Privatization, Efficiency and Intra-industry Effects: Analysis of China's Privatization*

Isaac Otchere and Zonglan Zhang[†]
Department of Finance, University of Melbourne, Australia, and
[†]ANZ Bank, Australia

ABSTRACT

In this study, we use both accounting and stock market data to examine the performance of privatized firms in China and that of their rivals. Consistent with our conjecture, we find that competitors reacted negatively to the privatization announcements. However, the magnitude of the abnormal returns, together with the significance level, increases as the event window widens. For example, while the rivals marginally lost 0.5% of their value on the announcement date, they lost 1.3% (3.3%) of their value during the five-day (21-day) period surrounding the privatization announcement date. The results suggest that privatization of state owned enterprises in China signalled a change in the competitive balance in the industries, since most of the rivals reacted negatively to the announcements. Analysis of the operating performance measures also shows that the privatized firms outperformed their industry counterparts in the post-privatization period. Furthermore, we examine the long-term stock market performance of the privatized firms relative to that of the industry rivals and find that the privatized firms outperformed their industry rivals only by the end of the third year after privatization. Although most of the sample firms are partially privatized, and may probably be required to meet some social objectives during the post partial privatization period, we did not find any evidence that the proportion of government ownership explains the returns of the privatized firms.

I. INTRODUCTION

Privatization has swept the world in the past few decades. A World Bank study by Kikeri et al. (1992) shows that more than 80 countries have launched ambitious plans to privatize their state-owned enterprises (SOEs) as various governments use privatization to, among others, compel SOEs to be more market-oriented by removing political or governmental administration from the firms. According to

an OECD study of financial markets, privatization across the world increased 10% in 1999, yielding US$145 billion in returns to governments.[1] Gibbon (2000) notes that by mid-1999 the cumulative value of proceeds raised through privatization programmes by governments around the world exceeded US$1 trillion, with the average yearly revenue being around US$140 billion. A motivating factor behind the privatization drive is the well documented poor performance of some SOEs.

For the past two decades, China has embarked on a reform process that seeks gradually to move the country to a market economy. Privatization of state-owned enterprises has been a centrepiece of the reform process. As a socialist nation, China has had a long history of the old system of command planning that is closely linked to the SOEs. These SOEs are controlled by a number of government agencies, regional authorities, central line ministers and local ministerial branches. Although these SOEs still play an important role in the economy, it is hardly an overstatement to say that since the early 1990s these firms have been locked in a downward economic spiral, a situation only partially reflected in the rising number of firms that are officially declared losers. This unsatisfactory performance is attributed to the lack of separation between government and firm and unclear property rights (Steinfeld 1998). The activities of these state-owned companies, as compared to their non-state counterparts, are characterized by low efficiency. The government's economic reforms have focused attention on revitalizing state ownership with a view to increasing efficiency. The government's official stance on SOE reform has been to push for 'corporatization', a phenomenon almost universally recognized as an important step towards privatization. A number of firms have subsequently been privatized with a view to making them more efficient.

Privatization exposes these firms to the discipline of the market, increases competitiveness and provides the necessary incentives for improving performance. Since privatization provides new incentives for better performance in a new competitive environment, the newly privatized firms may become more aggressive in their operations. Privatization may thus signal to investors more efficient operations from the former SOEs. Rivals' stock returns may suffer if the market believes that there is a more efficient and aggressive competitor in the industry whose operations can possibly lead to a fall in product prices and hence erode the profitability of competitors. Thus far, whether efficiency and profitability of these former SOEs have improved since privatization has not been systematically analysed, although several studies have examined China's economic reforms (see, for example, Jefferson and Rawski 1994; Sachs and Woo 1997).[2] This study analyses the efficiency and profitability of former SOEs in China and, more importantly, the effects of privatization announcements on their rivals as well as the long-term stock market performance of the privatized firms.

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1 See *China Daily Business Weekly*, 23–29 July 2000.
2 Perhaps the only exception is Chen et al. (2000), who use accounting data to analyse the pre- and post-privatization operating and financial performance of former SOEs in China.

Our study is different from prior studies in several ways. First, we compare the post-privatization operating and financial performance of the former SOEs with that of their rivals. Second, we compare the long-term stock market performance of the privatized firms to that of their industry rivals to ascertain whether the competitive environment and the change in incentives and goals that accompany privatization result in the privatized firms performing differently from their industry counterparts. Examining the long-term stock market performance is important because, as Chen et al. (2000) have argued, it is only the profitable operations of SOEs that are carved out and privatized because the state wants privatized firms to be successful so that further privatizations could be made in future. Poor corporate profitability and the attendant poor stock market performance could dampen investors' confidence in IPOs and subsequently hinder the government's attempt to privatize additional SOEs. It is thus important to examine whether the privatized firms perform well in the stock market in the long run.

More importantly, we analyse the short-term stock market reaction of the industry counterparts to the privatization of the SOEs. Since privatization creates a new competitive environment and incentives for better performance, the operating and financial performance of the privatized firms may improve. Rivals' stock prices will react negatively to the announcement of the privatization if the market believes that there is now a more efficient and aggressive competitor in the industry whose operations can lead to declines in product prices and hence erode the profitability of the rival. This study is not only the first paper to analyse competitors' reaction to the privatization announcements and the long-run stock market performance of the former SOEs in China, but also the first study to examine the effects of privatization on competitors' stock price in a large sample. The only other study that examines industry effects of privatization announcement is the paper by Eckel et al. (1997) that examines the effects of the privatization of British Airways on rival airlines. However, the extent to which the results of such a single-announcement single-industry study can be generalized is limited.

We first examine the stock price reaction of the rivals to the privatization announcement to infer information about the expected impact of privatization on the industry counterparts. Consistent with our conjecture, we find that rivals generally reacted negatively to the privatization announcements. For the five-day (21-day) period surrounding the privatization announcement date, the rival firms lost 1.3% (3.3%) of their value. In terms of the operating performance, we find that the privatized firms systematically outperform their industry counterparts in the post-privatization period. Furthermore, we find that the privatized firms outperformed their industry rivals in terms of the long-run stock market returns, although the better performance occurred in the third year after privatization. Further analysis failed to support the conjecture that government ownership explains the lack of better stock market performance of the privatized firms over their industry counterparts, especially in the first two post-privatization years.

