

# **Is Public Listing a Way Out for State-Owned Enterprises? The Case of China\***

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September 2001

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\* The research for this paper was funded by grants from the Hong Kong Research Grants Council (No. RGC.HKUST6053/98H and No. DAG.HKUST00/01.HSS09).

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# **Is Public Listing a Way Out for State-Owned Enterprises? The Case of China**

## **ABSTRACT**

Public listing is a key and unique reform measure for large state-owned enterprises (SOEs) in China. Using a panel data set that contains both pre- and post-listing financial and ownership information on publicly listed firms in Shanghai and Shenzhen Stock Exchanges, we explore the effects of public listing in China. We find that using public listings as a means to reform SOEs has not worked wonders: company performance in the post-listing years are sharply lower than their levels in both the pre-listing years and the initial public offering years. Moreover, the effects of public listing on performance are not significantly affected by the percentage of state shares or of the total shares held by top shareholders, but are positively correlated with a more balanced ownership structure among these shareholders.

JEL Classification: P31, P27, G30

Keywords: state-owned enterprises, public listing, corporatization, reform, China

## 1. Introduction

Unlike most formerly socialist countries, China until recently avoided privatizing state-owned enterprises (SOEs) and instead sought to reform them through piecemeal measures, such as by increasing managers' decision-making autonomy, introducing financial incentives, and bringing in performance contracts between the government and SOEs (Naughton, 1995; Shirley and Xu, 2001). These reform measures were accompanied by improved productivity of SOEs during the 1980s (Groves et al., 1994; Jefferson, Rawski, and Zheng, 1994; Zhuang and Xu, 1996; Li, 1997). However, the performance of Chinese state industry has since steadily deteriorated (Lardy, 1998). Faced with mounting losses in the state sector, in the early 1990s the Chinese government began to shift the focus of SOE reform to privatization of small SOEs and the corporatization of larger ones (Cao, Qian and Weingast, 1999; Lin and Zhu, 2001).

The corporatization strategy aims to turn SOEs from public sole proprietorships controlled by industry-specific government agencies at various administrative levels into shareholding companies that are, at least in theory, independent in decision-making and diverse in ownership (Lin and Zhu, 2001). Public listing of SOEs in the domestic stock exchanges is a key measure of corporatization. Indeed, the vast majority of China's publicly listed companies are formerly state-owned or state-controlled firms, mostly large and better-performing ones.<sup>1</sup> Given the importance of public listing as a means to reform

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<sup>1</sup> Our data set, to be described later, does not contain information about the ownership types of the share-issuing firms. Based on our interviews with officials of China Securities Regulatory Commission, about 75% of listed companies are formerly state-owned. Another 10% are formerly shareholding companies that mostly had significant shares held by SOEs. Only less than 10% of listed companies are formerly private-owned firms or foreign-invested firms, which in most cases had SOEs as their joint venture partners.

large SOEs in China, it is surprising that there are virtually no systematic studies on the effects of public listing in the country.<sup>2</sup> In this paper, we attempt to fill this void.

Recent years have seen two strands of surging empirical literature on the impact of public listing or initial public offering (IPO) on company performance (Roell, 1996; Megginson and Netter, 2001). The first strand of literature focuses on developed countries, particularly the United States, and finds that public listing of privately-held companies tends to worsen company performance. Ritter (1991) finds that IPO firms underperform a set of comparable firms matched by size and industry. Laughran and Ritter (1995) find that both IPOs and seasoned equity offerings significantly underperform relative to non-issuing firms for five years after the offering date. Jain and Kini (1994), Degeorge and Zeckhauser (1993) and Mikkelsen, Partch, and Shah (1997) find that the performance of IPO firms—measured by return on assets (ROA) or return on sales (ROS)—declines in the first few years following the offering but do not decline further afterwards.

The above findings raise the question of why IPOs might worsen performance. One explanation is the agency cost. According to the agency theory set out by Jensen and Meckling (1976), public listing may heighten the conflicts of interest between managers and shareholders by increasing ownership dispersion, and the resulting higher agency costs lead to reduced performance. An empirical implication of the theory is that post-IPO performance should be positively correlated with managerial ownership. This

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<sup>2</sup> Xu and Wang (1998) study the impact of ownership concentration and the share of state ownership on the performance of listed companies in China, but their study does not deal with the issue of whether or not public listing itself improves company performance. Chen, Firth and Kim (2000) use a sample of about 330 IPOs in China between 1992-1995 to compare the differences in performance between A shares and B shares, which are issued to domestic and foreign investors respectively. However, they also do not address the issue of how public listing affects company performance.

hypothesis is partially supported by Jain and Kini (1994) and Holthausen and Larcker (1996) who find a positive relationship between performance and ownership stakes retained by pre-offering shareholders or insiders around IPOs.<sup>3</sup>

Another explanation for the performance decline after listing is that the pre-listing performance may be exaggerated. For example, offering firms may window-dress their accounting figures prior to going public. They may also time the offerings to coincide with periods of unusually good performance or favorable market valuations. Consequently, the over-stated pre-IPO performance would result in a superficial decline in post-IPO performance (Laughran and Ritter, 1995; Pagano, Panetta, and Zingales, 1998).

The second strand of literature on public listing deals with share issue privatization, which uses public listing to divest the government's ownership in SOEs.<sup>4</sup> Share issue privatization has been one of the major forms of privatizing SOEs around the world since the 1980s. In summarizing the long-run performance of share issue privatization, Megginson and Netter (2001) state that, "the average long-term, market-adjusted return earned by international investors in share issue privatizations is economically and significantly positive."

While public listings in developed countries either turn a privately-held company into a more widely-held public company, or transform an SOE into a private-owned public company, public listings in China are largely used to *corporatize* SOEs. China's share issue corporatization aims to transform an SOE into a modern-form corporation that

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<sup>3</sup> However, Mikkelson, Partch, and Shah (1997) find the relationship between a direct measure of managerial ownership stakes and post-listing performance to be statistically insignificant.

features both significant state and significant non-state institutional shareholders in addition to small individual shareholders. If public listings of private firms worsen company performance in developed capitalist economies and share issue privatization of SOEs improves company performance, it is an intriguing question as to whether public listing would improve or worsen company performance in the intermediate case of share issue corporatization.

