Competition, Ownership, Corporate Governance and Enterprise Performance: Evidence from China*

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Abstract

There exist three views in the literature on the efficiency of state-owned versus private firms: competition, ownership, and governance. Each view emphasizes on one aspect while ignoring others. In this paper, we use a unique World Bank survey data of 736 Chinese firms across seven sectors and five cities from 1996 to 2001 to assess the relative importance of the above three views, both independently and jointly. It is found that when examined independently each determinant matters in explaining the efficiency of our sample firms; however, when they are jointly examined, ownership type and corporate governance are relatively more important, while the competition effect is less significant generally. We also find there is some degree of substitutability between two pairs: privatization and corporate governance, and privatization and competition. These results suggest that the three views are indeed incomplete, and a complete package requires some combination of these determinants. We also find that non-SOEs seem to have certain advantage in some governance mechanisms than SOEs and that market competition matters greatly for SOEs but not so much for non-SOEs. These results have important policy implications for China's on-going privatization movement and her strive for better corporate governance and market competition.

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1. Introduction

There has been growing interest in the debate on the efficiency of state-owned firms versus private firms since many former socialist countries initiated their transition to capitalist and market economies. The privatization of many state-owned enterprises (SOEs) into mixed types of ownership provides a good testing ground for theories of relative efficiency of private firms and SOEs. Since 1978, the Chinese economy has gone through tremendous changes. The private sector has been growing from almost nothing to more than half of the economy.[1] At the same time, there is a significant entry of foreign firms and many SOEs have been restructured and transformed into the so-called corporatized firms. Thus, the rich Chinese experience should help provide important insight on the efficiency debate.[2]

There are generally three views in the debate on the efficiency of state-owned versus private firms. The first view, labeled as the *competition view*, recognizes that the main problem in SOEs lies in the lack of incentives. According to this view, such a problem can be alleviated if product-market competition is introduced. It is suggested that competition will reduce managerial slack and contain cost for both public and private firms which in turn compel SOEs to perform. In addition, competition provides information about costs and manager effort to the owners and with this information the owners can design better incentive systems and evaluate manager efforts more accurately (Holmstrom (1982), Lin, Cai, and Li (1998), Yarrow (1986)). In transition economies, however, increased competition may yield negative effects on efficiency. Blanchard and Kremer (1997) argue that competition creates incentives for breaking contracts

[1] According to PricewaterhouseCoopers report on China's private sector by Allan Zhang (2/24/2004): "Today, around two-thirds of China's GDP is generated by non-state sector, around half of it contributed by domestic private enterprises."

[2] Xu and Wang (1998) and Bai, Liu, Lu, Song, and Zhang (2003), among others, are papers dealing with the impact of ownership on Chinese listed firms. The first two papers find that state-owned shares have negative (or insignificant) impact and institutional shareholders have a large and positive impact on firm valuation while the late two studies find a non-linear, U-shaped relationship of firm valuation and government ownership.

when institutions are weak. Ickes et al. (1995) suggest that excessive competition, especially from abroad, destroys network capital and harms enterprise performance in the early transition period. The experience of former Soviet Union seems to support this argument. In short, the theoretical prediction of the effect of competition on firm efficiency is ambiguous.

The second view, labeled as the *ownership view*, looks into more fundamental problems in SOEs and argues that state-owned firms are inherently less efficient than private firms. This view can be traced back to earlier work by Hayek and Friedman. More recently, in a theory of privatization, Boycko, Shleifer, and Vishny (1996) argue that politicians often create pressure for SOEs to employ excess labor. Krueger (1990) also suggests that SOEs tend to hire politically connected people rather than those best qualified for the work. More generally, it is believed that SOEs tend to forgo maximum profit in the pursuit of social and political objectives, such as full employment, income redistribution and political stability.

However, the view that SOEs are inherently less efficient than private ones is not necessarily shared by all economists. For example, Vickers and Yarrow (1991), among others, point out that agency problems arise in private firms as well as public ones. Therefore, it is entirely possible that private firms may perform worse than SOEs if there is major corporate governance problem associated with them. Chang and Singh (1997) argue that since SOEs and large private firms must both contend with unwieldy bureaucracies and that both of the respective disciplinary mechanisms are imperfect, the private firms are not necessarily better governed. Other researchers, however, believe that private firms are more successful than state-owned firms in addressing problems of corporate governance. Alchian (1965) argues that since all citizens can be considered SOE owners, an SOE's ownership is more widely distributed than a private firm, resulting in a more serious principal-agent problem. In addition, since public

owned shares are difficult to transfer, public owners stand to gain or lose less from firm performance than do private owners. Because of these two reasons, SOEs tend to be less effectively monitored than a private firm. More recently, Boardman and Vining (1992), and Nellis (1994) argue that there is advantage for private monitoring, including more healthy market for managers and profit-oriented monitors. In addition, Konai (1980) and Kornai and Weibull (1983) argue that the fact that loss-making SOEs will be subsidized by the state, the so-called soft budget constrain problem, will prevent SOE managers from running the firm efficiently. In conclusion, SOEs may suffer more from corporate governance problems than private firms. We label this view on the efficiency of state-owned versus privately-owned firms as the *governance view*.

To a large extent, all of the above three views on the efficiency of private firms versus SOEs are valid arguments. It is, however, very important to assess the relative importance of the three views. For example, if one believes the competition view dominates the ownership view, then too much emphasizing on ownership changes as a way to tackle firm efficiency problem may be misguided. This highlights the important policy implications of the relevant views of the efficiency debate. In addition to examining which effect is stronger, it is also important to study whether there are substitution or complement effects among competition, ownership change, and corporate governance.

The answer to the above debate can only be reconciled by empirical evidence. Early empirical studies in comparing the effect of ownership versus competition yield mixed findings. For example, Caves & Christiansen (1980) find in a comparison of public and private railroads that in the presence of competition there is no difference between public and private efficiency. Yarrow (1986), based on his survey of pre- and post-privatization firm performance in Britain,

finds that performance depends more on market structure than on ownership. Therefore, he argues that although private firms have a general advantage in the monitoring of managers, it is the competitive and regulatory environment that shapes the incentives of managers. In contrast, Davies (1971) suggests a massive private-sector advantage in Australian airlines. More recently, using larger samples, Boardman and Vining (1989, 1992) present the evidence that private firms are more efficient than SOEs even in competitive industries. Megginson, Nash and Randenborgh (1994) examine firm performance before and after privatization and find that private ownership increases efficiency in all situations, and the effect is more pronounced in competitive markets. Ros (1999) argues that both ownership and market structure have significant effects on efficiency, but that the ownership effect is slightly more robust across different measures of performance. Dewenter and Malatesta (2001) use a large sample of multi-national, multi-year, and cross-sectional data and find that government-owned firms are significantly less profitable than privately-owned firms.

The evidence from transition economies is also mixed. Earle and Estrin (1998) find that for privatized firms in Russia, ownership has a much stronger impact on productivity than market structure. However, in a survey of studies on transition economies, Djankov and Murrell (2002) point out that import competition has a major positive effect outside of Russia. Focusing on Chinese SOEs, Li (1997) observes that productivity gains are associated with market liberalization. Nevertheless, the overall empirical literature suggests that while market structure has a positive impact on firm performance, this impact fails to dominate the ownership effect.

