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Politician control, agency problems and ownership reform

*Evidence from China**

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Abstract

Using data from a recent national survey on the ownership reform of state-owned enterprises in China, we study the effects of reducing politician control and agency problems on a number of reform outcomes. Taking into account the endogenous nature of the reform, we find that these outcome measures of the reform's success are positively affected by the lessening of politician control through increasing the firm's flexibility in labour deployment and by the mitigation of agency costs through the introduction of more effective corporate governance mechanisms such as one-share one-vote and shareholding-based board structure composition. Ownership structure also matters: relative to shareholding by the state, foreign ownership has a positive effect on reform outcomes; individual (mostly employee) shareholding has a negative or insignificant effect. Somewhat surprisingly, operating autonomy (excluding labour deployment flexibility) has a negative effect on firm performance, suggesting serious agency problems in the reformed enterprises.

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1. Introduction

The performance of state-owned enterprises (SOEs) suffers from both political costs (i.e., the costs associated with control of firms by politicians who have political goals that differ from economic efficiency) and agency costs (i.e., the costs resulting from managerial pursuit of private benefits at the expense of the firm) (Shleifer and Vishny, 1994; Qian, 1996). Whether these costs can be contained is the key to the success of SOE reforms. The large-scale ownership and organizational reform of Chinese SOEs during the second half of the 1990s represents the Chinese government's attempts to address the issues of politician control and agency problems.

Since the early 1990s, China has shifted the focus of its SOE reform from delegation of decision-making authority to the reform of ownership and corporate governance. Two strategies have been adopted: privatization and corporatization.[1] The reforms were propelled by the fact that SOEs' financial performance steadily deteriorated during the 1990s, following a period of improved productivity in the 1980s (Lardy, 1998).[2] Privatization is mostly used to sell small SOEs to private entrepreneurs (Cao, Qian and Weingast, 1999). The main strategy, however, is corporatization (Zhu, 1999). This aims to turn SOEs from sole state proprietorships controlled by industry-specific government agencies at various administrative levels to modern-form corporations with a Western-style corporate governance structure without serious erosion of dominant public, but not necessarily state, ownership. Corporatization transforms most SOEs into three types of shareholding companies: limited liability companies (LLCs), limited liability stock companies (LLSCs), and employee-owned stock cooperatives (EOSCs) (Lin and Zhu, 2001).[3] The shares of reformed firms are classified into five categories: state-owned, individual-owned (mostly shares issued to employees individually), legal-person-owned (i.e., shares owned by any institution that has a legal person status such as an investment company), collective-owned (i.e., shares issued to employees as a collective) and foreign-owned. In most corporatized enterprises, the majority of the

[1] Researchers appear to have different definitions of privatization and corporatization. Sometimes any divestiture of state shares is taken to imply privatization. Here, we follow the World Bank (1995) and Shirley (1999) who define privatization as 'the sale of state-owned assets' such that 'management control (measured as the right to appoint the managers and board of directors) passes to private investors'. Corporatization, on the other hand, is defined as diversification of ownership structure, especially through inclusion of non-state parties as shareholders, 'to make SOEs operate as if they were private firms facing a competitive market or, if monopolies, efficient regulation' (Shirley, 1999, p. 115).

[2] Small-scale ownership reform of SOEs, which is often referred to as shareholding reform in China, began in the mid-1980s; systematic experimentation with the shareholding system began in 1992 (SCESR, 1997). In December 1993, the *Company Law* was passed, and SOE reforms entered a stage in which privatization or corporatization of SOEs could, in principle, be guided by law. Large-scale ownership reform started in the mid-1990s. By the end of 1998, some 24,000 or 10.1 percent of SOEs had either been privatized or corporatized (*People's Daily*, August 7, 1999).

shares are held by the state, business entities controlled by or affiliated with the government or other SOEs, and employees.

In this research, we use data from a recent national survey of the ownership reform of state-owned industrial enterprises in China to study the effects of reducing politician control and agency problems on a number of measures of the reform outcomes. Taking into account the endogenous nature of the reform, we find that these outcome measures of the reform's success are positively affected by the lessening of politician control through increasing the firm's flexibility in labour deployment and by the mitigation of agency costs through the introduction of more effective corporate governance mechanisms such as one-share one-vote and shareholding-based board structure composition. Ownership structure also matters: relative to shareholding by the state, foreign ownership has a positive effect on reform outcomes; individual (mostly employee) shareholding has a negative or insignificant effect. Somewhat surprisingly, operating autonomy (excluding labour deployment flexibility) has a negative effect on firm performance, suggesting serious agency problems in the reformed enterprises.

Our study contributes to the literature on comparative economic transition. Chinese reform of SOEs contrasts with the reform strategy adopted in many Central and Eastern European countries. In these countries, outright privatization is the dominant measure of enterprise reform, whereas in China, privatization is limited only to small SOEs. The reform in China also contrasts with corporatization in these countries, where it was used to convert SOEs into wholly state-owned joint stock or limited liability companies and was pursued as a prelude to privatization (Frydman *et al*., 1993). In China, corporatization has been pursued as a lasting measure of SOE reforms, and in most cases corporatized enterprises have non-governmental shareholders.

Previous empirical studies of the effects of enterprise reform in China mostly focus on the effect of decentralization of decision-making authority and incentive contracting on the performance of SOEs (Groves *et al*., 1994; Jefferson, Rawski and Zheng, 1996; Li, 1997; Xu, 2000; Shirley and Xu, 2001), or compare differences in

[3] As reported in Lin and Zhu (2001), the vast majority of reformed SOEs were converted into these organizational forms, and only 7 percent were turned into pure private firms. Yet there are also a number of corporatized enterprises where non-state owners held the majority of shares. According to the *Company Law*, the main differences between limited liability companies and limited liability stock companies lie in the following: (i) the equity capital threshold (0.5 million vs. 10 million yuan); (ii) the level of approving authority (sub-provincial vs. provincial government or an authority designated by the State Council); (iii) the number of shareholders (2–49 vs. 5 or above); and (iv) the liquidity of shares – only shares in limited liability stock companies can be traded on a stock exchange, and only companies with equity capital of over 50 million yuan are eligible for listing. Employee-owned stock cooperatives are limited liability entities owned wholly or predominantly by the employees, individually (through shares issued to individuals) or collectively (through 'collective shares'). There is no minimum equity capital requirement. The shares for individual holdings can only be issued to enterprise employees, who may receive dividends in addition to their regular wages.

performance between state and non-state firms (Woo *et al*., 1994; Xu, 1995; Jefferson, Rawski and Zheng, 1996; Zhang, Zhang and Zhao, 2001). This research is one of the first few systematic empirical studies on the impact of the more recent SOE ownership reforms. Yao and Song (2003) also study the impact of ownership reform on firm performance in China, but they use a different dataset with a few hundred firms.

Our study also adds empirical material to the literature on corporatization. While there is a large body of literature on privatization (Megginson and Netter, 2001), there has been only limited empirical research systematically evaluating corporatization, either in China or elsewhere. Lin and Zhu (2001) use the same survey dataset mainly to examine organizational forms, ownership and the corporate governance structure of reformed enterprises, and the determinants of the pace of the reform. In this paper, we focus on the determinants of post-reform operating performance. Lee (1999) finds that reforms with corporatization elements undertaken in China between 1980 and 1994 lowered wages and improved productivity. Our study complements his in focusing on a different time period with different reform content as well as in using a different conceptual framework. Finally, Shirley (1999) provides empirical evidence that corporatization works better when combined with ownership and other reforms. The evidence she provides is based on case studies of 12 developing countries. In this paper we use a large sample of firms from a national survey in China to examine the short-run impact of ownership reform on performance. In particular, we focus on the role of decision-making autonomy, ownership structure and corporate governance in explaining the performance of reformed firms.