SOEs' low efficiencies are often attributed to a lack of managerial autonomy, soft budget constraints and the agency-incentive problem (Groves et al., 1994; Qian, 1996; Qian and Roland, 1996). The central goal of corporatization, including public listing, is to establish a "modern enterprise system" in China featuring corporate governance structures that separate the government from enterprises. The separation is deemed necessary both for enterprises to achieve full autonomy in structural and operational decisions and for the government to limit its liabilities to the enterprises, hence hardening the budget constraints. It is also hoped that corporatization will improve managerial incentives by installing a more clearly defined structure of rights and responsibilities and by introducing shareholders with incentives and abilities to monitor the managers. Another objective is to raise capital for SOEs and reduce their high debt to asset ratios by increasing direct finance through selling equity ownership stakes to the public as well as employees.

If the above objectives have, at least in part, been achieved, we would expect that post-listing performance should exceed the pre-listing level and that debt-asset ratios should decline whereas capital expenditure should grow at a faster rate after listing.

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<sup>4</sup> For an excellent survey of literature on share issue privatization, see Megginson and Netter (2001) and the literature cited therein.

Given China's weak accounting and disclosure system, it would not be surprising if most of the firms' pre-listing performance is over-stated. In that case, we might expect post-listing performance to be lower than the pre-listing level.<sup>5</sup> However, if public listing helps in establishing better corporate governance, improving managerial incentives and loosening firms' financial constraints, then company performance after the IPO year should improve over time and be better than that in the IPO year.

In this paper, we use a panel of pre- and post-listing data of all publicly listed companies in China to investigate the actual effects of public listing against its intended effects. We find that, overall, public listings as a means of reforming SOEs have not worked wonders. Company performance from the first post-listing year onward is sharply lower than the levels in both the pre-listing years and the IPO years. Moreover, the effects of public listing on performance are not significantly affected by the percentage of state shares or of the total shares held by top shareholders, but are positively correlated with a more balanced ownership structure among these shareholders. While the debt level is reduced initially after listing, it converges to the pre-listing level over time. Moreover, rather than increasing capital expansion, public listing actually reduces it.

In the following section, we provide some background information on public listings and the development of the stock market in China. Section 3 describes the data, defines the variables to be used in the regression analysis and presents some summary statistics. Main findings are reported in Section 4. The last section concludes.

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<sup>5</sup> On the other hand, listed companies also exaggerate reported earnings (Burgstahler and Dichev, 1997). Earnings management is a more serious problem in China than in developed countries. It offsets at least some, if not all, of the exaggeration of the pre-listing performance.

## 2. Public Listings in China

China's stock markets opened in 1990 with the establishment of Shanghai Stock Exchange (SHSE) when eight firms first went public. In the following year, Shenzhen Stock Exchange (SZSE) was also established. The following decade witnessed phenomenal growth in the stock market. By the end of 2000, the SHSE Composite Index grew to 2073 from 100 on its base day of Dec. 19, 1990, and the SZSE Composite Index to 635 from 100 on its base day of April 3, 1991.

(Insert Table 1 here)

Table 1 outlines the development of China's stock market. At the end of 2000, 1088 firms were listed on the two exchanges, with a total market capitalization close to 5 trillion yuan (about US\$0.6 trillion<sup>6</sup>), or 54% of China's GDP. The stock market has also become an increasingly important means of raising capital for China's SOEs, resulting in more than 480 billion yuan new equity issuance in 2000 alone.

China's publicly listed companies are allowed to issue four types of shares. The predominant type is A shares; these are listed in China, denominated in RMB and restricted to domestic investors. B shares are also listed in China and denominated in RMB, and until June 2001 their purchase was restricted to foreign investors using foreign currency. The two other types of shares are H shares and N shares, which are issued in Hong Kong and the United States respectively by A-share or B-share issuing firms. While most companies only issue A shares, the majority of B-share issuing companies

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<sup>6</sup> The current exchange rate is roughly 1 USD = 8.2 yuan.



also issue A shares. By the end of 2000, among the 114 B-share issuing firms only 28 issued B-shares exclusively; the rest also issued A shares. All the 19 H-share firms also issued A-shares.

The shares of listed companies are classified into five categories: state-owned, legal person (institution) -owned, employee-owned, individual-owned, and foreign-owned. The first two categories of shares cannot be traded on the stock exchanges, and their transfer requires special approval from the China Securities Regulatory Commission (CSRC). IPO firms are required by law to hold at least 35% of the total shares issued, and 25% of the total shares must be individual- or foreign-owned. Large shareholders are usually state or legal persons. The distinction between state and legal person shareholders is in many cases superficial. State shares are held by government bodies such as state asset management agencies, or institutions authorized to hold shares on behalf of the state such as a wholly state-owned investment company. Legal person shares are shares held by any entity or institution with a legal person status, including an SOE or a company controlled by an SOE. We do not have precise information about the identity of legal person shareholders; but it is safe to say that state ownership, directly or indirectly, accounts for a significant portion of all the legal person shares. Employee-owned shares are issued to employees of the issuing firm and are allowed trading only three years after the IPO if the firm can get CSRC's approval.

In China, the question of whether a company can make an IPO is determined largely by an administrative process rather than the market process seen in developed economies. When an SOE wants to go public, it must seek permission from the local government or/and its affiliated central government ministries, which receive an IPO

quota from the CSRC.<sup>7</sup> Under this quota system, how many and which firms go public in each year depends not only on the quality of the firm and macroeconomic conditions but also the availability and distribution of the quota. All firms in our sample became listed under the quota system.

### **3. Data, Variables and Summary Statistics**

The data for this study is a panel of financial and ownership data of all companies listed on the SHSE or SZSE from 1990 to June 2000. There are 1057 firms in our initial data set. Missing values or invalid data entries reduce our sample to 992 firms. A majority of the firms deleted were listed before 1994 and lack pre-listing data. The data was purchased from a major financial information service company in China.

