The Road to Capitalism: Competition and Institutional Change in China[1]

Shaomin Li and Shuhe Li

City University of Hong Kong, Kowloon, Hong Kong, China,

E-mail: efshuhe@cityu.edu.hk

and

Weiying Zhang

Peking University, Beijing, China

Li, Shaomin, Li, Shuhe, and Zhang, Weiying—The Road to Capitalism: Competition and Institutional Change in China

We develop a theory of institutional change and apply it to analyze China's transition toward capitalism. We focus on how product market competition induces institutional change through the interaction between bureaucrats and managers in regional government-controlled economies. When cross-regional competition is sufficiently intense, each region has to cut production costs. Given that the efforts of managers are not verifiable, local governments may have to grant total or partial residual shares to the managers. In general, intense product competition stimulates the rise of a private property system. We submit our theory to a vigorous empirical test using China's industrial census data of more than 400,000 firms. The test supports strongly our postulation that cross-regional competition is the driving force behind China's transition toward capitalism. *J. Comp. Econ.,* June 2000, **28**(2), pp. 269–292. City University of Hong Kong, Kowloon, Hong Kong; and Peking University, Beijing, China.   © 2000 Academic Press

Key Words: China; interregional competition; institutional change; privatization.

Journal of Economic Literature Classification Numbers: D23, H70, L13, P21.

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1. INTRODUCTION

Institutional arrangements, particularly property rights, are central to incentives and hence to economic performance. Under the condition that information about individual attributes and actions is largely decentralized, most economists agree that private ownership is the most high-powered incentive instrument. This view is supported by the fact that more than twenty former socialist economies, with about one-third of the world population, are trying to undergo the transition to capitalism.[2] Yet our knowledge of institutional change is limited. How do institutions change? What factors drive efficient institutional change? In particular, what are the driving forces behind the transition from government to private ownership? These questions provide both unprecedented challenges as well as opportunities for economists to study institutional change.

Among the transition economies, the Chinese case is particularly intriguing. When Deng Xiaoping and his comrades began the reform in 1978, no one, including Deng himself, expected to witness a nearly double-digit annual growth rate in the subsequent two decades and the rise of a predominant non-state sector. China's phenomenal performance is cited by some economists as an example of why privatization is not a necessary precondition for efficiency because the high growth rate in China has occurred under the dominance of public ownership (e.g., Stiglitz, 1994). Some argue that the success of township and village enterprises (TVEs), which are a form of collective ownership, challenges standard property rights theory (Weitzman and Xu, 1994; Li, 1996). However, the Chinese experience is not consistent with these arguments. In the last two decades, especially since the early 1990's, both state-owned enterprises (SOEs) and TVEs have been increasingly privatized and most newly established firms are private enterprises. In 1978, nearly four-fifths of the total industrial output in China came from SOEs. By 1997, the SOEs' share had shrunk to slightly more than a quarter (Statistical Survey of China, 1998, p. 99). The major players behind the rise of a private ownership system are local governments at various levels (China Reform Foundation, 1997; Cao et al., 1999).

Interestingly, the Chinese economic reform began with decentralization, rather than with the development of a private ownership system, and with revitalization, rather than privatization, of state firms. What are the driving forces behind the unintended and accelerating rise of a private ownership system in China? What motivates local governments to privatize the enterprises under their control and to issue licenses to newly established private firms?

The work of North (1990) and Weingast (1995) provides some hints about answers to these questions. North (1990) maintains that institutions are the rules

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[2] "Capitalism," according to *Webster's Collegiate Dictionary* (ninth edition), is "an economic system characterized by private or corporate ownership of capital goods, by investments that are determined by private decision rather than by state control, and by prices, production and the distribution of goods that are determined mainly by competition in a free market."

of the game, while organizations are the players, and competition among organizations is the key to institutional change. Weingast (1995), and Qian and Weingast (1997) propose that market-preserving federalism provides a good political foundation for economic development. They argue that cross-regional competition played a central role not only in the rise of England's economic power in the eighteenth century and that of the United States in the nineteenth century but also in the rise of the Chinese economy during the last two decades. More recently, Cao et al. (1999) argue that federalism, Chinese style, has induced privatization, Chinese style. However, one issue these authors do not address, at least not formally, is how cross-regional competition stimulates the rise of a private ownership system. It is not clear whether it is in the interest of local bureaucrats to privatize. Although privatization generally makes the pie that they share with firm managers and others bigger, it also decreases the relative shares of the local bureaucrats.