In Section 2, we present a conceptual framework that will be used to guide our analysis and to interpret our empirical findings. In Section 3, we describe the data and define the dependent and explanatory variables. Section 4 presents the econometric methods. The findings are reported in Section 5. The concluding section summarizes the main results and discusses their implications as well as limitations.

2. Politician control, agency problems, and corporate governance

Our empirical investigation is guided by some of the recent economic theories of organization and corporate governance, where authority relations are a central issue. Aghion and Tirole (1997) distinguish between formal and real authority in economic organizations. They show that real authority, i.e., the effective control over decisions, is determined by the structure of information, which in turn depends on the allocation of formal authority (i.e., the right to decide). In other words, with more formal authority, an agent will have incentives to acquire more productive information and hence enjoy more real authority. However, agency costs increase as more formal authority is delegated to the agent.

Before enterprise reforms started in the early 1980s, Chinese SOEs were controlled by politicians[4] who exercised almost all the formal authority over operating and personnel decisions. Such an allocation of authority led to a lack of managerial initiative on the one hand, and politically-motivated or misinformed business decisions on the other. Politicians have incentives to control and/or subsidize SOEs to achieve economically inefficient objectives for political purposes. In particular, politicians may require an SOE to hire more workers than needed or to maintain excess employment at the expense of firm performance (Shleifer and Vishny, 1994). Politicians do this in order to win political support, or to avoid 'social instability' that may arise as a result of high unemployment. Politicians may also ask an SOE to meet output growth targets that they can tout as their policy achievement even if the enterprise cannot sell all of its output at a profit. These considerations led to many problems among Chinese SOEs under the command system.

Chinese reforms that delegated many of the decision-making rights to SOE managers in the 1980s (Naughton, 1995) can be viewed as allocating some of the formal authority to the managers. As implied by Aghion and Tirole's theory, managerial autonomy then motivated SOE managers to become more informative about business decisions; as a result, they enjoyed more real authority. However, as agents of the state, SOE managers had a strong incentive to use (i.e., abuse) their newly acquired power in their own self-interest. On the other hand, politicians often maintained formal authority over key personnel and investment decisions and, in particular, over labour deployment.

In an insightful application of organization theories to Chinese enterprise reform, Qian (1996) characterizes the plight of Chinese SOEs in the 1990s as being caused by a combination of agency problems and politician control. Agency problems arise as managers enjoy more authority, formal as well as real, over business decisions, thanks to delegation reforms. While politician control may be a mechanism of checks-and-balances to mitigate agency costs, it also causes the loss of information, inefficient interference in management, use of incompetent but obedient managers, bad investment decisions, and soft budget constraints.[5] Qian (1996) argues that SOE reforms should aim at reducing both political and agency costs by establishing a new corporate governance system through a variety of measures such as depoliticization, privatization, and corporatization.

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[4] We follow Shleifer and Vishny (1994) in using the term 'politicians' instead of 'bureaucrats', the term used by, e.g., Bai and Wang (1998), Li (1998) and Shirley (1999), to refer to government officials in charge of enterprises in a socialist or transition economy. This terminology is consistent with our using the term 'political costs' rather than 'bureaucracy costs' to refer to inefficiencies associated with politician control. In organizational economics, the term 'bureaucracy costs' is often used to refer to the costs of using hierarchies rather than markets in organizing transactions (Williamson, 1985).

[5] Politician control is sometimes viewed as a form of agency problem because politicians enjoy the control rights but are not the residual claimants, and thus can be viewed as agents of the citizens (Bai and Wang, 1998). In this paper, we follow Qian (1996) in using the term 'agency problems' in a narrow sense to refer to the managerial moral hazard problem.

China's recent SOE ownership reform is indeed intended to deal with both of these costs through the establishment of a Western-style corporate system. It is hoped that political costs and agency costs will be simultaneously reduced by separating government from enterprises, introducing non-government corporate/institutional shareholders as well as employee and private shareholders, and establishing a more effective corporate governance structure.

However, as state ownership is still significant in the majority of reformed enterprises, and social institutions such as a social safety net that may be necessary for the complete separation of the government from enterprises have only just begun to develop in China, some degree of politician control, particularly over labour deployment, should still linger in the reformed firms. Moreover, it takes time to establish market-oriented economic and legal institutions conducive to effective corporate governance in a transitional economy (Shleifer and Vishny, 1997). Therefore, corporate governance in reformed enterprises often deviates from what is stipulated in the law and may be quite ineffective in containing agency costs. Consequently, both politician control and managerial moral hazard continue to pose problems in reformed enterprises.

Chinese managers in general enjoy more decision-making autonomy after ownership reform. This reduces political costs but may possibly increase agency costs when other mechanisms normally used to counter managerial moral hazard are weak or simply not present. The net effect of operating autonomy on firm performance is thus an open empirical issue.

Managerial control over labour decisions, which have been significantly conditioned by political considerations, should however improve firm performance. According to Shleifer and Vishny (1994), politician control tends to create labour redundancy in firms. In fact, there is strong evidence that Chinese SOEs demonstrate excess employment (Dong and Putterman, 2003). Unlike politicians, managers are not concerned about general employment situations. When given control over labour deployment, managers have stronger incentives to cut excess employment than politicians do.

Politician control also manifests itself in the selection and replacement mechanism of CEOs. If CEOs are appointed by the government, they are more likely to be subject to politicians' influence. On the other hand, government-appointed CEOs are accountable to politicians and hence their ability to abuse their power is possibly curtailed. The net effect of government appointment of CEOs on firm performance is, therefore, subject to empirical investigation. Moreover, replacing the incumbent management during the reform is found in the literature to result in better firm performance (Denis and Denis, 1995) and more restructuring in transition economies (Barberis *et al*., 1996). It is of some interest to see whether this is also the case in the Chinese reforms.

Ownership structure should have an impact on performance.[6] Greater ownership stakes by non-state shareholders such as private individuals or foreign investors

[6] See Shleifer (1998) and Megginson and Netter (2001) for excellent summaries of theories and evidence on the performance effect of ownership structure.

may imply relatively lower political costs, closer monitoring and more pressure for profits on self-interested mangers. However, not all private shareholders exert equal efforts on monitoring. Since the benefits of monitoring are shared by all shareholders while the costs are borne completely by the monitoring party, large shareholders internalize the costs and benefits of monitoring to a greater extent, and therefore make more monitoring efforts (Shleifer and Vishny, 1986). Indeed, Morck, Shleifer and Vishny (1988), McConnell and Servaes (1990), and Wruck (1989) find evidence of the positive effects of appropriate levels of ownership concentration, whereas Anderson, Lee and Murrell (2000) find that dispersed private ownership leads to worse performance than that exhibited by state ownership in Mongolia. In the current context, foreign and legal person shareholding may be characterized as representing relatively more concentrated ownership. It is thus possible that foreign ownership and legal person ownership may lead to better performance than state ownership. On the other hand, if shareholding by domestic private individuals (mostly employees in the Chinese case) is more of a dispersed ownership, then the comparison between state ownership and private ownership can only be settled empirically.

Theories of corporate governance imply that the degree of alignment of firm ownership and control, as reflected in the voting mechanism and the board structure, affects performance.[7] One-share one-vote is generally believed and theoretically shown to be a more efficient voting mechanism in corporate governance (Grossman and Hart, 1988; Harris and Raviv, 1988). One-share one-vote helps to reduce the likelihood that the manager will respond to shareholders that have greater control than their proportion of the total shares implies. Another mechanism used to protect shareholder interests is a shareholding-based board of directors. If a firm's board structure is characterized by a divergence between ownership shares and board representation, the manager and the shareholders who are disproportionately represented on the board may collude to pursue private or parochial interests at the expense of the under-represented shareholders. We thus expect, *ceteris paribus*, firms observing the one-share one-vote rule and firms with a shareholding-based board structure to demonstrate better performance.