A novel feature of our data set is that it contains pre-listing information. The current law requires IPO firms to provide three years of audited accounting data prior to listing. However, since the CSRC was established in 1992, two years after the first stock exchange was established, and major disclosure rules were only issued in 1993 and not immediately strictly enforced, the disclosure standard was not consistent during the first half of 1990s. As a result, firms listed in or before 1994 have incomplete pre-listing as well as some post-listing data. Nonetheless, the majority of firms in our data set have complete pre-listing financial data, which allows us to compare their pre- and post-listing performance.

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<sup>7</sup> There are no explicit rules governing quota allocations. Information on how much quota is issued to which agencies is hard to obtain. But based on our interviews with investment bankers in China, we find that quota may even be allocated to non-economic organizations such as the National Union of Women and the Communist Youth League. In 2000, the government decided to abandon the quota system and let the market determine which firms can go public. The first non-quota IPO appeared in 2001.

Another feature of the data set is that it is free of survival bias that may cause problems in studying listing effects on company performance. No firm in our data set ceased operations or was de-listed after going public. Although China's bankruptcy law was passed in 1986, listed companies can usually count on the government or state-owned banks to bail them out of financial difficulties and hence avoid bankruptcy. Also no publicly listed firms returned to private ownership in our sample period. Only in 2001 did we observe the first incidence of de-listing.

In our regression analysis, we follow the existing literature in choosing our dependent and explanatory variables. This allows us to highlight the similarities as well as differences in the effects of public listing in China in comparison with countries that have been previously examined in the literature. Definitions of the dependent and explanatory variables to be used in our regression analysis are listed in Table 2.

(Insert Table 2 here)

We report summary statistics in Table 3 for both the full sample and a sub-sample of balanced panels. The full sample is unbalanced, including all observations that are used in at least one of the subsequent regressions. For each variable the balanced panel consists of firms that have valid observations for the variable from one year before IPO ( $t = -1$ ) to four years after IPO ( $t = 4$ ). The IPO year is denoted by  $t = 0$ . The balanced panel is constructed only for the period from year  $-1$  to year 4 because a more stringent requirement, say from  $-1$  to 6, would result in too small a sample: only 291 firms were listed in China by the end of 1994, and the rest had fewer than six years of post-listing

history by the end of our sample period. Since it is useful to know what went on for years 5 and 6, we also report the summary statistics for these two years for firms included in our balanced sample when the data is available for those periods. The interpretation for the last two years requires extra caution due to the changes in the composition of the firms.

(Insert Table 3 here)

To minimize the possibility of a small number of outliers driving the results, we follow other authors in the literature to Winsorize the data. Specifically, we reset the value of a variable that is in the tail one percentile of the full sample to that of the 1<sup>st</sup> percentile and the 99<sup>th</sup> percentile respectively. The summary statistics of the full sample are listed in column 3 of Table 3. The average size of the firm, measured by either book value of assets (denoted as *asset*) or sales (*sales*), is quite large, with mean value of assets of 1.2 billion yuan and average sales of 701 million yuan. The average debt to asset ratio (*debt*) is 0.30. The average return on assets (*ROA*) is 10.9%. Firms generally experience sales growth (*salegrow*) during the sample period with the average annual growth rate of 20%. But the cross-sectional and time series variations of sales growth are quite high, with a standard deviation of over 61%.

Ownership is highly concentrated: the top 5 shareholders hold close to 60% of the total shares (*A5*). Furthermore, ownership concentration among the top 5 shareholders is also very high -- the Herfindahl concentration index of shareholding among the top 5 shareholders (*Herfindahl\_top5*) is 0.648. (At the sample mean of 59.8% of shares being

held by top 5 shareholders, if the shares were distributed equally among them, the Herfindahl index would be 0.072.)

Summary statistics for the balanced sub-sample depict the changes over time. Overall, firms experience performance deterioration after public listing. The average return on assets (*ROA*) drops steadily, from 19.6% in the year immediately prior to IPO to 2.7% in the sixth year after IPO. The average return on sales (*ROS*) also decreases from 16.6% one year before listing to 0.2% in the sixth year after listing. It is worth noting that the decline in both operating performance measures does not level off, as is found in the literature on listing for firms in Western countries. The average operating income (*OI*) also deteriorates, despite the growth in both firm assets and sales during the post-IPO period. Leverage (*debt*) is generally lower after listing, consistent with the findings in the literature. Capital expenditure (*capex*) drops steadily in post-IPO years. Interestingly, listed firms initially pay more taxes as a percentage of their operating income after the IPO; however, very soon they pay *lower* taxes than before listing. This is in contrast with what is commonly found in the literature on Western firms where a cost of listing is the potentially higher tax burden associated with heightened scrutiny for listed firms.

Since many factors, such as macroeconomic factors during this particular sample period, could play a role in these changes in firm performance, in the next section we examine whether performance decline and the changes in other measures remain intact once additional factors are controlled for.

#### 4. Regression Analysis

##### *Ex post effects of listing*

We now examine how public listings affect a variety of outcome measures of interest. We use ROA as the overall performance measure. Because IPO firms often experience rapid expansion in their asset base, which alone can be responsible for the drop in ROA, we also examine ROS, another conventional measure of operating performance, to check the robustness of what we may find about the changes in ROA. To fully understand the impact of public listings in China and to compare it with some earlier findings in the literature, we include other measures of the outcomes of public listing in our investigation: sales growth, investment rate, financial leverage and tax burden. The basic regression used to measure the effects of going public is the following:

$$y_{it} = \mathbf{a}_0 + \mathbf{b}_i + \mathbf{a}_t + \sum_{t=0}^6 \mathbf{g}_t PL_{it} + \mathbf{e}_{it} \quad (1)$$

Here we have included fixed-effects and year effects.  $PL_{it}$  is the dummy variable that is one when firm  $i$  is  $t$  years after going public and zero otherwise. The use of fixed effects implies that we use the pre-listing outcome as the benchmark to measure the effects of listing. Since the firms went public in distinct years, controlling for year dummies ( $\mathbf{a}_t$ ) would isolate the macro effects on the dependent variables, capturing effects such as the credit cycle and macro boom and bust. Note that we allow the listing effects to differ by the number of years after listing, a flexible functional form to capture the total effects of listing. Since our benchmark is the pre-listing values of the

independent variables, the sample used for the regression consists only of listed firms with data for both year  $-1$  and year  $0$ . If a firm also has data for year  $-2$ , then both year  $-2$  and  $-1$  data are used in the regression and the benchmark is the average of the values for the two pre-listing years.