The remainder of this paper is organized as follows. Section II presents a review of the relevant literature, while in Section III we briefly discuss China's privatization programme. Section IV deals with data selection, while the methodology is discussed in Section V. The results are presented and analysed in Section VI. Section VII concludes the study.

II. LITERATURE REVIEW

A. Performance of privatized firms

Several studies have documented that inefficiencies and low profitability characterize SOEs. The causes of the poor performance have, *inter alia*, been attributed to the realization of social and political objectives that involve wealth redistribution rather than wealth creation, and the appointment of management teams on the basis of political connections and not on merit (Krueger 1999). Prior studies also suggest that once these SOEs are privatized, they improve efficiency because the new competitive environment and the monitoring role of the stock market drive managers towards efficiency and profitability objectives. Megginson et al. (1994) investigate the operating and financial performance of 61 privatized firms from 32 industries in 18 countries and find significantly better performance for these former SOEs. Boubakri and Cosset (1998) document similar results.

The strongest evidence of improved post-privatization performance is provided by Pohl et al. (1997), who examine the post-privatization performance of 6300 firms in seven countries including Poland, Hungary and the Czech Republic. The authors find that privatized firms achieve much higher rates of productivity growth, investment and positive operating cash flows than SOEs. Frydman et al. (1997) also examine the effects of privatization on corporate performance of 188 Czech, Polish and Hungarian firms and provide evidence consistent with improvement in the sample firms' post-privatization performance, particularly their revenue generation capacity. Lee and Nellis (1990) analyse enterprise reform and privatization in socialist economies and find that most managers of SOEs do not have sufficient autonomy with which to achieve improved performance.[3] They point out that performance standards aimed at improving efficiency have not been well implemented in China, nor have sanctions for poor performance.

Prior studies have also examined whether partial privatization (the typical form of privatization in China) generates improvements in performance. Boardman and Vining (1989) and Boycko et al. (1996) suggest that partial privatization may not achieve the intended objective of improved efficiency because of continued state ownership, which may hinder the effective operations of the firm. They suggest that, in order to facilitate restructuring of state

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3 They analyse privatization in Algeria, China, Hungary, Laos, Mozambique, Poland and Yugoslavia.

enterprises, both cash flow rights and control rights should pass from governments to private hands. Eckel et al. (1997), who, *inter alia*, analyse industry effects of the partial privatization of Canadian Airways, find that without the transfer of voting control to private hands, the partial privatization of the Canadian Airways did not elicit any significant reaction from rival firms. Boubakri and Cosset (1998) analyse the post-divestiture performance of control privatizations (in which governments surrender voting control) and that of revenue privatizations (in which governments sell a minority ownership stake but do not surrender voting control) and find that both forms of privatization generate better post-privatization performance. However, the increases in profitability and efficiency were significantly larger for control privatizations than for revenue privatizations. The foregoing discussion suggests that privatization in China may not achieve the desired effects of improving the profitability and efficiency of the former SOEs given that the firms are partially privatized and hence are still controlled by the state.

B. Privatization and information transfer

If privatization creates a new competitive environment and incentive for better performance, then the operating and financial performance of the privatized firm will improve and a more efficient competitor will appear in the industry. Thus, the privatization of a firm will hurt rivals through increased competition. Rivals' stock prices will react negatively to the announcement of the privatization if the market believes that there is now a more efficient and aggressive competitor in the industry whose operations can lead to falls in product prices and hence erode the profitability of the rivals. Eckel et al. (1997) examine the effects of the privatization of the British Airways on rivals' stock price and document negative stock returns for rivals. They argue that the market's expectation of the efficiency of the privatized firm can be inferred from the rival firms' price effects.[4] We conjecture that in the post-privatization period, our sample firms could show better, or at least equal, performance than the rivals in terms of profitability and efficiency. These improvements could be reflected in market returns in the long term if new growth opportunities are uncovered. Alternatively, to the extent that privatization promotes entrepreneurship, former SOEs will have the incentive and the means to invest in growth options both at home and abroad (Megginson et al. 1994). Privatization, with the attendant change of objectives, will give the management of the firms the leverage to pursue risky but growth-oriented strategies and policies that will allow the firm to generate higher returns to the investors in the long run.

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4 Other corporate announcements for which information transfer effects have been documented include earnings announcements (Clinch and Sinclair 1987), bank failures (Aharony and Swary 1983), merger proposals (Eckbo 1983), bankruptcy announcements (Lang and Stultz 1992), going-private events (Slovin et al. 1991) and public offerings of common stock, convertible debt and straight debt (Szewczyk 1992).

III. China's privatization programme

China's efforts at restructuring its SOEs began in a concerted fashion in 1984 and have continued till now. The reforms aim at increasing the self-reliance of individuals, increasing innovation, improving economic efficiency and decreasing the financial demands placed on the state in supporting SOEs (Chen et al. 2000). A key aspect of the reform process has been the privatization of SOEs, a large number of which have been plagued by economic inefficiencies and underinvestment (Cao et al. 1999). Privatization in China is strongly interrelated with the development of the Shanghai stock market in 1990 and the Shenzhen stock market in 1991. The government views well functioning stock exchanges as crucial if inefficient and money losing SOEs are to be successfully leveraged and restructured (Mookerjee and Yu 1999). Consequently, there has been a remarkable growth in the equity market in China.[5] The World Bank reports that by the end of 1993 China's market capitalization had outstripped Indonesia's and was on par with those of the Philippines and Argentina. The establishment of the Shanghai Stock Exchange and Shenzhen Stock Exchange in the 1990s formally indicated that the governance of SOEs would be shifted to the capital markets. As in other countries, these stock markets also act as avenues for mobilizing both domestic and foreign funds that could be channeled to the productive sectors of the Chinese economy. They are also to facilitate the government's efforts at weaning money-losing SOEs off subsidized loans from government and exposing them to the discipline of the market (Mookerjee and Yu 1999).

