DOI: 10.1111/ecot.12299

ORIGINAL ARTICLE

ECONOMICS of TRANSITION and INSTITUTIONAL CHANGE WILEY

# Uncovering asset stripping during China's privatization

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**Funding information**
This work was supported by the National Natural Science Foundation of China Major Project (Grant Number: 71790601), National Natural Science Foundation of China General Project (Grant Number: 72073114; Grant Number: 71803157) and MOE (Ministry of Education in China) Project of Humanities and Social Sciences (Grant Number: 18YJC790196).

**Abstract**

This paper empirically studies the occurrence and extent of asset stripping via undervaluing public assets during the mass privatization of state-owned and collectively owned enterprises in China. Using three waves of a national survey of private firms, we provide evidence that state-owned and collectively owned assets were substantially underpriced, indicating the presence of corruption during privatization. Further analysis shows that the extent of underpricing is more severe in regions with less market competition or weaker property rights protection, and more pronounced for intangible assets such as intellectual property rights and land use rights. When comparing firm efficiency between privatized firms and de novo private firms, we find that the former group continues to enjoy considerable preferential treatments, yet significantly underperforms the latter, possibly due to continued government control and intervention. Finally, we provide evidence that insider privatization is an important source of corruption during the privatization process.

**KEYWORDS**

privatization, corruption, government intervention, China

**JEL CLASSIFICATIONS**

D73; K42; L33

# 1 | INTRODUCTION

The absence of market competition and rigorous accounting standards makes it difficult to determine the market value of state assets in many developing and transition economies; and the lack of transparency and oversight further leaves room for incumbent managers and local bureaucrats to manipulate the selling prices of state assets for their own interests. As a result, SOE executives and government officials regularly discount the selling prices of state assets during privatization (Fisman & Wang, 2015; Lu et al., 2009). This has caused wide public concerns in many developing countries (Birdsall & Nellis, 2003; Rose-Ackerman, 1999; Tangri & Mwenda, 2001; Tulchin & Espach, 2000), and the ongoing anti-corruption campaign in China has also uncovered many cases of asset-stripping. In probably the biggest corruption scandal in China since 1949, Zhou Yongkang, China's former security chief, was reported to have helped his family members and associates accumulate wealth by seizing state assets.[1]

A good grasp of the asset stripping phenomenon is crucial for understanding corruption and designing privatization programmes in transition economies, yet there lack rigorous empirical studies documenting such incidents and their magnitude, with existing studies relying on case studies or theoretical analysis (Ding, 2000; Gong, 2006; Gong & Shi, 2009; Lu et al., 2009; Smyth, 2000). This paper aims to empirically study the issue of underpricing during transfer of public assets and examine its determinants and its impacts on firm performance, by exploring a massive privatization programme in China during the 1990s, with state-owned and collectively owned enterprises transferred to private hands.

Our data comprise of three waves of a nationwide survey from 2004, 2006 and 2008, which cover both privatized firms and de novo private firms randomly drawn from 31 provinces in mainland China. In addition to its large sample size and its national representativeness, the survey also inquires a wide range of questions that provide rich information on the firms and their owners. To empirically estimate the degree of asset undervaluation, we propose a strategy to recover the extent of underpricing by comparing the current asset value of privatized firms with that of de novo private firms after controlling for initial registered asset and other firm and entrepreneur characteristics.

We find empirical evidence that the value of public firms may be significantly depressed when transferred to private ownership. On average, we produce evidence that the assets of public firms may have been underpriced by around 20% during privatization. In particular, firms were discounted by 60% when the firms were privatized through private negotiations between local governments and certain purchasers and underpriced by 30% when the firms were purchased by former management. In addition, we show results that underpricing was more severe in regions with less market competition and areas with poorer property rights protection, and more pronounced for less tangible assets such as intellectual property rights and land use rights. We further produce evidence that privatized firms continue to enjoy considerable favourable treatments, yet significantly underperform de novo private firms, possibly due to continued government control and intervention. Finally, insider privatization is found to be an important source of public asset underpricing, which may also help explain the underperformance of privatized firms. Overall, our results suggest that the danger of state assets being stolen is substantially higher with less transparent privatization process or weaker market-supporting institutions, and the empirical findings lend more support to the underpricing hypothesis rather than the asset appreciation or firm performance explanations. These findings thus help shed on the magnitude, the sources and the effects of asset stripping during China's privatization in the 1990s.

[1]For more detail, see the news from Caixin net 'Zhou Bin's White Gloves' (http://video.caixin.com/2014-01-30/100635560.html).

Our results, however, may suffer from the potential endogeneity problem caused by self-selection and omitting unobservable firm characteristics. To address the self-selection problem, we resort to the propensity score matching method by matching privatized firms and de novo private firms using a host of variables on the initial conditions of a firm when registering as a private firm. The results from PSM method are consistent with the baseline results. To tackle the endogeneity issue caused by omitted variables, we conduct the two-stage least square estimation by employing the share of state ownership in local industrial output and the fiscal burden of local government at the time of firm registration as instrumental variables for the probability that a firm is privatized from a local public firm. We find our results are robust after addressing the endogeneity concern.

The remainder of the paper is organized as follows: Section 2 reviews the relevant literature; Section 3 describes the institutional background for China's corporate restructuring and privatization in the 1990s; Section 4 discusses the data and empirical strategy, whereas Section 5 reports the main empirical results. Section 6 tests the alternative hypotheses and conducts the heterogeneity analysis, while Section 7 studies the impact of privatization. A short conclusion is given in Section 8.

## 2 | LITERATURE REVIEW

Our study is closely related to several strands of literature. The first is on how corruption relates to privatization. Theoretically, the relationship is not clear-cut. As public ownership gives firm management incentive and discretion to transfer assets and channel resources to related parties, privatization is expected to reduce corruption activities (Kaufmann & Siegelbaum, 1997). But as the privatization process is largely under the control of incumbent managers and local officials, privatization itself may give rise to corruption opportunities (Laffont & Meleu, 1999). Furthermore, Bjorvatn and Soreide (2005) show that the sale of public assets under a corrupt regime may result in highly concentrated industry structure and further reduce economic efficiency. Empirical studies have also provided mixed results. While some studies show that privatization helps reduce opportunities for public officials to extract rents (Clarke & Xu, 2004; Koyuncu et al., 2010; Schmidt, 2000), other papers find privatization has increased corruption within the political system, especially for developing countries and countries with socialist origin (Arikan, 2008; Boubakri et al., 2009).

The current paper also relates to studies on the effects of privatization on firm performance. Many studies find that privatization, partial or full, helps public firms increase profitability (Boubakri et al., 2005; Claessens & Djankov, 1999; D'Souza & Megginson, 1999; Xu & Wang, 1999), enhance sales or output (Claessens & Djankov, 2002; Smith et al., 1997) and promote labour productivity or TFP (Brown et al., 2006; Earle & Telegdy, 2002; Jefferson & Su, 2006; Li & Xu, 2004; Sun & Tong, 2003), while other researchers find that the effects of ownership transformation per se are quite weak in many countries and vary with the types of owners it gives control to (Hanousek et al., 2004; Jones, 1998; Manzetti, 1999; Omran, 2004; Puntillo, 1996). In particular, efficiency enhancing is more pronounced when the firm is sold to outsiders rather than insiders (Earle & Telegdy, 2002; Frydman et al., 1999; Smith et al., 1997), and control relinquishment by the government is crucial for efficiency gains in privatized firms (Boubakri et al., 2005).

The third strand of literature relevant for our study is the growing literature on rent seeking and asset stripping activities in China. Previous case studies in Ding (2000), Gong (2006), Gong and Shi (2009), Smyth (2000) and Lu et al., (2009) discuss the strategies and tactics used by SOE managers and local cares to encroach upon public assets. And a few empirical studies focus on publicly traded companies to document the patterns of asset underpricing in Chinese SOEs. Chen et al. (2008) find that CEOs of state firms attempt to get promotions by underpricing and allocating IPO shares to

parties important to their careers; Fisman and Wang (2015) document sizable underpricing in the transfer of non-traded shares from state firms to private firms by disguising their state ownership; and other studies provide evidence on related party transactions (Wong & Jian, 2003), tunnelling (Jiang et al., 2010; Liu & Lu, 2007) and financial fraud (Chen et al., 2006).

Compared to the existing literature, our study aims to contribute in the following ways: First, we can empirically examine the existence and estimate the extent of asset stripping during China's privatization process in the 1990s, and study how transparency and competition help reduce corruption during privatization. In addition, the detailed firm data allow us to carefully study the consequences of privatization on firm behaviours and performance, based on the comparison between privatized firms and de novo private firms in China. Finally, as the data include several thousands of small- and medium-sized private firms, our study expands on existing research on China's capital market that rely on case studies and listed firm data.

## 3 | INSTITUTIONAL BACKGROUND

Unlike many former socialist economies that rapidly privatized its state sector, China has adopted a distinctive reform strategy to gradually transform its public sector towards a market economy (Naughton, 1994, 2007). In the early phase of economic reform, the focus was to solve the incentive problem via decentralization and operational autonomy (Gordon & Li, 1991; Naughton, 2007), by signing individual contracts with SOE managers, which specify tax payments and contributions to the material-balance plan (Lee, 1990) and allow retained profit, salaries and bonuses to be linked to firm performance (Groves et al., 1994). Thus, very few state-owned enterprises were privatized during this stage.

But by the mid-1990s, the limitations of the decentralization reforms have manifested. With their high monopoly profits competed away by the large number of new entrants,[2] the inefficient operations of SOEs have led to mounting debts (Li & Rozelle, 2003; Naughton, 2007). In response, a second wave of industrial reforms was launched to more fundamentally restructure its public enterprises. With the 1994 Company Law providing a uniform legal framework for firms of different ownership types, the 15th Communist Party Congress passed the 'grasping the large and letting go of the small' policy in September 1997, where policymakers gave the greenlight to privatize the thousands of small- and medium-sized SOEs and collectively owned enterprises. The impact of the privatization initiative was fundamental: By the end of 2001, over 80% of all SOEs were restructured and 70% had been fully or partially privatized (Yusuf et al., 2006).