3. Data and variables

The data we analyze are drawn from a national survey of the ownership reform of industrial SOEs in China. The survey was conducted by the National Statistical Bureau in the summer of 1998. Its aim was to examine how ownership reform had proceeded among industrial SOEs during all of 1997 and the first quarter of 1998. The survey took the form of a three-part questionnaire. The first part contains:

[7] See Shleifer and Vishny (1997) for a survey of the corporate governance literature and Hermalin and Weisbach (2001) for a survey of a new literature on how the structure of the board of directors affects company performance.

(1) questions about the enterprise's basic profile (i.e., enterprise code, sector, location, and size); (2) the status of ownership reform (e.g., whether and when ownership reform was completed and what new organizational form was adopted, etc.); and (3) a personal profile of the top manager (e.g., age, gender, education, etc.). The second part of the questionnaire contains a set of questions about ownership structure and accounting information for the period under review. The third part of the questionnaire contains questions about various aspects of the reform, including questions on corporate governance structure, enterprise autonomy and in particular the manager's assessment of the effect of the reform.

A total of 40,246 industrial enterprises responded to the survey, equivalent to 62 percent of the total number of industrial SOEs that were in operation during that year.[8] All the enterprises in the survey were required to answer the first part of the questionnaire. 6,872 of the enterprises that responded to the survey (i.e., 17 percent of the enterprises surveyed) indicated they had completed their reform by the time of the survey. Only the reformed enterprises were required to answer the second part of the questionnaire (i.e., on ownership and accounting information).

A selected group of reformed enterprises was also asked to answer the third part of the questionnaire, and 2,632 firms responded.[9] Out of the 2,632 selected enterprises that responded to all three parts of the questionnaire, 1,634 completed their reform in 1997. We generate a dataset based on the survey results of these 1,634 enterprises. We only select firms that completed their reform in 1997 because we will use the accounting data from the first quarter of 1998 to examine the performance effect of the resulting ownership structure, corporate governance mechanisms and enterprise autonomy. The dataset thus includes accounting and ownership information for all of 1997 and the first quarter of 1998, information on the profiles of selected enterprises and their managers, as well as information on certain aspects of corporate governance and the manager's subjective assessment of the effects of the reform. Because some values were missing, the numbers of valid observations for our regressions are between 900 and 1,000.

The variables used in our analysis are defined in Table 1. We have three dependent variables. The first is the conventional operating performance measure, returns on assets (*ROA*), defined as the ratio of before-tax profits over the book value of total assets in the first quarter of 1998. This figure is annualized by multiplying it by four. As the firms in our sample completed their reform in 1997, this ROA regression only reflects the reform's short-term impact on performance with the underlying assumption that operating performance in the first quarter of 1998

[8] According to *China Statistical Yearbook* (1999, p. 421), there were about 64,900 industrial SOEs in 1998.

[9] The number of enterprises selected by each province (or centrally administered municipality) to answer part III of the questionnaire was assigned by the National Statistical Bureau, and ranged from 60 to 150. The provincial statistical bureau's survey teams were responsible for selecting these enterprises. While selection at the provincial level was supposed to be random, we do not know how quality control was achieved in terms of random and representative sampling.

Table 1. Variable definitions and descriptive statistics

Variable	*Definition*	*Mean*	*S.D.*
ROA_t	Returns on assets, defined as before-tax profits over the book value of total assets for the first quarter of 1998. Since the top and bottom 1 percentages represent significant outliers, we winsorized the data at the 1st and 99th percentiles. That is, the top and bottom 1 percentages are replaced with the 99th and 1st percentile values, respectively.	0.012	0.118
ROA_{t-1}	Returns on assets for 1997, also winsorized at the 1st and 99th percentiles.	0.028	0.098
$ROA_t - ROA_{t-1}$	The difference in the returns on assets for 1998 and 1997.	−0.017	0.108
IMPROV	A dummy variable that is one when the manager believes the restructuring has improved or will improve performance.	0.726	0.446
$leverage_{t-1}$	Debt–equity ratio in 1997. Winsorized at the 1st and 99th percentiles.	0.842	1.260
lnL_{t-1}	The logarithm of the number of employees in 1997.	5.511	1.515
Autonomy	A dummy variable that is one when the manager of the reformed firm has complete or basic autonomy over operating decisions (excluding issues related to labour deployment) and zero otherwise.	0.914	0.209
l_flex	A dummy variable that is one when the manager feels that he or she has reasonable flexibility and discretion in labour deployment.	0.722	0.447
D_{O-B}	A measure of the divergence between ownership structure and board structure, constructed as $D_{O-B} = \sqrt{\sum_{j=1}^{J}(S_j^B - S_j^O)^2}$, where S_j^B is the share of membership on the board of directors by each type of shareholder, S_j^O is the percentage share of ownership, and j = state, legal person, collective, individual, and foreign.	0.524	0.362
staying_CEO	A dummy variable that is one when the pre-reform CEO stays on as the CEO after reform.	0.631	0.483
CEO_ by_ govt	A dummy variable that is one when the post-reform CEO is appointed by the government.	0.163	0.370
1share_1vote	A dummy variable that is one when the one-share one-vote principle is adopted for the shareholder meetings.	0.327	0.469
share_individual	The share of individual ownership in total outstanding shares in 1998.	0.322	0.379
share_foreign	The share of foreign ownership in total outstanding shares in 1998.	0.014	0.080
share_other_ownership	The share of legal-person and collective ownership in total outstanding shares in 1998.	0.196	0.334

can be explained by organizational changes brought about by the reform before 1998. We justify this assumption by noting that there were several stages to the reform process including planning, proposal, approval and implementation, and the entire process normally lasted more than one year. The reform blueprint took shape well before completion of the actual reform. The affected parties should therefore react to the proposed reform well before it actually took place.[10]

The ROA regression measures how the *level* of operating performance is affected by ownership reform. To examine how the *change* in performance is affected by the reform, we also run another regression in which the dependent variable is $ROA_{1998,i} - ROA_{1997,i}$; here we include $ROA_{1997,i}$ on the right-hand side. The lagged performance is controlled because firms that have performed better in the past tend to show smaller performance changes.

Given that it may take time for ownership reform to have its full impact on a firm's performance, we use another measure of the reform outcome as our dependent variable: the subjective assessment of the reform by firm managers, assuming that their assessments are forward-looking. Specifically, the measure is a dummy variable (*IMPROV*) that takes the value of one when a firm's manager believes that the reform has improved or will improve performance.

Clearly all three measures of performance outcomes have shortcomings: the first two are based on short-run performance, and the third is subjective. But if we obtain similar findings from all three sets of regressions, the credibility of the findings is greatly strengthened. It turns out that the regression results using the three outcome measures are largely consistent.[11]

Many studies on Chinese enterprise reforms have used total factor productivity (TFP) as the performance measure. We use ROA as our performance measure for two reasons. The first is a practical reason: our dataset does not allow us to construct

[10] There is perhaps another issue: given that 1998 is considered by many as a particularly bad year for the Chinese economy, does it make sense to use 1998 performance as the dependent variable? We believe this is not an issue. Our focus is not to identify the aggregate effects of ownership reform on firm performance; rather, we aim to investigate how firms with *different reform patterns (in ownership structure, corporate governance, etc.)* were affected differently. Thus, even if all firms suffered from decreased ROA, firms with good reforms would be expected to experience a smaller fall (or even an increase) in ROA.