Since the establishment of the stock markets, a large number of SOEs have altered their ownership structures through privatization. However, it is usually the profitable divisions of government corporations that are carved out for privatization, as the government wants listed firms to be successful. Poor profitability and stock market performance of former SOEs may be seen as a sign of failure of the economic reforms and may hinder the government's subsequent efforts at privatizing other SOEs (Chen et al. 2000). The best known example of privatization in China is the restructuring programme of Zhucheng city in Shandong province, which started privatizing SOEs in 1992 when two-thirds of its SOEs were making losses or just breaking even.[6] Sichuan province has also been steadily selling off money-losing SOEs, while Guangdong province has been privatizing profitable SOEs in order to finance local infrastructure and also pay off the debts of the unprofitable SOEs with a view to preparing them for sale. In 1998, Heilongjiang province announced the privatization of 200 SOEs after having successfully completed the sale of 160 firms.[7] While Jefferson and Rawski (1994) and Sachs and Woo (1997) have documented that China's SOE reform has led to increased output, growing exports and rising total factor productivity, the efficiency and profitability of the former SOEs have not been systematically

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5 Mookerjee and Yu (1999) provide an interesting description of China's equity markets.
6 'China City Turns into a Prototype for Privatization', *Wall Street Journal*, 10 June 1995.
7 'Heilongjiang Puts 200 Firms on the Block', *China Daily*, 7 June 1996.

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analysed. Similarly, whether the industry counterparts react to the news of the arrival of potentially aggressive competitors has not been examined. We take up these issues in this paper.

IV. DATA

The study analyses the performance of SOEs that were privatized from 1992 to 1998 relative to that of their rivals. The industry rivals are those that operate in the same industry as the privatized firms and were listed on the Shanghai Stock Exchange before the privatized firm's initial public offering. To be included in the sample, the privatized firm and the rivals should have complete financial statements and stock price for the study period. Two privatized firms that were listed on the Hong Kong Stock Exchange (HKSE) and another firm that issued its B shares first on the HKSE were excluded from the study.[8] Our final sample consists of 23 privatized firms and 51 rivals from 13 industries for which we were able to collect complete financial data and stock returns for the three years after privatization. The number of announcements per industry ranged from one to three, while the number of competitors per industry ranged from two to seven. The annual reports, monthly share price of the privatized firms, daily and monthly share prices for the industry rivals and Shanghai A Share Index, used as a proxy for the market index, were obtained from Bloomberg data services. Supplementary data were also obtained from Homeway, a professional financial service provider in China, and the Shanghai Security News Online database.

It should be noted that most of the firms listed on the Shanghai Stock Exchange were former state-owned enterprises. To ensure that we compare the performance of the newly privatized firms with that of 'well established' industry counterparts, we selected rivals that had been listed on the stock exchange for at least two years before the sample firms were privatized. The median and mean age of the competitors used in the study at the time of the privatization of the sample firm is four years, although quite a few were six years older than the newly privatized firm. To the extent that a few of the rivals may not themselves be well established firms, we acknowledge this as a potential limitation in a later section.

Our descriptive statistics reveal (based on data in the year before privatization) that the privatized firms are smaller than the existing firms.[9] The privatized firms' median size, measured as sales scaled by total asset, is 0.66, while existing firms' size ratio is 0.74. These ratios are, however, not statistically significantly different. The privatized firms are not significantly different from the rivals in terms of leverage, as the sample firms' median leverage ratio (measured as book value of debt scaled by total asset) of 0.28 is not statistically different from that of existing

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8 B-Shares are those stocks listed on the Shanghai Stock Exchange that are available for investment by foreign investors.
9 We do not use year zero data to calculate the ratios because year zero data contain both pre- and post-privatization results.

firms of 0.23. However, our sample firms differ from existing firms in terms of profitability. The privatized firms appear to be more profitable than existing firms. The sample firms' return on asset and return on equity ratios of 10.72 and 30% respectively are larger than those of the publicly traded firms of 4.8 and 10%. However, these profitability ratios should be interpreted with caution, because to prepare the firms for the initial public offering, the managers may 'window dress' the accounts in year −1 to create a rosy picture about the profitability of the firms in order to elicit strong interest in the offer. Poor corporate profitability could dampen investors' interest and hinder the government's attempt to privatize additional state enterprises. We recognize that analysing the data for the years preceding the year of privatization would provide a better picture of the sample firms, but the lack of data precludes performing such analysis.

V. METHODOLOGY

A. Short-term reaction of rivals to the privatization

The initial stage of the analysis involves examination of the abnormal return behaviour of the industry competitors following the privatization announcements. The expected returns for each rival firm during the event period were calculated as:

$$R_{jt} = \alpha_j + \beta_j R_{mt} + U_{jt} \tag{1}$$

where R_{jt} is the expected return of firm j on day t, α and β are the alpha and beta respectively, R_{mt} is the return on the Shanghai Stock Exchange 30 Index for day t and u_{jt} is the residual error. The α and β for each industry competitor were calculated using an estimation window of 100 days prior to the event window. The abnormal returns were calculated as the difference between the observed returns and the expected returns as:

$$AR_{jt} = R_{jt} - E(R_{jt}) \tag{2}$$

where AR_{jt} is the abnormal return for firm j at time t, R_{jt} is the observed return for firm j at time t, and $E(R_{jt})$ is the expected return for company j on day t. These abnormal returns were averaged across firms in order to draw inferences about the impact of the privatization announcements.[10] The daily abnormal returns were then aggregated over various event windows to obtain the cumulative abnormal returns, which were subsequently tested for statistical significance. The average abnormal return (*AAR*) of the portfolio for day t is tested for significance using the standard testing methodology as:

10 However, as the industry-matched rivals have a common event date, there is a potential problem of cross-sectional correlation of returns, a problem that can bias statistical tests of significance. To reduce the severity of this problem, the stock returns of the industry rivals were grouped into equally weighted portfolios following the same procedure used by Firth (1996) and Howe and Shen (1998).

