyen and van Dijk, 2012). Among those studies, some have focused on Chinese state firms (e.g., Bai et al., 2000; Bai et al., 2006; Groves et al., 1994; Lin et al., 1998; White, 2000; Cull and Xu, 2003; Li and Xia, 2008; Feng and

Johansson, 2017). We contribute to this field of research by examining how firms that come under state control operate and perform.

The rest of this paper is structured as follows. Section 2 provides a literature review and develops the working hypotheses. Section 3 presents an overview of the data, introduces the variables, and discusses the empirical methodology. Section 4 presents the empirical results for firm performance and mechanisms behind firm performance after nationalization. Section 5 shows the results of robustness checks and Section 6 examines how local institutions affect the relationship between nationalization, firm performance and the various benefit and cost mechanisms. Finally, Section 7 concludes the paper.

2 Literature Review and Hypotheses Development

We begin the empirical analysis by examining the relationship between nationalization and firm performance. The literature on state and private firms has shown that state firms are relatively less productive than private firms and several studies have documented strong performance effects after privatization (Barberis et al., 1996; Frydman et al., 1999; La Porta and Lopez-de-Silanes, 1999). This is consistent with the property rights argument that private ownership tie managers' incentives to returns which are linked to their decisions (Shleifer, 1998). Typical changes following privatization include an increase in real sales, an increase in profitability, improvements in operating and investment efficiency, and an increase in capital spending (e.g., Megginson et al., 1994; D'Souza and Megginson, 1999; Chen et al., 2011). Based on existing evidence of higher productivity and better firm performance in the private sector, one potential hypothesis would be that nationalization is linked

to a deterioration in firm performance. However, we believe that such an assumption may be premature. It is often argued and shown empirically that state firms receive preferential treatment in different forms (e.g., Li, 1996; Aharony, et al., 2000; Wang et al., 2008). It is also plausible to assume that the level of preferential treatment bestowed upon state firms is considerably higher in autocratic regimes such as China, where the state wields a significant influence over the economy. For example, the Chinese banking system is largely composed of large state-controlled banks which provide a fast and easy route for preferential access to finance for state firms (Allen et al, 2005). As we will discuss below, there are several other mechanisms through which state firms may be treated favorably compared to privately controlled firms. It is not farfetched to assume that the benefits of such preferential treatment could be obtained relatively quick after nationalization. At the same time, if a deterioration in overall firm productivity does take place, it is likely to take longer to materialize. We therefore begin the analysis with the following working hypothesis:

Hypothesis 1: Nationalization is positively associated with firm performance

If a significant link between nationalization and firm performance is established, a natural next question is: what are the mechanisms through which nationalization benefits firm performance? Here, we look at three potential mechanisms: market power, government subsidies, and bank financing. It has often been argued that links to those in power is positively associated with market power. In the extreme case, market power comes in the form of monopoly rights. For example, this was the case of a select few oligarchs in Suharto's Indonesia (Johansson, 2015a) and during the leadership of UMNO in Malaysia (Gomez and Jomo, 1999; Johansson 2015b). In general, market power may be associated with a monopolistic position in a certain

industry, or some form of advantage such as preferential access to licenses or concessions (Faccio, 2002). In a cross-country study, Faccio (2002) shows that political connections are positively associated with market power. Similarly, state ownership may be associated with benefits in the form of market power. The Chinese government maintains control over many industries, and several industries are still tightly regulated (Feng et al., 2015). We therefore believe that a transfer from private to state control is related to market power:

Hypothesis 2: Nationalization is positively associated with market power

Subsidies are widely used in China, and they are often earmarked for state firms. Girma et al. (2009) find that Chinese industry subsidies totaled well over US\$300 billion during the period 1995-2005 and that approximately half of those subsidies went directly to SOEs. Lim et al. (2018) argue that subsidies are used as a form of policy instrument for the Chinese government to direct financial resources to industries and enterprises that it supports. Internationally, Chinese government support to domestic firms has become an increasingly sensitive issue and countries and business groups are raising their voices against what they see as unfair practices (e.g., Godemont et al., 2011; Blenkinsop, 2017; Lawder, 2017). As state firms are favored when it comes to government subsidies, one may assume that a firm that is nationalized is more likely to obtain preferential treatment in the form of increased government subsidies.

Hypothesis 3: Nationalization is positively associated with government subsidies

It is often said that one important channel through which state firms obtain favorable treatment is through the capital market. In a country such as China, where the banking

system is primarily comprised of large state-controlled banks, the advantages state firms may have relative to private firms are substantial. A large body of literature has discussed the discriminatory practices against the private sector in favor of the state sector (e.g., Tsai, 2007; Li et al., 2008; Feng et al., 2014). One key argument in this literature has been that private firms often have been cut off from access to finance through the formal financial system. As noted by Brandt and Li (2003), state banks in China give preferential treatment to SOEs by granting loans based on factors other than economic, including political, ideological and personal factors. We therefore hypothesize that a transfer from private to state control is linked to better access to finance.

Hypothesis 4: Nationalization is positively associated with bank financing

So far, we have discussed potential benefits firms may reap after they come under state control. What about costs? Here, we focus on three potential costs that may be associated with nationalization: tax burden, employment costs, and corporate donations. While privately owned firms primarily aim to maximize profits, firms that are controlled by governments face multiple tasks (Bai et al., 2006). Alternative objectives such as paying more taxes, employing more people, and donating more to different causes are likely to increase firms' overall costs. Tax rates can be influenced by various firm-specific factors, including firm size, return on assets (ROA), and growth (Adhikari et al., 2006; Feng et al., 2015), but we are primarily interested in the relationship between firm ownership and tax burden. Feng et al. (2015) show that Chinese firms controlled by people who participate in politics obtain preferential treatment in the form of a lower tax burden compared to other private firms. But how about state firms? Wu (2010) provides evidence that state ownership is positively

associated with tax burden in China. This suggests that taxes constitute a component of the policy burden faced by SOEs. Based on this, we hypothesize as follows:

***Hypothesis 5:** Nationalization is positively associated with a firm's tax burden*

Another potential cost that state-controlled firms take on is in the form of excess employment. It has been argued and shown empirically that firms receive benefits from politicians if they take on more labor (e.g. Schleifer and Vishny 1994; Boycko et al. 1996; Kornai et al. 2003; Röller and Zheng 2005; Johansson et al., 2017). In the case of China, state firms are known for taking on excess labor as part of soft budget constraints and the so-called policy burden they face (Lin et al., 1998; Lin and Tan, 1999). Maintaining higher employment and provide social stability have been important for the CCP during China's gradual transition. As a sign of this, employment and maintaining social stability have played a non-trivial role during the evaluation and promotion of local political leaders (Johansson et al., 2017). We therefore hypothesize as follows:

***Hypothesis 6:** Nationalization is positively associated with firm employment*

A third possible cost linked to state ownership is that of corporate donations. There are various reasons for why firms decide to donate to different causes. For example, Harbaugh (1998) argues that donations are associated with prestige. Along these lines, it has been shown that firms with higher levels of philanthropic expenditures exhibit significantly better reputation and visibility (Brammer and Millington, 2005, 2006), and that firm performance can be improved by increasing the size of charitable donations (Muller and Kräussl, 2011). Seifert et al. (2003) find a positive relationship between cash resources and cash donations. In the literature on corporate donations, there are only a few studies that examine donations made by state-controlled firms.

Zhang et al. (2010) and Gao (2011) both analyze private and state firm donations after the Sichuan earthquake in 2008. Their results suggest that state ownership was not linked to higher levels of donations. Based on this, one could hypothesize that nationalization would not be positively linked to corporate philanthropy. However, both studies focused on a single event that brought with it immense pressure on the private sector to engage and aid after a severe natural disaster. Here, on the other hand, we are more interested in ownership type and the general level of corporate donations. This issue is interesting due to the following reasons. Firstly, in contrast to private entrepreneurs, executives in SOEs are bureaucrats who can use corporate philanthropy as a tool to realize their political ambitions. CEOs' incentives to donate may therefore differ significantly between SOEs and private firms. Secondly, political ideology means that corporate social responsibility, including corporate donations, may constitute a relatively more important on the agenda for CEOs in SOEs as compared to CEOs in private firms. Last but not least, the Chinese charity and relief systems are to a large extent controlled by the government and are used by politicians to achieve certain policy objectives such as poverty reduction.² As a result, firms may choose to participate in charity programs as a way to cultivate good relationships with local governments. We thus argue that the policy burden taken on by state firms in China makes it likely that state ownership is associated with higher levels of corporate donations. We therefore hypothesize as follows:

Hypothesis 7: Nationalization is positively associated with corporate donations

² For example, the Red Cross Society of China is controlled by the central and local governments.

Finally, we are interested in the possibility that certain factors may influence the relationship between nationalization and firm performance, benefits and costs. Here, we focus on the quality of institutions. Previous studies have shown that the way ownership and relations affect firm performance can be affected by institutions. For example, Feng et al. (2014, 2015) examine the effect of local institutions on the relationship between political connections in the form of political participation by a controlling shareholder and firm performance in China. They find that the effect on firm performance is significantly larger in regions characterized by weak institutions, suggesting that weak institutions amplify the effect political connections has on performance. Faccio (2006) document similar results in a cross-country study. She shows that political connections have a larger effect on firm performance when firms operate in countries characterized by weaker institutions in the form of higher levels of corruption. These studies serve as a suitable starting point for our analysis, as they focus on firms' relationships with leading politicians or the government. State control constitutes a very explicit form of political connections and we therefore hypothesize that local institutions have a direct impact on the relationship between nationalization and firm performance, benefits, and costs:

***Hypothesis 8:** Local institutions amplify the effect nationalization has on firm performance as well as benefits and costs resulting from nationalization*

3 Data and Methodology

3.1 Data Sample

We first collect equity transfers of all listed firms in China during 2000-2013 from the CSMAR database. We then manually identify ownership type for buyers and sellers in each transaction. That is, we distinguish between government-owned and non-government owned firms. We use this information to define nationalized firms as firms which are sold by non-government owners to a firm owned by the government, resulting in the government becoming the first or second largest shareholder (in a robustness check, we only include firms in which the government has become the first largest shareholder because of an equity transfer).³ During 2000-2013, we find 4,415 equity transfer events. The manually collected data on buyers and sellers in these transfers amount to 5,967 firms, out of which 3,029 were identified as buyers and 2,938 as sellers. The information needed to manually identify these firms is primarily obtained from the National Enterprise Credit Information Publicity System in China and the China Enterprise data set in the WIND database. The few remaining observations not found in these databases were gathered from firm announcements, news and analyst reports.