While the specific means and pace of privatization were invariably locally determined, 'insider privatization' has been the most common form of privatization since the mid-1990s, with incumbent managers, workers and closely affiliated government officials obtaining significant shares of the privatized firms. Combined with the lack of transparency, this led many opportunities for managerial abuse and corruption. In addition, the double roles played by the local government, that is, the principal managing the local economy and the state agent implementing privatization policies, gave local officials substantial discretion to achieve personal gains through asset stripping and related-party transactions (Gong, 2006).

For example, firms going through restructuring tended to rely on internal accounting instead of external auditing for state asset evaluations (Gong & Shi, 2009). Incumbent managers could

[2]They include both collectively owned town and village enterprises (TVEs) and domestic private firms and foreign-invested firms.

manipulate firm's pre-privatization performance to make the firm look worse. Government officials may present information selectively to the public (Rose-Ackerman, 1999), and may also accept bribes to facilitate purchase of state assets at very low prices.[3] In a widely publicized privatization case, Luneng Group, one of the largest state-owned enterprises in Shandong province, was sold to two private firms at 3.7 billion RMBs, whereas the asset was estimated to at around 70 billion.[4]

In summary, corrupt managers and officials in China have been able to use various tactics to underprice state assets during privatization, despite the efforts of SASAC (State-owned Assets Supervision and Administration Commission) to stop such behaviours. While anecdotal evidence abounds showing its prevalence, there has been no systematic empirical study on the existence and the extent of asset stripping. We will attempt to fill this gap in the following sections.

# 4 | EMPIRICAL STRATEGY AND DATA

In this section, we present the empirical strategy and the data used to establish the existence and extent of asset underpricing during China's privatization in the 1990s.

## 4.1 | Empirical strategy

In the absence of reliable evaluation of firm assets before privatization, we cannot directly observe the magnitude of underpricing for privatized firms. Therefore, the following empirical strategy is used to recover the degree of asset undervaluation: the current asset value of privatized firms and that of de novo private firms are compared over time while controlling for initial registered asset and other firm and entrepreneur characteristics. The intuition is straightforward: If the assets of privatized firms were undervalued initially and yet the true value of these assets would be unmasked in the financial books once the asset transfer was completed, then these firms would appear to hold more valuable assets and accumulate assets faster than de novo private firms.

To formulate our empirical strategy, let $P_i$ be an indicator of whether the firm is a privatized firm (versus a de novo private firm), let $A_{it}$ denote the current net asset of firm $i$, and $A_{i0}$ represent the registered net asset of firm $i$ when first registering as a private firm. The model specification for estimating firm asset is as follows:

$$\log A_{it} = \alpha + \theta P_i + \gamma_2 log A_{i0} + \delta X_{it} + \eta_{it}, \tag{1}$$

where the current value of firm assets is explained by its ownership origin, initial asset, and firm attributes and entrepreneur attributes ($X_{it}$). θ captures the extent to which the initial asset of privatized firm is underpriced and is expected to be positive and significant. To alleviate the problem of endogeneity, we include a host of variables that may also affect firm asset growth. First, we include firm attributes such as *firm age* (the number of years since the firm was registered as a private firm). The second set of variables include entrepreneur characteristics, namely, *female* (a gender dummy variable), *education* (years of formal schooling), *former cadre* (a dummy indicating former government experience), *former manager* (an

[3]See Ding (2000) for a comprehensive review on the strategies widely used by state firm managers and officials to illicitly transfer public property into their own hands.

[4]For more details, see 'Whose Lunen?' Caijing Journal, January 8, 2007.

indicator of former managerial experience) and *party member* (A dummy for party membership before starting the firm). And, we control for province, year and industry fixed effects.

In later sections, we will use other estimation methods to better resolve the endogeneity issue, including propensity score matching (PSM) method and IV estimation. And to further alleviate the concern, we will also investigate potential mechanisms and conduct heterogeneity studies.

## 4.2 | Data

The firm-level data used in this study are from three waves of a nationwide survey of privately owned enterprises in China, which were conducted in 2004, 2006 and 2008 jointly by the All China Industry and Commerce Federation, the China Society of Private Economy at Chinese Academy of Social Sciences and the United Front Work Department of the Chinese Communist Party (the CCP).[5] As the survey includes questions about firms' initial asset registration and ownership type, the data can be used to recover information on firm privatization from the 1990s as well as the early 2000s.

To achieve a balanced representation of private firms across all regions and industries in mainland China, the multistage-stratified random sampling method was used in the survey, resulting in a sample that comprises both large firms and individual household enterprises randomly drawn from 19 sectors and 31 provinces in mainland China. Through intensive interviews with firm owners, the survey collected rich information about entrepreneur attributes such as family background, human capital, political connection and occupational experiences, as well as many aspects of firm attributes such as initial registered asset, current firm size, employment, firm age and basic financial background information. More importantly, the survey collected information on whether the firm is a privatized firm or a de novo private firm. For privatized firms, additional questions were asked to inquire information about firms' ownership types before privatization, how the firm was privatized and in which year, thus providing us the opportunity to study the possibility of asset stripping in the sale of public assets. One limitation of the dataset, however, is its cross-section feature, as the firms have not been followed up over time to track their changes. Thus, we cannot adopt panel estimation methods to analyse the data.

A preliminary analysis of the data shows that a substantial proportion of private firms were privatized from former state-owned enterprises or collective enterprises (19.2%).[6] As shown in Figure 1, most of the privatized firms in our sample went through ownership restructuring after 1997, which are consistent with the time line of mass privatization discussed in Section 2. And panel A of Table 1 demonstrates, among the privatized firms around 37.35% were privatized from former state-owned enterprise, 41.40% from former urban collective enterprises and 21.25% from former rural collective enterprises. Among the various methods through which public firms were privatized, 28.47% of firms were sold through open biddings, 12.74% were privatized through private negotiations between certain buyers and the local government (referred to as private negotiations hereafter), 20.39% were purchased by former management, 22.76% were bought by former staff, 7.21% were first taken into a trust and then sold, and another 8.44% were transferred into private hands to offset assets and liabilities. Not surprisingly, insider privatization was prevalent during the privatization of SOEs and collective enterprises in China, with 43% of privatized firm being transferred to the hands of former

[5]The survey collects prior year information; thus; the firm information in our data corresponds to 2003, 2005 and 2007. Every year firms in the survey are re-sampled nationally; thus, the data are a repeated cross-section data.

[6]To avoid complexities introduced by other types of ownership restructuring, we exclude firms that are publicly listed or ever merged with other firms from our empirical analysis.

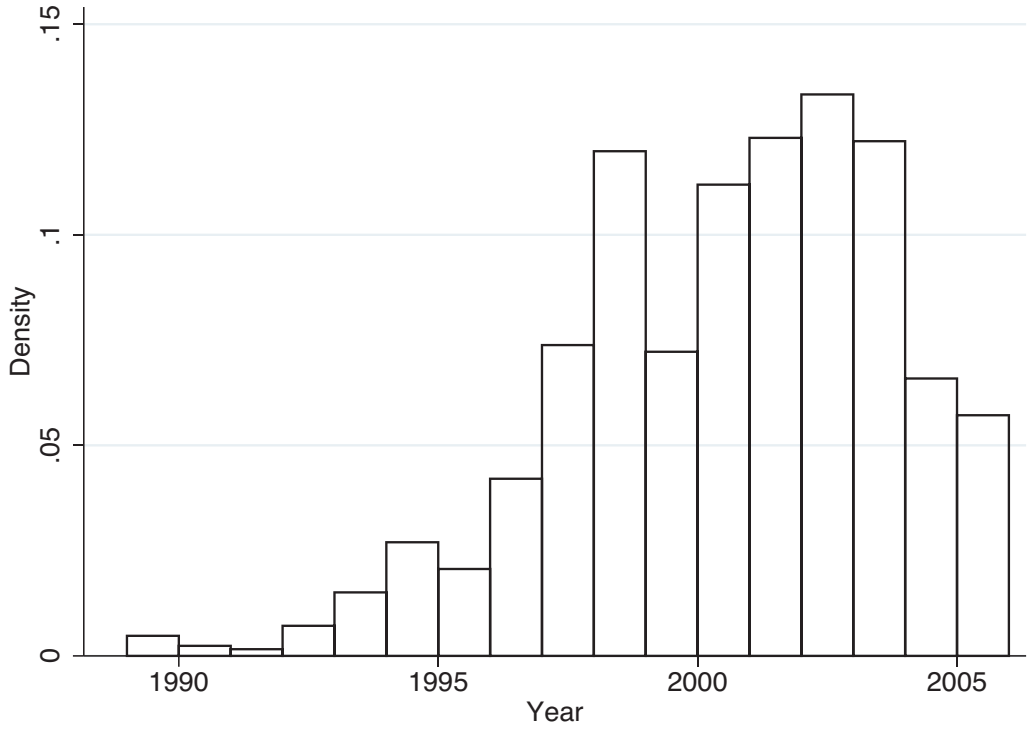


**FIGURE 1** Distribution of privatization activities over time

*Notes*: The vertical axis is the proportion of firms privatized in a year out of all privatized firms in our sample

**TABLE 1** Firm ownership and privatization mode (in percentage)

| | 2004 | 2006 | 2008 | Total |
|---|---|---|---|---|
| Panel A: Ownership type before privatization | | | | |
| SOE | 37.38 | 35.16 | 39.63 | 37.35 |
| Urban collective enterprise | 43.74 | 42.39 | 38.54 | 41.40 |
| Rural collective enterprises | 18.89 | 22.45 | 21.83 | 21.25 |
| Total | 100 | 100 | 100 | 100 |
| Panel B: Modes of privatization | | | | |
| Open bidding | 26.23 | 30.43 | | 28.47 |
| Take in trust and then purchase | 8.68 | 5.92 | | 7.21 |
| Private negotiation between certain purchasers and the government | 12.64 | 12.83 | | 12.74 |
| Purchased by former leadership | 19.62 | 21.05 | | 20.39 |
| Purchased by former staff | 23.77 | 21.88 | | 22.76 |
| Offsetting assets and liabilities | 9.06 | 7.89 | | 8.44 |
| Total | 100 | 100 | | 100 |

*Notes:* The authors' own calculation, based on the 2004, 2006 and 2008 survey of Chinese private entrepreneurs.

management and staff. Thus, the dataset gives us an opportunity to study how privatization bred corruption when China launched the large-scale privatization of its small and medium state-owned enterprises and collective enterprises.