While there are a large number of studies addressing the issue of impact of ownership and competition on firms' efficiency, there is a lack of empirical study on the relative effect of ownership and governance on efficiency, in particular the interactions of different ownership

type and governance mechanisms.[3] In this study, we intend to fill this gap in the literature by, first, including measures of the all three important variables, competition, ownership, and governance in our analysis. We assess the relative importance of the three views on the efficiency debate and also examine their interactions. By including the interaction terms into our regression analysis, we are able to answer the question to what degree that the three views are substitutable or complementary. Second, we examine to see if private firms differ from SOEs in their corporate governance structure. In other words, we try to address the issue: do state enterprises suffer more from corporate governance problems than private firms? If they do, in what corporate governance mechanisms are SOEs lagging behind private firms?

We achieve our goal by utilizing a detailed World Bank survey data on 736 Chinese firms across seven sectors and five cities from 1996 to 2001. We construct measures of ownership type, corporate governance mechanisms, and market competition from the survey data and include all these measures in a Cobb-Douglas production function framework. In this framework, we are able to examine different impacts of ownership type, corporate governance, and market competition on the productivity of the Chinese firms. To further examine the robustness of our results, we also perform (1) similar analysis on a measure of labor productivity; (2) panel data analysis with fixed effects of both firm type and ownership type; and (3) instrument variables estimations of our regressions. The latter two analyses are used to control for possible endogeneity problem of ownership type and governance variables.

The rest of the paper is organized as follows. In section 2 we discuss the survey data in detail. We study the distribution of SOEs and other type of firms and their basic characteristics.

[3] There is some evidence in China from Groves, Hong, McMillan, and Naughton (1994) and Li (1997) that tying managerial rewards to firm performance, one of the main corporate governance mechanisms, improves productivity even under state ownership. Groves et al. (1995) also show that SOE managers can subject to labor market disciplines. Shirley and Nellis (1991), among others, find evidence that soft budget constraints are indeed associated with poor SOE performance.

We also define measures of ownership type, corporate governance, and market competition. In section 3 we present the empirical models used in the study. In section 4, we present and discuss the main empirical results. Finally, we conclude the paper with some discussion of the policy implications.

2. Data and Variables

The sample is based on a World Bank survey of enterprises in China which covers the period of 1996-2001 for 736 firms across five major cities and seven sectors.[4] The five cities are Beijing, Chongqing, Guangzhou, Shanghai and Wuhan, while the seven sectors include electronic equipment, electronic components, consumer products, vehicles and vehicle parts, garments and leather goods, general machinery and textile. As shown in Table 1, the surveyed firms are almost evenly distributed across the five major cities, but quite differently across sectors. The largest sample sector is drawn from the vehicles and vehicle parts sector with 242 firms, but the smallest textile sector has only 15 firms. Other sectors fall in between.[5]

The survey questionnaire is divided into two parts. The first part is completed by the accountant in each firm providing its basic information on ownership, assets, revenues, cost and labor force. Clearly, this part gives a relatively comprehensive assessment of the enterprise performance. The second part is designed for a face-to-face interview with the general manager to obtain the firm's information on management and operation structure as well as firm restructuring.

[4] The survey is conducted by China's National Bureau of Statistics in 2002.

[5] It should be mentioned that the distribution of surveyed firms across sectors is slightly imbalanced: the vehicle and vehicle parts sector has been well-presented while the textile sector is likely to be under-presented. This is partly due to our stringent requirement on the size of the firm (over 100 employees) as we are interested in the medium and large size firms.

We collect variables for competition, ownership and corporate governance as well as production and performance, and present their summary statistics in Table 2. We next will discuss these variables in detail.

Production and Performance Variables

Three variables – sales, employment and capital – are used as proxies for firm production; while two variables – the value-added and the value-added per employee deflated by industrial price indices created by Chinese Statistics Yearbook – are used as two measures of firm performance.[6]

Two facts stand out comparing statistics from SOEs and non-SOEs. First, the total sales variable indicates that on average the firm sales is 254 million RMB while the sale of SOEs is much lower than non-SOEs (176 million versus 291 million). The average employment level is 1,014 persons, but with on average more workers in SOEs than Non-SOEs (1382 versus 835), suggesting over-employment of labor in the SOE sector. In terms of capital, all firms are more or less equal.

Second, it is shown that the performance measures for non-SOEs are more than twice higher than those of SOEs, again suggesting that non-SOEs are more efficient in utilizing its labor force.

Competition Variables

Besides inserting the sector and city dummies in our regressions, we use two measures of competition. One is the number of competitors to firms' major business line perceived by firm

[6] Following the literature, we also tried other performance measures such as sales per employee and sales growth, but found SOEs with high sales partly due to the government support could have negative profit over the sample period. Thus the value-added related variables are better indicators for firm performance in our sample.

managers as a measure of competitive environment. This index alleviates the endogeneity problem of traditional competition variables and provides a useful alternative on competition level.[7] However, since this is a subjective assessment by mangers, it may be subject to errors. We notice that on average firm managers expect to have more than 80 competitors, with SOE managers perceive to have even more, 123, while the non-SOEs perceive much less, 60.

The second measure is the potential entry cost for a new player to compete with firms' major products perceived by managers. We expect a negative correlation between productivity and entry cost, since the higher the entry cost, the more difficult for new players enter the market, and consequently the less competitive the market is and the lower productivity the incumbents have.

Ownership Variables

Our survey data offers detailed ownership information, including firm's self-claimed ownership type and ownership shares. In particular, it provides information on changes in ownership structure and performance before- and after-reform for those firms (mainly SOEs) pursuing restructuring over the survey period. We use both the ownership type and ownership shares as proxies for firm ownership structure in the study.

As presented in Table 3, we classify the sample firms into two categories – SOE and non-SOE. SOEs are the firms that the state owns 100 percent shares before their restructuring. Out of the total 736 sample firms, 406 are SOEs while the rest 330 are non-SOEs. Among the SOE

[7] The data for firm own market share and manager perception of import penetration are also available in our survey. However, we think these two variables are problematic, since the former is seriously endogenous to the firm's performance and the latter is endogenous to the domestic firms' performance (Djankov and Murrell 2002).

group, 266 firms have been restructured and 140 firms have not done so.[8] Among the non-SOE group, we further divide them into 116 foreign involved firms including joint ventures and wholly foreign owned firms, and 214 private and cooperative firms. The balance among ownership categories facilitates comparison of enterprise performance across different ownership types.

Besides the ownership type, we also use the percentage of private-owned shares as an alternative proxy for ownership structure. Many empirical studies on China's enterprise reform find that the private-owned firms often perform better than state-owned firms;[9] however, there is little discussion on the relationship between the degree of privatization and enterprise performance. The detailed information on the private and state–owned shares in the survey allows us not only to examine the impact of private-owned shares in comparison with the state-owned shares, but also to test whether the size of private shares is associated with better enterprise performance. As shown in Table 2, the ratio of private-ownership shares in non-SOEs is nearly 70 percent, which is five times higher than that in SOEs in our sample. Together with the large standard deviation of the distribution of the private shares, the data enable us to conduct a thorough study on the ownership issue in China.