$$t_s = AAR_t/(\sigma_t/\sqrt{N}) \tag{3}$$

where t_s is the *t*-statistic for the *AAR* on day *t*, σ_t is the standard deviation of *AAR* on day *t* and *N* is the number of firms. Similarly, we test whether the cumulative abnormal returns are significantly different from zero by dividing the cumulative abnormal return of each event window by its standard errors.[11]

B. Operating performance test

In this section, we use accounting data to examine the long-term profitability and efficiency performance of the sample firms relative to their competitors' using ratio analysis. The lack of data for the privatized firms in the pre-privatization period precludes a comparison of the performance of the privatized firms in the pre- and post- privatization period. So, consistent with Boardman and Vinning (1989), Loughran and Ritter (1997) and Cai and Wei (1997), we compare the post-privatization performance of the privatized firms to that of their rivals to ascertain whether the privatized firms perform better relative to their competitors in the post-privatized period. Financial ratios that reflect the efficiency and profitability performance of firms are employed in the test. The ratios were calculated for year −1, year +1, year +2 and year +3, where year −1 is the year before privatization and year +1, year +2 and year +3 are the first, second and third years after their initial public offering respectively. Consistent with prior studies on operating performance of IPOs, we exclude year 0 (year of privatization) because normally it straddles the pre- and post-privatization periods. The median ratio for the privatized firms and that of their rivals in each year is computed and the difference is tested for significance using the two-tailed Wilcoxon signed-rank test computed as:

$$\frac{Z - 0}{\sqrt{n(n+1)(2n+1)/6}} \tag{4}$$

where *Z* is the sum of the signed ranks and *n* is the number of observations.

C. Long-term abnormal returns to investors in share issue privatization

To the extent that privatization promotes entrepreneurship, former SOEs will have the incentive and the means to invest in growth options both at home and abroad (Megginson et al. 1994). The privatization of the sample firms, with the attendant change of objective, will give the management of the newly privatized firms the leverage to pursue risky but growth-oriented strategies and policies that

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11 In testing for the significance of the cumulative abnormal returns, we also employed a method proposed by Armitage (1995), which involves summing the individual daily (monthly) abnormal returns and dividing by the length of the event window as: $t_t = \sum_{t1-t2}/\sqrt{D}$, where t_t is the *t*-statistic for the CAR on day *t*, $\sum_{t1-t2}$ is the sum of average daily *t*-statistic for t_1 to t_2 (event window) and *D* is the number of event days between, and including, t_1 and t_2. The results were similar.

will allow the firm to generate higher returns for the investors. Thus, we hypothesize that the long-term stock market returns of the sample firms under private ownership would be better than or at least equal to those of their rivals. To examine this conjecture, we use both industry-adjusted and market-adjusted monthly returns for the three-year period following the privatization announcements.

The after market stock performance is analysed by examining the privatized firms' returns relative to those of their rivals from month 1 to month 36. Month 1 is defined as the month following the month of the initial public offering. We calculate abnormal returns in two ways. First, industry adjusted returns are calculated where the observed returns of the industry competitors are deducted from the returns of the privatized firms. Thus the industry adjusted abnormal returns of each privatized firm for month t is estimated as:

$$AR_{jt} = R_{jt} - R_{nt} \qquad (5)$$

where AR_{jt} is the abnormal return for the privatized firm j, R_{jt} is the monthly average stock return for the privatized firms and R_{nt} is the average monthly stock return of the competitors.

We also use the market model to estimate the market adjusted abnormal returns of the privatized firms. In the absence of historical return data for the privatized firms, we use alpha and beta of the competitor whose total asset value is close to that of the privatized firms as proxies to compute the expected returns of the privatized firm. The abnormal return for firm j is thus calculated as:

$$AR_{jt} = R_{jt} - \alpha_j - \beta_j R_{mt} \qquad (6)$$

These monthly abnormal returns are averaged across the sample and subsequently accumulated over the 36 months as:

$$CAR = \sum_{t=1}^{36} \frac{1}{J} \sum_{j=1}^{j} AR_{jt} \qquad (7)$$

Similar test statistics used to test the significance of the short-run abnormal and cumulative abnormal returns are used to test the monthly returns.

VI. RESULTS

A. Short-term price effects on rivals

To account for the possibility that information on the Shanghai Stock Exchange (SSE) may not be reflected in price instantly, we use longer as well as shorter event windows to capture the price effects. We report the results for the day -1, day 0, days -1 to 1, days -2 to 2, days -5 to 5 and days -10 to 10 event windows in Table 1. The results show that the rivals on average reacted negatively to the privatization announcements irrespective of the length of the event period.

Table 1 Summary of Industry Rivals' Abnormal Returns Effects Following the Privatization Announcements