We develop a theory of institutional change for transition economies by characterizing it as the rise of a private ownership system. We then apply our theory to explain China's road to capitalism. We argue that the rise of the private ownership system consists of two essential components, the privatization of existing SOEs and collective-owned enterprises (COEs) and the establishment of new private firms.

For ease of exposition, we focus on how cross-regional competition in the product market triggers privatization of SOEs and COEs. However, the same logic can be applied to analyze how cross-regional competition induces the establishment of new private enterprises. In our paper, firm ownership is defined by residual claimancy.[3] Privatization is the process of shifting residual claims from the government to managers. In our model, there are two local governments and two enterprises or firms. The enterprises were formerly owned by the central government. At the initial stage of reform, the central government gave the enterprises to the local governments, with each local government owning one enterprise. After the localization, the central government still maintains the authority to set tax rates as well as to retain a share of the tax revenue, but the local government obtains the residual claim on after-tax profits and also has the right to decide whether or not to shift residual claims to management. In other words, the local government has the autonomy to decide whether or not to privatize. To simplify our analysis, we assume that the manager has all the control rights over the firm's business, except for the rights of taxation and privatization. We further assume that the manager's residual claim rights are well

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[3] Traditionally, ownership is defined by residual rights. Grossman and Hart (1986) define ownership as control rights over assets. Economists recognize that both residual claims and control rights are indispensable to ownership. Here we omit control rights not because they are irrelevant but for technical tractability. Nevertheless, we conjecture that our results apply to control rights as well.

preserved in privatized firms. Thus, when the manager holds all residual claim rights to the firm, he is the de facto owner of the firm, enjoying both residual control rights and residual claim rights.

The two firms play a Bertrand–Nash price game in markets with differentiated products. The production cost is determined by the manager's non-verifiable effort. The local government is concerned with its own total revenue, i.e., the sum of its share of tax revenues and any profit remittance, which depends on its market share and the profit margin. We show that, when competition is sufficiently intense in the product market, the local government will be induced to shift the residual claims to the manager. The reasoning for this is inductive. As the product market becomes more competitive, the market share, and therefore the profits, is more sensitive to production costs. In order to maintain a minimum market share for survival, the manager must be motivated to work harder. Given that verification of the manager's effort is impossible, privatization is the only effective means by which the local government can motivate the manager. In contrast, if the central government sets the after-tax residual share or if two local governments collude perfectly to maximize their joint revenue, public ownership may prevail. We find that efficiency generally improves as a consequence of privatization.

Our theory offers an explanation for the ongoing process of privatization and the establishment of new private firms in China. We show that this process is a consequence of cross-regional competition, which has followed the decentralization policy introduced at the early stage of reform. More generally, the relevance of our theory extends beyond China and former socialist economies. According to a World Bank report, the output of SOEs accounts for a large share of GDP in many countries, including not only transition economies but also developing economies and even industrial economies (World Bank, 1995). However, across countries and across time, SOEs are poor performers. In the past decade, privatization of SOEs has taken place not only in socialist and developing economies but also in developed economies. We conjecture that the intensifying cross-country competition resulting from globalization has been, and will continue to be, one of the most fundamental driving forces behind the worldwide movement toward privatization and the transition to capitalism.

2. THE MODEL: COMPETITION AND PRIVATIZATION

Consider a multi-stage game of two firms and two local governments. The two firms were originally owned by the central government. At stage 0, the central government delegated ownership to local governments; firm i is controlled by local government i and run directly by manager i for $i = 1, 2$. The central government still maintains authority to set the profit tax rate $(1 - \tau)$, where $0 < \tau < 1$. The local government's share of tax revenue is ρ, where $0 < \rho < 1$. These

parameters are the same for both regions. At stage 1, given $(1 - \tau)$ and ρ, local government i determines the manager's after-tax profit retention rate $\beta_i \in [0, 1]$ in institutional competition; that is, it decides whether or not to privatize firm i. At stage 2, given $(1 - \tau)$ and ρ, β_1 and β_2, the two managers make unverifiable effort choices in cost-reduction competition. At stage 3, the two firms compete with each other in the product market by setting prices.