As alluded in the introduction, one of the main concerns in the literature is the potential endogeneity of ownership variables in the performance regression. To deal with this problem, we use age, debt/equity ratio, and size of the firm as potential instruments for the ownership variables following Anderson et. al. (2000). As expected, Table 2 documents that non-SOEs are

[8] It is possible that the ownership type of the restructured SOEs changed after their restructuring. In our sample, quite a few SOEs were restructured to become joint ventures or private and cooperative firms, while the others maintain the SOE status with the controlling state-owned shares. In this paper, we generally assign a firm two different ownership types splitting at the year of restructuring completion if it restructured over the surveyed period of 1996-2001.

[9] For example, see Lin and Zhu (2001), among others.

much younger than SOEs, with an average age of 10.45 and 27.6 years respectively; while the SOEs size estimated as the log value of sales is 9.78 much smaller than 12.58 of non-SOEs. The debt/equity ratio is also much lower for non-SOEs than that of SOEs, with 6.65 and 12.11 respectively. This is likely related to the soft budget constraint problem in SOEs.

Corporate Governance Variables

Good corporate governance is crucial to enterprise performance. We are able to construct corporate governance variables from four aspects: shareholder meeting, board of directors, transparency and managerial decision. Below, we discuss these four sub-indexes in detail.

Shareholder meeting and board of directors were introduced into China in recent years as a result of Chinese government's drive to modernize corporations' management systems. To assess their impact on enterprise performance in China, we construct a shareholder meeting index and a board of director index. More specifically, two questions are addressed in the shareholder meeting index: 1) Has a shareholder meeting been established? 2) Is the decision made with one-share-one-vote by the shareholder meeting? Four questions are used in the construction of the board of director index: 1) Does a firm have a board of directors? 2) Is the board of directors appointed by the shareholder meeting, or by the government, or by the firm but with the governmental approval? 3) Are the CEO and the chairman of the board two different individuals? 4) Are there more non-government members than government members in the board? We assign the value of 1 to each question if the answer is yes, and 0 otherwise. Accordingly, the highest values for these two indexes are 2 and 4 respectively. In our sample, the means of these two indexes, 0.45 and 1.79 respectively, are not quite high but the standard deviations, 0.75 and 1.64 respectively, are fairly large (Table 2). Comparing with non-SOE

group, SOEs have similar distribution of the shareholder meeting index but a significant lower value of board of director index.

To reflect the state of a firm's transparency, this paper uses the existence of external auditors as a proxy. The index takes 1 if a firm hires external auditors and 0 if not. It is shown in Table 2 that more than 85 percent of the sampled firms employ external auditors, and there is no significant difference between SOE and non-SOE groups.

Finally, we address the issue of a firm's autonomy when making decisions. In the past most Chinese firms were controlled by the government and had little flexibility in making hiring/firing decision and business operation. Thus the need for autonomy that enables firms to make labor and business decisions conditional to their profit maximization objective is particularly vital in the transition process from a centrally planned to a market economy. The survey asks the general manager of each firm two relevant questions: 1) In making major business decision, do you have to consult with municipal authorities? 2) In making hiring/firing decision, do you have to consult with local government or the labor bureau? The firm is identified as in full autonomy in managerial decision if answers to both questions are no and in partial autonomy there is only one negative answer. Accordingly, the value 2 is assigned to the managerial decision index if the firm is in full autonomy, the value 1 to a firm with partial autonomy, and 0 otherwise. Table 2 shows that non-SOEs have slightly higher autonomy than SOEs on average, and both groups have wide variation in value.

Summing up these four sub-indexes, we construct the corporate governance index. This aggregate index accordingly takes the value from 0 to 9. A firm with a higher value of the index is supposed to have a better corporate governance structure. It is observed that SOE group has a slightly lower value but higher standard deviation for the corporate governance index in

comparison with those of non-SOE group in the sample (Table 2). Therefore, there is some evidence that non-SOEs tend to have better corporate governance structure relative to SOEs as a whole.

The literature argues that a better corporate governance structure leads to higher productivity, and higher productivity in turn could help improve the corporate governance.[10] To alleviate this potential endogeneity problem, we use the size of the board of directors and non-state voting share in the shareholder meeting as instruments for the corporate governance index.[11] It is shown in Table 2 that non-SOEs have on average a larger board size than the SOEs, 5.20 versus 3.21 respectively. As expected, non-SOEs also have higher non-state voting share in their shareholder meetings.

3. Methodology

There are two standard approaches in the existing empirical studies on the effects of ownership, governance, and competition on firm productivity. The first directly estimates total factor productivity (TFP) within a production framework using competition, ownership, governance and others as explanatory variables.[12] The second examines the impact of ownership and other variables on a set of performance variables such as value-added, sales, profits, and employment.[13] Since it is unclear which approach is preferred, we pursue both in this paper.

Specifically, the empirical model from the first approach can be written as:

$$\ln Y_{it} = \alpha_0 + \alpha_1 \ln (K_{it}) + \alpha_2 \ln (L_{it}) + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it} , \qquad (1)$$

[10] For example, see Frydman, Gray, Hessel and Rapaczynski (1999).
[11] The selection of these two variables are inspired by Himmelberg, Hubbard and Palia (1999).
[12] For example, see Li (1997), Groves, Hong, McMillian, and Naughton (1994)
[13] For example, see Claessens, Djankov, and Pohl (1997), Frydman, Hessel, and Rapaczynski (1999).

where i is used to represent firm and t for time period. Y_{it} is the value-added of firm i at year t; K_{it} and L_{it}, respectively, are its corresponding capital stock and employment levels; X_{it} is a vector of measures of market competition, ownership, and corporate governance variables; and Z_{it} is a vector of control variables which, among others, include sector dummies as well as year dummies.

In the following empirical analysis, we use the number of potential competitors and the reverse of its entry cost (both in logarithmic) assessed by firm managers as two measures of competition. We use total share of private ownership as a measure of ownership and also use foreign ownership and private and cooperative ownership as separate ownership variables. For governance variable, we use an aggregate corporate governance index as well as disaggregated corporate governance mechanism variables such as board of director index, transparency index, managerial discretion index and shareholder meeting index. The sign and significance of variables represent the impact of market competition, firm ownership, and corporate governance on TFP of firms. We expect all coefficients to be positive.

The empirical model from the second approach is as follows:

$$y_{it} = \alpha + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it} , \qquad (2)$$

where i and t represent firm i and period t respectively. y_{it} is value-added divided by labor employment. In addition to sectorial and year dummy variables, we also include a proxy for firm size as a control variable.

In both regressions (1) and (2), we have also performed instrumental variable (IV) estimation as well as both firm-specific and ownership-type fixed effect within a panel data analysis. The instrumental variables for both ownership and corporate governance variables are

discussed in data and variable definition section. Firm specific fixed effect is to control potential endogeneity in the regressions due to unobserved firm characteristics. We also choose ownership-type as a fixed effect because we are concerned about the unique effects due to certain group of ownership-type. The detail will be left to the section on empirical results.