| | AR_1 | AR_0 | $CAR_{-1,1}$ | $CAR_{-2,2}$ | $CAR_{0,5}$ | $CAR_{-5,5}$ | $CAR_{-10,10}$ | Sample size | |
								Rivals	Privatizations
All rivals	−0.004	−0.005	−0.009	−0.013	−0.018	−0.027	−0.033	51	23
	(−1.66)***	(−1.70)***	(−1.91)***	(−2.10)**	(−2.40)**	(−3.00)*	(−2.88)*		
Iron & steel	−0.005	0.009	0.001	0.003	0.009	−0.004	−0.039	6	2
	(−1.70)***	(1.11)	(0.03)	(0.19)	(0.45)	(−0.13)	(−1.14)		
Chemicals – petro	0.005	−0.001	0.008	−0.003	−0.034	−0.033	−0.011	2	1
	(0.18)	(−0.05)	(0.43)	(−0.11)	(−5.14)*	(−0.69)	(−0.38)		
Chemicals – speciality	−0.002	−0.006	−0.012	−0.003	−0.029	−0.030	−0.037	3	1
	(−0.31)	(−1.20)	(−3.59)*	(−0.77)	(−10.20)*	(−2.58)*	(1.03)		
Construction	−0.024	−0.015	−0.001	−0.018	0.004	−0.006	−0.019	3	2
	(−2.62)**	(−0.85)	(−0.50)	(−0.88)	(0.33)	(−0.15)	(−0.19)		
Electricity	−0.06	−0.025	−0.005	−0.009	−0.053	−0.085	−0.056	4	2
	(−3.37)*	(−5.57)*	(−2.36)**	(−0.39)	(−1.34)	(−2.02)**	(−2.50)**		
Computer tech	0.001	−0.008	−0.009	−0.017	−0.032	−0.032	−0.073	4	2
	(0.20)	(−1.02)	(−0.81)	(−1.04)	(−4.14)*	(−2.50)**	(−1.63)***	3	1
Other high-tech	0.017	−0.013	0.004	0.014	0.009	0.029	0.110		
	(4.93)*	(−0.76)	(0.22)	(2.04)**	(0.37)	(0.73)	(1.52)		
Food & beverage	−0.003	−0.012	−0.016	−0.003	−0.044	−0.018	0.072	3	3
	(−0.15)	(−1.32)	(−0.81)	(−0.22)	(−2.22)**	(−1.51)	(1.86)***		
Auto manufacturing	0.010	−0.005	0.003	−0.008	−0.027	−0.009	−0.020	4	1
	(1.31)	(−0.58)	(0.13)	(−0.20)	(−1.08)	(−0.26)	(−0.26)		
Metal fabrication & ship building	−0.020	0.41	0.025	0.045	0.021	0.065	0.026	2	2
	(−1.51)	(1.20)	(0.23)	(1.18)	(0.38)	(18.7)*	(0.37)		
Real estate	0.017	−0.011	−0.012	−0.032	−0.003	−0.038	−0.010	6	2
	(−3.07)*	(−1.98)	(0.74)	(−1.67)	(−0.20)	(−1.83)***	(−0.49)		
Home furnishing	−0.003	−0.023	−0.026	−0.044	−0.047	−0.068	−0.093	4	2
	(−0.57)	(−5.56)*	(−10.10)*	(−5.98)*	(−3.47)*	(−7.40)*	(−2.89)*		
Pharmaceuticals	−0.005	−0.001	−0.022	−0.021	0.007	−0.011	−0.005	7	2
	(1.53)	(0.10)	(2.20)**	(1.20)	(0.38)	(0.40)	(0.11)		

This table presents the mean abnormal returns of the rival firms for different event windows around the privatization announcement date. The sample consists of competitors of the privatized firms listed on the Shanghai Stock Exchange prior to the announcement of the privatization. Abnormal returns are market adjusted returns and they measure the competitors' reaction to privatization announcements made between 1992 and 1995. All event periods are expressed in trading days relative to the announcement date. The *t*-statistics are reported in parenthesis. *, **, *** significant at 1, 5, 10% levels, respectively.

However, the magnitude of the abnormal returns together with the significance level increases as the event window widens. For example, while the rivals marginally lost 0.5% of their value on the announcement date, they lost 1.3% (3.3%) of their value during the five-day (21-day) period surrounding the event. This result is consistent with the conjecture that, as an emerging market, it takes much longer for information to be reflected in price.

The rivals' reaction is, however, not completely homogeneous across all industries. While most of the competitors reacted negatively to the privatization announcement, the rivals in the high-technology sector reacted positively to the announcement. Privatization was thus considered as good news for the high-technology industry. For such a dynamic and growth sector, the privatization could generate alliances and joint venture arrangements between the privatized firms and the industry competitors. Thus the privatization could unlock growth opportunities for both the privatized firm and the industry counterparts. Alternatively, the privatization could signal a relaxation of the regulations governing the whole sector; hence the rivals firms' positive reaction to the announcements. The home furnishing sector shows the strongest evidence of negative reaction, while the automotive manufacturing sector did not react to the announcement. Consistent with our expectations, the market considered the privatized firms as strong competitors in the industry.

B. Alternative explanations for the rival firms' reaction

There are other plausible reasons why the rival firms' stock price may react negatively to the privatization announcement. One might argue, for example, that the newly private firms could attract investors who would otherwise have invested in the existing firms. A related argument is that fund managers who track sector indices could move some of their investment to the newly privatized firms. These actions can cause a decrease in the price of the existing firm's shares. Alternatively, as Subrahmanyan and Titman (1999) argue, the presence of publicly traded firms in an industry can attract more information gathering about the industry, thus making the prices of all firms in the industry more efficiently priced and, consequently, more efficiently managed. While the latter possibility is beyond the scope of this paper, we examine the possibility that capital flows account for the rivals' stock price reaction.

First, investors may move their capital to the newly privatized firms if they believe that the newly private firms' prospects are better than the existing firms' prospects. If this is the case, then the attendant decrease in price of the existing firms will be consistent with our hypothesis and the argument by Eckel et al. (1997) that investors' expectation about the efficiency and competitiveness of the privatized firms can be inferred from the rival firms' price effects following the privatization announcement. Second, if fund managers who track indices move funds from existing firms to the newly privatized firms in order to maintain their exposure to the sector, portfolio rebalancing and the attendant price pressure will cause the share price of the existing firms to decrease and that of the newly
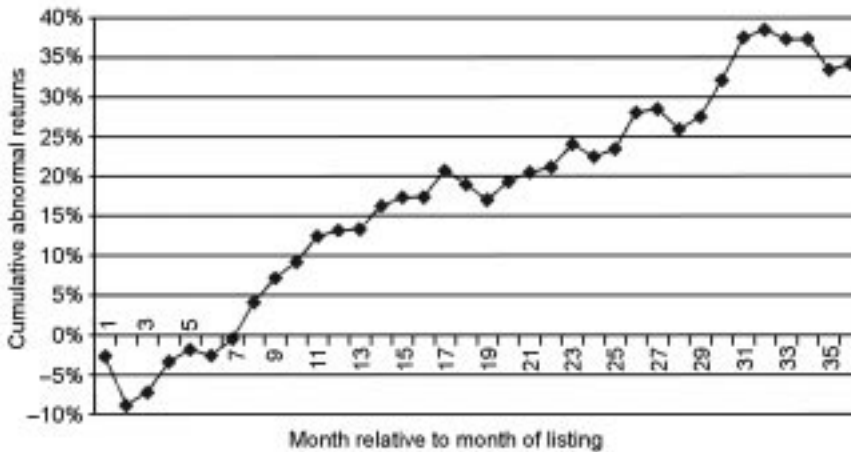
Figure 1   Industry Adjusted Abnormal Returns of the Privatized Firms.

privatized firms will increase. Since newly listed firms are usually not included in indices immediately after listing, one would expect the privatized firms' stock price to appreciate in the months following the initial public offering. However, this does not appear to be the case. The sample firms experienced a decrease in share price in the period immediately following the initial public offering (see Fig. 1). Hence, our evidence does not support institutional portfolio re-balancing (price pressure hypothesis) as the cause of the rival's reaction.