Table 2 presents the summary statistics of the main variables used in our analysis. Specifically, the data show that profit accounts for 7.9% of sales and private firms invest around 3% of its revenue in R&D activities on average during the sample period. Consistent with findings in the existing literature of private firms experiencing financial constraints and relying heavily on self-financing in China (Cull & Xu, 2005; Franklin et al., 2005; Long & Zhang, 2011), firms in our sample reinvest a large proportion of profit (45.7%) in their own businesses. On average, 14.5% of private entrepreneurs are female and have roughly 14 years of education. A large percentage of entrepreneurs have various political connections with the government or with the party, with 45.2% of entrepreneurs being party members, 20% having served as government cadre and 30% of private entrepreneurs are former managers of SOEs or collective enterprises.

Figure 2 provides some preliminary evidence of asset stripping. It shows that the asset gap between privatized firms and de novo private firms is most evident right after the privatization, but the gap becomes less pronounced over time.

## 5 | MAIN RESULTS

This section presents and discusses the main results from our empirical analysis. We first explore whether the initial asset value of privatized firms is significantly underpriced, using OLS estimation. Then, we address the potential endogeneity issue using both the propensity score matching method and the instrumental variable estimation.

### 5.1 | Privatization and underpricing of assets: baseline results

The estimation results for the presence and extent of underpricing from our baseline specifications are presented in Table 3. In column (1) of Table 3, we find privatized firms are significantly larger than de novo private firms in terms of current net asset values after controlling for firm age and initial net asset, with the estimated coefficient of privatized dummy being 22.8%. In column (2) and column (3), we include more entrepreneur attributes and the estimated asset gap between privatized firms and de novo private firms declines to 17%, still a substantial amount. This implies that on average state assets were underpriced by more than 15% during privatization, which is economically important by any standard. Consistent with expectations, private firms owned by female entrepreneurs or less educated entrepreneurs are significantly smaller, whereas public firm manager experiences are positively correlated with firm size because these characteristics correlate with firms' access to various resources.

### 5.2 | Standard errors are clustered at provincial level and reported in parentheses.Addressing endogeneity

A main concern with our empirical analysis lies in the potential endogeneity problem caused by measurement errors, reverse causality and omitted variables. For two reasons, we believe that the endogeneity issue has been mitigated. First, we have included sector, year and province dummies to capture the unobserved fixed effects and thus the endogeneity problem caused by omitting these fixed effects should be less of a concern. Second, the privatization variable is predetermined relative to the value of the dependent variable (current asset value), implying that reverse causality is not a major problem.

**TABLE 2** Summary statistics

| Variable | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Panel A: Firm level variables | | | | | |
| ln (net asset) (10,000 Yuan) | 6,901 | 5.500 | 2.030 | −11.50 | 18.40 |
| ln (cash) (10,000 Yuan) | 6,705 | 4.180 | 3.050 | −11.50 | 16.50 |
| ln (materials) (10,000 Yuan) | 6,682 | 0.617 | 7.280 | −11.50 | 17.40 |
| ln (patents) (10,000 Yuan) | 6,388 | −9.410 | 5.420 | −11.50 | 17 |
| ln (unpatented technology) (10,000 Yuan) | 6,354 | −10.20 | 4.280 | −11.50 | 16.10 |
| ln (land usage rights) (10,000 Yuan) | 6,538 | −6.220 | 7.620 | −11.50 | 16.50 |
| Privatized | 7,361 | 0.192 | 0.384 | 0 | 1 |
| ln (initial net asset) (10,000 Yuan) | 7,460 | 4.710 | 1.830 | −11.50 | 11.40 |
| ROE | 6,191 | 0.275 | 0.544 | −0.198 | 3.330 |
| ROS | 8,211 | 0.0793 | 0.161 | −1 | 0.989 |
| R&D/sale | 8,592 | 0.0307 | 0.113 | 0 | 0.909 |
| Investment/profit | 5,129 | 0.457 | 0.353 | 0 | 1 |
| IPRs | 9,497 | 0.948 | 3.220 | 0 | 21 |
| Firm age (Year) | 10,122 | 7.240 | 4.590 | 0 | 30 |
| ln (employee) | 9,869 | 3.830 | 1.590 | 0 | 9.900 |
| Government share | 7,905 | 0.000798 | 0.0132 | 0 | 0.400 |
| Oversea investment/total investment | 4,978 | 0.00364 | 0.0477 | 0 | 0.951 |
| Sale to other provinces/total sale | 2,143 | 0.239 | 0.312 | 0 | 1 |
| Initial bank loan | 9,357 | 0.266 | 0.442 | 0 | 1 |
| ln (current loan from state institutions) (10,000 Yuan) | 8,670 | −4.480 | 8.450 | −11.50 | 12.90 |
| Tax/sale | 8,559 | 0.0618 | 0.0635 | 0 | 0.400 |
| Fee/sale | 6,126 | 0.0277 | 0.0719 | 0 | 0.500 |
| ETC/sale | 7,035 | 0.0178 | 0.0511 | 0 | 1 |
| Using court to solve business disputes | 5,298 | 0.340 | 0.474 | 0 | 1 |
| Female | 10,314 | 0.145 | 0.352 | 0 | 1 |
| Education (Year) | 10,294 | 14 | 2.950 | 6 | 19 |
| Party member | 7,766 | 0.452 | 0.498 | 0 | 1 |
| Former cadre | 10,352 | 0.199 | 0.399 | 0 | 1 |
| Former manager | 6,761 | 0.302 | 0.459 | 0 | 1 |
| Panel B: Provincial level variables | | | | | |
| Non-SOE sales/total sales | 62 | 5.03 | 2.71 | 0.98 | 10.5 |
| Producer protection | 62 | 3.89 | 2.20 | 0 | 10 |

*Notes:* The authors' own calculation, based on the 2004, 2006 and 2008 survey of Chinese private entrepreneurs.

Nonetheless, our results may still suffer from the omission of other time-varying unobservable variables. Alternatively, privatized firms and de novo private firms may not be comparable, thus introducing the problem of sample selection. For example, if public firms with higher growth potential

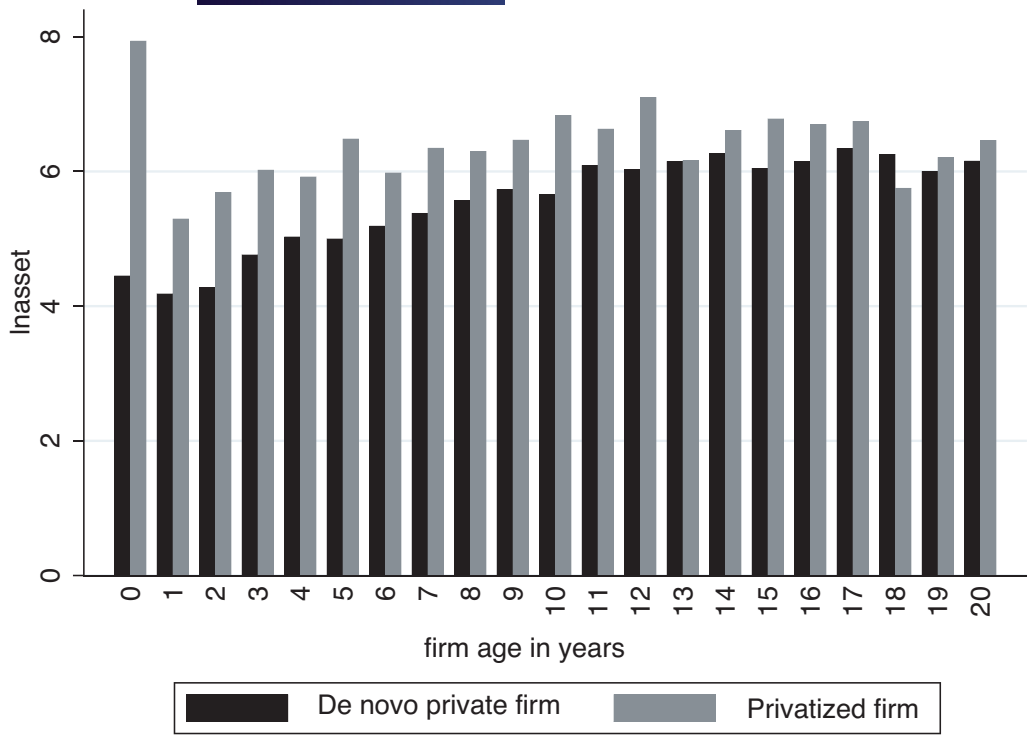


**FIGURE 2** Asset level over time (de novo private firms v. privatized firms)

than de novo private firms are more likely to privatized, the estimated asset gap may merely capture the difference in firm growth potential rather than under-pricing during privatization. To address this issue, we resort to the propensity score matching method where the 'treatment' is regarded as receiving an opportunity to start a private firm by purchasing an underpriced SOE or collective firm.

Specifically, we estimate propensity scores for privatized firms and de novo private firms using a logit model. The propensity score specification for each group includes a host of variables on the initial conditions of a firm when registering as a private firm. In particular, we include entrepreneur attributes such as education, former cadre experience, party membership, former public manager experience, as well as firm attributes such as initial sector dummies, founding year dummies, initial firm location dummies (city, town, village or development area), a dummy for having initial bank loans, survey year dummies and province dummies.

As all of the variables used for matching pass the standard balancing tests, they are appropriate covariates to use for constructing the matched sample. See Table A1 and Figure A1 in the Appendix for the results of balancing tests and distribution of propensity scores for each group. Table 4 reports the results using the propensity score matching method, where the estimates are positive and significant, in line with those obtained in Table 3. Although the PSM estimates tend to be larger, suggesting that our baseline results may underestimate the extent of underpricing, the difference in magnitude is not statistically significant.