After this data gathering process, we end up with a total of 135 cases of firms that were nationalized during the time period in question. Panel A of Table 1 presents the annual distribution of these cases of nationalization. Out of the 135 firms, seven

³ In the sample, there are 77 cases where the government becomes the first largest shareholder, on average holding 30.09% of the shares in the company. There are 28 cases where the government becomes the second largest shareholder, on average holding 10.32% of shares in the company.

were labeled “Special Treatment” (ST), i.e. they were firms which were under financial distress and were required by the China Securities Regulatory Commission (CSRC) to disclose this by using the prefix “ST” in front of their trading stock code. Dropping these firms can also reduce the risk of endogeneity in this study. In addition, six firms had gone public via a reverse merger (*jie ke shang shi*), and six of them were nationalized when they were younger than three years old. To avoid the risk of these cases affecting the empirical results, we drop them from our sample. Our final sample therefore has a total of 115 cases of nationalized listed firms during 2000-2013.

Table 1 presents the sample selection and final sample distribution. As can be seen in the last column in Panel A of Table 1, there were cases of firms being nationalized in every year throughout the sample period. The maximum number of cases in a year took place in 2008, when the control of sixteen listed firms changed from being privately controlled to being controlled by the government. Correspondingly, the smallest number of cases in a year took place in 2005, when only four firms were nationalized.

Panel B of Table 1 presents the industry distribution of the sample of nationalized firms as well as the stock exchange they were listed on at the time of the nationalization event. The CSRC Industry Classification Standard from 2012 is used to categorize the firms by industry. As can be seen in the table, the nationalized firms are spread out across all industries. However, a few industries are characterized by a large number of nationalized firms. Machinery and equipment has a total of 29 cases of nationalized firms during the time period in question. Others with at least ten cases of firms being nationalized include the metal and non-metal industry, wholesale and retail industry, and conglomerates. Columns 3 and 4 show that the nationalization of

listed firms took place relatively evenly across the Shanghai and Shenzhen stock exchanges, with a few more cases occurring on the Shanghai stock exchange.

[TABLE 1 HERE]

3.2 Variables

As discussed in Section 2, we want to examine the effects of nationalization on a variety of firm-level characteristics. We first analyze corporate performance, for which we look at three alternative and commonly used measures (e.g. Megginson et al., 1994; D'Souza and Megginson, 1998): Return on assets (*ROA*), defined as firms' net income divided by total assets; return on equity (*ROE*), calculated as the ratio of firms' net income to book value of equity; and return on sales (*ROS*), defined as percentage of firms' net income in total sales.

Then we take potential benefits into consideration. First, we examine firms' market power by analyzing three measures (e.g., Faccio, 2002). *Sales(Log)* is an absolute proxy of market share, defined as the natural log of firms' total sales. To describe firms' relative market power, we calculate *Mar_power1*, defined as the market value of firm equity divided by total market value of the same industry. Finally, we calculate a relative proxy that captures firms' relative possession of market sales, *Mar_power2*, defined as the percentage of firms' sales of total sales in the same industry. Second, we examine the potential benefits in the form of government subsidies using *Subsidy(Log)*, a simple absolute indicator that is defined as the natural log of government subsidies. We also use two relative proxies for

subsidies, *Subsidy(%assets)* and *Subsidy(%sales)*, which are defined as the ratio of government subsidies to firms' assets and sales, respectively. Similar definitions have been used in previous studies on government subsidies in China, including those of Piotroski and Zhang (2014) and Feng et al. (2015). The third potential benefit we consider is that of bank financing. For bank loans, we use four alternative measures (e.g., Charumilind et al., 2006; Claessens et al., 2008): First, we use a simple indicator named *Loan* to demonstrate the overall conditions of firms' bank financing, which we calculate as the percentage of firms' bank loans in total assets. Then, we construct three proxies for an analysis from the perspective of loan terms. The first variable is named *Loan term*, defined as ratio of long-term loans to total bank loans, where long-term loans are loans with maturity of one year or more. The next variable is *Loan long*, which equals the percentage of long-term loans in firms' assets. The last variable is *Loan short*, defined as the ratio of short-term loans to firms' assets, where short-term loans means loans with maturity of less than one year.

When it comes to costs that may result from nationalization, we first examine firms' tax burden. We use firms' real tax rate as a first proxy, *Tax1*, defined as the tax fee divided by income before tax. We also consider government tax incentives and deduct the government's tax return from the basis of *Tax1* to obtain the second indicator named *Tax2*. Finally, to gauge the impact of nationalization on tax avoidance, we introduce the variable *Tax evasion*, which is defined as the difference between the nominal tax rate and real tax rate. Similar measures have been used by, among others, Adhikari et al. (2006) and Feng et al. (2015). A second type of costs resulting from nationalization is employment cost. Here, we use four different measures (e.g., Dewenter and Malatesta, 2001): *Emp(log)*, defined as the natural log

of total employees, is an absolute indicator which shows the overall situation of companies' personnel; the two relative variables $Emp(\%assets)$ and $Emp(\%sales)$ are calculated as the ratio of total employees to firms' assets and sales, respectively. Lastly, we use a proxy called $Exemp$ to demonstrate the level of employment redundancy. We define the variable as the residual of an employment regression model (see Appendix 2 for more details). Finally, we pay attention to potential costs in the form of corporate donations. Here, we use alternative three measures. $Donation(log)$, the natural log of total donations, is an absolute indicator. $Donation(\%assets)$ and $Donation(\%sales)$ are two relative variables, calculated as the ratio of donations to firms' assets and total sales, respectively.

The key explanatory variable in the empirical analysis is $Nationalization$, a dummy variable which equals one in the years after the private firm i is taken over by a government department or government-owned firms, thereby resulting in the government becoming its first or second largest controlling shareholder, and zero otherwise.⁴ When we look at the potential impact of local institutions, we use $Market\ index$ to reflect the level of government intervention. The variable which is calculated as the aggregated National Economic Research Institute (NERI) Index of marketization at the provincial level. In addition, we use the $Law\ index$ in the propensity score matching process. $Law\ index$ is defined as the NERI's sub index that measures the quality of the legal system at the provincial level.

⁴ As a robustness check, we also run separate regressions where we only consider firms in which the government became the largest controlling shareholder. When doing so, the results remain qualitatively the same and we thus leave them out for the sake of brevity.

In addition to these key variables, we also use a set of control variables at the firm level, including: *Size*, the natural log of total assets; *B/M*, the book value of assets over the market value of equity; *Age*, the number of years the firm has been listed; *Growth*, the growth rate of assets; *Leverage*, total debt divided by total assets; *Board directors*, the number of board directors; *Independent directors*, the number of independent directors; *CSI300*, a dummy variable which equals one if the firm is included in the CSI 300 market index and zero otherwise; and *Strategy*, a dummy variable which equals one if the firm operates in a strategic industry and zero otherwise.

Detailed definitions of all variables used in the empirical analysis can be found in Appendix 2. Table 2 presents descriptive statistics for all dependent and explanatory variables. Finally, Appendix 3 provides Pearson and Spearman correlations between them. For brevity, one measure for each part of the performance and benefit analysis is included in the correlation matrix.

[TABLE 2 HERE]

3.3 *Empirical Methodology*

We begin the empirical analysis by estimating the following baseline model with a standard ordinary least square (OLS) regression:

$$Y_{i,t} = \alpha + \beta \text{Nationalization}_{i,t} + \delta X_{i,t} + A_t + B_i + \varepsilon_{i,t} \quad (1)$$

Here, $Y_{i,t}$ is one of dependent variables defined in Section 3.2, that is, measures for: performance, market power, subsidies, bank loans, tax payments, employment, and donations. The key explanatory variable is $Nationalization_{i,t}$, a dummy variable that equals one in the years after firm i was nationalized by the government and zero otherwise. $X_{i,t}$ is a set of time-varying firm-level control variables (see Section 3.2 for details): size, book-to-market ratio, firm age, growth rate of assets, leverage, number of board directors, number of independent directors, dummy variable of CSI300 and dummy variable of strategy industry. A_t and B_i are vectors of year and firm dummy variables that account for year and firm fixed effects, respectively. Finally, $\varepsilon_{i,t}$ is the error term for firm i at time t .

As a first robustness check, we use propensity score matching (PSM) to obtain a situation similar to a randomized experiment. Here, we also control for unobserved characteristics that our data does not account for by applying a difference-in-differences (DiD) approach. Using a DiD estimation procedure may cancel out or control for the effect of observed time invariant characteristics as well as the effect of unobserved time invariant characteristics in the data. As noted in Gertler et al. (2010, p 148), “simple propensity score matching cannot account for unobserved characteristics that might explain why a group chooses to enroll in a program and that might also affect outcomes. By contrast, matching combined with difference-in-differences at least takes care of any unobserved characteristics that are constant across time between the two groups”. We begin the estimation procedure with a logit regression of a nationalization dummy variable. Our matching model is as follows:

$$Pscore(X_{i,t}) = Probability(f_{i,t} = 1|X_{i,t}) = \frac{\exp(\theta X_{i,t})}{1 + \exp(\theta X_{i,t})} \quad (2)$$

Here, $X_{i,t}$ is a vector of matching variables based on firm characteristics, including size, book-to-market ratio, firm age, growth rate of assets, leverage, number of board directors, number of independent directors, dummy variable of strategy industry, the regional legal system (*Law index*) and SOEs percent of total listed firms in the province where the firm has its headquarters. For these variables, we use the three-years mean value before year t . $f_{i,t}$ is a dummy variable that equals one if firm i is nationalized in year t and zero otherwise. We then use the propensity scores from this logit estimation and perform a nearest neighbor match with replacement with other firms in each year. This procedure ensures that a nationalized firm is paired with a non-nationalized firm with similar lagged size, book-to-market ratio, age, growth, board and industry characteristics. Finally, we run DiD regressions on the matched sample to examine the relation between nationalization and the different dependent variables. We only keep six years of data for each firm. That is, we use data for three years before to three years after nationalization, excluding the year of the nationalization event. In practice, this means that at least three years of financial data before nationalization is required.⁵ The reason for limiting the observations to three years after the transition is to increase our sample size for nationalization as well as to mitigate serial correlation bias resulting from the DiD estimation (Bertrand et al., 2004).

⁵ We also tested using other thresholds such as 2, 4, and 5 years, but the results did not change significantly.