Since our model is timeless, the residual is best interpreted as the present value of all future residual flows when the theory is applied. Consequently, privatization should be understood as a permanent transfer of residual claims from the government to private hands. A short-term contract between the local government and management, such as the contract management responsibility system (*jingying chengbao zerenzhi*) practiced in China, can be seen as partial privatization of state-owned enterprises; i.e., $\beta_i < 1$. A complete sell-out of an SOE is full privatization; i.e., $\beta_i = 1$.

We model stages 1 through 3, assuming that the central government's initial decision to decentralize and to set the tax rate and the local government's share of tax revenue are determined exogenously, although the tax parameters can affect privatization as will be seen later. For this purpose, consider a spatial model. Suppose that the two firms are located at the two ends of a Hotelling's linear city having a length of 1. They produce an identical consumer product. There is a continuum of consumers evenly located along the linear city and each consumer buys one unit of good and incurs a unit transportation cost t. A natural interpretation of t is that it is a parameter of the degree of competition in the product market; a lower t represents a higher degree of competition. We assume that t summarizes all the factors affecting competition, such as transportation costs, trade barriers, enforcement, and other costs. Some of these factors are under the control of the central government, and others are under the control of local governments or are determined by technology. Since we focus on how competition triggers privatization, we assume that these factors are given exogenously.

Let π_i be the profit, p_i be the price, c_i be the unit cost, and x_i be the market share of firm i. Then $\pi_i = (p_i - c_i)x_i$. We assume that the cost function of firm i is $c_i = c_0 - a_i$, where c_0 is an intrinsic cost that is the same for both firms, and a_i is manager i's work effort, where $0 \leq a_i \leq c_0$.[4] Assume that price setting is costless and, if the manager is indifferent between two prices, i.e., they yield the same net utility, he will choose the one that results in larger profit. We assume that managers are risk-neutral and that manager i's disutility of effort is $\mu a_i^2/2$, where $\mu > 0$. The objective functions to be maximized, of the central government, local government i, and manager i, are $(1 - \rho)(1 - \tau)(\pi_1 + \pi_2)$, $\rho(1 - \tau)\pi_i + (1 - \beta_i)\tau\pi_i$, and $\beta_i\tau\pi_i - \mu a_i^2/2$.

We treat the cost and disutility functions as common knowledge, but assume that managerial efforts and costs cannot be verified by a third party. Partly as a

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[4] See also Hart (1983) for a similar formulation.

result of this, the managerial contract is based solely on profits.[5] Given that total demand and total transportation costs are both fixed, social welfare can be measured by the reverse of the sum of total production costs and total disutility. Thus, the first-best symmetric allocation a^{FB} is the solution to the following problem:

$$\min c_0 - a + \mu a^2$$

$$\text{s.t. } 0 \leq a \leq c_0.$$

We have for solutions $a_i^{FB} = a^{FB} = 1/(2\mu)$ if $c_0 > 1/(2\mu)$ and $a_i^{FB} = a^{FB} = c_0$ if $c_0 \leq 1/(2\mu)$ for $i = 1, 2$.

We now search for symmetric subgame perfect equilibria by backward induction. In the third stage, given the residual shares, production costs, and p_j, manager i's problem is to choose p_i to maximize after-tax retained profits. That is,

$$\max \beta_i \tau \pi_i$$

$$\text{s.t. } p_i \geq 0.$$

By using a standard analysis of Hotelling's linear city model, in a Nash equilibrium of the price game, we have for $i \neq j$ and $|a_1 - a_2| < 3t$,

$$p_i = t + \frac{c_j}{3} + \frac{2c_i}{3},$$

$$x_i = \frac{1}{2t}\left(t + \frac{c_j}{3} - \frac{c_i}{3}\right),$$

$$\pi_i = \frac{1}{2t}\left(t + \frac{c_j}{3} - \frac{c_i}{3}\right)^2. \tag{1}$$

For firm i to survive, $x_i > 0$. The inequality $|a_1 - a_2| < 3t$ is the simultaneous survival condition. Otherwise, both market share and profits will be zero.