While the propensity score matching method helps address the concern that the baseline results may be driven by selection on observable firm characteristics, our estimates may still suffer from omitting unobservable firm characteristics. To address this endogeneity issue, we conduct the two-stage least square estimation by employing two instrumental variables that correlate with the independent variable but do not directly correlate with firms' asset accumulation. It is widely believed that the probability that a firm is privatized from a local public firm is largely determined by the fiscal burden

**TABLE 3** Privatization and current asset

| | ln (Net asset) | | |
|---|---|---|---|
| **Variables** | **(1)** | **(2)** | **(3)** |
| Privatized | 0.228*** | 0.210*** | 0.174** |
| | (0.0436) | (0.0443) | (0.0635) |
| ln (initial net asset) | 0.749*** | 0.729*** | 0.708*** |
| | (0.0261) | (0.0271) | (0.0414) |
| Firm age | 0.0935*** | 0.0935*** | 0.0970*** |
| | (0.00508) | (0.00453) | (0.00604) |
| Female | | −0.217*** | −0.318*** |
| | | (0.0338) | (0.0610) |
| Education | | 0.0544*** | 0.0662*** |
| | | (0.00797) | (0.00830) |
| Party member | | | −0.0213 |
| | | | (0.0436) |
| Former cadre | | | −0.0119 |
| | | | (0.0373) |
| Former manager | | | 0.0963 |
| | | | (0.0611) |
| Constant | 1.578*** | 0.919*** | 0.966*** |
| | (0.147) | (0.163) | (0.306) |
| Industry FE | YES | YES | YES |
| Year FE | YES | YES | YES |
| Province FE | YES | YES | YES |
| Observations | 9,817 | 9,701 | 4,735 |
| *R*-squared | 0.557 | 0.563 | 0.575 |

*Notes:* Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

**TABLE 4** Propensity score matching

| | **Observed Coef.** | **Bootstrap Std. Err.** | ***Z*** | **P > z** | **Normal-based [95% Conf. Interval]** | |
|---|---|---|---|---|---|---|
| ATT | 0.4366149 | 0.0987897 | 4.42 | 0 | 0.2429908 | 0.6302391 |
| ATE | 0.4411694 | 0.0900674 | 4.9 | 0 | 0.2646405 | 0.6176983 |
| ATU | 0.4420969 | 0.0996151 | 4.44 | 0 | 0.2468548 | 0.637339 |

*Notes:* The outcome variable is ln (Net asset).

The *p* value is calculated using bootstrapping method with 200 iterations.

that it brought to the local government. By the mid-1990s, the sharply intensified competition deprived state-owned enterprises of the high monopoly profit they had long enjoyed, many state-owned small and medium enterprises fell into crisis with mounting debts due to inefficient operations (Li & Rozelle, 2003; Naughton, 2007). The large number of SOEs and collectively owned enterprises on the verge of bankruptcy, combined with substantial reduction in tax revenues from other struggling SOEs, became an increasing fiscal burdens for the local government (Cao et al., 1999). To get rid of the

loss-making public enterprises, local governments were motivated to privatize or close down many small and medium state-owned and collectively owned enterprises (Li & Lui, 2004).

To capture the fiscal pressure faced by the local government, the first instrumental variable used in this study is the share of state ownership in local industrial output at the time of firm registration. We expect that regions with a larger state sector faced more fiscal burden and were more likely to transfer state firms to private hands. Alternatively, we employ a second instrumental variable, that is, the fiscal burden of the local government (defined as (fiscal expenditure−fiscal revenue)/fiscal revenue) at the time of firm registration. We expect that regions with a heavier fiscal burden were more likely to privatize local firms, thus satisfying the relevance criterion for instrumental variables. On the other hand, local fiscal conditions and the state sector share at the time of privatization should not have any direct correlation with a firm's asset accumulation in later years, satisfying the exclusion restriction.

Table 5 presents the results from the instrumental variable estimation, where the first-stage results confirm the positive and significant correlation between the probability of privatization and the state sector share and local fiscal burden. The Cragg-Donald Wald *F* statistic implies that our instrumental variables are not weak instrumental variables and the over-identification test does not reject the null hypothesis that both instrumental variables are exogenous. Moreover, the second-stage results show that privatized firm accumulated asset faster than de novo private firms, providing further support for our main hypothesis.

In addition to addressing the endogeneity concern, the PSM method and the IV estimation also combine to shed light on what factors help separate privatized firms from de novo private firms. Our results suggest that firms whose owners have party membership or former public manager experience, and firms with more initial assets, with access to initial bank loans, registered in villages or towns (as opposed to cities), or located in regions with heavier fiscal burden are more likely to be privatized firms.[7]

### 5.3 | Robustness checks with alternative specifications

Up till now, we have shown provided evidence in support of the argument that privatized firms have benefitted from undervaluation of initial assets. One concern with our results is the possibility that the effects of privatization might be different for different time periods. To address this issue, we include the interaction terms between privatized dummy and dummy variables for various privatization years. As shown in Table A3 in the Appendix, we find that asset undervaluation is more prevalent for earlier years, which were most likely accompanied by weaker monitoring.

Another related concern is that our estimates may capture the effect of time trend, which implies that firms with different characteristics were selected to be privatized at different stage. As a result, we also control for time trend and its interaction terms with firm characteristics. Nevertheless, the coefficient of privatization dummy remains largely unchanged (see Table A4 in the Appendix).

## 6 | EXTENSION STUDIES: ALTERNATIVE HYPOTHESES AND HETEROGENEITY RESULTS

In this section, we develop further tests to differentiate the underpricing hypothesis from other competing hypotheses and provide heterogeneity results that highlight different factors that influence the presence and degree of asset underpricing during privatization.

[7]See table 5 and table A2 in the Appendix for the detailed estimates.

**TABLE 5** Instrumental variable estimation results

| | (1) | (2) |
|---|---|---|
| | First stage | Second stage |
| Variables | Privatized | ln (Net asset) |
| Privatized | | 0.877* |
| | | (0.477) |
| Local fiscal burden | 0.0733*** | |
| | (0.0251) | |
| SOE share in industrial output | 0.232*** | |
| | (0.0578) | |
| ln (initial net asset) | 0.0335*** | 0.698*** |
| | (0.00337) | (0.0281) |
| Firm age | −0.00578*** | 0.0980*** |
| | (0.00188) | (0.00778) |
| Female | −0.0387** | −0.301*** |
| | (0.0167) | (0.0662) |
| Education | −0.00254 | 0.0682*** |
| | (0.00211) | (0.00788) |
| Party member | −0.00577 | −0.0265 |
| | (0.0147) | (0.0533) |
| Former cadre | 0.171*** | −0.0559 |
| | (0.0125) | (0.127) |
| Former manager | 0.175*** | 0.0456 |
| | (0.0128) | (0.133) |
| Constant | −0.294*** | 0.979*** |
| | (0.0631) | (0.196) |
| Industry FE | YES | YES |
| Year FE | YES | YES |
| Province FE | YES | YES |
| Anderson canon. corr. LM statistic | 24.178 | |
| Cragg-Donald Wald *F* statistic | 12.030 | |
| Sargan statistic | 0.231 | |
| *p* value for Sargan statistic | 0.6309 | |
| Observations | 4,701 | 4,701 |
| *R*-squared | 0.199 | 0.571 |

*Notes:* Standard errors are clustered at provincial level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

## 6.1 | Testing alternative theories

While the estimation results in Tables 3–5 provide empirical support for the underpricing hypothesis, these findings are also consistent with two alternative hypotheses, the asset appreciation hypothesis and the firm performance hypothesis.

### 6.1.1 | Testing appreciation hypothesis

According to the appreciation hypothesis, privatized firm may possess more of certain types of initial assets with more potential for appreciation such as intellectual property rights and land use rights, possibly due to their state-ownership origins. Thus, the observed current asset gap between privatized firms and de novo private firms may merely reflect the difference in initial capital composition rather than the underpricing of assets. The first implication of this hypothesis is that the observed asset gap should grow, at least not diminish, over time after privatization because assets take time to appreciate. In contrast, the underpricing hypothesis posits that the asset value difference between privatized firms and de novo private firms should remain the same or decrease over time depending on whether privatized firms have the same performance as or underperform de novo private firms.

The second implication of appreciation hypothesis is that the asset gap should be larger for firms in areas with better market supporting institutions since the values of intellectual property rights and land use rights are more likely to increase due to greater market demand and better legal protection in such areas. On the contrary, the underpricing hypothesis predicts that the observed asset gap should be less pronounced in such an environment because manipulation would be more difficult due to more competition and better property rights protection.

To differentiate the underpricing hypothesis from the appreciation hypothesis, we test the first implication by interacting the privatized dummy with firm age in our baseline specifications. To test the second implication, we utilize a set of marketization indices constructed by Fan and Wang (2007) to measure institutional heterogeneity. The first index used to measure the development of market in a region is the percentage of sales from non-state sector in a province (denoted as Non-SOE sales/total sales). We argue that non-state firms are potential purchasers when privatizing public firms, which may help reduce the opportunities of corruption by increasing competition. The second index on producer protection comes from firms' responses in a survey inquiring how well their properties can by protected by the local legal system, with 0 being least protected and 10 being most protected (denoted as producer protection). Better protection of property rights, whether for private property or public property, makes it more difficult for powerful elites to appropriate state and collective asset during privatization. We conduct the tests by re-estimating Equation (1) with the introduction of two sets of institutional indices and the interaction terms between the institutional indices and privatized firm dummy.

Table 6 reports the results when including interaction terms as covariates. As shown in column (1), there exists a substantial asset gap between privatized firms and de novo private firms when they are surveyed immediately after registering as private firms given similar initial conditions, with the estimated asset gap declining overtime. Column (2) and column (3) present the estimation results under different institutions, which shows that the asset gap between privatized firms and de novo private firms is less pronounced in areas with more developed non-state sector and better property rights protection. The regression results from column (1) suggest it takes around 10 years for a privatized firm to become comparable to a de novo private firm with similar initial conditions. Combining all the results in Table 6, the empirical evidences are largely consistent with the underpricing hypothesis, whereas the appreciation hypothesis is not supported.