4. Empirical Results

4.1. TFP Regressions

In this sub-section, we first report the empirical results on the Cobb-Douglas production function regression equation (1).[14] In table 4, we report the OLS estimates of the production function with capital and labor as the two major inputs. We further take each of the competition, ownership structure, and corporate governance variables as additional explanatory variables of TFP. Since there are two competition variables, their corresponding models are labeled respectively as Models 1 and 2. Similarly, for the two ownership variables, regression models are referred to as Model 3 and 4. Model 5 corresponds to the regression equation with the four corporate governance indexes as explanatory variables.

The Table 4 regressions provide three key results on the validity of the three views. First, both the competition variables, the number of competitors for each firm and the reverse of its entry cost, do not enter significantly and only the variable for the number of competitors has expected positive sigh. This result indicates that competition, as measured by our analysis, does not affect a firm's TFP significantly. It seems to be inconsistent with the competition view but consistent with the mixed finding in some empirical literature for developing and transition

[14] We also included sectorial and city dummies to control for other sector-specific and city-specific factors and year dummies to control for possible macroeconomic and business cycle effects in the regressions. To save space, we suppressed the coefficients for the three dummy variables in the tables. This rule is applied to all late regressions unless specified.

economies.[15] However, it is our view that this result should be interpreted with caution. This does not necessarily mean that competition does not matter at all for a firm's TFP in China, but it only suggests that the relationship is weak during the survey years from 1996 to 2001. Moreover, in the following analysis, we further document that competition matters greatly in enhancing efficiency of SOEs in the presence of its insufficient internal governance and management.

Second, by contrast, both the ownership variables, private ownership share and its legal status, enter positively and significantly. This result is consistent with the ownership view that the lack of incentives in SOEs is a fundamental issue which is detrimental to their productivities. It also provides evidence for the Chinese government effort to alter the nature of the state nominated ownerships or to entirely privatize SOEs.

Third, the aggregate corporate governance variable enters positively and significantly, which lends support to the governance view. As for each governance mechanism, it is shown that all the coefficients for the managerial decision index, board of directors, and transparency index are positive and statistically significant at 1% level. The only exception in the corporate governance mechanisms is the shareholder meeting index, which has a negative and statistically significant coefficient. Although it requires further investigation, we suspect that the shareholder meeting is still superficial and not so effective in bringing positive changes in firm efficiency in China.

The above results suggest that when each of the three views is examined independently, the ownership and governance views seem to be consistent with the Chinese experience during the survey period of 1996 to 2001. Since each view emphasizes one aspect of the determinants in TFP, it would be interesting to see whether the above results still hold if we combine some or all

[15] See, for example, Djankov and Murrell (2002) for a survey of the evidence.

of these determinants. Moreover, we could also examine the interaction among these determinants. These investigations are reported in Table 5.

Models 1 and 2 combine competition and ownership in the Cobb-Douglas production function regression without and with their interaction term. Similarly, the pair of models 3 and 4 corresponds to the combination of competition and governance, while the pair of models 5 and 6 corresponds to the combination of ownership and governance. In models 7 and 8, we combine all three determinants in the regressions. Four observations are obtained. First, higher percentage of private shares and higher levels of corporate governance boost firms' productivity, while the competition variable still does not affect TFP significantly. This suggests that the ownership and governance views remain valid even when they are considered together. Second, the interaction term between competition and private shares enters negatively and significantly. This implies that more intense competition in product market is particularly positive for enhancing TFP in firms with lower percentages of private shares. In other words, product market competition and privatization are substitutable to a certain degree as more intense competition in product market result in less enhancement of TFP in firms with higher percentages of private shares. [16]Third, the interaction term between private shares and governance also enter negatively and significantly. It yields a similar interpretation. Finally, the interaction between competition and governance does not enter significantly. The interaction regressions indicate that both the ownership and governance views are incomplete in explaining the phenomenal growth in the Chinese experience. They only focus on one determinant in firms' productivities while ignoring other potentially important determinants. Our exercise points out that both are important so they

[16] The negative interaction term indicates that the effect of competition on TFP is small for firms with high private shares, but big for SOEs. It implies that competition disciplines the SOEs more than private firms. This may be consistent with the view that product market competition provides a substitute for internal governance and management for SOEs in improving its productivity.

should be jointly emphasized. Moreover, although both exert significantly positive effects on TFP, there are nevertheless some degree of substitutability between them. This result is novel in the empirical literature on Chinese economies.

4. 2. Value-Added per Employee Regressions

In this sub-section, we report similar regressions for a measure of labor productivity, value-added per employee, as in the regression equation (2). The results are shown in Table 6 which is the counterpart of Table 5. In these regressions, in addition to sectorial and year dummies, we include a control variable for size of the company (measured by the total capital of the firm). The results from Table 6 are broadly consistent with those from Table 5. It suggests that ownership structure and corporate governance also affect firms' labor productivities significantly. It should be noted that Table 6 also documents one different result: the interaction between competition and private shares enter negatively but no longer significantly. This indicates that the two determinants do not show some degree of substitutability as before.

4.3. Robustness Checking

We check the robustness of the results in Tables 5 and 6 in three ways. First, we test for the possibility of a correlation between sectorial (or city) growth rate and firm productivities. To do so, we replace sector dummies by a control variable for sectorial growth estimated as the mean of the sector sales growth rates to regression equations (1) and (2) and show the regression results in Model in Table 7 for Cobb-Douglas production function regressions and in Table 8 for performance regressions. Similarly, we substitute city dummies by city GDP growth rates and report the results in Model 2 of Table 7 and 8. The coefficients in these regressions are very

close to those in Model 7 in Tables 5 and 6. These growth controls do not change the central implication: both ownership and governance are vital for improving firm performance in China.

Second, we notice that one of the main concerns with the above results is that there is a potential endogeneity problem with ownership and/or governance variables. [17] That is, better performed firms may choose to have certain ownership type and corporate governance mechanisms. Or alternatively, there are some unobserved firm characteristics that affect both performance and ownership/governance variables. In order to address this endogeneity issue, we perform an instrumental variable analysis of the regression equations (1) and (2). Specifically, we use the variables firm age, debt/equity ratio, and size of the firm as potential instruments for the ownership variable, while the size of the board and non-state voting share in shareholder meetings as potential instruments for corporate governance variables. The results of the IV estimation are reported in Models 3 and 4 in Tables 7 and 8.[18] Except for the coefficient of private ownership share, which becomes insignificant but still positive, other coefficients are mainly consistent with those in Tables 5 and 6, suggesting our main conclusions from Model 1 are rather robust.

Third, we perform fixed effect analysis of regression equations (1) and (2). We assign fixed effect for ownership type and examine the impact of competition and corporate governance on firm productivity. In Model 5 in both tables, the aggregate governance index enters positively and significantly, while the competition variable is positive and marginally significant. In Model 6 when firm-specific fixed effect is controlled for, both the private ownership share and governance index are once again significant.