In the second stage, given the residual shares and a_j, manager i's problem is to choose his action a_i to maximize his utility:

$$\max \frac{\beta_i \tau}{2t}\left(\max\left\{0, t + \frac{a_i}{3} - \frac{a_j}{3}\right\}\right)^2 - \frac{\mu a_i^2}{2}$$

$$\text{s.t. } 0 \leq a_i \leq c_0.$$

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[5] We emphasize a particular feature of the spatial model in this paper. At the symmetric equilibrium of the spatial model, both the market share and profits of each firm are determined uniquely by the transportation cost t and an independent variable of managerial effort a_i. Hence, we can isolate the effect of competition from the usual incentive considerations. As the two local governments collude perfectly and competition disappears, the agency problem does not matter in our model. In contrast, in a standard agency model, the principal needs to design incentive-compatible payment schemes even in the absence of competition.

For $9\mu t > \tau$,[6] we have the following reaction functions for $i \neq j$:

$$a_i = \frac{\beta_i \tau (3t - a_j)}{9\mu - \beta_i \tau}. \tag{2}$$

From (2), the efforts of the two managers are strategic substitutes. In addition, given manager j's effort a_j, manager i's effort increases monotonously with his residual share β_i with $a_i = 0$ for $\beta_i = 0$.

For interior equilibrium solutions of the action game, we have for $i \neq j$

$$a_i = \frac{\beta_i \tau (9\mu t - 2\beta_j \tau)}{3\mu (9\mu t - \beta_i \tau - \beta_j \tau)},$$

$$x_i = \frac{9\mu t - 2\beta_j \tau}{2(9\mu t - \beta_i \tau - \beta_j \tau)},$$

$$\pi_i = \frac{t(9\mu t - 2\beta_j \tau)^2}{2(9\mu t - \beta_i \tau - \beta_j \tau)^2} \tag{3}$$

so long as the parameters are such that actions are interior solutions.

A necessary condition for interior solutions to exist is $9\mu t > 2\tau$. Differentiating x_i with respect to β_i and β_j, when $9\mu t > 2\tau$, we have

$$\frac{\partial x_i}{\partial \beta_i} = \frac{\tau(9\mu t - 2\beta_j \tau)}{2(9\mu t - \beta_i \tau - \beta_j \tau)^2} > 0$$

$$\frac{\partial x_i}{\partial \beta_j} = \frac{-\tau(9\mu t - 2\beta_i \tau)}{2(9\mu t - \beta_i \tau - \beta_j \tau)^2} < 0. \tag{4}$$

That is, firm i's market share increases with the residual share of its own manager, and it decreases with the residual share of its rival's manager. This is the fundamental reason that the two local governments compete for privatization.[7]

In the first stage, given β_j, local government i's problem is to choose β_i to maximize its total revenue, subject to manager i's participation constraint,

[6] This is a sufficient second-order condition.

[7] However, the partial effect of competition on effort, given shares, depends on the relative sizes of the residual shares. It is easy to show that one's effort increases with the degree of competition if and only if one's residual share is greater than the residual share of one's rivals. At symmetric equilibrium, the efforts are independent of the degree of competition and depend only on the residual shares. For a general model in which the effect of competition on effort is ambiguous, see Schmidt (1997). In our model, although competition has an ambiguous partial effect on effort, strategic interactions between the two governments imply that, as competition becomes more intense, each local government has to grant a higher residual share to its manager to induce more effort because effort becomes more valuable. Thus the total effect of competition on effort is, in general, positive because it induces a change in the residual shares.