### 6.1.2 | Testing performance hypothesis

Another interpretation that competes with the underpricing hypothesis in explaining our empirical findings is the performance hypothesis, which attributes the observed asset gap to better performance of privatized firms relative to de novo private firms. Thus, to differentiate the underpricing hypothesis from the performance hypothesis, we test whether privatized firms outperform de novo private firms with a wide spectrum of measures.

**TABLE 6** Testing appreciation hypothesis

| | ln (Net asset) | | |
|---|---|---|---|
| **Variables** | **(1)** | **(2)** | **(3)** |
| Privatized | 0.458*** | 0.371*** | 0.317*** |
| | (0.0848) | (0.124) | (0.114) |
| Privatized*firm age | −0.0549*** | | |
| | (0.0119) | | |
| Privatized*Non-SOE sales/total sales | | −0.0398*** | |
| | | (0.0139) | |
| Non-SOE sales/total sales | | 0.160 | |
| | | (0.124) | |
| Privatized*producer protection | | | −0.0393** |
| | | | (0.0146) |
| Producer protection | | | 0.0308 |
| | | | (0.107) |
| Constant | 0.913*** | −0.0771 | 0.719*** |
| | (0.261) | (0.629) | (0.247) |
| Controls | YES | YES | YES |
| Observations | 3,492 | 2,936 | 2,936 |
| R-squared | 0.629 | 0.645 | 0.644 |

*Notes:* Control variables include ln(initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors clustered at provincial level are reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

Specifically, we use return on equity (ROE) and return on sales (ROS) to measure firm profitability; the ratio between R&D investment and sales (denoted as R&D/sales) and the number of intellectual property rights (IPRs) to measure the effort as well as efficiency of firm innovations; and the share of profit used to reinvest to measure investment intensity (investment/profit). As shown in Table 7 Panel A, we find that firms privatized from former SOEs or collective enterprises consistently underperform de novo private firms. In particular, privatized firms are significantly less profitable, less innovative and less likely to make investment.

To test the possibility that privatized firms may have performed better in an earlier period of time, we include the interaction term between privatized dummy and firm age and find the pattern persists through different periods in the firm's life cycle (see Table 7 Panel B). In summary, we do not find evidence that supports the performance hypothesis. On the other hand, the underperformance of privatized firms helps explain how our empirical strategy may underestimate the extent of underpricing, leading more credibility to our baseline estimates.

## 6.2 | Heterogeneity results

To obtain further supporting evidence, we also derive more implications of the underpricing hypothesis and test them empirically. In particular, we will explore how asset type, privatization mode and firm origin will impact the presence and degree of asset underpricing during th privatization process.

**TABLE 7** Testing performance hypothesis

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Variables** | **ROE** | **ROS** | **R&D/sale** | **Investment/ profit** | **IPRs** |
| Panel A | | | | | |
| Privatized | −0.0758 | −0.0267*** | −0.0104 | −0.0435* | −0.330** |
| | (0.0940) | (0.00792) | (0.00635) | (0.0234) | (0.132) |
| Constant | 0.434* | 0.0753** | 0.0379** | 0.386*** | −2.496*** |
| | (0.222) | (0.0342) | (0.0184) | (0.0760) | (0.653) |
| Controls | YES | YES | YES | YES | YES |
| Observations | 3,118 | 3,071 | 3,179 | 1,820 | 3,350 |
| *R*-squared | 0.038 | 0.061 | 0.053 | 0.105 | 0.120 |
| Panel B | | | | | |
| Privatized | −0.0847 | −0.0258*** | −0.0112* | −0.0403* | −0.371** |
| | (0.0960) | (0.00755) | (0.00638) | (0.0236) | (0.174) |
| Privatized*firm age | −0.0163 | 0.00159 | −0.00129 | 0.00616 | 0.0726 |
| | (0.0144) | (0.00130) | (0.00142) | (0.00584) | (0.0601) |
| Constant | 0.418* | 0.0766** | 0.0369* | 0.389*** | −3.103*** |
| | (0.230) | (0.0344) | (0.0182) | (0.0748) | (0.728) |
| Controls | YES | YES | YES | YES | YES |
| Observations | 3,118 | 3,071 | 3,179 | 1,820 | 3,344 |
| *R*-squared | 0.038 | 0.061 | 0.053 | 0.106 | 0.072 |

*Notes:* Control variables include ln(initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

### 6.2.1 | Different types of assets

One implication of the underpricing hypothesis is that the extent of undervaluing should differ dramatically across different types of assets. Intangible assets such as intellectual property rights or intangible assets including land use rights would be more likely to suffer underpricing due to the difficulty in asset evaluation. For example, before privatization, the lands owned by former state-owned enterprises are allotment lands that are usually obtained for free or at very low prices from the government. But once the firms are privatized, these lands can be converted to commercial lands at market price with substantial appreciation. Thus, we would expect to see privatized firms hold more assets that are more likely to be manipulated.

Table 8 presents the estimation results where the current asset is divided into cash, materials, patents, unpatented technology and land use rights. As expected, privatized firms own substantially more assets in the forms of patents and land usage rights after controlling for the initial size and other characteristics of firms.[8] Combined with the fact that privatized firms are less active in innovation and

[8]However, we do not have information about the initial value of different types of asset, thus cannot control for the initial value of different assets separately.

**TABLE 8** Privatization and capital structure

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| **Variables** | **ln(cash)** | **ln(materials)** | **ln(patents)** | **ln(unpatented technology)** | **ln(land usage rights)** |
| Privatized | 0.0552 | 0.410 | 0.536** | −0.168 | 0.861*** |
| | (0.113) | (0.619) | (0.226) | (0.224) | (0.258) |
| Constant | −1.440*** | 2.086* | −9.796*** | −8.869*** | −7.056*** |
| | (0.468) | (1.138) | (0.823) | (0.679) | (1.113) |
| Controls | YES | YES | YES | YES | YES |
| Observations | 3,404 | 3,383 | 3,210 | 3,187 | 3,308 |
| *R*-squared | 0.237 | 0.112 | 0.086 | 0.037 | 0.143 |

*Notes:* Control variables include ln(initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

investment, the results suggest that these assets suffer more underpricing during privatization, giving additional supporting evidence for our underpricing argument.

### 6.2.2 | Insider privatization

Another implication of the underpricing hypothesis is that the degree of asset stripping will differ depending on the mode of privatization. Because insiders such as firm managers and local government officials generally have more information about the firms and have greater capacity to manipulate the privatization process, we expect the underpricing of public assets to be more severe in insider privatization.

To test this hypothesis, we re-estimate the baseline equations by replacing the privatization dummy by a set of dummy variables to indicate how the firm was privatized (the omitted group is de novo private firms). The regression results are reported in Table 9. We find that underpricing is only significant for insider privatization, with firms privatized through private negotiations between the local government and certain purchasers or firms purchased by former management having substantially larger asset size (57% and 26.5% higher, respectively) than de novo private firms, after controlling for a spectrum of firm attributes and entrepreneur attributes. However, firms privatized via more transparent procedures such as open bidding or by purchasers with little influence on the transaction prices, for example, ordinary former staffs, do not have significantly higher asset values than de novo private firms. These results suggest that the initial values of firms purchased by incumbent managers or government favoured individuals are largely undervalued, implying substantial asset stripping by powerful elites during the privatization process.[9]

[9]One may argue that firms privatized through private negotiation and management buyout would outperform de novo private firms as we only observe these firms experience higher growth rates in asset value. To study this possibility, we estimate the performance equation by introducing a set of dummy variables to indicate how the firms are privatized. Still, privatized firms do not significantly perform better however they have been privatized.

**TABLE 9** Insider privatization and underpricing

| | ln (Net asset) | |
|---|---|---|
| **Variables** | **(1)** | **(2)** |
| Open bidding | 0.0673 | 0.167 |
| | (0.0932) | (0.178) |
| Take in trust and then purchase | 0.00354 | 0.117 |
| | (0.178) | (0.212) |
| Private negotiation | 0.445*** | 0.570*** |
| | (0.145) | (0.185) |
| Purchased by former leadership | 0.131 | 0.265* |
| | (0.117) | (0.137) |
| Purchased by former staff | 0.0221 | 0.116 |
| | (0.0921) | (0.153) |
| Offsetting assets and liabilities | −0.0477 | 0.0705 |
| | (0.133) | (0.127) |
| Constant | 0.770*** | 0.783*** |
| | (0.231) | (0.234) |
| Controls | Controls I | Controls II |
| Observations | 2,936 | 2,936 |
| *R*-squared | 0.645 | 0.646 |

*Notes:* Control I includes ln (initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies. Control II include ln(initial net asset), firm age, female, education, party member, former cadre, former manager, former SOE, former urban collective enterprise, former rural collective enterprise, as well as sector, year and provincial dummies.

Standard errors clustered at provincial level are reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

The pattern above also helps rule out one additional alternative explanation. As underpricing is only observed for specific purchasers rather than for the general public, it cannot be explained by the argument that underpricing is used to signal commitment to privatization or to help build public support for privatization (Biais & Perotti, 2002; Jones et al., 1999).

The prevalence of insider privatization may also help explain the poor performance of firms after privatization. By transferring firms to individuals favoured by local government officials, insider privatization is less likely to cut off the connections between firms' management and government officials, which allows the officials to continue influencing firms' decisions on input, investment and production.

### 6.2.3 | Different firm origins

Another possibility is that the extent of manipulation during privatization might be quite different for firms previously belonging to different levels of government. For example, collective firms are usually controlled by the local villages or communities but state firms are owned by higher level

government, which implies weaker monitoring for state firms (Huang et al., 2017). To test this possibility, we perform the robustness check by distinguishing whether the firm is privatized from collective firms or state firms. The results in Table 10 suggest that undervaluation is indeed more serious for state firms.