To further alleviate concerns for potential endogeneity, we also run an additional robustness check in the form of a two-stage least square (2SLS) regression. Here, we use the variable SOE percentage of listed firms in the province in question as the instrumental variable (IV). The first stage regression thus looks like as follows:

$$Nationalization_{i,t} = \varphi + SOEPercent_{i,t} + \delta X_{i,t} + A_t + B_i + \eta_{i,t} \quad (3)$$

The second stage regression can then be written as:

$$Y_{i,t} = \alpha + \beta Instrumented\ Nationalization_{i,t} + \delta X_{i,t} + A_t + B_i + \varepsilon_{i,t} \quad (4)$$

Here, *Instrumented Nationalization_{i,t}* is the fitted value of the nationalization indicator from the first-stage regression. Finally, we examine how local institutions may influence the relationship between nationalization and the different dependent variables. To do this, we run OLS regressions using the following model:

$$Y_{i,t} = \alpha + \beta Nationalization_{i,t} + \gamma Nationalization_{i,t} * MarketIndex_{i,t} + \delta X_{i,t} + A_t + B_i + \varepsilon_{i,t} \quad (5)$$

4 Firm Effects of Nationalization

4.1 Firm Performance

We begin the analysis of the effects of nationalization by examining firm performance. For completeness, we use three alternative measures of performance: ROA, ROE, and ROS. We estimate the standard OLS regression model in Equation (1) where $Y_{i,t}$ is one of the three performance measures. Table 3 displays the results of the estimations. Column 1 shows the results when ROA is the dependent variable. The coefficient for the key explanatory variable *Nationalization* is positively significant at the 1% level. Looking at Columns 2 and 3, the results are similar, with highly significant and positive coefficients for the Nationalization dummy variable. These results are in stark contrast to those of Huang et al. (2017), who argue that renationalization is a sub-optimal economic policy as they find a negative relationship between renationalization and firm performance. As discussed earlier, we believe that there are both benefits and costs resulting from a firm being nationalized, and the final effect on its performance depends on how these benefits and costs play out relative to each other. It also suggests that while our results on nationalization and performance do not align with those of Huang et al. (2017), the overall economic effects of nationalization can still be negative, as other and potentially more productive privately controlled firms are likely to be discriminated against to the advantage of nationalized firms.

[TABLE 3 HERE]

4.2 *Benefits*

Next, we analyze potential benefits that firms may experience after being nationalized. We begin by examining the relationship between nationalization and market power. Here, we use Sales(log), Mar_power1, and Mar_power2 as alternative proxies for a firm's market power (see Appendix 2 for definitions of the different measures). Focusing on Sales(log), the regression results in Column 1 shows that the coefficient for market power is positively significant at the 1% level. Similarly, market power is positively and significant in Columns 2 and 3. These results support the hypothesis that nationalization helps firms improve their market position, both in terms of sales and in terms of sales and firm size relative to the industry in which they operate.

[TABLE 4 HERE]

Another potential benefit is that of government subsidies. As discussed earlier, the assumption that nationalized firms are provided more subsidies is not farfetched. This is particularly true in the case of China, where SOEs are known for obtaining preferential treatment in the form of government subsidies. To examine this, we run regressions with three alternative measures of government subsidies as dependent variables. The results of these regressions are presented in Table 5. Column 1 presents the results for the regression with the first proxy for government subsidies, Subsidy(log) as the dependent variable. The coefficient for government subsidies is positive significant at the 1% level. Columns 2 and 3 show the same results, with positive and highly significant coefficients for the alternative proxies for government

subsidies. We can thus conclude that nationalization is positively associated with government subsidies.

[TABLE 5 HERE]

The third potential benefit that nationalization may bring with it is that of improved access to finance. As discussed earlier, SOEs in China are well known for having preferential access to capital from a variety of sources, not the least in the form of bank loans. When we examine bank loans, we look at four alternative measures that capture not only the total loan amounts, but also the effects on loans with different term structures. The empirical results of this analysis are presented in Table 6. The first column in Table 6 presents the regressions results with the total loan to asset ratio as the dependent variable. The coefficient for the key explanatory variable Nationalization is positively significant at the 1% level, indicating that nationalization has a positive effect on overall bank loans that firms take on. Columns 2 and 3 focus on longer term loans relative to total loans and total assets, respectively. In both cases, the coefficient for Nationalization is positively significant at the 1% level. Finally, Column 4 displays results for short terms loans relative to total assets. Here, the coefficient for nationalization is negative, albeit not statistically significant. These results suggest that nationalized firms increase their overall bank loans. They also show that the increase is primarily in the form of long-term loans, with short-term loans displaying a weak decrease. One way to interpret this is that nationalized firms, as other state-controlled companies in China, obtain preferential access to bank financing, especially in the form of coveted long-term loan arrangements.

[TABLE 6 HERE]

4.3 *Costs*

Next, we examine potential costs to firm as a result of becoming nationalized. A natural starting point is that of taxation. As we argued when developing our working hypotheses, it is natural to assume that firms controlled by the state pay higher taxes on average. This in turn implies that firms that undergo a change from private to state control are likely to experience an increase in tax payments after being nationalized. To test this hypothesis, we use three alternative measures, two proxies for the tax rate and one for the degree to which firms evade paying taxes. We run standard OLS regressions which each of these three measures as the dependent variable with the results presented in Table 7. Column 2 and 3 show that nationalization is positively and significantly associated with tax payments, suggesting that a nationalization event is followed by an increase in taxes paid by the firm in question. The results when we use the proxy for tax evasion as the dependent variable are provided in Column 3. The coefficient for nationalization is negatively significant at the 1% level, indicating that firms are less likely to evade paying taxes after they are nationalized. Overall, these results show that a change from private to state control is linked to significantly higher tax payments by listed firms.

[TABLE 7 HERE]

Another potential cost that may increase as a result of a firm being nationalized is that of personnel costs. As discussed earlier, state firms in China typically face different forms of policy burden. Among these the requirement to provide employment constitutes a potentially important constraint. To analyze whether nationalization is linked to higher employment rates, we examine three proxies for employment. We also look at a measure that proxies for redundant personnel. We run separate regressions for each of these employment measures, with the results presented in Table 8. Columns 1 to 3 show the results for the alternative measures of employment. The coefficient for nationalization is positively significant at the 1% level, suggesting that a shift from private to state control is associated with an increase in not only the number of employees but also the number of employees relative to the size and sales of the firm. Column 4 provides results for our proxy for redundant personnel. Once again, the coefficient for nationalization is positively significant at the 1% level, indicating that the amount of redundant personnel increases after a firm has been nationalized.

[TABLE 8 HERE]

Finally, we examine how nationalization impact how much firms donate to different causes. Our working hypothesis is that the overall level of corporate donations increases as firms become nationalized. To collaborate this hypothesis empirically, we use the alternative measures for donations discussed in Section 3.2 as dependent variable in baseline OLS regressions. Table 9 presents results from the three different regressions. Focusing once more on the key explanatory variable, we

find that the coefficient for nationalization is positively significant at the 1% level in all three columns. These results indicate that a transfer of control from private to state is followed by an increase in corporate donations to different causes.

[TABLE 9 HERE]

5 Robustness Checks

Our findings in Section 4 support the hypothesis that nationalization brings with it both benefits and costs and that the overall economic effect is positive in the case of listed firms in China. However, it could be argued that these results are driven by unobserved firm characteristics or endogeneity. To alleviate these concerns, we run two robustness checks. We first use the PSM-DiD approach discussed in Section 3.3. In the first step, we apply the matching model in Equation (2) to identify a suitable matching sample for the 115 nationalized firms. We then run a DiD regression for each of the dependent variables on the 230 firms in the new sample. It should be noted that the performance of the DiD approach hinges on the satisfaction of the parallel trends assumption, which states that in the absence of treatment firms, the observed DiD estimator is zero. To be precise, the parallel trends assumption requires similar trends in the dependent variables during the pre-nationalization era for both the treatment and control groups. Before presenting the results from the DiD estimation, we thus need to make sure that the parallel trends assumption is satisfied.

Figure 1 shows the matching effect of the PSM approach. In Panel A, we plot the kernel density distribution of the propensity score both before and after the matching process. Compared to the distribution of the full sample, a much smaller gap can be

seen in the new matched sample, suggesting that the control firms constitute an appropriate match. In Panel B, we plot the unconditional mean of the main dependent variables in this paper, both for the treatment and control firms during the period from three years before to three years after the nationalization event. During the pre-nationalization period, the treatment group exhibits higher levels government subsidies, bank loans, tax rate and corporate donations than the control group. It also exhibits lower ROA, sales and less employees than that of the control firms. However, the constant gap of these variables shows that the firm characteristics are trending closely in parallel for the two groups over the three years leading up to the exogenous shock, confirming the underlying identifying assumption of a parallel trend. It is also worth noting that the gap between the treatment group and the control group visibly increases after the event, which provides a first suggestive evidence for the main findings in this paper.

[FIGURE 1 HERE]

The results of the PSM-DiD estimations are presented in Table 10, where the findings for each dependent variable are displayed in a separate panel. For the sake of brevity, we only include the coefficients for the key explanatory variable, but all control variables are included in the regressions.

Panel A in Table 10 presents the results for the three performance measures. The coefficient for nationalization in all three regressions is positively significant at the 1% level, showing that our initial baseline results hold up when considering omitted variables and endogeneity. Panel B displays the results for the alternative measures

for the benefits firms may reap as a result of being nationalized, i.e. increased market power, more government subsidies, and more bank loans. The results mirror our initial findings, with nationalization being significantly and positively associated with market power, government subsidies, overall bank loans, and long-term bank loans. Similar to our baseline results, there is a negative relationship between nationalization and short-term bank loans, but it remains statistically insignificant. Finally, Panel C presents the results for the various cost measures. Nationalization is still positively associated with tax payments and negatively associated with tax evasion. Moreover, nationalization is once more positively associated with employment, redundant personnel, and donations. We can thus conclude that the baseline results presented in Section 4 hold up when we estimate PSM-DiD regressions.