C. Determinants of rival firms' reaction to the privatization announcements

To shed further light on the results of the rivals that reacted to the privatization announcement, we run the following cross-sectional regression to determine whether firm-specific factors can explain the rivals' abnormal returns:

$$CAR_j = \alpha_j + \beta_{j1} Corr_j + \beta_{j2} Size_j + \beta_{j3} Age_j + \epsilon_j \tag{8}$$

where CAR_j is the 11-day cumulative abnormal returns ($CAR_{(-5,5)}$), $Corr_j$ is the correlation between rival j and the privatized firm's returns, $Size_j$ is the rival firm j's total assets scaled by its sales in the year of privatization, and Age_j is the number of years since the rival firm's listing on the stock exchange. Since privatization affects competitors' performance, the effects could be more prominent for industry counterparts with similar cash flow and investment opportunities as the privatized firm. Consistent with Firth (1996) and Erwin and Miller (1998), we use the stock return correlation between the privatized firm and the industry rivals as a proxy for the degree of similarities in cash flow. However, because the privatized firms do not have historical stock returns, we use post-privatization returns over the period +20 days to +120 days to estimate the correlation.

Table 2 Rival Firms' Cross-sectional Regression Results

	α	β_1	β_2	β_3	Adjusted R^2
Coefficient	0.2678	−0.6633	0.0028	−0.0043	0.84
Standard error	0.06185	0.1077	0.0078	0.0067	
t-statistic	(4.33)*	(−6.16)*	(0.37)	(0.65)	

This table shows the results of the cross-sectional regression of the event period cumulative abnormal returns on *Correlation*, *Size* and *Age*. Firms included in this regression are competitors of the privatized firms listed on the Shanghai Stock Exchange prior to the announcement of the privatization. The dependent variable is the market-adjusted abnormal returns calculated for the competitors for the 11-day period ($CAR_{(5,5)}$) relative to the announcement date. Correlation between rival firm *j*'s returns and the privatized firm's returns is a proxy for similarity in nature of business and source of cash flow. To ensure that we have adequate data to estimate the correlation, we use one year's return data to estimate the correlation and use the correlation to retrospectively estimate the regression. Size is the rival firm's total assets scaled by its sales in the year of privatization, and Age is the number of years since the rival firm's listing on the stock exchange. The *t*-statistics are presented in parenthesis.
*Significant at 1%.

It is expected that if the correlation of returns is greater, then the negative abnormal returns to the competitor will be greater. Further, the bigger the rival, the more competitive it would be and, hence, the less the announcement effects. The older firms may be well established and can compete well with the privatized firms and hence they may exhibit small negative reaction following the privatization announcement. However, it is also true that older firms could be less competitive because they may not have as many profitable investments. This implies that privatization could have severe negative effects on such firms. The results of the cross-sectional regression are presented in Table 2.

The figures in the second row are standard errors, while those in the third row are *t*-statistics. The correlation variable is strongly significant (at 1%). This result suggests that the greater the similarity in the sources of cash flow, the greater the negative reaction. The regression captures a large proportion of the variation in abnormal returns, with an adjusted R^2 of 84%.

D. Analysis of efficiency and profitability results

The efficiency and profitability of the privatized firms relative to their competitors is examined using ratios that have been used in prior studies (see Megginson et al. 1994; Loughran and Ritter 1997; Boubakri and Cosset 1998). We examine eight ratios categorized into profitability, efficiency, leverage and capital expenditure ratios. Details of these ratios are presented in the Appendix. Given the usually poor performance of these firms under government ownership, we expect significantly negative median difference between the privatized firms' ratios and those of their rivals in year −1. However, as a result of the expected improvement in profitability and efficiency performance when the firms come under private ownership, we conjecture that the performance of the privatized

firms will be better than, or at least equal to, that of their rivals in the post-privatization years. The results of the test are presented in Table 3. Panel A contains the median ratios of privatized firms. Panel B reports the median ratios of the rival firms while Panel C shows the associated Wilcoxon *Z*-statistics for the difference in median test.

i. Efficiency

We use asset turnover as the first ratio for the firm's efficiency performance. We conjecture that once a firm is privatized, it will be able to employ its resources more efficiently because of conversion of objectives to profit goals and the attendant reduction of government subsidies. The privatized firms will have lower asset turnover ratios than the rival firms in year -1 (negative *z*-statistic) but at least equal asset turnover ratios in the post-privatization years. As reported in Table 3, the median difference between the two groups is negative in year -1, but is not significantly different from zero. However, the difference in the post-privatization is positive and significant at 10%.

The profit margin (net income to net sales ratio) that measures how much operating profits can be made out of each dollar of sales may, to some extent, reflect the cost efficiency of the firm's operations (although it is also a profitability measure). Since higher efficiency is expected after divesture, the median difference is expected to be positive and significantly different from zero for the years after privatization. Once again, we find evidence consistent with this conjecture. Although in year -1 the privatized firms are marginally more profitable than their rivals, the out-performance in the post-privatization period is larger and strongly significant. These results show that the former SOEs achieve post-privatization efficiency improvements in using their assets.

ii. Profitability

If there is transfer of ownership from the public to the private sector, the profitability of the privatized firm may increase because of the competitive environment within which the firm now operates. Boycko et al. (1996) have shown that once both control rights and cash flow rights completely move from the politicians to the managers after privatization, the latter show greater interest in profits and efficiency than did the politicians. We use return on asset (ROA), return on equity (ROE) and return on cash flows (RCF) as measures of profitability and expect the median difference between privatized firms' ratios and those of the rivals to be significantly positive in the post-privatization period.