# 7 | FURTHER ANALYSIS: IMPACT OF PRIVATIZATION

## 7.1 | Preferential access: post-privatization

In the previous sections, we provide substantial evidence that state assets and collective assets were undervalued when transferred into private hands. The corrupted process may not only harm equality but also reduce potential efficiency gains from privatization. First, when firms are transferred to purchasers favoured by local government officials, the intimate relationships between privatized firms and the local government will remain so that privatized firm will continue to enjoy preferential policies but also labour under government intervention. Second, corruption prevents productive assets from being transferred to more capable owners, implying misallocations of economic resources.

To test the possibility of continued privileges, we examine whether privatized firms enjoy favourable treatments relative to de novo private firms in several different aspects. We first test whether privatized firms have better access to loans from state banks and other state institutions. Second, we check whether privatized firms are less likely to suffer heavy government expropriations using four measures: tax rate (defined as tax payment divided by sales), fee rate (defined as extralegal fee payment divided by sales), special assessment rate (defined as special assessment payment divided by sales), and ETC burden (defined as expenses on public relationship and entertaining divided by sales), which has been popularized by Cai et al., (2011) to measure corruption in China. Finally, we examine

**TABLE 10** The effect of privatization on state firms and collective firms

| | (1) | (2) | (3) |
|---|---|---|---|
| **Variables** | **ln (Net asset)** | **ln (Net asset)** | **ln (Net asset)** |
| Privatized from SOEs | 0.410*** | 0.361*** | 0.258*** |
| | (0.0650) | (0.0632) | (0.0843) |
| Privatized from collective enterprises | 0.142*** | 0.137** | 0.122* |
| | (0.0515) | (0.0517) | (0.0718) |
| Constant | 1.493*** | 0.864*** | 0.983*** |
| | (0.138) | (0.162) | (0.306) |
| Controls | Control I | Control II | Control III |
| P value for $\beta_{soe} = \beta_{\text{collective enterprises}}$ | 0.0000 | 0.0003 | 0.0504 |
| Observations | 9,421 | 9,306 | 4,735 |
| *R*-squared | 0.565 | 0.570 | 0.575 |

*Notes:* Control I includes ln (initial net asset), firm age, as well as sector, year and provincial dummies. Control II includes ln (initial net asset), firm age, female, education, as well as sector, year and provincial dummies. Control III includes ln (initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

whether privatized firms enjoy better access to local judicial protection by examining whether they are more likely to resort to local courts when involved in disputes. Consistent with our expectations, the results in Table 11 show that privatized firms are associated with better access to loans at the times of initial founding, less government expropriation in the form of extralegal fee and grease money, and better judicial protection by frequently using courts to solve business disputes.[10]

## 7.2 | Government control and weak incentives

The puzzling findings on performance on one hand and privileged treatment on the other require explanations. One possibility is that managerial incentives and government control could remain a severe problem in privatized firms in China. For example, to reduce local unemployment and maintain social stability, the local government usually has incentives to staff more workers than needed to firms under its control (Boycko et al.,l., 1996; Shleifer & Vishny, 1994). Consequently, managers in privatized firms may not have much incentive to improve firm efficiency as firm performance is substantially impacted by government policy in many cases.[11]

To test whether privatized firms suffer more government control and intervention, we perform the estimation using equity share held by the government and firm employment as dependent variables. For managerial incentives, we make use of three indicators: the percentage of investment made overseas, the proportion of sales realized by interprovincial trade and the ratio of accumulated accounts receivable to total asset. While the first two variables are used to measure entrepreneur's willingness to take risks and explore growth opportunities, the third is used to measure managers' incentive to collect debts that tend to accumulate when managers have weaker incentives. We report the estimation results in Table 12. Compared with de novo private firms, the equity share held by local government as well as firm employment is substantially larger in firms privatized from former SOEs or collective enterprises, signalling more government control and possibly more interventions. For incentives, we find that managers in privatized firms are less likely to seek growth opportunities overseas or in other regions, and they also have less incentive to collect overdue debts.

In summary, the evidence presented in this subsection sheds light on how corruption possibly impedes firm efficiency after privatization. In the absence of a direct corruption measure, we will be not able to study the impact of corruption explicitly; thus, the findings in this subsection should be interpreted as additional suggestive evidence in support of the asset-stripping hypothesis.

# 8 | CONCLUSION

Mass privatization in the absence of an effective regulatory system may lead to severe corruption in many developing countries. Despite numerous popular media reports, few empirical studies have been performed to rigorously assess its extent, determinants and potential impacts. Using three waves

[10]Interestingly, we find that privatized firms pay a slightly higher tax rate than de novo private firms, which probably suggests that it is more difficult for privatized firms to evade tax due to visibility.

[11]Another possible explanation is that privatized firms are not in the hands of the most capable and efficient entrepreneurs. But we do not have information in our dataset to compare the devotion, ambition and risk attitudes of private entrepreneurs from privatized firms and de novo private firms. On the other hand, simple comparisons on observable characteristics such as education level and working experience as former managers suggest that entrepreneurs from privatized firms are more educated and more experienced.

**TABLE 11** Privatization and favourable treatments

| Variables | (1) Initial bank loan | (2) ln (current state loan) | (3) Using court to solve business disputes | (3) Tax/sales | (5) Fee/sales | (6) Special assessment/sales | (7) ETC/sales |
|---|---|---|---|---|---|---|---|
| Privatized | 0.0789*** | 0.631 | 0.105*** | 0.00538* | −0.00209 | −0.00297** | −0.00371** |
| | (0.0203) | (0.434) | (0.0269) | (0.00294) | (0.00313) | (0.00122) | (0.00147) |
| Constant | 0.469*** | −12.15*** | −0.161** | 0.0389*** | 0.0188 | 0.0244** | 0.0456*** |
| | (0.0861) | (1.154) | (0.0772) | (0.00698) | (0.0141) | (0.00899) | (0.00945) |
| Controls | YES | YES | YES | YES | YES | YES | YES |
| Observations | 3,165 | 3,090 | 2,558 | 3,160 | 2,431 | 2,109 | 2,739 |
| R-squared | 0.092 | 0.260 | 0.096 | 0.058 | 0.078 | 0.045 | 0.077 |

*Notes:* Control variables include ln(asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

**TABLE 12** Government control and managerial incentives

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Tobit | OLS | Tobit | Tobit | OLS |
| Variables | Government share | Ln(employment) | Oversea investment/total investment | Sales to other provinces/ total sales | Account receivable/ asset |
| Privatized | 0.274** | 0.344*** | −0.377*** | −0.0639* | 0.171*** |
| | (0.122) | (0.0511) | (0.0194) | (0.0388) | (0.0549) |
| Constant | −0.575* | 0.573** | −20.60*** | 0.432*** | 0.606*** |
| | (0.328) | (0.261) | (0.00686) | (0.113) | (0.118) |
| Controls | YES | YES | YES | YES | YES |
| Observations | 3,202 | 3,439 | 1,929 | 1,340 | 3,394 |
| *R*-squared | 0.373 | 0.536 | 0.451 | 0.203 | 0.084 |

*Notes:* Control variables include ln(asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

of a national survey of private firms, we attempt to fill the gap in the literature by studying the mass privatization movement in China.

We produce results suggesting that state assets were substantially underpriced during privatization and that the extent of underpricing is more severe in regions with less market competition or weaker property rights protection, and more pronounced for intangible assets such as intellectual property rights and land use rights. We also find evidence that privatized firms continue to enjoy considerable preferential treatments over de novo private firms, yet significantly underperforms the latter. Finally, we provide evidence that insider privatization may be an important source of corruption during privatization.

While our study is based on China's experience in the 1990s, the lack of transparency and effective oversight during privatization is similarly prevalent in many developing and transition countries with severe corruption and asset stripping.[12] In addition to creating social inequality, corruption and asset stripping also lead to inefficient allocation of resources, and more importantly, stifle the demand for the rule of law and for clearly defined property rights (Sonin, 2003). In the end, the resultant corruption may also undermine the very market economy that privatization programmes are designed to promote, as shown in the preferential treatment enjoyed by privatized firms in our study. Thus, our finding that stronger market-supporting institutions and more transparent mechanisms can help curb asset stripping behaviours may have implications beyond the borders of China.

## REFERENCES

Arikan, G. G. (2008). How privatizations affect the level of perceived corruption. *Public Finance Review*, *36*, 706–727. https://doi.org/10.1177/1091142107313302

Biais, B., & Perotti, E. (2002). Machiavellian privatization. *American Economic Review*, *92*(1), 240–258. https://doi.org/10.1257/000282802760015694

Birdsall, N., & Nellis, J. (2003). Winners and losers: Assessing the distributional impact of privatization. *World Development*, *31*(10), 1617–1633. https://doi.org/10.1016/S0305-750X(03)00141-4

Bjorvatn, K., & Soreide, T. (2005). Corruption and privatization. *European Journal of Political Economy*, *21*(4), 903–914. https://doi.org/10.1016/j.ejpoleco.2005.02.001

Boubakri, N., Cosset, J., & Houcem, S. (2009). Does privatization foster changes in the quality of legal institutions? *Journal of Financial Research*, *32*(2), 169–197. https://doi.org/10.1111/j.1475-6803.2009.01247.x

Boubakri, N., Cosset, J., & Omrane, G. (2005). Liberalization, corporate governance and the performance of privatized firms in developing countries. *Journal of Corporate Finance*, *11*(5), 767–790. https://doi.org/10.1016/j.jcorpfin.2004.05.001

Boycko, M., Shleifer, A., & Vishny, R. W. (1996). A theory of privatisation. *The Economic Journal*, *106*(435), 309–319. https://doi.org/10.2307/2235248

Brown, J. D., Earle, J. S., & Telegdy, A. (2006). The productivity effects of privatization: Longitudinal estimates from Hungary, Romania, Russia, and Ukraine. *Journal of Political Economy*, *114*(1), 61–99. https://doi.org/10.1086/499547

Cai, H., Fang, H., & Xu, C. (2011). Eat, drink, firms, government: An investigation of corruption from the entertainment and travel costs of Chinese firms. *The Journal of Law and Economics*, *54*(1), 55–78. https://doi.org/10.1086/651201

Cao, Y., Qian, Y., & Weingast, B. R. (1999). From federalism, Chinese style to privatization. *Chinese Style. Economics of Transition*, *7*(1), 103–131. https://doi.org/10.1111/1468-0351.00006

Chen, G., Firth, M., Gao, D. N., & Rui, O. M. (2006). Ownership structure, corporate governance, and fraud: Evidence from China. *Journal of Corporate Finance*, *12*(3), 424–448. https://doi.org/10.1016/j.jcorpfin.2005.09.002

Chen, Z., Choi, J. J., & Jiang, C. (2008). Private benefits in IPOs: Evidence from state-owned firms, *AFA 2009 San Francisco Meetings Paper*.