[TABLE 10 HERE]

As a second robustness check, we take potential endogeneity into account and estimate a two-stage least squares (2SLS) regression model presented in Equations (3) and (4). Results for the 2SLS regressions are presented in Table 11. In the first column of Panel A, the results of the first stage regression are shown. SOEs percentage, which measures the proportion of state-owned enterprises in local firms and also indicate the negotiation strength of the local government in terms of buying stakes in private firms, is used as the instrumental variable (IV) in this study. The logic for using this IV is that the bigger the SOEs percentage is, the more likely the local firms are to be nationalized. We indeed find that the coefficients of the IV in the first stage are significant at the 1% level, suggesting a strong relation between SOEs

percentage and nationalization. In addition, the Cragg-Donald Wald F-statistic shows that the IV is not weak. For the instrument to be valid, it also needs to satisfy the exclusion restriction condition, that is, SOEs percentage must be related to the outcome variables of individual firms only through the nationalization event. The province-level proportion of SOEs should not (directly) affect the performance of a local individual company. We therefore believe that the SOEs percentage is an acceptable instrument for nationalization. The rest of the columns in Panel A present the results of the second stage regressions for the different performance measures. In all three cases, the coefficient for nationalization is positively significant at the 1% level. Panel B presents the results for the various measures used to gauge the benefits firms reap when they are nationalized. Similar to Panel A, the first column in each section of the panel shows the first-stage estimation, with highly significant IV variables in all three cases. Market power is again positively associated with nationalization at the 1% level. Similarly, the coefficient for nationalization is positively significant at the 1% level for all three measures of government subsidies. Next, overall bank loans and long-term loans are still positively related to nationalization. Just as before, nationalization is negatively associated with short-term loans and this time the relationship between the two is weakly significant. Panel C presents the results for costs associated with firms being nationalized. As before, the first column in each section provides the results of the first-stage regression. For taxes, the relationship between nationalization and tax payments remains positively significant at the 1% level. Similarly, nationalization is strongly and negatively associated with tax evasion. In the case of employment, nationalization is positively associated with the various measures of firm employment. The coefficient for

nationalization is also positively significant in the case of our measure for redundant personnel, albeit this time only at the 5% level. Finally, nationally is positively associated with all three measures of firm donations and it remains significant at the 1% level. The results in Table 11 suggest that the baseline results in Section 4 were not driven by endogeneity.

[TABLE 11 HERE]

6 Local Institutions

So far, we have found strong evidence in favor of the hypothesis that nationalization has a significant impact on firm performance and that this impact is an aggregate of various benefits and costs associated with a firm being controlled by the state. We now turn to the question of what may drive this relationship between nationalization and key firm variables. As noted in Section 2, we hypothesize that the context in which firms operate may influence how ownership type relates to performance, benefits, and costs. More specifically, the local institutional setting may drive the effects of state control. To test this empirically, we estimate the regression model found in Equation (5).

The results of the regressions on each of the dependent variables are provided in Table 12. The explanatory variables of interest here are *Nationalization* and the interaction between nationalization and local institutions, *Nationalization*Market*

index.⁶ As before, we include the same control variables, but leave them out of the tables for the sake of brevity. Looking first at the results for firm performance in panel A, we see that nationalization remains positively significant at the 1% level. The interaction variable for nationalization and local institutions is negative and significant at the 1% level for ROA and ROS, but not statistically significant in the case of ROE. Overall the results suggest that the effect of nationalization on firm performance is driven by the quality of local institutions. Firms operating in regions characterized by weak institutions experience a stronger impact on performance after being nationalized. Panel B presents results for regressions on each of the proxies for the three forms of potential benefits that we analyze. In the case of market power, nationalization remains positively significant at the 1% level. More importantly, the interaction term *Nationalization*Market index* is negatively significant at the 1% level in all three cases, indicating that local institutions accentuate the effect nationalization has on market power. These results are mirrored in the case of government subsidies and bank loans. The only difference is that the interaction variable is not statistically significant in the case of Loans. In addition, the interaction variable as well as nationalization on its own are statistically insignificant in the case of Loan short. Taken together, these results support the hypothesis that the benefits firms reap from becoming nationalized are amplified by the institutional setting in which they operate.

Finally, Panel C presents the results for the various measures for the three forms of costs associated with nationalization. For taxes, the interaction variable is

⁶ A lower market index indicates a lower quality of local institutions.

negative but only significant in the regression on the proxy *Tax2*. The interaction variable is positively significant in the case of *Tax evasion*. These results suggest that the tax increase firms experience after being nationalized is larger in regions characterized by weak institutions. Similarly, the negative relationship between nationalization and tax evasion is accentuated for firms operating in weak institutional settings. In the case of employment, the interaction variable come back negatively significant at the 1% level for all three measures of employment, but statistically insignificant in the case of the measure for redundant personnel. For firm donations, Nationalization*Market index is negatively significant at the 1% level in all three regressions. Taken together, these results strongly support the hypothesis that the relationship between nationalization and the three different costs is amplified when firms operate in regions characterized by weak institutions.

[TABLE 12 HERE]

7 Conclusion

This paper contributes to the still underrepresented area of research on government intervention into the corporate sector through nationalization of privately controlled firms. We examine cases in which the state took control over listed privately controlled companies in the context of China's transition economy. More specifically, we use a sample of 115 cases to shed light on how nationalization affect firm performance and various mechanisms of benefits and costs.

Our empirical results indicate that nationalization of firms in China is positively associated with various measures of firm performance. When we examine the

mechanisms behind this relationship, we find that nationalization is related to an increase in market power and government subsidies, as well as better access to finance through the banking system. We also identify several costs related to nationalization, including a higher tax burden, higher employment costs, and higher levels of corporate donations. Robustness tests show that these results hold up when we consider potential omitted variables and endogeneity.

We also find that local institutions influence the relationship between nationalization and firm performance and the various mechanisms. In particular, we find that weak institutions are associated with a larger effect of nationalization on firm performance, benefits and costs associated with nationalization. These findings are important as they shed light on the effects of an ongoing process in which the Chinese government actively takes a leading role in the economy by becoming a controlling shareholder in large companies.

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Table 1. Sample distribution**Panel A. Sample selection and time distribution of nationalized firms**

A nationalized firm is identified as a private firm which is taken over by a government department or by government-owned firms resulting in the government becoming its first or second largest controller. We identified 146 such cases during 2000-2013. We then drop firms designated with special treatment due to being in distress (ST and *ST), undergoing a reverse merger, and firms that were nationalized when they were less than three years old. The sample does not include financial firms.

Year	Initial sample	Special circumstances			Final sample
	Number of firms	*ST&ST	Reverse merger	Nationalized when age<3	Number of firms
2000	7	1	0	1	5
2001	10	3	0	1	6
2002	6	1	0	0	5
2003	5	0	0	0	5
2004	7	1	0	0	6
2005	4	0	0	0	4
2006	14	0	0	0	14
2007	13	0	0	0	13
2008	17	1	0	0	16
2009	10	0	1	2	7
2010	13	0	0	1	12
2011	8	0	2	0	6
2012	10	0	3	0	7
2013	11	0	1	1	9
Total	135	7	7	6	115

Table 1. Sample distribution (contd.)**Panel B. Industry distribution of nationalized firms**

This panel describes the industry distribution of the nationalized firms. Industry is classified according to the China Security Regulatory Commission (CSRC) industry classification standard (2012). Column 1 presents the CSRC Industry code, Column 2 presents the number of nationalized firms in different industry, and Columns 3 and 4 show if the firms are listed on the Shanghai Stock Exchange or Shenzhen Stock Exchange, respectively.

Industry	Industry code	Firms	Shanghai	Shenzhen
Agriculture	A02	1	1	0
Mining	B06	1	0	1
Food, beverages	C14,C15	3	1	2
Textile, apparel	C17,C18	4	3	1
Furniture	C21	1	0	1
Paper making, printing	C22,C23	2	1	1
Petroleum, chemistry, plastic	C25,C26,C28,C29	9	3	6
Medicine	C27	9	5	4
Metal, non-metal	C30	13	6	7
Machinery, equipment	C30—C41	29	17	12
Power, water	D44	4	2	2
Construction	E47,E48,E50	4	2	2
Wholesale, retail	F51,F52	10	5	5
Transportation	G56,G58	1	1	0
IT	I63,I64,I65	8	6	2
Real estate	K70	4	1	3
Social services	N78	1	0	1
Conglomerates	S90	11	8	3
Total		115	62	53

Table 2. Descriptive statistics

This table displays descriptive statistics for the main variables in the analysis. The sample contains all Chinese A-share firms from 1996 to 2016. Special treatment (ST, *ST) firms and financial firms are excluded. Observations with missing data for any of the variables are also excluded, leaving an unbalanced panel of 28,419 firm-years for 2,229 unique firms. Variables are winsorized at the 1th and 99th percentile. Variable definitions are provided in Appendix 2.

Variable	N	Mean	Median	Standard Deviation	Minimum	Maximum
ROA	28,419	3.71%	3.51%	4.46%	-6.67%	12.57%
ROE	28,419	6.79%	6.79%	7.87%	-13.08%	21.38%
ROS	28,419	11.89%	9.80%	12.44%	-12.90%	41.26%
Sales(Log)	28,419	20.88	20.81	1.34	18.59	23.53
Mar_power1	28,419	3.18%	1.41%	4.24%	0.23%	16.60%
Mar_power2	28,419	3.07%	1.02%	4.78%	0.06%	18.62%
Subsidy(log)	28,419	15.07	14.49	1.56	12.68	18.20
Subsidy(%assets)	28,419	0.36%	0.17%	0.46%	0.01%	1.75%
Subsidy(%sales)	28,419	0.86%	0.34%	1.25%	0.01%	4.84%
Loan	28,419	20.83%	18.34%	12.77%	3.78%	47.38%
Loan term	28,419	31.66%	24.77%	24.61%	2.66%	85.37%
Loan long	28,419	5.98%	3.24%	6.38%	0.39%	23.30%
Loan short	28,419	14.30%	11.07%	10.51%	1.02%	37.54%
Tax1	27,759	17.56%	15.84%	11.98%	-1.92%	44.02%
Tax2	27,759	16.19%	14.38%	11.26%	-2.20%	41.05%
Tax evasion	27,759	7.97%	6.30%	13.26%	-17.48%	32.95%
Emp(log)	28,419	7.46	7.50	1.09	5.36	9.67
Emp(%assets)	28,419	1.14%	0.81%	1.02%	0.09%	3.90%
Emp(%sales)	28,419	2.48%	1.55%	2.58%	0.20%	10.07%
Exemp(log)	28,419	8.35	8.46	0.66	6.72	9.31
Donation(log)	17,426	12.17	12.32	2.21	7.81	15.89
Donation(%assets)	17,426	0.02%	0.01%	0.03%	0%	0.13%
Donation(%sales)	17,426	0.05%	0.01%	0.07%	0%	0.27%
Size	28,419	21.56	21.43	1.13	19.79	23.96
B/M	28,419	0.83	0.63	0.63	0.16	2.46
Age	28,419	8.02	7	5.69	0	19
Growth	28,419	0.15%	0.10%	0.23%	-0.15%	0.78%
Leverage	28,419	46.22%	46.40%	20.05%	11.29%	81.49%
Board directors	28,419	9.08	9	1.76	6	13
Independent directors	28,419	2.71	3	1.20	0	4
CSI 300	28,419	0.10	0	0.30	0	1
Strategy	28,419	0.38	0	0.49	0	1