A referee points out that 1998 witnessed the worst irregularity in Chinese statistics in a long time. This should not affect our conclusions, however. The Chinese data can have problems when they are related to GDP growth, other aggregate data, and sensitive questions such as corruption. In the case of firm-level survey data, neither the firms or the surveyors have great incentive to abuse numbers. For instance, the average annual pre-tax ROA in our sample is only 1.2 percent, which does not strike us as particularly high.

[11] In the dataset, the answers for the manager's assessment of the effect of restructuring on performance are slightly more nuanced than can be represented by a binary variable, ranging from 'significant improvement', 'some improvement', and 'no improvement' to 'worsening performance'. We collapse 'some improvement' and 'significant improvement' into 'improvement', and 'no improvement' and 'worsening performance' into 'no improvement'. We believe that collapsing the outcomes into fewer categories will probably reduce the extent of measurement errors in the subjective performance indicator. Moreover, the endogeneity issue is very difficult to deal with under the ordered probit framework.

the TFP measure. Second, many Chinese SOEs experienced rising productivity but declining financial performance during the 1990s (Bai, Li and Wang, 1997). This situation arose when SOEs failed to sell all of their output or adjusted their output in a sub-optimal way (for instance, not reducing quantity when output prices fell) while their technical efficiency may have improved. Using the industrial census data in the 1990s, Bai, Du and Tao (2002) find that financial performance is a robust measure of firm performance for firms of various ownership types, while productivity tends to be a fragile measure. In particular, for private firms, both productivity and financial performance are positively correlated and tend to have similar determinants; but for SOEs, productivity and financial performance are sometimes negatively correlated and have somewhat different determinants. Therefore, in a study of firms with different ownership structures, it seems more appropriate to use financial performance as the performance measure.

In our analysis, the effectiveness of the protection of shareholders' interest is proxied by two variables. The first is a dummy variable (*1share_1vote*) that takes the value of one when one-share one-vote is adopted for shareholder meetings and zero otherwise. The second is a new measure we introduce in this paper to proxy the extent of deviation of ownership from control. Specifically, we define a variable D_{O-B} that measures the divergence between the ownership structure and the structure of the board of directors:

$$D_{O-B} = \sqrt{\sum_{j=1}^{J}(S_j^B - S_j^O)^2}\,, \tag{1}$$

where S_j^B is the share of membership on the board of directors by each type of shareholder (including state, legal person, collective, individual and foreign),[12] and S_j^O is the ownership share by each type of shareholder. D_{O-B} is bound between 0 and $\sqrt{2}$. Based on earlier discussions, we expect D_{O-B} to be negatively related to performance and *1share_1vote* to be positively related to performance.

4. Methods

The regressions we run are the following:

$$\begin{aligned} ROA_i &= X_i\beta_1 + A_i\alpha_1 + O_i\gamma_1 + D_{O-B,i}\delta_1 + C_i\theta_1 + \varepsilon_i \\ ROA_{t,i} - ROA_{t-1,i} &= ROA_{t-1,i}\rho + X_i\beta_2 + A_i\alpha_2 + O_i\gamma_2 + D_{O-B,i}\delta_2 + C_i\theta_2 + \varepsilon \\ P(IMPROV_i = 1) &= \Phi(X_i\beta_3 + A_i\alpha_3 + O_i\gamma_3 + D_{O-B,i}\delta_3 + C_i\theta_3) \end{aligned} \tag{2}$$

[12] In the board of directors' data, there is no information on the representation of the 'collective' shares, which seem to be included in the vague category 'others'. We thus treat 'others' as an approximate measure for the 'collective' shares.

The right-hand side of the third regression is the normal cumulative density. *X* includes such conventional controls as leverage (lagged by one period), and log of the number of employees (lagged by one period) as a measure of size. We have also tried including the logarithm of capital (lagged by one period) in *X*. The results are very similar to those obtained without including it, while the adjusted R^2 is roughly the same. We thus decide not to include it.

The other explanatory variables will be called the reform variables. *A* includes two dummies. The first is a dummy variable (*autonomy*) indicating whether the CEO has complete or at least basic decision-making autonomy (the default is that the CEO has limited autonomy) over operating decisions (but not labour deployment). The second is a dummy variable (*l_flex*) indicating whether the CEO has flexibility in deploying labour after the reform. *O* includes the percentage ownership share by legal persons, collectives, individuals, and foreigners, respectively, the omitted category being the state share. Finally, *C* includes a dummy (*staying_CEO*) indicating whether the incumbent CEO stays on after the reform, and a dummy (*CEO_by_govt*) that takes the value of one if the post-reform CEO is appointed by the government, and zero otherwise (when the CEO is appointed by the firm, board of directors or shareholder meetings).

We first estimate Equation (2) using the ordinary least squares method. However, we recognize that the reform variables (i.e., *A, O, D* and *C*) could be endogenous in several ways. First, there could be reverse causality. That is, instead of reform variables affecting performance, it could be performance that causes the firms to choose systematically different reform measures. Second, there could be selection bias, that is, certain types of firms choose particular packages of reform measures. In other words, firm heterogeneity could be correlated with both performance and reform variables. Finally, there is the classical omitted-variable bias. Omitted variables could be correlated with both performance and the reform variables.

When examining the effects of reforms on performance, transition literature has paid attention to the endogeneity issue (Li, 1997; Frydman, Gray, Hessel and Rapaczynski, 1999; Anderson, Lee and Murrell, 2000; Shirley and Xu, 2001). To deal with the issue in the current study, we identify instrumental variables by noting some of the special features characterizing the Chinese ownership reform.

First, one ingredient of the latest wave of Chinese SOE reforms is to 'grab the big and let go of the small'. Chinese SOEs are classified as large, medium and small, with the classification often based on historical heritage rather than current size. The government adopts different reform policies for firms of different historically-determined sizes. Reform measures based on these size categories should not directly affect performance, especially since we have controlled for the number of employees in the firm. Therefore, these three historically determined size categories offer useful identifying information. *Second*, the government may receive different control benefits associated with different industries (Demsetz and Lehn, 1985). The line ministries may face different incentives to reform SOEs. As a result, a firm's reform measures should be influenced by its industry affiliation. *Third*,

reform measures may also depend on the authorities approving the reform. These include the State Economic and Trade Commission (ETC), provincial ETCs, local ETCs, State System Reform Committee (SRC), provincial SRCs, local SRCs, other governing authorities, multiple government agencies (for joint decisions), and the *ad hoc* agencies in charge of ownership reform. The difference in the approving authority appears to affect the reform measures, yet it is unlikely to be directly related to firm performance.

In our implementation, for each potentially endogenous variable, say A, we first obtain two variables representing the target reforms at the level of the government or the reform-implementing agency. In particular, we obtain the fitted values of A on: (a) the size-industry dummies (we call the fitted value $A_{size,\ industry}$); and (b) the reform's approving agency dummies (A_{agency}). $A_{size,\ industry}$ can be interpreted as the target reform outcome from the central government and line ministries, while A_{agency} approximates the reform's approving agency's specific reform target. These two variables therefore reflect the reform policies of the policy suppliers (i.e., the government) and should be correlated with firm-specific reform variables, but are likely to be un-correlated with firm-specific performance. We shall present estimations based on the generalized methods of moments that treat all the reform variables as endogenous and use A_{agency}, $A_{size,\ industry}$ to identify the effects of these variables.[13]

It is important to consider the possibility that these instruments may also be correlated with firm performance, in which case they may not serve as good instruments. To examine the validity of our identifying assumptions, we use the overidentifying restrictions test developed by Hansen (1982). That paper shows that if an equation is overidentified by an abundance of instruments, a test of overidentifying restrictions – Hansen's 'J' statistic – can be used to evaluate the validity of the model. If this statistic (distributed Chi-squared in the number of overidentifying restrictions) leads to the rejection of the null hypothesis that the additional moment conditions are approximately satisfied, the validity of the model is called into question. As will be seen, the statistical tests suggest that these instruments serve as valid instruments. Another important condition for good instrumental variables is that they have good explanatory power for the endogenous variables (Bound, Jaeger and Baker, 1995; Staiger and Stock, 1997). This condition is also satisfied in our case. Indeed, the F-statistics of the excluded instruments in the first-stage regressions are almost always greater than 10, and the marginal R_s^2 of these excluded instruments range from 2 to 11 percent, quite high in comparison with the marginal R_s^2 that are required for a reasonable instrumental variable estimation (Bound, Jaeger and Baker, 1995).