Claessens, S., & Djankov, S. (1999). Ownership concentration and corporate performance in the Czech Republic. *Journal of Comparative Economics*, *27*(3), 498–513. https://doi.org/10.1006/jcec.1999.1598

[12]In fact, the Corruption Perception Index for 2012 places China at 80 out of 174 countries surveyed.

Claessens, S., & Djankov, S. (2002). Privatization benefits in Eastern Europe. *Journal of Public Economics*, *83*(3), 307–324. https://doi.org/10.1016/S0047-2727(00)00169-9

Clarke, G. R. G., & Xu, C. (2004). Privatization, competition, and corruption: How characteristics of bribe takers and payers affect bribes to utilities. *Journal of Public Economics*, *88*(9), 2067–2097. https://doi.org/10.1016/j.jpubeco.2003.07.002

Cull, R., & Xu, C. (2005). Institutions, ownership, and finance: The determinants of investment among Chinese firms. *Journal of Financial Economics*, *77*(1), 117–146.

Ding, X. (2000). The illicit asset stripping of Chinese state firms. *The China Journal*, *43*, 1–28.

D'souza, J., & Megginson, W. L. (1999). The financial and operating performance of privatized firms during the 1990s. *Journal of Finance*, *54*(4), 1397–1438. https://doi.org/10.1111/0022-1082.00150

Earle, J. S., & Telegdy, A. (2002). Privatization methods and productivity effects in Romanian industrial enterprises. *Journal of Comparative Economics*, *30*(4), 657–682. https://doi.org/10.1006/jcec.2002.1798

Fan, G., & Wang, X. (2007). NERI Index of Marketization of China's Provinces 2006 Report. Beijing: Economic Science Press (in Chinese).

Fisman, R., & Wang, Y. (2015). Corruption in Chinese privatizations. *Journal of Law, Economics, and Organization*, *31*, 1–29. https://doi.org/10.1093/jleo/ewu003

Franklin, A., Qian, J., & Qian, M. (2005). Law, finance, and economic growth in China. *Journal of Financial Economics*, *77*(1), 57–116. https://doi.org/10.1016/j.jfineco.2004.06.010

Frydman, R., Gray, C., Hessel, M., & Rapaczynski, A. (1999). When does privatization work? The impact of private ownership on corporate performance in the transition economies. *Quarterly Journal of Economics*, *114*(4), 1153–1191. https://doi.org/10.1162/003355399556241

Gong, T. (2006). Corruption and local governance: The double identity of Chinese local governments in market reform. *The Pacific Review*, *19*(1), 85–102. https://doi.org/10.1080/09512740500417723

Gong, T., & Shi, H. (2009). Management corruption in China's industrial restructuring: How and why state assets get lost. *China Information*, *23*(3), 411–445. https://doi.org/10.1177/0920203X09341858

Gordon, R. H., & Li, W. (1991). Chinese enterprise behavior under the reforms. *American Economic Review*, *81*(2), 202–206.

Groves, T., Hong, Y., McMillan, J., & Naughton, B. (1994). Autonomy and incentives in Chinese state enterprises. *Quarterly Journal of Economics*, *109*(1), 183–209. https://doi.org/10.2307/2118432

Hanousek, J., Kocenda, E., & Svejnar, J. (2004). Ownership, control and corporate performance after large-scale privatization. William Davidson Institute Working Paper No. 652.

Huang, Z., Li, L., Ma, G., & Xu, C. (2017). Hayek, local information, and commanding heights: Decentralizing state-owned enterprises in China. *American Economic Review*, *107*(8), 2455–2478. https://doi.org/10.1257/aer.20150592

Jefferson, G. H., & Su, J. (2006). Privatization and restructuring in China: Evidence from shareholding ownership, 1995–2001. *Journal of Comparative Economics*, *34*(1), 146–166. https://doi.org/10.1016/j.jce.2005.11.008

Jiang, G., Lee, C. M. C., & Yue, H. (2010). Tunneling through intercorporate loans: The China experience. *Journal of Financial Economics*, *98*(1), 1–20. https://doi.org/10.1016/j.jfineco.2010.05.002

Jones, D. C. (1998). The economic effects of privatization: Evidence from a Russian panel. *Comparative Economic Studies*, *40*(2), 75–102. https://doi.org/10.1057/ces.1998.12

Jones, S. L., Megginson, W. L., Nash, R. C., & Netter, J. M. (1999). Share issue privatizations as financial means to political and economic ends. *Journal of Financial Economics*, *53*(2), 217–253. https://doi.org/10.1016/S0304-405X(99)00021-5

Kaufmann, D., & Siegelbaum, P. (1997). Privatization and corruption in transition economies. *Journal of International Affairs*, *50*(2), 419–458.

Koyuncu, C., Ozturkler, H., & Yilmaz, R. (2010). Privatization and corruption in transition economies: A panel study. *Journal of Economic Policy Reform*, *13*(3), 277–284. https://doi.org/10.1080/17487870.2010.503099

Laffont, J., & Meleu, M. (1999). A positive theory of privatisation for Sub-Saharan Africa. *Journal of African Economies*, *8*(1), 30–67. https://doi.org/10.1093/jafeco/8.suppl_1.30

Lee, K. (1990). The Chinese model of the socialist enterprise: An assessment of its organization and performance. *Journal of Comparative Economics*, *14*(3), 384–400. https://doi.org/10.1016/0147-5967(90)90058-H

Li, D., & Lui, F. (2004). Why do governments dump state enterprises? Evidence From China. In: *Governance, regulation, and privatization in the Asia-pacific region*. University of Chicago Press.

Li, H., & Rozelle, S. (2003). Privatizing rural China: Insider privatization, innovative contracts and the performance of township enterprises. *The China Quarterly*, *176*, 981–1005.

Li, W., & Xu, C. (2004). The impact of privatization and competition in the telecommunications sector around the world. *The Journal of Law and Economics*, *47*(2), 395–430. https://doi.org/10.1086/422984

Liu, Q., & Lu, Z. (2007). Corporate governance and earnings management in the Chinese listed companies: A tunneling perspective. *Journal of Corporate Finance*, *13*(5), 881–906. https://doi.org/10.1016/j.jcorpfin.2007.07.003

Long, C., & Zhang, X. (2011). Cluster-based industrialization in China: Financing and performance. *Journal of International Economics*, *84*(1), 112–123. https://doi.org/10.1016/j.jinteco.2011.03.002

Lu, M., Chen, Z., & Zhang, S. (2009). Price for the dreamed public ownership: A case study of corruption in China's privatization. *Journal of Nanjing University*, *2*, 49–60. (In Chinese).

Manzetti, L. (1999). *Privatization South American Style*. Oxford University Press.

Naughton, B. (1994). Chinese institutional innovation and privatization from below. *American Economic Review*, *84*(2), 266–270.

Naughton, B. (2007). *The Chinese economy: transitions and growth*. MIT Press.

Omran, M. (2004). The performance of state-owned enterprises and newly privatized firms: Does privatization really matter? *World Development*, *32*(6), 1019–1041. https://doi.org/10.1016/j.worlddev.2004.01.006

Puntillo, R. (1996). Mass privatization in Poland and Russia: The case of the tortoise and the hare? *Journal of Emerging Markets*, *1*, 7–28.

Rose-Ackerman, S. (1999). *Corruption and government: causes, consequences, and reform*. Cambridge University Press.

Schmidt, K. M. (2000). The political economy of mass privatization and the risk of expropriation. *European Economic Review*, *44*(2), 393–421.

Shleifer, A., & Vishny, R. W. (1994). Politicians and firms. *Quarterly Journal of Economics*, *109*(4), 995–1025. https://doi.org/10.2307/2118354

Smith, S. C., Cin, B., & Vodopivec, M. (1997). Privatization incidence, ownership forms, and firm performance: Evidence from Slovenia. *Journal of Comparative Economics*, *25*(2), 158–179. https://doi.org/10.1006/jcec.1997.1463

Smyth, R. (2000). Asset stripping in Chinese state-owned enterprises. *Journal of Contemporary Asia*, *30*(1), 3–16. https://doi.org/10.1080/00472330080000021

Sonin, K. (2003). Why the rich may favor poor protection of property rights. *Journal of Comparative Economics*, *31*(4), 715–731. https://doi.org/10.1016/j.jce.2003.09.005

Sun, Q., & Tong, W. H. S. (2003). China share issue privatization: The extent of its success. *Journal of Financial Economics*, *70*(2), 183–222. https://doi.org/10.1016/S0304-405X(03)00145-4

Tangri, R., & Mwenda, A. (2001). Corruption and cronyism in Uganda's privatization in the 1990s. *African Affairs*, *100*(398), 117–133. https://doi.org/10.1093/afraf/100.398.117

Tulchin, J. S., & Espach, R. H. (2000). *Combating corruption in Latin America*. Woodrow Wilson Center Press.

Wong, T. J., & Jian, M. (2003). Earnings management and tunneling through related party transactions: Evidence from Chinese corporate groups. EFA 2003 Annual Conference Paper No. 549.

Xu, X., & Wang, Y. (1999). Ownership structure and corporate governance in Chinese stock companies. *China Economic Review*, *10*(1), 75–98. https://doi.org/10.1016/S1043-951X(99)00006-1

Yusuf, S., Nabeshima, K., & Perkins, D. H. (2006). *Under new ownership: Privatizing China's state-owned enterprises*. World Bank Publications.