Our identifying assumption is that differences between pre- and post-listing performance capture the listing effects. In contrast, most of the authors on the effects of listing use the matching approach to identify the listing effects. That is, they find a matched sample for their sample of listed firms and then compute the listing effects as the before-after difference for the listed sample minus the before-after difference for the matched sample. Matching is usually done through the closest match based on size-industry category (e.g., Pagano, Panetta and Zingales, 1996 and 1998). Matching, however, poses serious requirements for data (Heckman, Ichimura and Todd, 1997 and 1998). The researcher needs to have access to another, much larger, data set in which important characteristics of the sample firm--most often performance, size, and industry--are close to the listing firms. Poor matching often results in mis-specified test statistics and biased estimates.

Since we do not have access to a large sample of firms that satisfy the strict matching requirements, we cannot use the common method of matching. Moreover, it is difficult, if not impossible, to find reasonable matches for our sample: these are overwhelmingly large firms, and there is currently no Chinese data set that surveys the large firms—state or nonstate—between 1990 and 2000 and that contains the necessary financial information. Without matching, however, we need to qualify our results on the

listing effects: they should be understood as the effects of listing on the “listed” sample, not as the effects of random assignment of listing on *any* firm.

The regression results are reported in Table 4. (Table 5 reports the number of observations for each year for each dependent variable. Depending on the specification, the number of firms included in the regressions range from 605 to 961.) Public listing is associated with a significant drop in operating performance measured by ROA (Columns 2). The zero, 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>/6<sup>th</sup> post-listing year effects on ROA are -1.5, -5.7, -4.9, -5.2, -3.8, and -3.1 percentage points, respectively.<sup>8</sup> In other words, the overall operating performance of listed firms in China is significantly lower than pre-listing levels for many years after listing.

(Insert Tables 4 and 5 here)

The decline in performance, however, cannot simply be attributed to the sharp increase in assets. As total assets normally increase significantly after IPOs, it is possible that operating income scaled by assets potentially has a downward bias. However, operating income scaled by sales (i.e., ROS) also shows a similar decline after listing. Column 3 of Table 4 shows that the listing effects on ROS from the listing year to the 5<sup>th</sup>/6<sup>th</sup> year are, respectively, 1.4, 0.0, -2.0, -4.6, -3.6, and -6.4. Note that the negative effects of listing on ROA and ROS are very precisely estimated. The decline in ROS after listing is not due to an increase in the scale of production. Column 4 of Table 4 shows that the growth rate of sales (*salegrow*) does not significantly change as a result of listing,

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<sup>8</sup> We bundle the 5<sup>th</sup> and 6<sup>th</sup> year together because there are relatively too few observations for each year.



except for years 4 to 6, when sales growth drops roughly 8 percentage points (with t-statistics about 1.55).

Furthermore, the decline in operating performance as a result of listing cannot be fully explained by the possibility of pre-listing performance being over-stated. If this were the case, and if the listing had achieved its intended goals to some degree, then we would not be able to explain why the performance one year after the IPO is so much lower than during the IPO year, nor why the performance does not significantly improve over time during the post-listing years.

One of the most-cited reasons for going public is that it loosens the financial constraints faced by firms (Roell, 1996; Pagano, Panetta, and Zingales, 1998). If so, the post-listing growth in capital expansion should speed up. Listing does not appear to play such a role in China (Column 5, Table 4, *capex*). The share of capital expenditure in net fixed assets increases only during the listing year, then decreases from year 2 until year 6 after listing at an accelerating pace. Thus the expansion in production capacity happens at most only in the first post-listing year and quickly slows down over time. Not surprisingly, listing leads to a reduction in the debt-asset ratio (Column 5, Table 4, *debt*), especially initially. With the lapse of time, however, the leverage ratio converges to the pre-listing level, as demonstrated by the statistically insignificant coefficient for the dummy of years 5 to 6

A posited hypothesis in the literature is that, due to more stringent financial disclosure requirements, going public might lead to higher tax payments (Pagano, Panetta, and Zingales, 1998). We find the opposite in the case of Chinese firms. Column 6 of Table 4 (*tax\_oi*) shows that while the ratio of tax to operating income initially

increases by 1.7 percentage points, it is actually *lower* than the pre-listing level in post-listing years 2 to 6 (with some coefficients being statistically insignificant). Thus there does not appear to be an increased scrutiny in collecting taxes after public listing.

It remains possible that other time-varying variables correlated with the listing variables explain the variations in our dependent variables. To check this we control for some variables that are the “usual suspects” in explaining the outcome regardless of whether a firm is listed or not (as in Pagano, Panetta, and Zingales, 1998). To this end, we add in the right-hand side *log (lagged sales)* to capture size effects, i.e. larger firms may exert more market power and therefore generate more profits, and *log (lagged leverage ratio)* to control for financial structure and its informational contents. The results are reported in Table 6.<sup>9</sup>

(Insert Table 6 here)

Most of the qualitative findings in Table 4 remain intact. There is one minor change. The initial positive and statistically significant effects of listing on ROS become insignificant in the listing year (i.e., year 0). In the meantime, lagged sales ( $\ln sales_{t-1}$ ) have a positive and significant role in post-listing ROS, which suggests increased market power gives rise to higher profit margins.

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<sup>9</sup> We have also tried adding more variables such as the share of intangibles in total assets and investment rate (both lagged by one period) as additional explanatory variables, and we obtained qualitatively similar results. However, in doing so we lost a significant number of observations.

### *Ownership structure and listing effects on performance*

Public listing changes the ownership structure of a company. When used to transform an SOE, public listing in China is intended to introduce non-state shareholders with better abilities and incentives to monitor and exercise effective control over the management. As managerial ownership is negligible for the vast majority of Chinese firms, a very dispersed ownership structure with numerous small shareholders clearly cannot achieve such a goal. Thus, for most listed firms in China, the majority of shares are held by the state and/or a number of legal persons. In what follows, we examine the impact of the ownership structure on the listing effects. In particular, we examine two aspects of ownership effects: whether the listing effects differ by direct state ownership, and how ownership concentration by top shareholders and the balance of power among them affect the listing effects.