[13] For an application of the GMM method with a similar strategy of selecting instruments, see Svensson (2003). In particular, he uses the region-industry mean of bribes as the instrument for firm-level bribes to identify the effects of firm-level corruption on firm performance.

5. Results

5.1 Descriptive statistics

Descriptive statistics of the dependent and explanatory variables used in our regression analysis are presented in Table 1. Some interesting facts stand out. The ROA in the first quarter of 1998 was on average only 1.2 percent, reflecting the troubles still faced by many of the firms after ownership reform, and perhaps also the adverse macro shocks felt during 1998. Also reflecting the macro shocks, there was an average 1.7 percent decline in ROA between 1998 and 1997. Seventy-two percent of the managers thought that the reform had improved or would improve performance. The vast majority of firms appear to have operating decision-making autonomy after the reform (91 percent), but the grant of control over labour deployment to managers lags behind (72 percent), reflecting the government's concerns over the unemployment of SOE workers. The measure of the divergence between ownership and board control is fairly large (0.52), as the perfect alignment of ownership and control implies a value of zero for the variable. It appears that the majority of incumbent CEOs stay on after reform (63 percent) and 16 percent of the CEOs are appointed directly by the government. The one-share one-vote principle is observed by only one-third of the firms. On average, the state remains the largest shareholder, accounting for roughly 47 percent of the total shares in reformed enterprises. Legal-person and collective shares account for 20 percent. There is also substantial private involvement: 32 percent of the total shares of these former SOEs are in the hands of private citizens, and 1.3 percent is owned by foreigners. Interested readers may refer to Table 2 for the correlation matrix of the explanatory variables.

5.2 Base results

Table 3 presents the base results with odd columns for the OLS results and even columns for the GMM results. The first two columns focus on the level of ROA, the second two columns on the change in ROA, and the final two columns on the likelihood of a favourable judgment by firm managers of the impact of ownership reform.

Before getting to the results relating to our main interest, we first examine how some conventional factors affect our dependent variables. Without considering endogeneity, larger firms do not exhibit significantly worse performance (except in the *IMPROV* regression). Once endogeneity is considered, however, larger firms are shown to have both a lower level of and lower change in ROA, and their managers have a less favourable assessment of the reform (t = 1.41). Before considering the issue of endogeneity, there appears to be a negative correlation between debt burden and reform outcomes. But the correlation proves to be spurious and disappears once endogeneity is tackled with the GMM method.

Table 2. Correlation matrix of explanatory variables

Panel A

	$leverage_{t-1}$	lnL_{t-1}	*autonomy*	*l_flex*	D_{O-B}
lnL_{t-1}	0.042				
autonomy	−0.017	0.015			
l_flex	−0.031	0.022	0.202		
D_{O-B}	−0.090	−0.087	−0.062	−0.010	
staying_CEO	0.023	0.002	−0.048	0.019	−0.019
CEO_by_govt	−0.035	0.151	0.016	−0.064	0.214
1share_1vote	0.040	−0.038	0.018	0.050	−0.170
share_other_ownership	−0.064	−0.059	0.077	0.086	0.024
share_individual	0.196	−0.169	−0.014	−0.046	−0.556
share_foreign	−0.106	0.058	0.065	0.079	−0.113

Panel B

	staying _CEO	*CEO_by _govt*	*1share _1vote*	*share_other _ownership*	*share _individual*
CEO_by_govt	−0.073				
1share_1vote	0.103	−0.321			
share_other_ownership	−0.094	−0.026	−0.059		
share_individual	0.096	−0.438	0.378	−0.266	
share_foreign	−0.079	−0.038	−0.107	−0.028	−0.126

We now examine how business autonomy, ownership structure and corporate governance affect performance outcomes. Autonomy is not significantly correlated with performance in the OLS regression. Taking into account the endogeneity of the reform changes the result. In the GMM regressions, *autonomy* is associated with significant drops both in ROA level and in ROA changes, whereas the sign in *IMPROV* is negative but highly insignificant. Recall that the decrease in political costs as a result of more business autonomy would imply a positive effect of *autonomy* on performance, while a possible increase in agency costs would imply a negative effect. Therefore, the negative effect of *autonomy* on performance appears to suggest that there are serious agency problems in reformed enterprises.

Consistent with our conjecture, a firm's flexibility in labour deployment (*l_flex*) has a significant positive effect on all three measures of reform outcomes whether we consider endogeneity or not. But note that the magnitude of the effects on both the level and the change in ROA tends to be greater when endogeneity is taken

Table 3. Determinants of reform outcomes: pooled sample

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) probit	(6) GMM
	ROA_t	ROA_t	$ROA_t - ROA_{t-1}$	$ROA_t - ROA_{t-1}$	IMPROV	IMPROV
$leverage_{t-1}$	–0.009	–0.004	–0.002	0.001	–0.023	–0.013
	(2.92)***	(1.49)	(0.62)	(0.45)	(1.93)*	(0.61)
lnL_{t-1}	0.001	–0.004	0.000	–0.004	–0.017	–0.024
	(0.36)	(1.97)**	(0.03)	(2.08)**	(1.75)*	(1.41)
autonomy	0.016	–0.230	0.015	–0.129	0.060	–0.031
	(1.23)	(2.86)***	(1.27)	(2.14)**	(1.17)	(0.12)
l_flex	0.028	0.108	0.018	0.073	0.285	0.268
	(3.48)***	(2.80)***	(2.60)***	(2.28)**	(9.63)***	(1.71)*
D_{O-B}	–0.027	–0.089	–0.019	–0.035	–0.038	–0.155
	(2.97)***	(2.31)**	(2.36)**	(1.07)	(1.06)	(1.17)
staying_CEO	0.017	–0.074	–0.002	–0.041	0.012	–0.130
	(2.27)**	(1.74)*	(0.23)	(1.25)	(0.39)	(0.78)
CEO_by_govt	–0.038	0.031	–0.018	–0.010	–0.069	0.099
	(3.53)***	(0.63)	(1.90)*	(0.27)	(1.63)	(0.53)
1share_1vote	0.011	0.179	–0.002	0.092	0.043	0.164
	(1.47)	(4.34)***	(0.31)	(2.84)***	(1.41)	(1.17)
share_individual	–0.003	–0.090	–0.009	–0.052	0.019	0.131
	(0.21)	(2.32)**	(0.90)	(1.62)	(0.39)	(0.51)
share_foreign	–0.014	0.280	–0.024	0.311	–0.064	1.499
	(0.32)	(1.76)*	(0.63)	(2.33)**	(0.39)	(1.66)*
share_other	0.017	–0.029	0.018	–0.004	0.040	0.419
_ownership	(1.49)	(0.54)	(1.78)*	(0.10)	(0.88)	(1.29)
ROA_{t-1}			–0.338	–0.362		
			(9.32)***	(7.77)***		
Observations	931	927	922	918	991	987
R-squared	0.07		0.91		0.115	
P-value for Hansen's J		0.649		0.773		0.582

Notes: Throughout the tables, *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels. In parentheses are t-statistics. In column (5), we report dp/dx, and the R-squared refers to the pseudo R-squared. Hansen's J refers to the J-test statistics for the null hypothesis that the instruments are orthogonal to the residual.