[17] Alternatively it is called selection bias or simultaneity problem in the privatization and enterprise restructuring literature (see, for example, an excellent survey on this issue in Djankov and Murrell (2002)).
[18] Some scholars argue that the ownership share structure in China is fairly stable once it formed, thus we re-ran the regression in Model 4 leaving out the endogeneity problem of the ownership and found the similar result as Model 3.

It should be mentioned that all models shown in Tables 7 and 8 have relatively good explanatory power as indicated by higher R^2. The relatively high R^2 for the first stage regression in the IV estimation also suggests that the chosen instrument variables for ownership and governance indexes are reasonable.

To sum up, our results suggest that both ownership structure and corporate governance are important to firm's productivity. Among the individual corporate governance mechanisms, the managerial decision index, and the board of directors index seem to be most important in affecting firm's TFP. Foreign ownership seems to matter more in explaining firm's TFP than private and cooperative ownership. The interaction terms are also similar as in previous regressions. By contrast, we fail to find the importance of competition on firm's productivity during the survey period of 1996 to 2001. As noted before and demonstrated in the following section, we need to be cautious in drawing the conclusion that competition matters less in firm's productivity in China.

5. Extensions

5.1. Comparison of SOEs and non-SOEs

In this subsection, we report Cobb-Douglas production function for SOEs and non-SOEs respectively.[19] The purpose of this analysis is to further compare and contrast the effect of competition and corporate governance on firms of different ownership type. It is important to understand if there is any difference in the effect of competition and corporate governance on firm's productivity as the findings can help us to further distinguish the channels of ownership, competition and corporate governance in their impact on firm performance.

[19] We also tried the value-added per employee function and obtained similar results.

Table 9 reports the Cobb-Douglas production function regressions of SOEs versus non-SOEs. A general comment should be made at this moment. We notice that there is a slightly higher coefficient for capital in non-SOEs than SOEs, suggesting that SOEs may not be so efficient in utilizing their capital stock. The R^2 for all regressions are again very high. To save space, we also suppress the report of coefficients for sectorial dummies and year dummies.

There are several interesting observations that we can draw from Table 9. First, all coefficients for the competition variable in the SOE regression are positive and highly significant, while the same coefficients in the non-SOE regressions are negative but not significant. This finding suggests that competition matters greatly for SOEs. This may be due to the fact that an SOE, because of its internal governance and management problems, needs more pressure from the market in order to improve its productivity. While for non-SOEs, the distinguish features of property rights of the firms may be enough pressure for them to pay attention to their productivity. This result is consistent with our earlier finding that the interaction term of competition and ownership enters negatively and significantly in our regressions. Second, although the coefficients for the corporate governance index are all significant in both regressions, the coefficient in the SOE regression is substantially higher than that in the non-SOE regression. Indeed, the difference is as high as 2.4 and 1.4 times. This finding suggests that in SOEs, corporate governance seems to matter more than those in non-SOEs. Third, in Model 1 for both types of firms, we find that both managerial decision indexes are positive and highly significant in the production function regressions. However, the coefficient in the SOE regression is more than 3 times higher than that in non-SOE regression. This highlights the importance of granting managerial discretion in both types of firms, especially in SOEs. Fourth, the board of director index is positive in both regressions but only significant in non-SOE

regression. This may suggest that the board plays an important role in the governance of non-SOEs but fails to function well in SOEs. Fifth, the shareholder meeting index is positive and highly significant in the SOE regression but negative and highly significant in the non-SOE regression. This finding is somewhat puzzling. It may suggest that in non-SOEs, shareholder meetings are not yet effective as a corporate governance mechanism.

5.2. Regression Results across Sectors

Since our survey expands seven distinct sectors, it is rather likely that in each sector, competition, ownership and governance affect firms' productivities in significantly different ways. We investigate this possibility in this sub-section and present the results in Table 10.[20]

Three findings are in order. First, for the competition variable, it is found that only two of the seven sectors enter positively and significantly. Moreover, it is surprising that for the sector of garment and leather goods, competition affects productivities negatively and marginally significant. It may suggest that this sector has experienced over-competition in recent years. In short, even within a certain sector, competition is still less important in firm performance in China.

Second, for the ownership variable, we obtain a slightly surprising result: ownership matters in only two sectors, garment and leather goods as well as general machinery. This result implies that except for these two sectors, other sectors already have high percentages of private shares (see Table 3). Therefore, it is natural that ownership is vital for these two sectors.

Third, for the governance variable, five of seven sectors show significant impact. Once again, this result suggests that improving the governance structure in Chinese firms will boost

[20] Again we tried the value-added per employee function for each sectors in this part and for each city in the next part and obtained very similar results as those from the Cobb-Douglas function.

their productivities. It is interesting to note that the two sectors in which governance matters less are garment and leather goods as well as general machinery. However, ownership matters greatly in these two sectors. This interesting finding shows that there is a strong substitutability between ownership and governance in these two sectors.

5.3. Regression Results across Cities

In the final extension, we realize that although the five cities are major cities in China, firms may show different behavior given the geographical difference. Hence, it would be more informative if firms in each city are examined independently. Table 11 presents the result of this segmentation of cities.

Again, we organize our findings in the following order. First, for the competition variable, we find that except in Wuhan, firms in other four cities do not show significant impact from more intense competition. This result may make sense that in the five cities, Wuhan is one of the cities with larger body of SOEs (see Table 3), and therefore introducing market competition will change the incentive systems in these firms and alter managerial behavior (see, e.g., Lin, Cai and Li (1998)).

Second, for the ownership variable, the result is quite mixed: ownership matters in two cities, Beijing and Guangzhou, while it does not in other three cities, Chongqing, Shanghai and Wuhan. Third, for the governance variable, firms in all of the five cities show significant impact. Combining these two results, we reconfirm the major conclusion in this paper: both ownership and governance are important for Chinese firms, with the latter relatively more important.

6. Conclusion

This paper employs a new data set on the ownership of 736 firms across five major cities in China and assesses three different views on the efficiency of state-owned versus privately-owned firms: competition, ownership and governance. First, we examine each view independently. On the competition view, we find mixed results. We find that during the period of 1996 to 2001, the general relationship between the intensity of competition and a firm's performance is weak. However, in the sub-sample of SOEs, we find competition still matters in enhancing SOE's productivity. On the ownership view, we find that private ownership share and its legal status affect a firm's performance positively and significantly. This finding is consistent with the ownership view that the lack of incentives in SOEs is a fundamental issue and changing the nature of ownership is beneficial to the firm. On the governance view, we find that 1) a more independent and effective board of directors boosts a firm's valuation; 2) more independent and professional managerial decisions significantly improve the firm's performance; 3) a more transparent firm in disclosing its relevant information is usually associated with better performance and higher valuation; and 4) shareholders' meeting is rather ineffective in Chinese firms. The governance index, which is constructed from the above four mechanisms, show a consistent positive impact on firm's productivities.