The issue of whether state ownership affects listing effects is a natural question in the context of Chinese listed firms. The most important owners for Chinese listed firms tend to be either the state or legal persons, with smaller shares going to foreign and individual owners. While many of the legal person shares are often owned by state-owned or state-controlled enterprises/institutions, it is still important to find out whether the listing effects differ by the presence of direct state involvement. To examine the potential differences between listed firms with and without direct state ownership, we decompose the sample into two groups, depending on whether there was any direct state ownership in the year of listing. We have 389 firms with state ownership in year 0, and 193 firms without any state ownership. State ownership for the rest of the firms cannot be

identified due to missing values of state shares.<sup>10</sup> Among firms with direct state ownership, the state on average owns about 40% of the total shares. Table 7 presents the regression results.

(Insert Table 7 here)

The differences in performance between firms with and without direct state ownership appear to be quite small. The coefficients associated with various post-listing years for both sets of firms are almost identical for the *ROA* regressions (see columns 3 and 4). This finding is consistent with our earlier remark that the distinction between state and legal person shareholders is in many cases superficial and our conjecture that state ownership, directly or indirectly, accounts for a significant portion of all the legal person shares.

When *ROS* is the dependent variable, however, there are some differences. For companies with direct state ownership, there is a monotone decline in *ROS*. For companies without direct state ownership, however, there is a monotone decline only until year 3, when the reversal begins. Combined with the statistically insignificant decline of *ROA* for firms without direct state ownership in the 5<sup>th</sup>/6<sup>th</sup> year, this seems to suggest that these firms may experience a shorter and less severe post-listing decline in performance than firms with direct state ownership.

We now turn to the issue of how listing effects hinge on the extent of state ownership and on the firm's ownership concentration structure.<sup>11</sup> Following Demsetz and

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<sup>10</sup> Note however that there may still be indirect state ownership as some legal person shares might be indirectly owned by the state.

Lehn (1985), we construct two measures of ownership concentration: (1) the percentage of shares held by the top 5 shareholders ( $A5$ ), and (2) the Herfindahl concentration index of ownership among the top 5 shareholders ( $Herfindahl\_top5$ ). It should be noted that the way we construct Herfindahl index is slightly different from other authors. Demsetz and Lehn (1985), for example, use the Herfindahl index to capture concentration of ownership among *all* shareholders. Under our construction, the Herfindahl index measures the concentration of control power among the top 5 shareholders. A high Herfindahl index implies that control power is likely to be in the hands of the largest shareholder, while a small Herfindahl index means that ownership is more evenly distributed and there is a balance of control power among the large shareholders.

The regression we run is:

$$y_{it} = \mathbf{a}_0 + \mathbf{a}_i + \mathbf{a}_t + \mathbf{g} X_{it} + \mathbf{b}_1 A5_{it} + \mathbf{b}_2 Herfindahl\_top5_{it} + \mathbf{b}_3 state\_shares_{it} + \mathbf{b}_4 list_{it} (1 + \mathbf{b}_5 A5_{it} + \mathbf{b}_6 Herfindahl\_top5_{it} + \mathbf{b}_7 state\_shares_{it}) + \mathbf{e}_{it} \quad (2)$$

Here  $list$  is a listing dummy, and  $X$  represents other control variables that we mentioned earlier. We could use a formulation similar to eq. (1) and allow ownership variables to interact with a dummy for each of the post-listing years, but that would lead to too many interaction terms and potentially collinearity and identification problems. Therefore, we adopt the parsimonious specification of one listing dummy, and allow the listing dummy to interact with the ownership variables. The total effects of listing on the dependent variable are then  $\mathbf{b}_4 + \mathbf{b}_4 \mathbf{b}_5 A5_{it} + \mathbf{b}_4 \mathbf{b}_6 Herfindahl\_top5_{it} + \mathbf{b}_4 \mathbf{b}_7 state\_shares_{it}$ .

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<sup>11</sup> Note that our focus here is on how ownership structure affects the effects of public listing on company performance rather than on how it affects company performance itself as in, for example, Claessens and Djankov (1999) who study the effects of ownership concentration on corporate performance in the context of voucher privatization in the Czech Republic.

(Insert Table 8 here)

Table 8 reports the regression results. The extent of state ownership only has a marginal negative impact on the effects of listing on ROA: the coefficient of the interaction term between listing and state ownership (*list\*state\_shares*) is negative but statistically insignificant.<sup>12</sup> Moreover, the total effects of state shares on the ROA of listed firms are immaterial. In other words, *ceteris paribus*, performance of listed firms is not affected by the extent of state ownership. These results are in line with the findings reported in Table 7 that firms without state ownership and those with state ownership all experience a similar pattern of performance deterioration.

Ownership concentration has only marginal direct impacts on performance: the direct effects of both *A5* and *Herfindahl\_top5* are statistically insignificant. Moreover, the listing effects do not hinge on ownership concentration measured by *A5*—as demonstrated by the insignificant coefficients on the interaction term of *list* and *A5*. The balance of power among largest shareholders matters however. The interaction term of *list* and *Herfindahl\_top5* is negative and significant in the *ROA* equation. Thus an ownership structure that features more balance of power among top owners appears more conducive to positive listing effects on operating performance. Our results are consistent with the notion that checks-and-balances among large shareholders may reduce the likelihood of a dominant shareholder maximizing his or her own private interest at the

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<sup>12</sup> However, state ownership has a positive and statistically significant listing effect on ROS. In other words, a firm's profit margins improve more after listing when it has a higher percentage of state shares. Given the negative effect of listing on ROA, the positive effect on ROS seems to suggest that the increase in total assets as a result of public listing generates a smaller increase in sales in firms with more state shares.

expense of other shareholders. The test of the role of checks-and-balances in corporate governance and its effect on company performance is, to our collective knowledge, the first in the literature.<sup>13</sup>

## **5. Conclusion**

Using a comprehensive panel data set of financial and ownership information on China's publicly listed firms between 1990 and 2000, we explore the effectiveness of public listing as a means of reforming SOE in China. Overall, our findings suggest that public listing in China has not achieved its intended goals. Specifically, we find that public listing is associated with sharp deterioration in performance for up to six years after the year of listing, and it is true for firms with or without direct state ownership. The effects of listing on performance are not significantly affected by the percentage of shares held by the state or by large shareholders.