All variables except for lnL_{t-1} and $leverage_{t-1}$ are considered endogenous in the GMM specifications. For each endogenous variable (say R), the instruments are the size-industry mean of R, and the mean of R for particular type of government agency in charge of the ownership reform. Industry dummies are not included in both specifications because they were tested to be jointly insignificant.

into consideration. This suggests that *l_flex* is negatively correlated with the error terms of the regressions, implying that firms with worse financial performance are granted more flexibility in labour deployment, and correcting for such selection effects raises our estimates of the effects of *l_flex*. The coefficients in the GMM regressions suggest that granting managerial control over labour deployment would increase *annualized* ROA by 10.8 percent instead of 2.8 percent as found in the OLS regression, and the change in ROA by 7.3 percent rather than 1.8 percent. This result suggests that political costs associated with labour issues are especially large, and flexibility in labour deployment is especially important for firm performance.

Ownership structure is found to have important effects on reform outcomes, and the contrast between considering and not considering endogeneity is striking. When ownership variables are treated as being exogenous, then relative to state ownership, the correlations of performance with individual, foreign, or other ownership are insignificant – the one exception is that other ownership may be positively correlated with the change in financial performance between the two years. When ownership variables and other reform variables are considered endogenous, however, the results change completely.

In the GMM regressions, the effect of individual ownership (predominantly by employees) is negative and statistically significant for the level of ROA, and is negative and close to being significant for the change in ROA (t = 1.62). These results are consistent with the notion that private ownership by itself is not sufficient to counter agency costs; some kind of concentrated private ownership is needed to achieve effective monitoring (Shleifer and Vishny, 1986). State ownership represents nominally the ownership of all the people, but delegated agency is to some extent accountable for the performance. Yet in the case of dispersed private ownership, there is still nominal ownership by many people but without the benefits of some accountability. Our finding on the negative effect on performance of dispersed private ownership is also consistent with evidence from Mongolia given in Anderson, Lee and Murrell (2000), who find similar evidence after considering the endogeneity of the ownership structure. Another interesting finding is that the effect of foreign ownership becomes positive and statistically significant in all three regressions. The magnitude of the effect is large: an increase of foreign ownership share by 1 percent raises annualized ROA by more than 0.28 percent and changes in ROA by 0.31 percent. The effect of other ownership is statistically indistinguishable from state ownership. This result is intuitive since much of the legal-person and collective ownership in China tends to be essentially another form of state ownership.

The results on CEO appointment and turnover also change dramatically after considering endogeneity. Without considering endogeneity, firms whose CEOs are appointed by the government exhibit worse performance, and firms with the same CEO after reform are more likely to exhibit a better level of financial performance. Once we take endogeneity into consideration, however, CEO appointment by the government no longer has any systematic relationship with performance. Moreover,

incumbent CEOs staying on after reform are associated with a negative level of ROA. This suggests a positive nature of the selection bias: incumbent CEOs choose, or are chosen, to stay on in firms with better performance. The negative effect of CEOs staying on is weakly consistent with the finding in the literature that changing CEOs after reform results in better performance (Denis and Denis, 1995) and more restructuring (Barberis *et al.*, 1996) in transition economies.

The voting mechanism for shareholder meetings also matters. The one-share one-vote dummy has no significant effect on performance when not considering endogeneity, but has positive and significant effects on both the level of and the change in ROA.

Finally, consistent with our hypothesis, the deviation of board structure from share ownership has a significant and negative effect on ROA level; and the signs are also correct for the change in ROA and *IMPROV*. The effects (in terms of magnitude) that take endogeneity into account are stronger than in the OLS regression. The magnitude of the effect is very large. For example, compared with firms in which there is hypothetically no such deviation (i.e., $D_{O-B} = 0$), firms with the maximum divergence between ownership and control ($D_{O-B} = \sqrt{2}$) would have an annualized ROA that is 12.5 percentage points lower, and a change in ROA, 4.9 percentage points lower.

5.3 Do the effects differ by organizational type?

It is possible that the effects of decision-making autonomy, ownership structure and corporate governance mechanisms differ qualitatively among the three main organizational types, i.e., limited liability stock companies (LLSCs), limited liability companies (LLCs) and employee-owned stock cooperatives (EOSCs). It would be re-assuring to find that most of our key findings stay intact for each of these organizational types. Tables 4, 5 and 6 present the results separately for each of the three organization types. We present both the OLS (or probit in the case of *IMPROV*) and GMM results. Indeed, the signs for our important variables remain intact across the three sub-samples.

6. Conclusions

Using a large sample of Chinese firms undertaking ownership reform in 1997, our study of the recent experience of Chinese enterprise reform suggests that differences in authority allocation, ownership structure, and corporate governance mechanisms hold important clues to explaining performance variation in reformed firms. Specifically, we find evidence that firms tend to perform better when managers have flexibility in labour deployment, when corporate governance mechanisms lead to better alignment between ownership and control, and when foreign ownership is higher. Interestingly, dispersed individual ownership and operating

Table 4. Determinants of reform outcomes: LLSC

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) probit	(6) GMM
	ROA_t	ROA_t	$ROA_t - ROA_{t-1}$	$ROA_t - ROA_{t-1}$	IMPROV	IMPROV
$leverage_{t-1}$	–0.009	–0.004	0.003	0.001	0.018	–0.011
	(1.51)	(1.45)	(0.45)	(0.48)	(0.47)	(0.54)
lnL_{t-1}	0.007	–0.004	–0.000	–0.003	–0.028	–0.026
	(1.25)	(1.92)*	(0.03)	(1.91)*	(0.85)	(1.51)
autonomy	–0.050	–0.252	–0.027	–0.143		0.002
	(1.56)	(3.09)***	(0.95)	(2.36)**		(0.01)
l_flex	0.022	0.118	0.021	0.081	0.489	0.253
	(1.23)	(3.03)***	(1.37)	(2.51)**	(4.17)***	(1.60)
D_{O-B}	–0.038	–0.082	–0.032	–0.025	–0.069	–0.181
	(1.88)*	(2.12)**	(1.84)*	(0.77)	(0.56)	(1.36)
staying_CEO	0.015	–0.065	0.013	–0.031	–0.073	–0.123
	(0.98)	(1.52)	(1.01)	(0.95)	(0.85)	(0.74)
CEO_by_govt	–0.062	0.046	–0.018	0.001	–0.058	0.111
	(1.70)*	(0.93)	(0.57)	(0.01)	(0.30)	(0.59)
1share_1vote	0.009	0.174	0.006	0.085	0.144	0.185
	(0.68)	(4.18)***	(0.51)	(2.64)***	(1.73)*	(1.31)
share_individual	–0.024	–0.082	–0.036	–0.045	–0.072	0.115
	(0.87)	(2.10)**	(1.51)	(1.40)	(0.41)	(0.45)
share_foreign	0.104	0.301	0.064	0.323	0.550	1.445
	(1.57)	(1.88)*	(1.12)	(2.40)**	(1.29)	(1.60)
share_other	0.034	–0.021	0.024	0.008	–0.012	0.416
_ownership	(1.27)	(0.39)	(1.04)	(0.17)	(0.07)	(1.27)
ROA_{t-1}			–0.417	–0.358		
			(4.66)***	(7.64)***		
Observations	130	129	130	129	133	132
R-squared	0.23		0.94		0.17	
P-value for Hansen's J		0.631		0.759		0.568

Notes: Throughout the tables, *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels. In parentheses are t-statistics. In column (5), we report dp/dx, and the R-squared refers to the pseudo R-squared. Hansen's J refers to the J-test statistics for the null hypothesis that the instruments are orthogonal to the residual.