Table 3. Baseline results: Performance

This table presents ordinary least square (OLS) regression results for nationalization and firm performance. The dependent variables are ROA, ROE, and ROS, respectively (see Appendix 2 for variable definitions). All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) ROA	(2) ROE	(3) ROS
Nationalization	4.733*** (10.50)	5.727*** (6.03)	3.333** (1.98)
Size	-0.668*** (-5.89)	-1.038*** (-3.52)	-1.141** (-2.17)
B/M	-0.018*** (-16.99)	-0.041*** (-14.85)	-0.046*** (-12.18)
Age	-0.330 (-1.35)	-1.461* (-1.79)	-0.780 (-0.88)
Growth	0.019*** (17.16)	0.044*** (14.99)	0.052*** (11.72)
Leverage	-0.012*** (-2.75)	0.066*** (6.80)	0.049*** (2.72)
Board directors	-0.114*** (-2.74)	-0.192* (-1.89)	-0.471*** (-2.65)
Independent directors	0.167 (1.59)	0.130 (0.49)	0.513 (1.19)
CSI 300	0.128 (0.76)	0.965** (2.40)	0.401 (0.65)
Strategy	-0.414 (-1.58)	-1.606*** (-3.01)	-1.383 (-1.51)
Constant	24.506*** (5.62)	49.985*** (3.54)	50.091*** (2.94)
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.0979	0.0487	0.0397
F	56.83	29.01	22.44

Table 4. Baseline results: Market power

This table presents ordinary least square (OLS) regression results for nationalization and market power. We use Sales(log), Mar_power1 and Mar_power2 as proxies of a firm's market power (see Appendix 2 for variable definitions). All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Sales(log)	(2) Mar_power1	(3) Mar_power2
Nationalization	0.733*** (26.48)	3.760*** (16.51)	3.082*** (12.05)
Size	0.758*** (97.77)	0.899*** (14.11)	1.324*** (18.48)
B/M	-0.001*** (-11.58)	-0.010*** (-14.38)	-0.004*** (-4.62)
Age	0.002 (0.09)	-0.422* (-1.90)	-0.591** (-2.37)
Growth	0.001*** (10.70)	0.006*** (7.46)	0.005*** (5.85)
Leverage	0.001*** (5.50)	-0.013*** (-6.03)	-0.001 (-0.41)
Board directors	0.008*** (2.67)	0.034 (1.41)	0.060** (2.20)
Independent directors	0.011 (1.34)	-0.052 (-0.81)	-0.126* (-1.73)
CSI 300	0.035** (2.10)	-0.389*** (-2.88)	-0.241 (-1.59)
Strategy	0.013 (0.71)	-1.756*** (-11.46)	-2.301*** (-13.36)
Constant	4.558*** (10.65)	-9.605*** (-2.73)	-17.210*** (-4.35)
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.587	-0.00504	-0.0203
F	1471	72.91	58.30

Table 5. Baseline results: Government subsidies

This table presents ordinary least square (OLS) regression results for nationalization and government subsidies. We use three alternative proxies to measure government subsidies (see definitions in Appendix 2): Subsidy(Log) Subsidy(%assets) and Subsidy(%sales). All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Subsidy(Log)	(2) Subsidy(%assets)	(3) Subsidy(%sales)
Nationalization	0.128** (2.02)	0.345*** (12.17)	0.767*** (7.99)
Size	0.449*** (25.25)	-0.179*** (-22.62)	-0.554*** (-20.61)
B/M	0.000 (1.28)	-0.000*** (-2.67)	0.000 (0.43)
Age	0.112* (1.82)	0.036 (1.30)	0.215** (2.30)
Growth	-0.001*** (-3.40)	-0.000*** (-4.18)	-0.002*** (-6.00)
Leverage	0.005*** (7.69)	0.006*** (21.58)	0.017*** (18.43)
Board directors	0.005 (0.70)	-0.002 (-0.79)	0.007 (0.66)
Independent directors	0.021 (1.17)	0.006 (0.74)	0.009 (0.34)
CSI 300	0.213*** (5.64)	0.061*** (3.61)	0.248*** (4.35)
Strategy	0.013 (0.29)	0.003 (0.15)	0.031 (0.47)
Constant	4.265*** (4.35)	3.690*** (8.43)	9.565*** (6.45)
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.260	0.0166	-0.0283
F	421.3	94.35	50.82

Table 6. Baseline results: Bank loans

This table presents ordinary least square (OLS) regression results for nationalization and bank loans. The analysis covers four alternative measures of bank loans (see Appendix 2 for detailed variable definitions): *Loan*, or a firm's total bank loans; *Loan term*, the term structure of a firm's bank loans; *Loan long*, a firm's long-term loans; *Loan short*, a firm's short-term loan. All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(22) Loan	(23) Loan term	(24) Loan long	(25) Loan short
Nationalization	5.638*** (5.02)	13.263*** (6.75)	5.860*** (9.03)	-0.146 (-0.14)
Size	1.401*** (4.59)	2.312*** (4.55)	1.020*** (6.45)	0.382 (1.40)
B/M	0.021*** (9.36)	-0.003 (-0.62)	0.007*** (4.15)	0.012*** (5.68)
Age	0.011 (0.02)	-2.594* (-1.90)	-0.524 (-1.64)	0.688 (1.17)
Growth	0.002 (0.75)	0.041*** (8.85)	0.014*** (9.43)	-0.014*** (-6.36)
Leverage	0.233*** (22.59)	-0.058*** (-3.68)	0.063*** (10.90)	0.172*** (19.83)
Board directors	-0.046 (-0.51)	-0.402** (-2.09)	-0.108* (-1.92)	0.098 (1.12)
Independent directors	0.276 (1.30)	0.461 (1.07)	0.357*** (2.72)	-0.084 (-0.44)
CSI 300	0.028 (0.07)	-2.279** (-2.51)	-0.523** (-2.00)	0.653* (1.91)
Strategy	-0.154 (-0.29)	-3.293*** (-2.87)	-0.687** (-2.06)	0.500 (1.00)
Constant	-27.425** (-2.41)	28.885 (1.28)	-12.711** (-2.25)	-17.483 (-1.62)
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	0.181	0.0555	0.0974	0.151
F	47.92	16.49	18.87	38.27

Table 7. Baseline results: Taxes

This table presents ordinary least square (OLS) regression results for nationalization and taxes. Tax1 and Tax2 signify the real tax rate that firms face. Tax evasion is used as a proxy for the degree to which firm evade paying taxes. Detailed definitions of all variables are found in Appendix 2. The somewhat lower total number of observations is due to missing data. All control variables are lagged by one year. T-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Tax1	(2) Tax2	(3) Tax evasion
Nationalization	8.869*** (9.00)	10.487*** (12.50)	-10.268*** (-11.91)
Size	1.078*** (3.70)	1.283*** (4.65)	-1.776*** (-6.14)
B/M	0.006* (1.87)	0.004 (1.38)	-0.002 (-0.61)
Age	-1.546* (-1.84)	-1.519* (-1.84)	2.253*** (2.60)
Growth	0.006** (2.10)	0.006** (2.30)	-0.005* (-1.76)
Leverage	-0.048*** (-4.64)	-0.051*** (-5.41)	0.060*** (6.01)
Board directors	0.004 (0.04)	0.015 (0.14)	-0.031 (-0.28)
Independent directors	-0.036 (-0.13)	0.105 (0.40)	-0.086 (-0.31)
CSI 300	0.090 (0.17)	0.086 (0.17)	-0.251 (-0.48)
Strategy	-0.253 (-0.40)	-0.123 (-0.21)	-0.051 (-0.08)
Constant	18.670 (1.34)	11.695 (0.85)	12.523 (0.87)
Firm and Time FE	YES	YES	YES
Observations	27,759	27,759	27,759
R-squared	0.018	0.023	0.101
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.0171	0.0218	0.0998
F	14.18	18.01	72.06

Table 8. Baseline results: Employment

This table presents ordinary least square (OLS) regression results for nationalization and employment. We use *Emp(Log)*, *Emp(%assets)*, and *Emp(%sales)* as proxies of total employees hired by a firm. The fourth dependent variable *Exemp* proxies the degree of redundant personnel. Detailed variable definitions are provided in Appendix 2. All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Emp(Log)	(2) Emp(%assets)	(3) Emp(%sales)	(4) Exemp
Nationalization	1.024*** (10.13)	2.589*** (8.38)	6.411*** (6.05)	0.339*** (7.94)
Size	0.420*** (16.65)	-0.720*** (-11.95)	-2.037*** (-8.89)	0.909*** (76.14)
B/M	0.000 (1.40)	0.002*** (4.60)	0.007*** (5.00)	-0.002*** (-12.17)
Age	-0.065 (-0.89)	0.082 (0.82)	0.555* (1.77)	-0.061 (-1.48)
Growth	-0.001*** (-2.80)	-0.002*** (-5.30)	-0.009*** (-5.92)	0.001*** (6.84)
Leverage	-0.000 (-0.46)	0.009*** (4.46)	0.031*** (4.15)	-0.003*** (-8.36)
Board directors	0.019*** (2.65)	0.025* (1.72)	0.067 (1.11)	-0.008* (-1.65)
Independent directors	0.017 (1.03)	0.013 (0.39)	0.018 (0.15)	0.000 (0.03)
CSI 300	0.242*** (7.16)	0.379*** (7.12)	1.373*** (7.31)	-0.390*** (-15.38)
Strategy	0.038 (0.77)	-0.042 (-0.52)	-0.327 (-1.28)	0.022 (0.75)
Constant	-0.952 (-0.79)	14.638*** (7.96)	36.370*** (6.29)	-10.404*** (-15.78)
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	0.198	0.138	0.0792	0.217
F	48.27	30.46	16.46	349.7