These findings suggest that firms without formal state ownership do not behave so much differently from firms with state ownership in their quest for profits, and that ownership concentration by large shareholders is ineffective in improving performance when they are likely to be the state agencies or SOE-like institutions. As long as there is a significant presence of direct or indirect state ownership in listed firms, small variations in the percentage of state shares do not matter much to performance. The findings also suggest that China's stock market and legal systems are not sufficiently functional for the

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<sup>13</sup> Our result is related to the work of Claessens, Djankov and Lang (2000), who find widespread presence of opportunities for expropriation in East Asian corporations. It is also related to recent findings by Cull, Matesova and Shirley (2001), who provide evidence consistent with the hypothesis that dominant owners and/or managers may "strip resources from a firm they own in part and transfer them to a firm they own in whole or to their personal accounts" (p. 29).

listed firms to establish effective corporate governance that protects the interest of small public shareholders.

Our finding that a more balanced ownership structure among top shareholders improves the listing effects on performance suggests that when these very large shareholders themselves are not profit-oriented, introducing checks-and-balances to prevent misbehavior by dominant shareholders may be important in designing a corporate governance framework in China.

After comparing the positive effects of share issue privatization as found in the literature with the poor effects of share issue corporatization as experienced by Chinese firms, one may be tempted to conclude that share issue corporatization does not work as a way to reform SOEs. However, given the short history of China's stock market, we do not want to make too strong a claim about the success (or failure) of public listing solely based on our findings. It is possible that public listing may eventually become useful in transforming SOEs and improving their performance as the stock market, legal systems and other market institutions develop over time and as more private entrepreneurs accumulate sufficient wealth to acquire more stakes and become the large shareholders of listed firms. It would be very interesting to see if corporatization in general and public listing in particular is a viable alternative to privatization in the long run.



**Table 1. Development of the China's Stock Market<sup>1</sup>**

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total Number of Listed Firms	10	14	53	183	291	323	530	745	851	949	1088
Capital Raised <sup>2</sup> (billion yuan)	4.59	0.5	9.4	31.407	13.827	11.854	34.144	93.397	79.504	88.297	142.829
Market Capitalization <sup>3</sup> (billion yuan)	N/A	N/A	104.813	353.101	369.061	347.428	984.238	1752.924	1950.564	2647.117	4809.094
Market Capitalization/GDP (%)	N/A	N/A	3.93	10.2	7.89	5.94	14.5	23.44	24.9	32.32	54.03
Number of Investors <sup>4</sup> (million)	N/A	N/A	2.1665	7.7766	10.5898	12.4247	23.0723	33.3333	39.107	44.8197	58.0113
Total Book Value of Assets (billion yuan)	N/A	N/A	48.1	182.1	330.9	429.5	635.2	966.058	1240.752	1610.736	1796.027
State Shares (as a % of Total Shares)	N/A	N/A	41.38	49.06	43.31	38.74	35.42	31.52	34.25	36.11	38.90
Legal Person Shares (as a % of Total Shares)	N/A	N/A	27.86	23.07	23.51	24.99	28.38	32.74	30.39	27.73	24.45

<sup>1</sup>Source: China Securities Regulatory Commission, *China Securities and Futures Statistical*, China Finance and Economic Publishing House, Beijing, 1999, and CSRC's official web site <http://www.csrc.gov.cn/CSRCSite/deptlistcom/stadata/stadata.htm>. Some of the statistics were not kept by the CSRC until 1992.

<sup>2</sup>By the end of 2000, the Chinese market had total market capitalization of US\$580.942 billion, which was only slightly lower than US\$616.34 billion (HK\$4,795.150 billion) of the main board of Hong Kong Stock Exchange.

<sup>3</sup>Including both IPO and seasoned offerings of A and B shares.

<sup>4</sup>Including institutional and individual accounts.

**Table 2. Definition of Variables**

<i>Variable Name</i>	<i>Definition</i>
<i>asset</i>	Book value of asset.
<i>OI</i>	Operating income before depreciation, amortization and extraordinary items.
<i>debt</i>	Ratio of total debt to debt plus total shareholders' equity. Calculated as (short term debt + long term debt) / (short term debt + long term debt + shareholders' equity).
<i>ROA</i>	Return on assets: operating income (OI) of year $t$ divided by book value of assets at the end of year $t-1$ .
<i>ROS</i>	Return on sales, calculated as the ratio of operating income (OI) to sales.
<i>ln_sales</i>	Natural log of sales, used to measure firm size and as a proxy of market power.
<i>capex</i>	Capital expenditure, scaled by net fixed assets.
<i>salegrow</i>	Growth rate of sales. Calculated as $(sales_t - sales_{t-1}) / sales_{t-1}$ .
<i>tax_oi</i>	Ratio of paid tax to operating income (OI).
<i>state_shares</i>	Percentage of state-owned shares.
<i>A5</i>	Shares held by top 5 shareholders divided by total number of shares.
<i>Herfindahl_top5</i>	Herfindahl index of ownership concentration among top 5 shareholders. Calculated as $\sum S_i^2$ , where $S_i$ is the ratio of shares held by the $i^{th}$ shareholder to total shares held by all top 5 shareholders.