Then, we examined the three views jointly. It is found that 1) the ownership and governance views remain valid even when they are considered together; 2) the negative and significant interaction term between competition and private shares suggests that there exists some degree of substitutability between them; 3) substitutability also exists between ownership and governance; and 4) substitutability does not seem to exist between competition and governance. These new results suggest that although each of the ownership and governance

views is essential in explaining the phenomenal growth in the Chinese experience, they are nevertheless incomplete in that each only focuses on one determinant in a firm's performance while ignoring other potentially more important determinants. In other words, both are important and thus they should be jointly emphasized.

Finally, we examine the potential different effect of competition and corporate governance on the productivities of SOEs and non-SOEs. We find some advantage of corporate governance structure in terms of board and managerial incentives of non SOEs. We further document that product market competition still matters greatly in improving productivities of SOEs.

Our results are robust to an array of checks, including the controls for various sectorial and city specific characteristics, the use of different measures of performance, the controls for potential endogeneity problem, and analysis of sectorial and city sub-samples. The public policy implication of this research is obvious. Unlike the ownership proponents who favor only privatization and the governance proponents who favor only improving the governance structure, we believe that both increasing private shares and improving the governance structure are necessary in enhancing productivities and valuations for Chinese firms, in particular SOEs. Future reforms should be directed simultaneously towards these two aspects, and any attempt to lean towards one aspect would undoubtedly lead to unfavorable consequences.

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Table 1. Firm Distribution across Cities and Sectors

	Total	Beijing	Chongqing	Guangzhou	Shanghai	Wuhan
	736	136	150	145	150	155
Electronic Equipment	142	25	12	33	33	39
Electronic Components	157	36	22	35	33	31
Consumer Products	45	4	4	18	14	5
Vehicles & Vehicle Parts	242	41	82	29	40	50
Garment & Leather Goods	88	23	8	19	29	9
General Machinery	47	7	14	11	1	14
Textile	15	0	8	0	0	7

Table 2. Summary Statistics

			All Firms			SOEs			Non SOEs		
Category	**Variable**	**Unit**	**Obs.**	**Mean**	**SD.**	**Obs.**	**Mean**	**SD.**	**Obs.**	**Mean**	**SD.**
Production	Sales	1000 RMB	4414	254002.1	1235592	1446	17684	532584	2968	291607.9	1458860
	Employment	workers	4410	1014.68	1948.74	1445	1382.76	2555.97	2965	835.31	1538.83
	Capital	1000 RMB	4123	107243.8	448610.7	1349	109955.4	334683.5	2774	105925.1	494670.7
Performance	Value-Added	1000RMB	4413	60840.2	325636.9	1445	40683.2	117656.9	2968	70653.8	387390.1
	Value-Added per Employee	1000 RMB	4232	62.27	230.32	1422	34.51	68.38	2810	76.33	277.39
Competition	Competitor	Firms	4416	81.0	450.0	1446	123.6	679.70	2970	60.28	273.69
	Entry Cost	1000 RMB	4356	329936.8	2133591	1424	528734	3548920	2932	233385.8	787746.2
Ownership	Private-Ownership Share	Percentage	4413	49.41	44.05	1446	13.15	26.83	2967	67.09	39.78
Corporate Governance	Corporate Governance Index	Dummy (0-9)	4416	3.82	2.79	1446	3.52	3.09	2970	3.98	2.62
	Shareholder Meeting Index	Dummy (0-2)	4416	0.45	0.75	1446	0.47	0.79	2970	0.45	0.73
	Board of Director Index	Dummy (0-4)	4416	1.79	1.64	1446	1.49	1.67	2970	1.93	1.61
	Transparency Index	Dummy (0-1)	4416	0.86	0.34	1446	0.87	0.33	2970	0.87	0.35
	Managerial Decision Index	Dummy (0-2)	4416	0.72	0.88	1446	0.69	0.89	2970	0.74	0.89
Potential Determinants	Age	Years	4416	16.07	18.05	1446	27.6	21.93	2970	10.45	12.42
of Ownership	Debt/Equity Ratio	Percentage	2673	8.27	58.24	797	12.11	77.33	1876	6.65	47.81
	Size of the Firm (ln(Sales))	Log Value	4414	12.45	14.03	1446	9.78	13.19	2968	12.58	14.19
Potential Determinants	Size of Board of Director	Persons	4416	4.55	3.68	1446	3.21	3.91	2970	5.20	3.38
of Corporate Governance	Non-State Voting Share in Shareholder meeting	Percentage	4416	18.47	33.43	1446	8.20	21.05	2970	23.46	37.01

Table 3. Firm Distribution across Ownership Structure

		SOEs			Non SOEs			
	Total	Sub-Total	Restructured Firms	Not - Restructured Firms	Sub-Total	Joint Ventures	Wholly Foreign Owned Firms	Private/Cooperative Firms
	736	406	266	140	330	94	22	214
across city:								
Beijing	136	71	37	34	65	25	4	36
Chongqing	150	68	43	25	82	19	0	63
Guangzhou	145	58	35	23	87	25	10	52
Shanghai	150	104	80	24	46	12	8	26
Wuhan	155	105	71	34	50	13	0	37
across sector:								
Electronic Equipment	142	67	46	21	75	21	15	39
Electronic Components	157	77	47	30	80	28	4	48
Consumer Products	45	21	19	2	24	5	2	17
Vehicles & Vehicle Parts	242	128	72	56	114	27	0	87
Garment & Leather Goods	88	56	43	13	32	12	1	19
General Machinery	47	43	29	14	4	1	0	3
Textile	15	14	10	4	1	0	0	1

Table 4. Cobb-Douglas Production Function Regressions

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
ln (Capital)	0.3712***	0.2914***	0.3864***	0.3393***	0.3516***	0.3403***
	(0.018)	(0.0199)	(0.017)	(0.017)	(0.017)	(0.017)
ln (Employment)	0.5494***	0.5127***	0.5570***	0.5938***	0.5579***	0.5657***
	(0.026)	(0.026)	(0.026)	(0.025)	(0.026)	(0.025)
Competition:						
ln (the number of competitors)	0.0112					
	(0.013)					
ln (1/entry cost)		-0.1553				
		(0.0159)				
Ownership Structure:						
Ownership Shares: Private-Ownership Share (%)			0.0034***			
			(0.001)			
Legal Status: Foreign Involved Firms				0.6719***		
				(0.057)		
Private and Cooperative Firms				0.1699***		
				(0.046)		
Corporate Governance Index (0-9)					0.0913***	
					(0.007)	
Managerial Decision Index (0-2)						0.1371***
						(0.028)
Board of Director Index (0-4)						0.1421***
						(0.018)
Transparency Index (0-1)						0.1028***
						(0.05)
Shareholder Meeting Index (0-2)						-0.094***
						(0.034)
Constant	2.2529***	1.5033***	1.9232***	2.0524***	2.2325***	2.259**
	(0.162)	(0.149)	(0.160)	(0.155)	(0.145)	(0.146)
Number of Observations	3489	3538	3624	3627	3627	3627
Adjusted R Square	0.549	0.566	0.557	0.570	0.571	0.575