Table 9. Baseline results: Donations

This table presents ordinary least square (OLS) regression results for nationalization and donations. We use Donation(Log), Donation(%assets) and Donation(%sales) as proxies for how much firms spend on donations. Appendix 2 provides definitions for the dependent and explanatory variables. The total number of observations has decreased somewhat due to missing data on donations. All control variables are lagged by one year. *T*-statistics are reported in parentheses and all dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) Donation(Log)	(2) Donation(%assets)	(3) Donation(%sales)
Nationalization	0.667** (2.53)	0.153*** (9.44)	0.295*** (8.95)
Size	0.469*** (6.81)	-0.023*** (-6.03)	-0.038*** (-5.07)
B/M	-0.002*** (-3.97)	-0.000 (-0.63)	-0.000 (-0.65)
Age	0.118 (1.05)	0.008 (1.50)	0.016 (1.54)
Growth	0.003*** (4.82)	0.000 (0.87)	0.000 (0.35)
Leverage	-0.004 (-1.62)	0.000** (2.18)	0.000 (1.30)
Board directors	0.015 (0.58)	0.000 (0.35)	0.000 (0.19)
Independent directors	-0.032 (-0.50)	0.002 (0.66)	0.004 (0.68)
CSI 300	0.334*** (4.04)	0.011*** (3.51)	0.018*** (3.02)
Strategy	-0.058 (-0.48)	-0.005 (-0.96)	-0.007 (-0.62)
Constant	0.443 (0.28)	0.458*** (5.21)	0.761*** (4.28)
Firm and Time FE	YES	YES	YES
Observations	17,426	17,426	17,426
Number of firms	2,164	2,164	2,164
Adjusted R ²	0.0775	0.143	0.108
F	41.17	13.98	9.948

Table 10. Robustness check: PSM-DID

This table presents the results of the PSM-DID estimations. The original sample together with the matched sample make up for a total of 230 firms. The three panels in the table present the relationship between nationalization and firm performance, benefits and costs, respectively. All control variables are the same as the ones used in the full sample estimations. *T*-statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Panel A. Performance

Variables	(1) ROA	(2) ROE	(3) ROS
Nationalization	7.470*** (9.39)	10.351*** (9.84)	2.843 (0.91)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	1,366	1,366	1,366
Number of firms	230	230	230
Adjusted R ²	0.0366	-0.0155	-0.130
F	10.68	8.179	3.491

Panel B. Benefits

1. Market power

Variables	(1) Sales(Log)	(2) Mar power1	(3) Mar power2
Nationalization	0.731*** (8.64)	5.392*** (11.48)	3.012*** (9.09)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	1,366	1,366	1,366
Number of firms	230	230	230
Adjusted R ²	0.280	0.0338	0.0406
F	27.25	10.54	10.89

2. Subsidies

Variables	(1) Subsidy(Log)	(2) Subsidy(%assets)	(3) Subsidy(%sales)
Nationalization	0.941*** (6.66)	0.747*** (9.38)	1.838*** (6.28)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	1,366	1,366	1,366
Number of firms	230	230	230
Adjusted R ²	-0.0235	0.0796	-0.0541
F	7.815	12.97	6.479

3. Bank loans

Variables	(1) Loan	(2) Loan term	(3) Loan long	(4) Loan short
Nationalization	4.447** (2.57)	12.219*** (6.67)	6.503*** (11.58)	-0.879 (-0.85)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	1,366	1,366	1,366	1,366
Number of firms	230	230	230	230
Adjusted R ²	0.105	-0.0162	0.0939	-0.106
F	3.102	8.147	13.77	4.396

Panel C. Costs

1. Taxes

Variables	(1) Tax1	(2) Tax2	(3) Tax evasion
Nationalization	8.606*** (4.52)	20.961*** (20.01)	-21.475*** (-19.51)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	1,366	1,366	1,366
Number of firms	230	230	230
Adjusted R ²	0.0596	0.490	0.574
F	8.318	23.26	42.25

2. Employment

Variables	(1) Emp(Log)	(2) Emp(%assets)	(3) Emp(%sales)	(4) Exemp
Nationalization	1.247*** (6.48)	3.944*** (7.30)	9.090*** (4.77)	0.545*** (3.61)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	1,366	1,366	1,366	1,366
Number of firms	230	230	230	230
Adjusted R ²	0.167	0.272	0.138	0.0516
F	6.530	8.259	3.697	11.46

3. Donations

Variables	(1) Donation(Log)	(2) Donation(%assets)	(3) Donation(%sales)
Nationalization	1.067*** (2.75)	0.212*** (9.68)	0.391*** (8.92)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	1,366	1,366	1,366
Number of firms	230	230	230
Adjusted R ²	0.0728	0.342	0.275
F	5.704	5.350	5.041

Table 11. Robustness check: 2SLS**Panel A. Performance**

This panel shows the results of a two-stage least square (2SLS) regression with SOEs percent as the instrumental variable. In the year after firm i is nationalized, SOEs percent equals the number of listed SOEs divided by the total number of listed enterprises in the same province, and zero otherwise. Column 1 shows the first stage results of ROA, ROE and ROS, and columns 2 to 4 show the second stage results of ROA, ROE and ROS, respectively. The control variables are the same as in the previous regressions. We control for year and firm fixed effect in all models. T -statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	First Stage	Second Stage		
	(1) Nationalization	(2) ROA	(3) ROE	(4) ROS
IV (SOEs percent)	5.524*** (88.21)			
Nationalization		6.605*** (11.93)	5.504*** (3.68)	6.015*** (2.81)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	.	0.0192	-0.0324	-0.0424
F	.	92.65	45.40	38.19

Table 11. Robustness check: 2SLS (contd.)**Panel B. Benefits**

This panel shows the results of a two-stage least square (2SLS) regression with SOEs percent as the instrumental variable. In the year after firm i is nationalized, SOEs percent equals the number of listed SOEs divided by the total number of listed enterprises in the same province, and zero otherwise. Sections 1 to 3 show the results for market power, subsidies and bank loans, respectively. The control variables are the same as in the previous regressions. We control for year and firm fixed effect in all models. T -statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

1. Market Power

Variables	First Stage		Second Stage	
	(1) Nationalization	(2) Sales(Log)	(3) Mar_power1	(4) Mar_power2
IV (SOEs percent)	5.524*** (88.21)			
Nationalization		0.904*** (15.63)	4.508*** (7.02)	3.535*** (5.18)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	.	0.586	-0.0290	-0.0360
F	.	1453	45.96	40.95

2. Subsidies

Variables	First Stage		Second Stage	
	(1) Nationalization	(2) Subsidy(log)	(3) Subsidy(%assets)	(4) Subsidy(%sales)
IV(SOEs percent)	5.524*** (88.21)			
Nationalization		0.901*** (6.78)	0.837*** (14.08)	2.449*** (12.16)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	.	0.255	0.00518	-0.0405
F	.	420.4	95.05	53.15

3. Bank loans

Variables	First Stage		Second Stage		
	(1) Nationalization	(2) Loan	(3) Loan term	(4) Loan long	(5) Loan short
IV (SOEs percent)	5.524*** (88.21)				
Nationalization		3.110*** (3.23)	15.734*** (7.53)	6.967*** (12.13)	-2.804* (-1.75)
Control variables	YES	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229	2,229
Adjusted R ²	.	0.110	-0.0252	0.0199	0.0776
F	.	195.3	49.92	87.69	37.71

Table 11. Robustness check: 2SLS (contd.)**Panel C. Costs**

This panel shows the results of a two-stage least square (2SLS) regression with SOEs percent as the instrumental variable. In the year after firm i is nationalized, SOEs percent equals the number of listed SOEs divided by the total number of listed enterprises in the same province, and zero otherwise. Sections 1 to 3 show the results for taxes, employment and donations, respectively. The control variables are the same as in the previous regressions. We control for year and firm fixed effect in all models. T -statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

1. Taxes

Variables	First Stage		Second Stage	
	(1) Nationalization	(2) Tax1	(3) Tax2	(4) Tax evasion
IV (SOEs percent)	5.759*** (90.55)			
Nationalization		11.756*** (7.06)	16.044*** (10.24)	-16.203*** (-9.90)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	27,759	27,759	27,759	27,759
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	.	-0.0694	-0.0658	0.0190
F	.	13.90	17.78	96.09

2. Employment

Variables	First Stage		Second Stage		
	(1) Nationalization	(2) Emp(Log)	(3) Emp(%assets)	(4) Emp(%sales)	(5) Exemp
IV (SOEs percent)	5.524*** (88.21)				
Nationalization		1.210*** (16.52)	4.182*** (26.05)	10.704*** (17.73)	0.203** (2.28)
Control variables	YES	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229	2,229
Adjusted R ²	.	0.129	0.0489	-0.00776	0.217
F	.	203.8	127.4	71.80	347.6

3. Donations

Variables	First Stage		Second Stage	
	(1) Nationalization	(2) Donation(Log)	(3) Donation(%assets)	(4) Donation(%sales)
IV (SOEs percent)	6.955*** (82.20)			
Nationalization		1.989*** (8.01)	0.269*** (35.16)	0.512*** (31.07)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	17,352	17,352	17,352	17,352
Number of firm:	2,090	2,090	2,090	2,090
Adjusted R ²	.	-0.0554	-0.0257	-0.0532
F	.	46.24	82.24	59.49

Table 12. Local institutions**Panel 1. Performance**

This panel presents the results of nationalization, institutions and performance. Here, *Market index* represents the degree of marketization. The control variables are the same as in the previous regressions. We control for year and firm fixed effects in all regressions. *T*-statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

Variables	(1) ROA	(2) ROE	(3) ROS
Nationalization	7.769*** (9.00)	8.908*** (3.18)	13.598*** (3.40)
Nationalization*Market index	-0.454*** (-3.70)	-0.499 (-1.18)	-1.612*** (-2.66)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.0215	-0.0323	-0.0418
F	96.12	45.61	37.26

Table 12. Local institutions (contd.)**Panel B. Benefits**

This panel presents the results of nationalization, institutions and various firm benefits including market power, subsidies, and bank loans. Here, *Market index* represents the degree of marketization. The control variables are the same as in the previous regressions. We control for year and firm fixed effects in all regressions. *T*-statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

1. Market power

Variables	(1) Sales(Log)	(2) Mar power1	(3) Mar power2
Nationalization	1.221*** (13.55)	6.902*** (9.31)	6.293*** (4.93)
Nationalization* Market index	-0.073*** (-5.69)	-0.470*** (-4.45)	-0.450** (-2.32)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.588	-0.00432	-0.0358
F	1425	71.19	42.55

2. Subsidies

Variables	(1) Subsidy(Log)	(2) Subsidy(%assets)	(3) subsidy(%sales)
Nationalization	0.790*** (3.82)	0.709*** (7.68)	2.089*** (6.68)
Nationalization* Market index	-0.099*** (-3.36)	-0.054*** (-4.15)	-0.198*** (-4.45)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229
Adjusted R ²	0.260	0.0172	-0.0276
F	407.8	91.83	49.82

3. Bank loans

Variables	(1) Loan	(2) Loan term	(3) Loan long	(4) Loan short
Nationalization	7.480*** (4.16)	19.780*** (5.07)	9.878*** (11.03)	-9.756 (-1.07)
Nationalization* Market index	-0.289 (-1.06)	-1.023* (-1.73)	-0.601*** (-4.71)	0.802 (0.93)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	0.111	-0.0248	0.0213	0.000529
F	193.7	52.33	95.87	21.44

Table 12. Local institutions (contd.)**Panel C. Costs**

This panel presents the results of nationalization, institutions and various firm costs including taxes, employment, and donations. Here, *Market index* represents the degree of marketization. The control variables are the same as in the previous regressions. We control for year and firm fixed effects in all regressions. *T*-statistics are reported in parentheses. All dependent variables are winsorized at the 1st and 99th percentile. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.