**Table 3. Summary Statistics<sup>1</sup>**

		<i>Full Sample</i> <sup>2</sup>			<i>Balanced Panel</i> <sup>3</sup>					
		<i>t=-1</i>	<i>t=0 (IPO)</i>	<i>t=1</i>	<i>t=2</i>	<i>t=3</i>	<i>t=4</i>	<i>t=5</i>	<i>t=6</i>	
<i>asset</i> (million yuan)	mean	1183.997	1230.728	530.864	843.479	1034.541	1198.152	1326.709	1466.001	1752.552
	std dev	3108.648	3221.904	1027.012	1595.529	1700.946	1823.214	1961.404	2081.066	2443.456
	obs	6904	7296	456	456	456	456	456	456	254
<i>Sales</i> (million yuan)	mean	700.926	705.034	511.371	600.480	644.255	643.119	708.525	770.268	857.417
	std dev	1367.097	1365.408	850.413	1063.418	1100.858	1141.417	1312.600	1359.032	1428.980
	obs	6964	7353	443	443	443	443	443	443	243
<i>OI</i> (million yuan)	mean	87.956	88.002	65.567	80.045	71.247	62.170	67.156	73.480	58.091
	std dev	211.756	219.527	167.615	201.406	141.338	175.038	234.006	193.743	159.165
	obs	6239	6575	285	285	285	285	285	285	105
<i>ROA</i>	mean	0.109	0.196	0.154	0.097	0.074	0.06	0.044	0.028	0.027
	std dev	0.111	0.147	0.118	0.094	0.094	0.087	0.08	0.06	0.055
	obs	5483	115	115	115	115	115	115	59	57
<i>ROS</i>	mean	0.135	0.166	0.162	0.137	0.078	0.044	0.053	-0.003	0.002
	std dev	0.179	0.132	0.108	0.148	0.211	0.239	0.239	0.252	0.246
	obs	6239	285	285	285	285	285	285	105	94
<i>Debt</i>	mean	0.304	0.328	0.264	0.28	0.293	0.305	0.319	0.343	0.361
	std dev	0.196	0.202	0.178	0.18	0.185	0.188	0.196	0.203	0.216
	obs	6827	430	430	430	430	430	430	230	217
<i>Capex</i>	mean	0.268	0.743	0.577	0.431	0.282	0.16	0.13	0.025	0.038
	std dev	0.630	1.025	0.856	0.731	0.652	0.598	0.518	0.399	0.324
	obs	5766	136	136	136	136	136	136	75	71
<i>Salegrow</i>	mean	0.198	0.287	0.478	0.222	0.105	0.238	0.134	0.124	0.165
	std dev	0.613	0.859	1.147	0.812	0.554	0.752	0.599	0.652	0.597
	obs	6114	250	250	250	250	250	250	185	181
<i>tax_oi</i>	mean	0.133	0.144	0.151	0.142	0.123	0.126	0.092	0.088	0.108
	std dev	0.173	0.14	0.163	0.198	0.232	0.216	0.186	0.238	0.258
	obs	6239	285	285	285	285	285	285	105	94
<i>A5</i>	mean	0.598	0.662	0.586	0.581	0.574	0.577	0.558	0.577	0.558
	std dev	0.154	0.230	0.157	0.151	0.142	0.136	0.139	0.143	0.132
	obs	4831	199	199	199	199	199	199	71	63
<i>Herfindahl_top5</i>	mean	0.648	0.622	0.640	0.622	0.617	0.618	0.604	0.610	0.602
	std dev	0.242	0.247	0.235	0.238	0.229	0.227	0.230	0.230	0.232
	obs	4941	230	230	230	230	230	230	87	96

Note: <sup>1</sup> The values of *ROA*, *ROS*, *debt*, *capex*, *salegrow*, *tax\_oi*, *A5*, *Herfindahl\_top5* are expressed as fractions, while *asset sales*, *OI* are in million yuan. *Sales* is adjusted by GDP deflator (1995=100). Summary statistics are based on Winsorized data. Winsorization is done by resetting a value below the 1<sup>st</sup> percentile to the 1<sup>st</sup> percentile the full-sample, and resetting above the 99<sup>th</sup> values to the 99<sup>th</sup> percentile.

<sup>2</sup> An observation is included in full sample summary statistics if it is used in one of the subsequent regressions. Full sample is an unbalanced panel in that new firms are added over time and a firm may re-enter the panel after disappearance.

<sup>3</sup> A firm is included in the balanced panel only if it has non-missing values of the particular variable in this table throughout the period from one year before IPO ( $t=-1$ ) to four years afterwards ( $t=4$ ). (The IPO year is marked by  $t=0$ .) In other words, the panel from  $t=-1$  to  $t=4$  is balanced. To give a more complete picture, we also present summary statistics for a sub-sample of firms in the balanced panel in years  $t=5$  and  $t=6$ .

**Table 4. Effects of Public Listing Part I**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ROA</i>	<i>ROS</i>	<i>salegrow</i>	<i>capex</i>	<i>debt</i>	<i>tax_oi</i>
t=0	-0.015 (3.44)***	0.014 (2.38)**	0.019 (0.68)	0.103 (2.93)***	-0.110 (20.06)***	0.017 (2.40)**
t=1	-0.057 (10.04)***	0.000 (0.03)	-0.006 (0.20)	-0.021 (0.44)	-0.094 (14.96)***	0.009 (0.98)
t=2	-0.049 (6.97)***	-0.020 (2.41)**	-0.030 (0.84)	-0.135 (2.19)**	-0.074 (10.33)***	-0.014 (1.40)
t=3	-0.052 (6.04)***	-0.046 (4.67)***	-0.023 (0.58)	-0.221 (2.89)***	-0.060 (7.48)***	-0.025 (2.13)**
t=4	-0.038 (3.39)***	-0.036 (3.00)***	-0.083 (1.57)	-0.240 (2.46)**	-0.038 (3.88)***	-0.028 (1.95)*
t=5 or 6	-0.031 (2.36)**	-0.064 (4.52)***	-0.085 (1.54)	-0.359 (3.08)***	-0.015 (1.41)	-0.024 (1.36)
constant	0.341 (22.04)***	0.285 (5.42)***	0.348 (6.08)***	0.902 (5.96)***	0.371 (8.40)***	0.127 (1.97)**
observations	3317	5096	4800	3572	6545	5096
number of firms	605	792	766	654	961	792
R-squared	0.44	0.13	0.03	0.10	0.13	0.03

Note. \*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels. The coefficients for year dummies are not reported. t5-6 is the listing-age dummy for firms in 5<sup>th</sup> or 6<sup>th</sup> year after the IPO.

**Table 5. Number of Firms in Each “Listing Age” Cohort Used in Regressions.**

	<i>ROA</i>	<i>ROS</i>	<i>salegrow</i>	<i>capex</i>	<i>debt</i>	<i>tax_oi</i>
t=-2	514	535	702	538	662	535
t=-1	605	792	766	654	961	792
t=0	605	792	766	654	961	792
t=1	501	681	665	553	857	681
t=2	422	604	566	454	756	604
t=3	317	499	461	347	647	499
t=4	126	304	250	136	430	304
t=5 or 6	133	229	366	146	447	229
Total	3317	5096	4800	3572	6545	5096

Note: The sample is selected in such a way that a firm must have valid observations in both the IPO year and the year before.