$$\max \frac{(\rho(1-\tau) + (1-\beta_i)\tau)}{(9\mu t - \beta_1\tau - \beta_2\tau)^2} \frac{t(9\mu t - 2\beta_j\tau)^2}{2}$$

$$\text{s.t. } 0 \le \beta_i \le 1,$$

$$\frac{\beta_i\tau t(9\mu t - 2\beta_j\tau)^2}{2(9\mu t - \beta_1\tau - \beta_2\tau)^2} - \frac{\mu(\beta_i\tau(9\mu t - 2\beta_j\tau))^2}{2(3\mu(9\mu t - \beta_1\tau - \beta_2\tau))^2} \ge 0.$$

The participation constraint is equivalent to $9\mu t \ge \beta_i\tau$.[8] Note that local government i's revenue consists of two components, $\rho(1-\tau)\pi_i$, which is the tax revenue, and $(1-\beta_i)\tau\pi_i$, which is the profit revenue. The trade-off facing local government i is that a higher β_i generates a higher profit π_i but decreases its relative share. We refer to the first effect as the incentive effect and to the second effect as the distribution effect.

Write the first part of the above objective function as $g_i(\beta_i, \beta_j) = (\rho(1-\tau) + (1-\beta_i)\tau)/(9\mu t - \beta_1\tau - \beta_2\tau)^2$, for $i \ne j$. Differentiating with respect to β_i, we have

$$\frac{\partial g_i}{\partial \beta_i} = \frac{2\tau(\tau + (1-\tau)\rho) - 9\mu t\tau - \beta_i\tau^2 + \beta_j\tau^2}{(9\mu t - \beta_1\tau - \beta_2\tau)^3}. \tag{5}$$

From (5), it is clear that there is no interior symmetric equilibrium solution to the residual share game that is derived from the action game with interior solutions.[9] Let $t^* = 2(\tau + (1-\tau)\rho)/(9\mu)$. For $9\mu t > 2\tau$, the participation constraint is satisfied, and it is easy to check that for all $\beta_i \in [0, 1]$,

$$\frac{\partial g_i}{\partial \beta_i}(\beta_i, 0) = \frac{2\tau(\tau + (1-\tau)\rho) - 9\mu t\tau - \beta_i\tau^2}{(9\mu t - \beta_i\tau)^3} < 0 \qquad \text{if } t > t^*,$$

$$\frac{\partial g_i}{\partial \beta_i}(\beta_i, 1) = \frac{2\tau(\tau + (1-\tau)\rho) - 9\mu t\tau - \beta_i\tau^2 + \tau^2}{(9\mu t - \beta_i\tau - \tau)^3} \ge 0 \qquad \text{if } t \le t^*.$$

Collecting our results, we have the following proposition.

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[8] The reader may be curious about this constraint since it implies that, given other factors, the smaller the residual share for the manager is, the more likely it is to be met. The reason for this is that the above inequality includes the manager's incentive compatibility constraint.

[9] The only exceptional case is $t = t^*$. In this rare case, after-tax residual shares do not matter as long as they are symmetric across regions. Thus, there is a discontinuity introduced when β_i is reduced from a positive value to zero.

PROPOSITION 1. If $t > t^*$, $(\beta_1^*, \beta_2^*, a_1^*, a_2^*, p_1^*, p_2^*)$, where $\beta_1^* = \beta_2^* = 0$, $a_1^* = a_2^* = 0$, and $p_1^* = p_2^* = t + c_0$, is a subgame perfect equilibrium. If $(2\tau/9\mu) < t \leq t^*$ and $c_0 > (\tau/3\mu)$, $(\beta_1^*, \beta_2^*, a_1^*, a_2^*, p_1^*, p_2^*)$, where $\beta_1^* = \beta_2^* = 1$, $a_1^* = a_2^* = \tau/(3\mu)$, and $p_1^* = p_2^* = t + c_0 - (\tau/3\mu)$, is a subgame perfect equilibrium.