1. Taxes

Variables	(1) Tax1	(2) Tax2	(3) Tax evasion
Nationalization	12.554*** (4.69)	17.825*** (7.08)	-18.630*** (-7.09)
Nationalization*Market index	-0.552 (-1.45)	-1.100*** (-3.06)	1.253*** (3.34)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	27,759	27,759	27,759
Number of firms	2,229	2,229	2,229
Adjusted R ²	-0.0688	-0.0633	0.0215
F	15.74	20.18	95.62

2. Employment

Variables	(1) Emp(Log)	(2) Emp(%assets)	(3) Emp(%sales)	(4) Exemp
Nationalization	1.474*** (12.91)	5.825*** (23.52)	14.462*** (15.44)	0.300** (2.16)
Nationalization* Market index	-0.067*** (-4.14)	-0.484*** (-13.73)	-1.204*** (-9.03)	0.006 (0.30)
Control variables	YES	YES	YES	YES
Firm and Time FE	YES	YES	YES	YES
Observations	28,419	28,419	28,419	28,419
Number of firms	2,229	2,229	2,229	2,229
Adjusted R ²	0.130	0.0712	0.00383	0.217
F	217.3	147.9	78.91	338.0

3. Donations

Variables	(1) Donation(Log)	(2) Donation(%assets)	(3) Donation(%sales)
Nationalization	2.568*** (6.08)	0.285*** (22.44)	0.544*** (19.75)
Nationalization* Market index	-0.288*** (-4.76)	-0.020*** (-11.03)	-0.038*** (-9.55)
Control variables	YES	YES	YES
Firm and Time FE	YES	YES	YES
Observations	17,426	17,426	17,426
Number of firms	2,164	2,164	2,164
Adjusted R ²	-0.0519	0.0287	-0.0126
F	44.42	90.28	65.86

Figure 1. Parallel trend assumption

Panel A: Kernel density plots of the matched sample

We use propensity score matching to identify 115 firms for the control group for each of the 115 treatment firms during 2000 to 2013. We first use a logit regression to predict the propensity score for each firm in the matched sample. We then plot the kernel density distribution of the propensity score before and after the matching process.

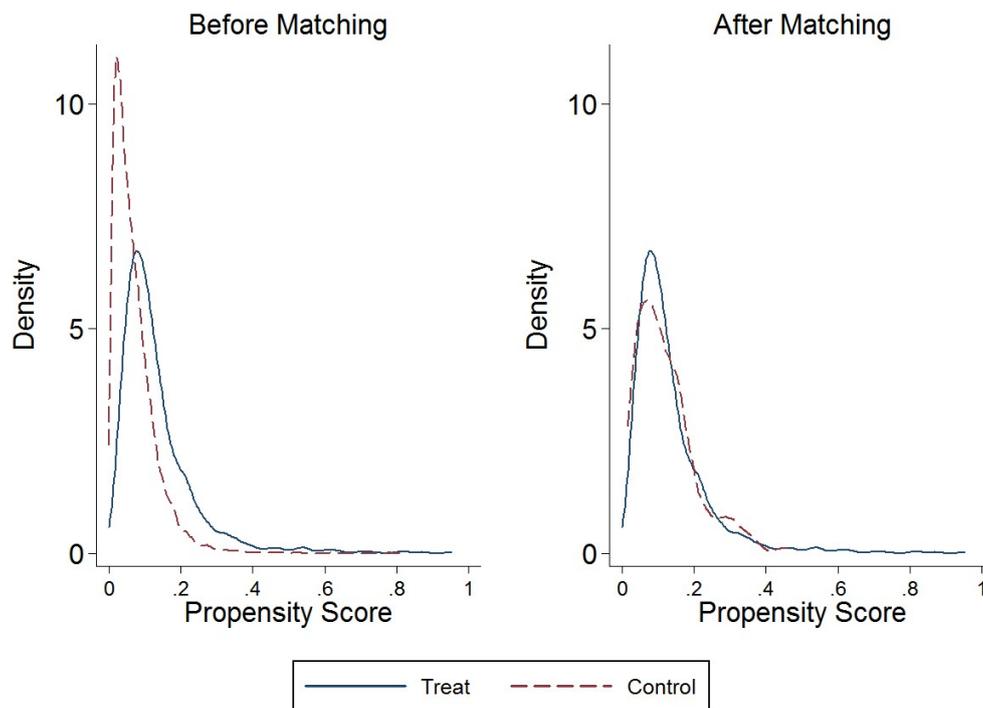
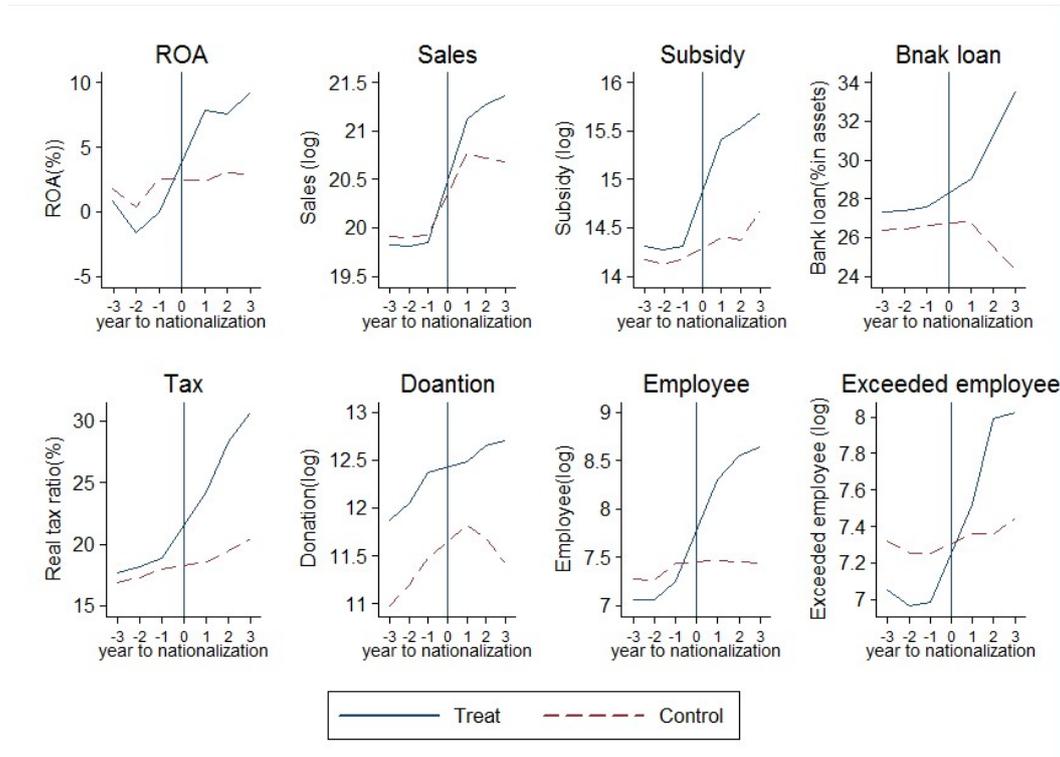


Figure 1. Parallel trend assumption (contd.)

Panel B: Parallel trend

This panel presents the unconditional mean of the main dependent variables for the treatment and control groups from three years before to three years after the nationalization event. Eight main dependent variables are showed here, including ROA, Sales(log), Subsidy(log), Bank loan(% in assets), Tax rate, Donation(log), Employee(log) and Exceeded employee(log).



Appendix 1. Stock code list of nationalized firms

This appendix displays the stock code of the 115 nationalized firms in the final sample.

Year	NO.of firms	Stock code
2000	5	000639,600622,600647,600658,600892
2001	6	000672,000729,600157,600617,600783,600847
2002	5	000607,600074,600854,600869,600880
2003	5	000801,600139,600635,600687,600758
2004	6	000409,000516,000540,000555,000586,000766
2005	4	000023,000877,000885,000913
2006	14	000411,000521,000544,000620,000657,000812,000892,000921,600101,600156,600213,600397,600505,600794
2007	13	000150,000605,000615,000633,000671,000780,000889,000930,000990,600185,600221,600239,600629
2008	16	000532,000546,000587,000636,000736,000819,600097,600207,600223,600265,600422,600466,600608,600657,600728,600743
2009	7	000939,600291,600338,600360,600556,600773,600983
2010	12	000012,000545,002002,002049,002074,600084,600086,600373,600398,600715,600760,600790
2011	6	000415,600145,600149,600175,600605,600730
2012	7	000809,002200,600133,600515,600538,600691,600706
2013	9	000030,000498,000616,002167,002230,300080,600517,600738,601318

Appendix 2. Variable definitions⁷

Name	Definition	Data source
Panel A: Key explanatory variables		
Nationalization	A dummy variable which equals one in the years after the private firm i is taken over by a government department or government-owned firms, thereby resulting in the government becoming its first or second largest controller, and 0 otherwise.	Hand collected
Market index	A measure of overall marketization for each province in China.	NERI INDEX of Marketization of China's Provinces 2016 Report ⁸
Law index	A measure of the regional legal system for each province in China.	
Panel B: Instrumental variable		
SOEs percent	In the year after firm i is nationalized, it equals to the number of listed SOEs (State Owned Enterprises) divided by total number of listed enterprises in the same province.	CSMAR

⁷ All data are collected at the end of each year.

⁸ Because of the comparability of the data, we use the data in the year 2008 to cover firm observations before or during that year, and the data in the year 2014 to cover firm observations after 2008.