**Table 6. Effects of Public Listing: Part II**

	(1)	(2)	(3)	(4)	(5)	(6)
	<i>ROA</i>	<i>ROS</i>	<i>salegrow</i>	<i>capex</i>	<i>debt</i>	<i>tax_oi</i>
t=0	-0.017 (3.97)***	0.006 (1.05)	0.044 (1.81)*	0.128 (3.60)***	-0.110 (17.06)***	0.016 (2.00)**
t=1	-0.058 (10.36)***	-0.004 (0.50)	0.035 (1.22)	0.010 (0.20)	-0.090 (11.91)***	0.008 (0.85)
t=2	-0.051 (7.28)***	-0.019 (2.18)**	0.045 (1.33)	-0.088 (1.41)	-0.074 (8.36)***	-0.012 (1.10)
t=3	-0.055 (6.50)***	-0.041 (4.03)***	0.058 (1.50)	-0.155 (2.00)**	-0.058 (5.68)***	-0.024 (1.81)*
t=4	-0.042 (3.78)***	-0.022 (1.78)*	-0.005 (0.09)	-0.150 (1.52)	-0.023 (1.75)*	-0.022 (1.35)
t=5 or 6	-0.034 (2.60)***	-0.035 (2.36)**	-0.092 (1.69)*	-0.295 (2.49)**	-0.011 (0.75)	-0.019 (0.97)
<i>ln_sales<sub>t-1</sub></i>	0.003 (1.05)	0.049 (11.21)***	-0.562 (32.49)***	-0.098 (4.18)***	0.004 (0.89)	0.022 (3.84)***
<i>ln_debt<sub>t-1</sub></i>	0.002 (4.60)***	-0.000 (0.22)	-0.000 (0.13)	-0.008 (2.81)***		-0.001 (1.64)
constant	0.338 (5.25)***	-0.645 (7.27)***	11.212 (31.94)***	3.103 (6.44)***	0.254 (3.05)***	-0.231 (2.00)**
observations	3282	4307	4235	3511	4380	4307
number of firms	604	790	734	648	734	790
R-squared	0.44	0.17	0.26	0.11	0.16	0.04

Note. \*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels. The coefficients for year dummies are not reported. t5-6 is the listing-age dummy for firms in 5<sup>th</sup> or 6<sup>th</sup> year after the IPO.

**Table 7. Listing Effects on Performance: Firms with or without State Ownership**

	(1)	(2)	(3)	(4)	(5)	(6)
	ROA			ROS		
	Full Sample	With State Ownership	Without State Ownership	Full Sample	With State Ownership	Without State Ownership
t=0	-0.017 (3.97)***	-0.014 (2.42)**	-0.014 (1.57)	0.006 (1.05)	-0.009 (1.05)	-0.025 (2.00)**
t=1	-0.058 (10.36)***	-0.051 (6.29)***	-0.065 (5.36)***	-0.004 (0.50)	-0.023 (1.96)*	-0.067 (4.00)***
t=2	-0.051 (7.28)***	-0.047 (4.57)***	-0.049 (3.07)***	-0.019 (2.18)**	-0.043 (2.95)***	-0.081 (3.70)***
t=3	-0.055 (6.50)***	-0.050 (3.85)***	-0.051 (2.57)**	-0.041 (4.03)***	-0.067 (3.66)***	-0.100 (3.63)***
t=4	-0.042 (3.78)***	-0.038 (2.29)**	-0.040 (1.59)	-0.022 (1.78)*	-0.105 (4.45)***	-0.076 (2.15)**
t=5 or 6	-0.034 (2.60)***	-0.032 (1.60)	-0.016 (0.51)	-0.035 (2.36)**	-0.110 (3.84)***	-0.058 (1.36)
$\ln\_sales_{t-1}$	0.003 (1.05)	0.006 (1.42)	-0.013 (2.36)**	0.049 (11.21)***	0.039 (6.55)***	0.016 (2.02)**
$\ln\_debt_{t-1}$	0.002 (4.60)***	0.002 (4.05)***	0.001 (2.23)**	-0.000 (0.22)	0.001 (0.76)	-0.001 (0.89)
constant	0.338 (5.25)***	0.279 (3.22)***	0.598 (5.42)***	-0.645 (7.27)***	-0.472 (3.84)***	-0.061 (0.40)
observations	3282	2072	1052	4307	2072	1052
number of firms	604	389	193	790	389	193
R-squared	0.44	0.45	0.47	0.17	0.20	0.13

Note: \*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1 percent levels. A firm is identified as having direct state ownership if a positive amount of state-owned shares is observed in the IPO year. If a firm reports a missing value of state ownership that is not clearly identifiable, it is deleted from “with state ownership” and “without state ownership” subsamples. Therefore, the total number of firms with and without state ownership is smaller than the number of firms in the full sample.

**Table 8. Ownership Structure and Listing Effects on Performance**

	(1)	(2)
	<i>ROA</i>	<i>ROS</i>
<i>list</i>	0.029 (0.98)	-0.012 (0.21)
<i>A5</i>	0.025 (0.75)	0.000 (0.00)
<i>list * A5</i>	-0.004 (0.10)	-0.002 (0.03)
<i>Herfindal_top5</i>	-0.040 (0.97)	0.074 (0.97)
<i>list * Herfindahl_top5</i>	-0.071 (2.48)**	-0.055 (1.03)
<i>state_shares</i>	0.033 (1.56)	-0.053 (1.34)
<i>list * state_shares</i>	-0.032 (1.31)	0.078 (1.72)*
<i>ln_sales<sub>t-1</sub></i>	-0.017 (2.91)***	0.041 (3.90)***
<i>ln_debt<sub>t-1</sub></i>	0.002 (3.00)***	0.001 (0.71)
constant	0.754 (5.22)***	-0.595 (2.24)**
observations	873	873
number of firms	163	163
R-squared	0.39	0.13

Note. \*,\*\*,\*\*\* represent statistical significance at the 10, 5, and 1 percent levels. The coefficients for year dummies are not reported.



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