The ROA, ROE and RCF ratios reported in Table 3 for the privatized firms and those of the competitors show that the median differences are positive and strongly significant. The positive results for year -1 are surprising. However, it is possible that the preparation for public listing could have given the companies a spur to improve their profitability. This is consistent with the findings of Dewenter and Malatesta (2000). Alternatively, the out-performance of the privatized firms in the year prior to the privatization can be due to manipulation of the accounting data. To prepare for the initial public offering, the managers of

Table 3 Summary Results of Profitability and Efficiency Performance for the Privatized Firms and Their Rivals

Year	Asset turnover	Operating margin	ROA	ROE	Cashflow returns	Debt to asset ratio	Interest cover ratio	Capital expenditure on sales	Capital expenditure growth
A: Median ratios of privatized firms									
Year −1	0.6607	0.2106	0.1072	0.2998	0.2000	0.2884	7.7367	0.1462	–
Year 1	0.6048	0.2080	0.1191	0.1669	0.1482	0.1741	19.4230	0.1252	0.4202
Year 2	0.5599	0.2004	0.0896	0.1477	0.1332	0.1074	17.9100	0.0839	0.2587
Year 3	0.4210	0.2248	0.0970	0.1262	0.1237	0.0958	12.3665	0.1037	0.2935
B: Median ratios of industry rivals									
Year −1	0.7411	0.1305	0.0484	0.0997	0.0761	0.2288	3.8920	0.1116	–
Year 1	0.5411	0.0932	0.0455	0.0971	0.0731	0.2946	2.4794	0.0714	−0.0663
Year 2	0.4549	0.0800	0.0376	0.1001	0.0473	0.3533	1.9078	0.0725	−0.1657
Year 3	0.3972	0.0893	0.0358	0.0999	0.0253	0.3586	2.5078	0.0454	−0.0599
C: Z-statistics for the difference in median									
Year −1	−0.9658	1.3280	3.1389*	3.3803*	3.0594*	0.6592	3.0400*	1.3336	(NA)
Year 1	1.6482***	3.2636*	4.3050*	4.0256*	3.8342*	−2.8319*	2.6680*	0.8745	1.0791
Year 2	1.8225***	2.3906*	3.4794*	3.2900*	3.2059*	−3.0060*	1.8827**	0.5688	1.3336***
Year 3	1.6474***	1.4120***	2.5103*	1.4120***	1.7821**	−1.6474***	2.1004*	1.5724***	−0.1348

This table presents the results of the profitability and efficiency test for the privatized firms and their rivals. For each performance measure, the table provides median ratios for years −1, 1, 2 and 3. All event years are relative to the year of privatization, defined as year 0, i.e. year +1 is the year immediately after the year of privatization etc. We exclude year 0 because it includes both the pre- and post-privatization performance measures. Panel A presents the median ratios for the privatized firms, while Panel B presents the median ratios for the rival firms. Panel C provides the Wilcoxon *Z*-statistics to assess whether the median ratio of the privatized firm and that of the rival firms are statistically different.
*, **, *** Significant at the 1, 5, and 10% levels, respectively.

the privatized firms may 'window dress' the accounts in year −1. The results reported in Table 3 also show that in year 1 and year 2 there is a significant difference (at the 1% level) between the medians of the two groups for all three ratios. While the findings suggest that the sample firms are more profitable than their competitors after privatization, the out-performance becomes less significant in the longer term (third year) after the initial public offering.

iii. Leverage

Privatization may lead to a decrease in leverage for two reasons. First, the government's removal of debt guarantees will increase the firm's cost of borrowing; second, the firm will have increased access to public equity markets. As the firm reduces the use of debt in its capital structure, interest expense will decline and hence the interest cover ratio will increase while the debt to total assets ratio will decline. The results, reported in Table 3, are mostly consistent with our prediction. First, we find that in year −1 the median difference of debt to asset ratio between the privatized firms and the rival firms is positive but not significantly different from zero, while the interest cover ratio difference is significantly positive in year −1. However, we document a significantly negative difference for debt to asset ratio and a positive difference for interest cover ratio from years 1 to 3. These results show that, relative to their competitors, the privatized firms successfully decrease the use of debt after privatization.

iv. Capital investment spending

One incentive for governments to launch privatization programmes is that emphasis on efficiency will lead the privatized firms to increase their capital investment spending because they have wider access to equity markets and would thus be motivated to invest in growth opportunities. Privatized firms could exhibit greater values of capital investment than the competitors in the post-privatization years. To evaluate this assertion, capital expenditures to net sales ratio and capital expenditure growth rate are estimated for the privatized firms and their industry counterparts. A significantly positive difference in medians is expected for both ratios in the years after the privatization. Table 3 shows that while the differences are positive, only capital expenditure to sales in year 3 and the capital expenditure growth rate in year 2 are significant. Hence, we find only weak evidence that the privatized firms have more capital investments than their competitors in the years after the privatization.

Based on the results discussed in this section, we conclude that the privatized firms systematically perform better than their rivals on most of the ratios in the post privatization period. Our results contrast with those of Chen et al. (2000), who find that their sample of privatized firms underperform. However, the results of the two studies are not directly comparable, for, while we analyse the post-privatization performance of our sample relative to that of their industry counterparts, Chen et al. (2000) compare the pre- and post-privatization performance of their sample.

E. Do investors in share issue privatization earn significantly higher abnormal returns in the long run?

This section examines the returns of privatized firms over a longer horizon. The difference between the returns of the newly privatized firms and their industry rivals will provide a measure of the extent to which the performance of the privatized firms either exceeds or falls below the expectations of investors at the time that the firms were privatized.