All variables except for lnL_{t-1} and $leverage_{t-1}$ are considered endogenous in the GMM specifications. For each endogenous variable (say R), the instruments are the size-industry mean of R, and the mean of R for particular type of government agency in charge of the ownership reform. Industry dummies are not included in both specifications because they were tested to be jointly insignificant.

Table 5. Determinants of reform outcomes: LLC

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) probit	(6) GMM
	ROA_t	ROA_t	$ROA_t - ROA_{t-1}$	$ROA_t - ROA_{t-1}$	IMPROV	IMPROV
$leverage_{t-1}$	–0.004	–0.004	0.001	0.001	–0.021	–0.016
	(1.08)	(1.53)	(0.26)	(0.39)	(1.32)	(0.79)
lnL_{t-1}	–0.000	–0.004	0.000	–0.004	–0.008	–0.022
	(0.12)	(1.94)*	(0.07)	(2.06)**	(0.61)	(1.29)
autonomy	0.025	–0.231	0.021	–0.134	0.076	–0.069
	(1.56)	(2.87)***	(1.52)	(2.22)**	(1.18)	(0.27)
l_flex	0.030	0.107	0.017	0.075	0.271	0.280
	(2.85)***	(2.79)***	(1.87)*	(2.32)**	(6.99)***	(1.79)*
D_{O-B}	–0.026	–0.090	–0.011	–0.034	0.017	–0.140
	(2.21)**	(2.33)**	(1.15)	(1.06)	(0.38)	(1.05)
staying_CEO	0.023	–0.075	–0.003	–0.043	0.007	–0.120
	(2.32)**	(1.75)*	(0.35)	(1.32)	(0.18)	(0.72)
CEO_by_govt	–0.036	0.032	–0.011	–0.010	–0.105	0.126
	(2.57)**	(0.64)	(0.90)	(0.25)	(1.91)*	(0.67)
1share_1vote	0.015	0.179	–0.006	0.091	0.053	0.146
	(1.42)	(4.33)***	(0.68)	(2.81)***	(1.33)	(1.04)
share_individual	–0.004	–0.089	0.005	–0.051	0.099	0.166
	(0.21)	(2.31)**	(0.34)	(1.60)	(1.49)	(0.64)
share_foreign	–0.052	0.278	–0.044	0.300	0.509	1.530
	(0.86)	(1.76)*	(0.87)	(2.26)**	(1.39)	(1.69)*
share_other	0.021	–0.028	0.026	–0.003	0.076	0.425
_ownership	(1.45)	(0.53)	(2.08)**	(0.08)	(1.31)	(1.31)
ROA_{t-1}			–0.314	–0.362		
			(6.68)***	(7.77)***		
Observations	530	527	524	521	561	558
R-squared	0.07		0.92		0.139	
P-value for Hansen's J		0.649		0.777		0.575

Notes: Throughout the tables, *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels. In parentheses are t-statistics. In column (5), we report dp/dx, and the R-squared refers to the pseudo R-squared. Hansen's J refers to the J-test statistics for the null hypothesis that the instruments are orthogonal to the residual.

All variables except for lnL_{t-1} and $leverage_{t-1}$ are considered endogenous in the GMM specifications. For each endogenous variable (say R), the instruments are the size-industry mean of R, and the mean of R for particular type of government agency in charge of the ownership reform. Industry dummies are not included in both specifications because they were tested to be jointly insignificant.

Table 6. Determinants of reform outcomes: EOSC

	(1) OLS	(2) GMM	(3) OLS	(4) GMM	(5) probit	(6) GMM
	ROA_t	ROA_t	$ROA_t - ROA_{t-1}$	$ROA_t - ROA_{t-1}$	IMPROV	IMPROV
$leverage_{t-1}$	–0.030	–0.004	–0.026	0.001	–0.082	–0.021
	(4.30)***	(1.37)	(4.18)***	(0.50)	(2.51)**	(1.04)
lnL_{t-1}	0.007	–0.004	0.003	–0.004	0.024	–0.023
	(0.83)	(1.96)**	(0.46)	(2.10)**	(0.64)	(1.36)
autonomy	0.022	–0.225	0.022	–0.131	0.025	–0.062
	(0.74)	(2.83)***	(0.82)	(2.18)**	(0.21)	(0.25)
l_flex	0.019	0.108	0.016	0.076	0.283	0.304
	(1.10)	(2.83)***	(1.02)	(2.35)**	(3.66)***	(1.97)**
D_{O-B}	–0.016	–0.085	–0.015	–0.033	–0.188	–0.181
	(0.78)	(2.23)**	(0.84)	(1.01)	(2.09)**	(1.40)
staying_CEO	0.021	–0.070	0.004	–0.035	0.074	–0.135
	(1.12)	(1.66)*	(0.24)	(1.07)	(0.91)	(0.83)
CEO_by_govt	0.040	0.030	–0.004	–0.010	–0.036	0.144
	(0.73)	(0.62)	(0.08)	(0.26)	(0.16)	(0.78)
1share_1vote	0.018	0.175	0.008	0.093	–0.019	0.138
	(1.05)	(4.28)***	(0.53)	(2.90)***	(0.25)	(1.00)
share_individual	0.051	–0.093	0.005	–0.057	0.031	0.176
	(1.70)*	(2.43)**	(0.17)	(1.80)*	(0.24)	(0.70)
share_foreign	–0.008	0.262	0.175	0.294		1.234
	(0.03)	(1.67)*	(0.80)	(2.22)**		(1.42)
share_other	0.024	–0.028	0.000	–0.010	–0.000	0.314
_ownership	(0.72)	(0.53)	(0.01)	(0.23)	(0.00)	(1.00)
ROA_{t-1}			–0.317	–0.370		
			(3.17)***	(7.95)***		
Observations	166	166	164	164	174	174
R-squared	0.17		0.90		0.135	
P-value for Hansen's J		0.622		0.759		0.481

Notes: Throughout the tables, *, ** and *** represent statistical significance at the 10, 5 and 1 percent levels. In parentheses are t-statistics. In column (5), we report dp/dx, and the R-squared refers to the pseudo R-squared. Hansen's J refers to the J-test statistics for the null hypothesis that the instruments are orthogonal to the residual.

All variables except for lnL_{t-1} and $leverage_{t-1}$ are considered endogenous in the GMM specifications. For each endogenous variable (say R), the instruments are the size-industry mean of R, and the mean of R for particular type of government agency in charge of the ownership reform. Industry dummies are not included in both specifications because they were tested to be jointly insignificant.

autonomy lead to worse performance, suggesting the seriousness of agency problems in reformed firms. Our analysis suggests that it is important to take into account the endogenous nature of the ownership reform. Indeed, many of the results change sign when endogeneity is taken in to account in the empirical implementation.

The findings in this paper, however, are subject to important caveats. First, short-term ROA and managerial subjective assessments are not ideal measures of reform outcomes. The long-term effects of the ownership reform need to be explored in future research. Second, the data are cross-sectional, and hence we have no means of controlling for firm heterogeneity. Since both flaws are due to limitations of the dataset, the collection of better quality data is needed to improve our understanding of the issue.