Proposition 1 says that, if competition is sufficiently intense, i.e., if $2\tau/9\mu < t \leq t^*$, the local government will be induced to privatize its firm. The intuition is that, under sufficiently intense competition, the incentive effect dominates the distribution effect. The incentive effect is the marginal effect of the change in the residual share on total profit, which, ignoring the common denominator and other irrelevant items, is given by $I = 2\tau(\rho(1 - \tau) + (1 - \beta_i)\tau) > 0$. The distribution effect is the marginal effect of the change in the residual share on the local government relative share for fixed total profit and is given by $S = -\tau(9\mu t - \beta_i\tau - \beta_j\tau) < 0$. If $t > t^*$, $I < -S$, for the symmetric case, and therefore the local government prefers to retain all the profits even at the expense of the manager's incentives. On the other hand, if $t < t^*$ and $9\mu t > 2\tau$, $I > -S$, for the symmetric case, and therefore the local government prefers to retain tax revenue only, because the revenue increase resulting from a bigger profit share will not offset the tax revenue loss.

The underlying reason for this result is that the sensitivity of market share x_i to β_i depends positively on the intensity of competition.[10] To see this, differentiate Eq. (4) with respect to t,

$$\frac{\partial^2 x_i}{\partial t \partial \beta_i} = \frac{9\mu\tau[(9\mu t - \beta_i\tau - \beta_j\tau) - 2(9\mu t - 2\beta_j\tau)]}{2(9\mu t - \beta_i\tau - \beta_j\tau)^3} < 0,$$

$$\frac{\partial^2 x_i}{\partial t \partial \beta_j} = \frac{-9\mu\tau[(9\mu t - \beta_i\tau - \beta_j\tau) - 2(9\mu t - 2\beta_i\tau)]}{2(9\mu t - \beta_i\tau - \beta_j\tau)^3} > 0 \qquad (6)$$

for $\beta_i = \beta_j$ and $9\mu t > 2\tau$. That is, the marginal effects of both one's own and one's rival's incentives on one's own market share decrease as competition becomes less intense. Recall that the effect of one's rival's residual on one's own market share is negative. Since the local government's revenue depends directly on its market share, pressure to motivate its manager to cut costs is stronger when competition is more intense and weaker when it is less intense.

Note that the critical level t^* is positively correlated with ρ; hence, the larger ρ is, other things being equal, the more private ownership is likely to prevail. Consequently, the larger the share of total tax revenue allocated to the local government is, the larger the private sector is. The intuition is that the higher the tax share to the local government, given the tax rate, the more likely it is that the

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[10] This is consistent with a more general result that shows that the market share is more sensitive to production costs as competition becomes more intense (Hay and Liu, 1997).

incentive effect will dominate the distribution effect. Both the critical level t^* and the equilibrium action a^* are negatively correlated with the tax rate $1 - \tau$. Thus, a lower tax rate may promote a higher degree of private ownership and induce more efficient action. However, as the tax rate approaches zero, the local government will have little incentive to privatize since it will get almost no tax revenue and also almost no profit revenue if the share of the manager is close to 1.[11]

Obviously, equilibrium efforts are smaller than the first-best actions. Nevertheless, when competition is sufficiently intense, efficiency can be improved by promoting privatization. Recall that welfare can be measured by the reverse of $c_0 - a + \mu a^2$. In Proposition 1, the privatization case produces greater welfare than the non-privatization case.[12]

Next, we show that for $\tau < 9\mu t < 2\tau$, there is no symmetric equilibrium to the residual sharing game when the actions are interior solutions to (3). Note that there is no interior equilibrium solution to the residual sharing game. We thus need to examine only the corner solutions to the residual sharing game. First, $\beta_1^* = \beta_2^* = 0$ is not an equilibrium since $(\partial g_i / \partial \beta_i)(0, 0) > 0$. Second, $\beta_1^* = \beta_2^* = 1$ is not an equilibrium since $(\partial g_i / \partial \beta_i)(1, 1) < 0$. Thus no interior solutions of the action game can be supported by an equilibrium for $(\tau/9\mu) < t < (2\tau/9\mu)$.

Now we check whether corner solutions of the action game can be supported as an equilibrium for $(\tau/9\mu) < t < t^*$. First we show that $a_1 = a_2 = 0$ cannot be supported as an equilibrium. Note that $a_1 = a_2 = 0$ can be treated as a limiting case in (3) and (5) with β_1 and β_2 approaching zero and that $a_1 = a_2 = 0$ can only be supported by $\beta_1 = \beta_2 = 0$ in equilibrium. From the perspective of local governments, granting positive shares to managers to support zero efforts is inconsistent with government revenue maximization. When $(\tau/9\mu) < t < t^*$, (5) implies that $\beta_1 = \beta_2 = 0$ is not an equilibrium for the residual sharing game, and hence $a_1 = a_2 = 0$ cannot be supported as an equilibrium.