Table 5. Cobb-Douglas Production Function Regressions
(The Combined Effect of Corporate Governance, Ownership and Competition Effects on Labor Productivity)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
ln (Capital)	0.3777***	0.3787***	0.3431***	0.3421***	0.3572***	0.3597***	0.3483***	0.3525***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.017)	(0.018)	(0.018)
ln (Employment)	0.5737***	0.5728***	0.5782***	0.5791***	0.5702***	0.5699***	0.5881***	0.5862***
	(0.027)	(0.027)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)	(0.026)
Competition	-0.0041	0.0468	0.0115	0.0294			0.0139	0.0726***
	(0.013)	(0.021)	(0.013)	(0.020)			(0.013)	(0.023)
Private-Ownership Share (%)	0.0032***	0.0057***			0.0019***	0.0036***	0.0016***	0.0068***
	(0.001)	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
Corporate Governance Index (0-9)			0.0928***	0.1058***	0.0834***	0.1065***	0.0860***	0.1059***
			(0.007)	(0.013)	(0.007)	(0.011)	(0.008)	(0.015)
Interactive Effects								
Competition*Private Share		-0.001***						-0.0013***
		(0.0003)						(0.0003)
Competition*Corporate Governance				-0.0050				0.0021
				(0.004)				(0.004)
Private Share*Corporate Governance						-0.0005***		-0.0006***
						(0.002)		(0.001)
Constant	1.9241***	1.7882***	2.1510***	2.1043***	2.0553***	1.9623***	1.9984***	1.7456***
	(0.172)	(0.178)	(0.157)	(0.162)	(0.156)	(0.159)	(0.167)	(0.178)
Number of Observations	3486	3486	3489	3489	3624	3624	3486	3486
Adjusted R Square	0.554	0.555	0.569	0.569	0.572	0.5730	0.569	0.5721

Table 6. Performance Regressions
(The Combined Effect of Corporate Governance, Ownership and Competition Effects on Value Added per Employee)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Competition	-0.0123	0.0356	0.0039	0.0332			0.0075	0.0729***
	(0.014)	(0.022)	(0.014)	(0.020)			(0.014)	(0.024)
Private-Ownership Share (%)	0.0045***	0.0069***			0.0031***	0.0048***	0.0027***	0.0075***
	(0.001)	(0.001)			(0.001)	(0.001)	(0.001)	(0.001)
Corporate Governance Index (0-9)			0.1048***	0.1259***	0.0900***	0.1127***	0.0928***	0.1206***
			(0.007)	(0.014)	(0.008)	(0.011)	(0.008)	(0.016)
Size of the firm	0.2063***	0.2070***	0.1647***	0.1637***	0.1817***	0.1842***	0.1808***	0.1835***
	(0.014)	(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.014)
Interactive Effects								
Competition*Private Share		-0.0009***						-0.0011***
		(0.000)						(0.000)
Competition*Corporate Governance				-0.0081*				-0.0017
				(0.004)				(0.005)
Private Share*Corporate Governance						-0.0005***		-0.0005***
						(0.000)		(0.000)
Constant	0.8655***	0.7358***	1.2103***	1.1375***	1.0066***	0.9148***	0.9844***	0.7191***
	(0.169)	(0.176)	(0.157)	(0.160)	(0.153)	(0.157)	(0.165)	(0.176)
Number of Observations	3486	3486	3489	3489	3624	3624	3486	3486
Adjusted R Square	0.2093	0.211	0.2334	0.2339	0.2358	0.2377	0.239	0.2431

Table 7. Robustness Checking for Cobb-Douglas Production Function Regressions

	Model 1 Controlling sector sales growth	**Model 2** Controlling city GDP growth	**Model 3** 3SLS	**Model 4** 3SLS	**Model 5** Fixed Effect (ownership-specific)	**Model 6** Fixed Effect (firm-specific)
ln (Capital)	0.3644***	0.3805***	0.4789***	0.3259***	0.3086***	0.2767***
	(0.018)	(0.018)	(0.030)	(0.017)	(0.016)	(0.024)
ln (Employment)	0.5444***	0.6105***	0.5960***	0.5831***	0.6248***	0.8436***
	(0.026)	(0.026)	(0.042)	(0.026)	(0.024)	(0.039)
Competition	0.0194	0.0627***	0.8363***	0.1376***	0.0736***	
	(0.023)	(0.024)	(0.086)	(0.045)	(0.025)	
Private-Ownership Share (%)	0.0060***	0.0071***	0.0868***	0.0071***		0.0063**
	(0.001)	(0.001)	(0.007)	(0.001)		(0.003)
Corporate Governance Index (0-9)	0.0980***	0.1077***	0.2082***	0.2483***	0.0616***	0.0370*
	(0.016)	(0.016)	(0.079)	(0.053)	(0.019)	(0.022)
Interactive Effects						
Competition*Private Share	-0.0008***	-0.0014***	-0.0187***	-0.0011***	-0.0006***	-0.0006
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)
Competition*Corporate Governance	0.0017	0.0052	0.0769***	-0.0159	-0.0039	-0.0021
	(0.005)	(0.004)	(0.023)	(0.013)	(0.005)	(0.007)
Private Share*Corporate Governance	-0.0005***	-0.0006***	-0.0062***	-0.0009***	0.0001	-0.0003
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	2.0093***	1.1303***	-2.9716***	1.4873***	2.2552***	1.1864***
	(0.171)	(0.211)	(0.487)	(0.215)	(0.161)	(0.290)
Number of Observations	3486	3486	2235	3486	3486	3486
Adjusted R Square	0.5548	0.5473	0.1698	0.5526	within = 0.5532 between = 0.5859 overall = 0.5584	within = 0.2421 between = 0.5175 overall = 0.4898
The First Stage Regression						
Corporate Governance Index						
Adjusted R Square			0.4591	0.4617		
Private-Ownership Share						
Adjusted R Square			0.1624			
sigma_u					0.3508	1.1205
sigma_e					1.1191	0.6488
rho					0.0895	0.7489

Table 8. Robustness Checking for Performance Regressions

	Model 1 Controlling sector sales growth	**Model 2** Controlling city GDP growth	**Model 3** 3SLS	**Model 4** 3SLS	**Model 5** Fixed Effect (ownership-specific)	**Model 6** Fixed Effect (firm-specific)
Competition	0.0162	0.0659***	0.8257***	0.1430***	0.0778***	
	(0.023)	(0.024)	(0.090)	(0.047)	(0.026)	
Private-Ownership Share (%)	0.0067***	0.0075***	0.0888***	0.0077***		0.0063**
	(0.001)	(0.001)	(0.008)	(0.001)		(0.003)
Corporate Governance Index (0-9)	0.1124***	0.1236***	0.2105**	0.2681***	0.0716***	0.0425*
	(0.016)	(0.016)	(0.083)	(0.055)	(0.020)	(0.022)
Size of the Firm	0.1718***	0.2170***	0.3236***	0.1560***	0.1500***	0.2420***
	(0.014)	(0.014)	(0.026)	(0.014)	(0.012)	(0.023)
Interactive Effects						
Competition*Private Share	-0.0006**	-0.0012***	-0.0185***	-0.0010**	-0.0005**	-0.0005
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.001)
Competition*Corporate Governance	-0.0025	0.0009	0.0743***	-0.0216	-0.0076	-0.0023
	(0.005)	(0.005)	(0.024)	(0.014)	(0.005)	(0.007)
Private Share*Corporate Governance	-0.0004**	-0.0006***	-0.0062***	-0.0009***	0.0001	-0.0004
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.9662***	0.0716	-4.0412***	0.4421**	1.4026***	0.5412**
	(0.172)	(0.215)	(0.492)	(0.207)	(0.156)	(0.241)
Number of Observations	3486	3486	2235	3486	3486	3486
Adjusted R Square	0.1995	0.2083	-0.5526	0.2117	within = 0.1641	within = 0.0486
					between = 0.8628	between = 0.128
					overall = 0.2189	overall = 0.1135
The First Stage Regression						
Corporate Governance Index						
Adjusted R Square			0.4591	0.4617		
Private-Ownership Share						
Adjusted R Square			0.1625			
sigma_u					0.415	1.159
sigma_e					1.156	0.650
rho					0.114	0.761