The methodological problems relating to long-term event studies have been discussed by a number of researchers, including Barber and Lyon (1997), Fama (1998), Brav (2000) and Mitchel and Stafford (2000). The centrepiece of their argument is that expected returns can only roughly be estimated; hence long-term abnormal returns are imprecise and are the results of a joint test of stock market efficiency and a model of expected returns.[12] To address this concern, we also calculate industry-adjusted abnormal returns for the sample firms as the difference between the returns of the privatized firms and the rival firms returns.

The cumulative industry-adjusted and market-adjusted abnormal returns and the test statistics are presented in Table 4. We document significantly positive cumulative abnormal returns for the privatized firms over the three-year period irrespective of whether the returns are industry-adjusted or market-adjusted. The industry-adjusted abnormal returns are 33%, whereas the market-adjusted returns for the privatized firms (competitors) are about 31% (−2%). The market adjusted returns of the privatized firms and their competitors at the end of years 2 and 3 are significantly different at 5%, although the returns of the privatized firms in year 2 are not significantly different from zero. However, the privatized firms do not out-perform their industry counterparts during the first post-privatization year as their returns are not significantly different from zero and are also not statistically different from the competitors' returns. The abnormal returns documented for the sample firms are robust since both the industry- and market-adjusted returns are similar in magnitude. The results suggest that over the three-year holding period, shareholders of privatized firms earned significantly greater returns than shareholders of the industry rivals.

Moreover, as Fig. 1 shows, the privatized firms performed worse than their industry counterparts in the first seven months after privatization. After this initial period of under-performance, the privatized firms out-performed the competitors.

F. Impact of ownership structure on performance

The evidence in the previous section suggests that investors may have been initially sceptical about the performance of newly privatized firms. This could

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12 Abnormal returns should reflect the unexpected future economic rents arising from an event. The fundamental problem relating to long-run abnormal return studies is that one should be able to measure long-term expected returns precisely. The studies cited above show that, thus far, there is no convincing way of doing this.

Table 4 Long-term Cumulative Abnormal Returns for the Privatized Firms and Their Competitors

| Event windows | Industry adjusted abnormal returns of privatized firms | | Market adjusted abnormal returns | | | |
| | | | Privatized firms | | Rival firms | |
	CAR	Test statistics	CAR	*t*-statistics	CAR	*t*-statistics
(+1, +12)	0.1309	0.99	0.1311	1.34	0.0012	0.02
(+1, +24)	0.2209	1.35	0.1990	1.50	−0.0150	−0.18
(+1, +36)	0.3316	2.18**	0.3097	2.12**	−0.0207	−0.11

This table reports the industry-adjusted and market-adjusted abnormal returns for a sample of privatized firms and their industry competitors for 36 months after privatization. The industry-adjusted returns are computed as the difference between the privatized firms' returns and the competitors' returns. Since the privatized firms did not have historical stock return data, we used the regression parameters of industry counterparts matched on the basis of size (as measured by total assets) as proxy to compute the expected returns, which were then deducted from the actual returns to obtain the market adjusted returns.
**Significant at the 5% level.

reflect the fact that most of these firms were partially privatized. Existing evidence from other countries shows that partial privatization does not produce better performance for partially privatized firms (see Boardman and Vining 1989; Boycko et al. 1996). If there is not a complete transfer of voting control from the government to private hands, investors may consider the firms to be still under government control, since the firms would need approval from the government (as the majority shareholder) for any major investment decision. This may stifle initiative and the stock market performance may reflect this handicap. Eckel et al. (1997), for example, have shown that the partial privatization of Canadian Airways could not generate any significant abnormal returns over those earned by its competitors.

To ascertain whether government ownership affects the abnormal returns of the privatized firms during the post-privatization period, we estimate the following regression:

$$CAR_j = \alpha_j + \beta_{j1}GO + e_{jt} \tag{9}$$

where CAR_j is the industry adjusted abnormal returns for privatized firm j over the 12-, 24- and 36-month periods after its public listing. GO is the proportion of the government ownership of the firm. Though not reported here, the coefficient of government ownership is not significant in any of the regressions. We also used the average abnormal returns over the three-year period as the dependent variable, but the coefficient of interest was not significant.

VII. Conclusion

Prior studies suggest that when state-owned enterprises are privatized, they become more efficient because the new competitive environment together with the monitoring role of the stock market drives managers towards efficiency and profitability objectives. The operating and financial performance of the privatized firm will improve as a result and a more efficient competitor will appear in the industry. Thus, the privatization of a firm could hurt rivals through increased competition. In this study, we use both accounting and the stock market data to examine the post-privatization operating and financial performance of the privatized firms and that of their rivals in China. We find that competitors reacted strongly and negatively to the privatization announcements and the magnitude of the abnormal returns, together with the significance level, increases as the event window widens. For example, while the rivals marginally lost 0.5% of their value on the announcement date, they lost 1.3% (3.3%) of their value during the five-day (21-day) period surrounding the event. This result is consistent with the conjecture that in an emerging market it takes much longer for information to be reflected in price.

Consistent with our conjecture, our sample of privatized firms exhibit significant improvements in profitability and efficiency relative to their competitors in the post-privatization period. However, the better operating performance of the privatized firms over their industry counterparts is not systematically reflected in the stock returns until the third year. We also do not find any evidence that the percentage of government ownership of the privatized firms accounts for the sample firms' stock market performance.

Isaac Otchere
Department of Finance
Faculty of Economics and Commerce
The University of Melbourne
Victoria 3010
Australia

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APPENDIX

Table A1 Definition of Ratios Used in the Study

Measure	Ratios	Calculation
Profitability	Profit margin (PM)	Net income /net sales
	Return on asset (ROA)	Net income/total assets
	Return on equity (ROE)	Net income/total equity
	Return on cash flows (ROCF)	(EBIT + depreciation)/total assets
Asset efficiency	Asset turnover (ATO)	Net sales/total assets
Capital expenditure	Capital investment spending (CE)	Capital expenditures/net sales
	Capital expenditure growth rate	(Current year capital expenditures – previous year capital expenditures)/previous year capital expenditures
Leverage	Debt to asset ratio (DA)	Total liabilities/total assets
	Interest cover ratio (IC)	EBIT/interest expense