Panel C: Control variables

Size	Natural log of total assets.	$Ln (Assets_{i,t})$	
B/M	The book value of assets divided by its market value of equity.	$\frac{Assets_{i,t}}{Equity\ market\ value_{i,t}} \times 100$	
Age	The number of year the firm has been listed.	$Year_{i,t} - Listed\ Year_i$	
Growth	The growth rate of assets.	$(\frac{Assets_{i,t}}{Assets_{i,t-1}} - 1) \times 100$	CSMAR
Leverage	Total debt divided by total assets.	$\frac{Debt_{i,t}}{Assets_{i,t-1}} \times 100$	
Board directors	The number of board members.		
Independent directors	The number of independent directors.		
CSI 300	Dummy variable which equals to one if it the firm is included in the CSI 300 Index.		
Strategy	Dummy variable which equals one if the firm operates within a strategic industry ⁹ and zero otherwise.		

Panel D: Dependent variables (performance)

ROA	Return on assets, net income divided by total assets.	$\frac{Net\ income_{i,t}}{Assets_{i,t}} \times 100$	
ROE	Return on equity, net income divided by the book value of equity.	$\frac{Net\ income_{i,t}}{Equity_{i,t}} \times 100$	CSMAR
ROS	Return on sales, net income divided by total sales.	$\frac{Net\ income_{i,t}}{Sales_{i,t}} \times 100$	

⁹ Strategic industries are: Coal, Oil and gas, Steel, Non-ferrous metals, Railway, Aerospace, Airports, City water, Electric energy, Telecoms (except internet), Housing, Equipment manufacturing, Automobile manufacturing.

Panel E: Dependent variables (benefits)			
Variable	Name	Definition	Data source
	Sales(Log)	Natural log of sales.	$Ln (Sales_{i,t})$
Market power	Mar_power1	The market value of firm equity divided by total market value of the same industry.	$\frac{Market\ value_{i,j,t}}{Industry\ market\ value_{j,t}} \times 100$
	Mar_power2	The firm's sales divided by the total sales in the same industry.	$\frac{Sales_{i,j,t}}{Industry\ Sales_{j,t}} \times 100$
	Subsidy(Log)	Natural log of the amount of government subsidies.	$Ln (Subsidy_{i,t})$
Subsidy	Subsidy(%assets)	Government subsidies divided by total assets.	$\frac{Subsidy_{i,t}}{Assets_{i,t}} \times 100$
	Subsidy(%sales)	Government subsidies divided by total sales.	$\frac{Subsidy_{i,t}}{Sales_{i,t}} \times 100$
	Loan	Total loans divided by total assets.	$\frac{Total\ loan_{i,t}}{Assets_{i,t}} \times 100$
Bank loans	Loan term	Long-term loans divided by total loans.	$\frac{Long\ term\ loan_{i,t}}{Total\ loan_{i,t}} \times 100$
	Loan long	Long-term loans divided by total assets.	$\frac{Long\ term\ loan_{i,t}}{Assets_{i,t}} \times 100$
	Loan short	Short-term loans divided by total assets.	$\frac{Short\ term\ loan_{i,t}}{Assets_{i,t}} \times 100$

Panel F: Dependent variables (costs)				
Variable	Name	Definition	Data source	
Tax	Tax1	The tax fee divided by the income before tax.	$\frac{Tax\ fee_{i,t}}{EBT_{i,t}} \times 100$	
	Tax2	The tax fee minus tax return, then divided by the income before tax.	$\frac{Tax_{i,t} - Tax\ return_{i,t}}{EBT_{i,t}} \times 100$	CSMAR
	Tax evasion	Nominal tax rate minus Tax1.	$Nominal\ tax\ rate_{i,t} - Tax1$	
Employment	Emp(log)	Natural log of the total employees.	$Ln (Employees_{i,t})$	WIND& CSMAR
	Emp(%assets)	Total employees divided by total assets.	$\frac{Employees_{i,t}}{Assets_{i,t}} \times 100$	
	Emp(%sales)	Total employees divided by total sales.	$\frac{Employees_{i,t}}{Sales_{i,t}} \times 100$	
	Exemp	A measure of excess personnel, defined as the residual of the following regression: $Employees_{i,t} = C + \beta_1 \times Size + \beta_2 \times Leverage + \beta_3 \times growth + \beta_4 \times ROA + \beta_5 \times PPE + \varepsilon_{i,t}$		
Donations	Donation(log)	Natural log of the amount of donations.	$Ln (Donation_{i,t})$	CSMAR
	Donation(%assets)	Total donations divided by total assets.	$\frac{Donation_{i,t}}{Assets_{i,t}} \times 100$	
	Donation(%sales)	Total donations divided by total sales.	$\frac{Donation_{i,t}}{Sales_{i,t}} \times 100$	

Appendix 3. Correlation matrix

This appendix presents Pearson correlations (lower triangular) and Spearman correlations (upper triangular) between the main dependent and explanatory variables. The definition of each variables is provided in Appendix 2. The sample consists of all Chinese A share companies except for firms assigned with Special Treatment (ST and ST*) and financial firms. All variables are winsorized at the 1st and 99th percentile.

	ROA	Sales(log)	subsidy(log)	Loan	Tax1	Emp(log)	Exemp(log)	Donation(log)	Nationalization
ROA	1***	0.0881***	0.0639***	-0.3718***	0.0097	0.0258***	-0.0576***	0.1823***	0.0488***
Sales(log)	0.1318***	1***	0.4015***	0.0497***	0.1846***	0.6242***	0.8342***	0.4053***	0.0502***
subsidy(log)	0.0842***	0.4293***	1***	-0.0679***	0.0004	0.3318***	0.4101***	0.2193***	0.0681***
Loan	-0.312***	0.0206***	-0.0605***	1***	0.0463***	0.0604***	0.1647***	-0.0123*	0.1501***
Tax1	0.073***	0.0948***	-0.0214***	0.026***	1***	0.0946***	0.1522***	0.1025***	0.1352***
Emp(log)	0.0509***	0.6122***	0.343***	0.0299***	0.0454***	1***	0.5716***	0.2968***	0.1663***
Exemp(log)	0.0311***	0.5641***	0.2606***	0.067***	0.0434***	0.3034***	1***	0.383***	-0.0201***
Donation(log)	0.155***	0.3588***	0.1995***	-0.0287***	0.0342***	0.2443***	0.2085***	1***	0.0833***
Nationalization	0.0746***	0.0265***	0.0429***	0.1627***	0.1037***	0.1241***	-0.0922***	0.0304***	1***
Size	0.0508***	0.8456***	0.4556***	0.0605***	0.0714***	0.5342***	0.6401***	0.35***	-0.0523***
B/M	-0.25***	0.4294***	0.1293***	0.3369***	0.1076***	0.2615***	0.3032***	0.1232***	0.0049
Age	-0.1112***	0.2511***	0.1445***	0.1329***	0.0953***	0.1371***	0.1168***	0.0327***	0.1876***
Growth	0.1889***	0.0976***	0.0555***	-0.0293***	0.0156**	0.0375***	0.0522***	0.0667***	0.0431***
Leverage	-0.3642***	0.3014***	0.0471***	0.5904***	0.0721***	0.1897***	0.1509***	0.0427***	0.1137***
Board directors	-0.004	0.1849***	0.0199***	0.0779***	0.0319***	0.1765***	0.1336***	0.0658***	-0.0338***
Independent directors	0.013*	0.2885***	0.1223***	0.0177**	0.0238***	0.1913***	0.2193***	0.1375***	-0.0339***
CSI 300	0.1276***	0.4602***	0.2027***	-0.0326***	0.0108	0.3568***	0.2327***	0.2389***	-0.044***
Strategy	-0.045***	0.1248***	0.0801***	0.012	-0.0489***	0.1271***	0.0708***	0.0204***	-0.0493***

Appendix 3. Correlation matrix (contd.)

	Size	B/M	Age	Growth	Leverage	Board directors	Independent directors	CSI 300	Strategy
ROA	-0.0007	-0.395***	-0.1903***	0.306***	-0.4117***	-0.008	-0.006	0.1228***	-0.0577***
Sales(log)	0.8348***	0.4104***	0.2897***	0.1854***	0.3543***	0.1685***	0.2551***	0.4209***	0.1053***
subsidy(log)	0.4313***	0.0776***	0.1343***	0.0999***	0.0375***	-0.0048	0.0884***	0.1636***	0.0716***
Loan	0.0794***	0.372***	0.1488***	-0.0265***	0.6007***	0.0839***	0.0342***	-0.0324***	0.0095
Tax1	0.1494***	0.1669***	0.1227***	0.0671***	0.1142***	0.0389***	0.0442***	0.0404***	-0.0642***
Emp(log)	0.5397***	0.2742***	0.1864***	0.0934***	0.2313***	0.1613***	0.1874***	0.3329***	0.1123***
Exemp(log)	0.9716***	0.5226***	0.342***	0.1606***	0.4223***	0.1842***	0.2787***	0.4528***	0.0958***
Donation(log)	0.3944***	0.1239***	0.0593***	0.1522***	0.0763***	0.0746***	0.1462***	0.2756***	0.0271***
Nationalization	-0.0412***	-0.0137*	0.1896***	-0.0106	0.1021***	-0.0406***	-0.0432***	-0.044***	-0.0493***
Size	1***	0.4758***	0.3219***	0.2368***	0.3407***	0.1616***	0.271***	0.4617***	0.0884***
B/M	0.5168***	1***	0.2028***	-0.0289***	0.5586***	0.1691***	0.17***	0.1085***	0.0641***
Age	0.2924***	0.1926***	1***	-0.1173***	0.3484***	0.0004	0.0515***	0.1051***	-0.0797***
Growth	0.1603***	-0.0185**	-0.0165**	1***	0.0422***	0.0242***	0.0456***	0.1004***	0.016**
Leverage	0.2962***	0.5136***	0.3283***	0.0179**	1***	0.1117***	0.0973***	0.0899***	0.0225***
Board directors	0.1959***	0.1564***	-0.0133*	-0.0164**	0.1068***	1***	0.6629***	0.1464***	0.0467***
Independent directors	0.3081***	0.1739***	0.0786***	0.0003	0.0809***	0.6104***	1***	0.2162***	0.0638***
CSI 300	0.5182***	0.1353***	0.0971***	0.0291***	0.0779***	0.1714***	0.2183***	1***	0.0726***
Strategy	0.1054***	0.071***	-0.0807***	0.008	0.0161**	0.0496***	0.071***	0.0726***	1***