Table 9. Cobb-Douglas Production Function Regressions: SOEs vs. Non-SOEs

	SOEs			Non SOEs		
	Model 1 OLS	**Model 2** OLS	**Model 3** 3SLS	**Model 4** OLS	**Model 5** OLS	**Model 6** 3SLS
ln (Capital)	0.2153***	0.2324***	0.2322***	0.3582***	0.3775***	0.3686***
	(0.035)	(0.035)	(0.032)	(0.020)	(0.021)	(0.021)
ln (Employment)	0.6861***	0.6716***	0.6639***	0.5999***	0.5832***	0.5729***
	(0.051)	(0.051)	(0.049)	(0.031)	(0.031)	(0.030)
Competition	0.0722***	0.0642*	0.0656	-0.0003	0.0186	0.0151
	(0.025)	(0.033)	(0.048)	(0.015)	(0.025)	(0.082)
Corporate Governance Index (0-9)		0.1337***	0.1398***		0.0709***	0.1128
		(0.022)	(0.039)		(0.017)	(0.069)
Managerial Decision Index (0-2)	0.3235***			0.1036***		
	(0.095)			(0.031)		
Board of Director Index (0-4)	0.0118			0.1341***		
	(0.052)			(0.021)		
Transparency Index (0-1)	0.0867			0.0652		
	(0.087)			(0.059)		
Shareholder Meeting Index (0-2)	0.2264***			-0.1880***		
	(0.068)			(0.040)		
Interactive Effects						
Competition*Private Share						
Competition*Corporate Governance		0.0005	0.0002		-0.0058	-0.0052
		(0.008)	(0.013)		(0.005)	(0.020)
Private Share*Corporate Governance						
Constant	2.5087***	2.3859***	2.4283***	1.9047***	1.8339***	1.7854***
	(0.306)	(0.289)	(0.293)	(0.192)	(0.198)	(0.280)
Number of Observations	1170	1170	1170	2319	2319	2319
Adjusted R Square	0.5136	0.5091	0.509	0.6178	0.6102	0.6055
The First Stage Regression						
Corporate Governance Index						
Adjusted R Square			0.7898			0.3055

Table 10. Cobb-Douglas Production Regression across 7 Sectors

	Sectors						
	Electronic Equipment	**Electronic Components**	**Consumer Products**	**Vehicles & Vehicle Parts**	**Garment & Leather Goods**	**General Machinery**	**Textile**
ln (Capital)	0.5074***	0.3542***	0.2242***	0.3173***	0.1073***	0.5612***	0.2066
	(0.041)	(0.041)	(0.054)	(0.029)	(0.039)	(0.083)	(0.143)
ln (Employment)	0.3701***	0.5126***	0.8443***	0.6120***	0.8127***	0.5182***	0.9547***
	(0.078)	(0.056)	(0.133)	(0.043)	(0.065)	(0.104)	(0.228)
Competition	0.2095*	0.1069**	-0.0513	0.1843***	-0.0009	-0.0861	0.1389
	(0.111)	(0.052)	(0.259)	(0.057)	(0.041)	(0.081)	(0.243)
Private-Ownership Share (%)	0.0190***	0.0076***	0.0023	0.0093***	0.0050*	0.0071	-0.0679
	(0.005)	(0.003)	(0.008)	(0.002)	(0.003)	(0.004)	(0.043)
Corporate Governance Index	0.1401**	0.1583***	-0.075	0.1019***	0.0289	-0.0225	0.1973
	(0.062)	(0.034)	(0.109)	(0.030)	(0.030)	(0.040)	(0.150)
Interactive Effects							
Competition*Private Share	-0.0027**	-0.0017***	-0.0019	-0.0034***	-0.0003	0.001	-0.0120**
	(0.001)	(0.001)	(0.002)	(0.001)	(0.000)	(0.001)	(0.005)
Competition*Corporate Governance	0.0042	-0.0062	0.0805**	0.0198*	-0.0104	0.0269*	-0.0289
	(0.018)	(0.006)	(0.033)	(0.011)	(0.008)	(0.014)	(0.034)
Private Share*Corporate Governance	-0.0025***	-0.0006	0.0002	-0.0006**	0.0006	-0.0005	0.0150*
	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.008)
Constant	1.5564***	1.7024***	2.1855*	1.5021***	2.9737***	-0.0889	-1.4423
	(0.557)	(0.410)	(1.142)	(0.293)	(0.376)	(0.628)	(1.704)
Number of Observations	594	728	174	1220	443	245	82
Adjusted R Square	0.4953	0.5882	0.746	0.6442	0.579	0.6475	0.8348

Table 11. Cobb-Douglas Production Regression across 5 Cities

	Cities				
	Beijing	**Chongqing**	**Guangzhou**	**Shanghai**	**Wuhan**
ln (Capital)	0.1120***	0.3156***	0.3961***	0.4299***	0.3672***
	(0.042)	(0.034)	(0.043)	(0.029)	(0.043)
ln (Employment)	0.7197***	0.6694***	0.5669***	0.7133***	0.4752***
	(0.070)	(0.052)	(0.059)	(0.047)	(0.062)
Competition	0.1131**	0.0907	-0.0337	0.0468	0.1566***
	(0.047)	(0.061)	(0.051)	(0.050)	(0.054)
Private-Ownership Share (%)	0.0088***	0.0003	0.0126***	0.0005	0.0189***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
Corporate Governance Index	0.1144***	0.1451***	0.0611	0.2410***	0.0632
	(0.032)	(0.030)	(0.040)	(0.035)	(0.040)
Interactive Effects					
Competition*Private Share	-0.0022***	0.0004	-0.0016**	0.0032***	-0.0049***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Competition*Corporate Governance	-0.0186**	-0.0268***	0.0349***	-0.0389***	0.0481***
	(0.008)	(0.009)	(0.010)	(0.011)	(0.012)
Private Share*Corporate Governance	0.0001	0.0002	-0.0015***	-0.0016***	-0.0019***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.9454***	1.3517***	1.9138***	0.4778	1.6235***
	(0.380)	(0.334)	(0.467)	(0.357)	(0.368)
Number of Observations	609	799	492	790	796
Adjusted R Square	0.5032	0.6681	0.5889	0.6531	0.4394