These limitations notwithstanding, the empirical regularities found in our analysis should not be taken too lightly, especially as we have been able to find reasonably good instruments (judged both by *a priori* reasoning and by statistical tests) for the reform variables, and given that the results from all three sets of regressions are similar. Moreover, most of our findings are consistent with what is implied by theory and with findings in related empirical studies (Megginson and Netter, 2001), and thus should be given some credence.

References

Aghion, P. and Tirole, J. (1997). 'Formal and real authority', *Journal of Political Economy*, 105(1), pp. 1–29.

Anderson, J. H., Lee, Y. and Murrell, P. (2000). 'Competition and privatization amidst weak institutions: Evidence from Mongolia', *Economic Inquiry*, 38(4), pp. 527–49.

Bai, C.-E., Du, M. and Tao, Z. (2002). 'What is up is really down: Evidence about technical and economic efficiencies from China', mimeo, University of Hong Kong.

Bai, C.-E., Li, D. D. and Wang, Y. (1997). 'Enterprise productivity and efficiency: When is up really down?' *Journal of Comparative Economics*, 23(3), pp. 265–80.

Bai, C.-E. and Wang, Y. (1998). 'Bureaucratic control and the soft budget constraint', *Journal of Comparative Economics*, 26(1), pp. 41–61.

Barberis, N., Boycko, M., Shleifer, A. and Tsukanova, N. (1996). 'How does privatization work? Evidence from the Russian shops', *Journal of Political Economy*, 104, pp. 764–90.

Bound, J., Jaeger, D. A. and Baker, R. M. (1995). 'Problems with instrumental variables estimation when the correlation between the instruments and the endogenous variable is weak', *Journal of the American Statistical Association*, 90(430), pp. 443–50.

Cao, Y., Qian, Y. and Weingast, B. R. (1999). 'From Federalism, Chinese style to privatization, Chinese style', *Economics of Transition*, 7(1), pp. 103–31.

China Statistical Yearbooks (1999). Beijing: China Statistics Press.

Demsetz, H. and Lehn, K. (1985). 'The structure of corporate ownership', *Journal of Political Economy*, 93, pp. 1155–77.

Denis, D. J. and Denis, D. K. (1995). 'Performance changes following top management dismissal', *Journal of Finance*, (50), pp. 1029–57.

Dong, X.-Y. and Putterman, L. (2003). 'Soft budget constraints, social burdens, and labor redundancy in China's state industry', *Journal of Comparative Economics*, 31(1), pp. 110–33.
Frydman, R., Rapaczynski, A. and Earle, J. (1993). *The Privatization Process in Central Europe*. London: Central European University Press.
Grossman, S. and Hart, O. (1988). 'One share-one vote and the market for corporate control', *Journal of Financial Economics*, 20, pp. 175–202.
Groves, T., Hong, Y., McMillan, J. and Naughton, B. (1994). 'Autonomy and incentives in Chinese state enterprises', *Quarterly Journal of Economics*, 109(1), pp. 183–209.
Hansen, L. P. (1982). 'Large sample properties of generalized methods of moments estimators', *Econometrica*, 50, pp. 1029–54.
Harris, M. and Raviv, A. (1988). 'Corporate governance: Voting rights and majority rules', *Journal of Financial Economics*, 20, pp. 203–35.
Hermalin, B. E. and Weisbach, M. S. (2001). 'Boards of Directors as an endogenously determined institution: A survey of the economic literature', *National Bureau of Economic Research working paper no. 8161*, Cambridge, MA: NBER.
Jefferson, G. H., Rawski, T. G. and Zheng, Y. (1996). 'Chinese industrial productivity: Trends, measurement issues, and recent developments', *Journal of Comparative Economics*, 23(2), pp. 146–80.
Lardy, N. (1998). *China's Unfinished Economic Revolution*. Washington, DC: Brookings Institution Press.
Lee, Y. (1999). 'Wages and employment in China's SOEs, 1980–1994: Corporatization, market development, and insider forces', *Journal of Comparative Economics*, 27, pp. 702–29.
Li, D. D. (1998). 'Changing incentives of the Chinese bureaucracy', *American Economic Review*, 88(2), pp. 393–97.
Li, W. (1997). 'The impact of economic reform on the performance of Chinese state enterprises, 1980–1989', *Journal of Political Economy*, 105(5), pp. 1080–106.
Lin, Y.-M. and Zhu, T. (2001). 'Ownership restructuring in Chinese state industry: An analysis of evidence on initial organizational changes', *China Quarterly*, 166, pp. 305–41.
McConnell, J. and Servaes, H. (1990). 'Additional evidence on equity ownership and corporate value', *Journal of Financial Economics*, 27, pp. 595–612.
Megginson, W. L. and Netter, J. M. (2001). 'From state to market: A survey of empirical studies on privatization', *Journal of Economic Literature*, 39(2), pp. 321–89.
Morck, R., Shleifer, A. and Vishny, R. W. (1988). 'Management ownership and market valuation: An empirical analysis', *Journal of Financial Economics*, 20, pp. 293–315.
Naughton, B. (1995). *Growing Out of the Plan: Chinese Economic Reform, 1978–1993*. New York: Cambridge University Press.
Qian, Y. (1996). 'Enterprise reform in China: Agency problems and political control', *Economics of Transition*, 4(2), pp. 422–47.
Shirley, M. (1999). 'Bureaucrats in business: The roles of privatization versus corporatization in state-owned enterprise reform', *World Development*, 27, pp. 115–36.
Shirley, M. and Xu, L. C. (2001). 'The empirical effects of performance contracts', *Journal of Law, Economics, and Organization*, 17(1), pp. 168–200.
Shleifer, A. (1998). 'State versus private ownership', *Journal of Economic Perspectives*, 12(4), pp. 133–50.
Shleifer, A. and Vishny, R. W. (1986). 'Large shareholders and corporate control', *Journal of Political Economy*, 94, pp. 461–88.

Shleifer, A. and Vishny, R. W. (1994). 'Politicians and firms', *Quarterly Journal of Economics*, 109(4), pp. 995–1025.
Shleifer, A. and Vishny, R. W. (1997). 'A survey of corporate governance', *Journal of Finance*, 52(2), pp. 737–83.
Staiger, D. and Stock, J. H. (1997). 'Instrumental variables regression with weak instruments', *Econometrica*, 65(3), pp. 557–86.
Svensson, J. (2003). 'Who must pay bribes and how much? Evidence from a cross section of firms', *Quarterly Journal of Economics*, 118(1), pp. 207–30.
Williamson, O. E. (1985). *The Economic Institutions of Capitalism*, New York: The Free Press.
Woo, W. T., Hai, W., Jin, Y. and Fan, G. (1994). 'How successful has Chinese enterprise reform been? Pitfalls in opposite biases and focus', *Journal of Comparative Economics*, 18(3), pp. 410–37.
World Bank (1995). *Bureaucrats in Business*. New York: Oxford University Press.
Wruck, K. (1989). 'Equity ownership concentration and firm value', *Journal of Financial Economics*, 23, pp. 3–28.
Xu, C. (1995). *A Different Transition Path: Ownership, Performance, and Influence of Chinese Rural Industrial Enterprises*, New York and London: Garland.
Xu, L. C. (2000). 'Control, incentives, and competition: The impact of reform in Chinese state-owned enterprises', *Economics of Transition*, 8(1), pp. 151–73.
Yao, Y. and Song, L. (2003). 'Impacts of privatization on firm performance in China', working paper, Peking University.
Zhang, A., Zhang, Y. and Zhao, R. (2001). 'Impact of ownership and competition on the productivity of Chinese enterprises', *Journal of Comparative Economics*, 29, pp. 327–46.
Zhu, T. (1999). 'China's corporatization drive: An evaluation and policy implications', *Contemporary Economic Policy*, 17(4), pp. 530–39.