**How to cite this article:** Long, C., Zhang, J., & Yang, J. (2021). Uncovering asset stripping during China's privatization. *Economics of Transition and Institutional Change*, 29, 651–680. https://doi.org/10.1111/ecot.12299

## APPENDIX A

### A.1 Detailed information of PSM estimation

**TABLE A1** Logit regression for the probability of running a privatized firm

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Tobit | OLS | Tobit | Tobit | OLS |
| Variables | Government share | Ln(employment) | Oversea investment/total investment | Sales to other provinces/ total sales | Account receivable/ asset |
| Privatized | 0.274** | 0.344*** | −0.377*** | −0.0639* | 0.171*** |
| | (0.122) | (0.0511) | (0.0194) | (0.0388) | (0.0549) |
| Constant | −0.575* | 0.573** | −20.60*** | 0.432*** | 0.606*** |
| | (0.328) | (0.261) | (0.00686) | (0.113) | (0.118) |
| Controls | YES | YES | YES | YES | YES |
| Observations | 3,202 | 3,439 | 1,929 | 1,340 | 3,394 |
| *R*-squared | 0.373 | 0.536 | 0.451 | 0.203 | 0.084 |

*Notes:* Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

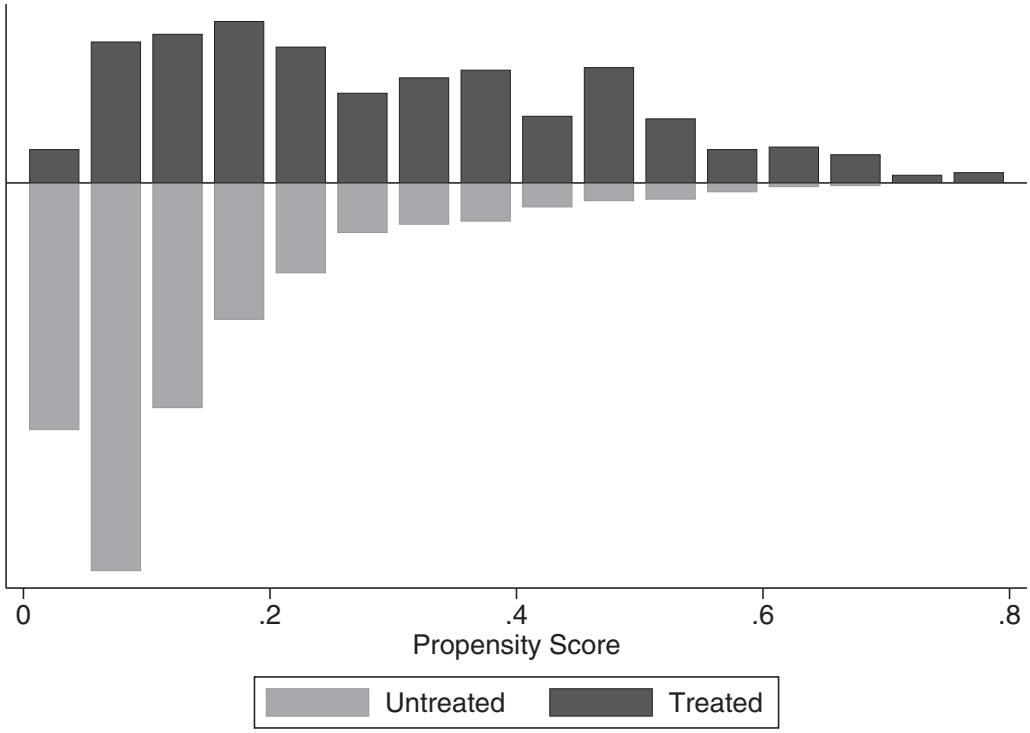


**FIGURE A1** Distribution of propensity score

## A.2 Controlling for time trends

**TABLE A2** Balancing tests

| | Unmatched | Mean | | % reduct | | *t*-test | |
|---|---|---|---|---|---|---|---|
| **Variables** | **Matched** | **Treated** | **Control** | **%bias** | **\|bias\|** | **t** | **p>\|t\|** |
| Education | U | 14.50 | 14.11 | 13.50 | | 5.95 | 0 |
| | M | 14.28 | 14.25 | 1 | 92.80 | 0.150 | 0.877 |
| Former cadre | U | 0.234 | 0.176 | 14.50 | | 6.700 | 0 |
| | M | 0.261 | 0.273 | −3.100 | 78.80 | −0.440 | 0.657 |
| Party member | U | 0.684 | 0.347 | 71.60 | | 29.62 | 0 |
| | M | 0.625 | 0.623 | 0.500 | 99.20 | 0.0800 | 0.934 |
| Former manager | U | 0.554 | 0.231 | 70.10 | | 27.26 | 0 |
| | M | 0.464 | 0.464 | 0.100 | 99.90 | 0.0100 | 0.993 |
| Initial bank loan | U | 0.346 | 0.250 | 21.10 | | 6.480 | 0 |
| | M | 0.367 | 0.377 | −2.300 | 89.10 | −0.340 | 0.732 |
| Initial headquarter (city=1, other=0) | U | 0.231 | 0.246 | −3.700 | | −1.630 | 0.102 |
| | M | 0.460 | 0.454 | 1.500 | 58.20 | 0.210 | 0.835 |

**TABLE A3** The effects of privatization at different years

| | ln (Net asset) | | |
|---|---|---|---|
| **Variables** | **(1)** | **(2)** | **(3)** |
| Privatized*1989 | −0.278 | −0.123 | 0.160 |
| | (0.665) | (0.633) | (0.781) |
| Privatized*1990 | −0.528 | −0.463 | −0.249 |
| | (0.317) | (0.411) | (0.439) |
| Privatized*1991 | 0.863** | 0.895* | 0.0123 |
| | (0.363) | (0.490) | (0.805) |
| Privatized*1992 | 1.532*** | 1.559*** | 1.500** |
| | (0.388) | (0.362) | (0.717) |
| Privatized*1993 | 0.330 | 0.379 | −0.00216 |
| | (0.442) | (0.452) | (0.600) |
| Privatized*1994 | 0.669* | 0.724* | 0.151 |
| | (0.349) | (0.371) | (0.531) |
| Privatized*1995 | 0.638* | 0.705* | 0.339 |
| | (0.343) | (0.349) | (0.746) |
| Privatized*1996 | 0.796* | 0.863* | 0.880 |
| | (0.444) | (0.452) | (0.733) |

(Continues)

**TABLE A3** (Continued)

| | ln (Net asset) | | |
|---|---|---|---|
| **Variables** | **(1)** | **(2)** | **(3)** |
| Privatized*1997 | 0.768** | 0.782** | 0.611 |
| | (0.319) | (0.339) | (0.534) |
| Privatized*1998 | 0.819*** | 0.819** | 0.521 |
| | (0.286) | (0.298) | (0.515) |
| Privatized*1999 | 0.575* | 0.539 | 0.578 |
| | (0.330) | (0.335) | (0.461) |
| Privatized*2000 | 0.402 | 0.373 | 0.253 |
| | (0.345) | (0.356) | (0.487) |
| Privatized*2001 | 0.554 | 0.542 | 0.292 |
| | (0.329) | (0.342) | (0.417) |
| Privatized*2002 | 0.344 | 0.301 | 0.154 |
| | (0.310) | (0.325) | (0.378) |
| Privatized*2003 | 0.580* | 0.585* | 0.168 |
| | (0.288) | (0.300) | (0.423) |
| Privatized*2004 | 0.313 | 0.309 | 0.102 |
| | (0.315) | (0.332) | (0.375) |
| Privatized*2005 | 0.113 | 0.0789 | −0.183 |
| | (0.245) | (0.241) | (0.324) |
| Constant | 1.980** | 1.210* | 0.239 |
| | (0.775) | (0.709) | (0.617) |
| Controls | Control I | Control II | Control III |
| Observations | 896 | 893 | 518 |
| *R*-squared | 0.567 | 0.575 | 0.628 |

*Notes:* Control I includes ln (initial net asset), firm age, as well as sector, year and provincial dummies. Control II includes ln (initial net asset), firm age, female, education, as well as sector, year and provincial dummies. Control III includes ln (initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.

**TABLE A4** Controlling for time trend

| | ln (Net asset) | | |
|---|---|---|---|
| **Variables** | **(1)** | **(2)** | **(3)** |
| Privatized | 0.215*** | 0.195*** | 0.122* |
| | (0.0512) | (0.0509) | (0.0612) |
| Trend | 0.0579 | 0.100** | 0.156** |
| | (0.0628) | (0.0489) | (0.0743) |
| ln (initial net asset)*Trend | −0.00800 | −0.00457 | −0.0228 |
| | (0.0101) | (0.0115) | (0.0190) |
| Firm age*Trend | −0.00309 | −0.00218 | −0.00207 |
| | (0.00333) | (0.00353) | (0.00473) |
| Female *Trend | | 0.0637*** | 0.0206 |
| | | (0.0215) | (0.0347) |
| Education*Trend | | −0.00597 | −0.00317 |
| | | (0.00533) | (0.00734) |
| Former cadre*Trend | | | −0.0568 |
| | | | (0.0369) |
| Party member*Trend | | | 0.0676* |
| | | | (0.0347) |
| Former manager*Trend | | | −0.0155 |
| | | | (0.0341) |
| Constant | 1.276*** | 0.465*** | 0.543** |
| | (0.228) | (0.161) | (0.255) |
| Controls | Control I | Control II | Control III |
| Observations | 6,745 | 6,698 | 3,492 |
| *R*-squared | 0.582 | 0.590 | 0.628 |

*Notes:* Control I includes ln (initial net asset), firm age, as well as sector, year and provincial dummies. Control II includes ln (initial net asset), firm age, female, education, as well as sector, year and provincial dummies. Control III includes ln (initial net asset), firm age, female, education, party member, former cadre, former manager, as well as sector, year and provincial dummies.

Standard errors are clustered at provincial level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by *, ** and ***, respectively.