For $(\tau/9\mu) < t < t^*$, we now show that $a_1 = a_2 = c_0$ can be supported as an equilibrium when $c_0 \leq \min\{(\tau/3\mu), 3(t^* - t)\}$. Given $a_j = c_0$ and β_i, the best response of manager i is $a_i = \beta_i \tau(3t - c_0)/(9\mu t - \beta_i \tau)$, provided that this value lies between 0 and c_0. Government i maximizes $((\rho(1 - \tau) + (1 - \beta_i)\tau)/(9\mu t - \beta_i \tau)^2)(t(9\mu t - 3\mu c_0)^2/2)$ subject to manager i's participation constraint. It can be easily checked that the sign of the derivative of government i's objective function with respect to β_i is the same as $t^* - t - (\beta_i \tau/9\mu)$. Note that $a_i \leq c_0$ is equivalent to $\beta_i \leq (3\mu c_0/\tau)$. Given $c_0 \leq \min\{(\tau/3\mu), 3(t^* - t)\}$, we have $t^* - t - (\beta_i \tau/9\mu) \geq 0$ if $\beta_i \leq (3\mu c_0/\tau)$. Thus the best response

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[11] In fact, the condition in the second part of Proposition 1 does not hold when $\tau = 1$.

[12] Note that $-(c_0 - (\tau/3\mu) + (\tau^2/9\mu)) > -c_0$.

of government i is $\beta_i = (3\mu c_0/\tau)$.[13] It follows that manager i's best response becomes $a_i = c_0$.[14] Collecting our results, we have the following proposition.

PROPOSITION 2. *If* $(\tau/9\mu) < t \leq t^*$ *and* $c_0 \leq \min\{(\tau/3\mu), 3(t^* - t)\}$, $(\beta_1^*, \beta_2^*, a_1^*, a_2^*, p_1^*, p_2^*)$, *where* $\beta_1^* = \beta_2^* = (3\mu c_0/\tau)$, $a_1^* = a_2^* = c_0$, *and* $p_1^* = p_2^* = t$, *is a subgame perfect equilibrium.*

From Proposition 2, we observe that, when product market competition is sufficiently intense, managers are motivated to cut all possible costs in their actions, and as a result the first-best can be achieved. The reader may find it surprising that, when competition intensifies sufficiently, even without full privatization, managers have full incentives to reduce costs. There are two reasons for this result. First, the profit function, and consequently the objective function of the manager under the conditions in Proposition 2, exhibits increasing returns to effort. Thus, a small increase in the residual share of the manager may induce a significant cost reduction. Second, if the potential for cost reduction is limited, local governments may not need to grant total after-tax residual shares to motivate the manager since partial residuals will suffice to induce the manager to cut costs fully.

If $9\mu t < \tau$, Eq. (2) does not hold in general because the second-order condition is not satisfied. Hence, we need to look for corner solutions to the action game. Let $k_i = \sqrt{9\mu t/\beta_i\tau}$. Equivalently, manager i maximizes the following objective function by choosing a_i,

$$(3t + a_i - a_j)^2 - (k_i a_i)^2 = ((1 + k_i)a_i - (a_j - 3t))((1 - k_i)a_i - (a_j - 3t)),$$

provided that $a_i \geq a_j - 3t$. Manager i's objective function becomes non-positive when $a_i < a_j - 3t$ since, in this case, the market share of region i is zero. We claim that for $c_0 > 3t$, $a_j = c_0$, and $\beta_i\tau > 9\mu t$, we have $a_i^* = c_0$. Note that under the specified conditions, $a_j - 3t > 0$, $1 - k_i > 0$, and the above function is negative if $(a_j - 3t)/(1 + k_i) < a_i < (a_j - 3t)/(1 - k_i)$, and it is non-positive if $0 \leq a_i \leq (a_j - 3t)/(1 + k_i)$. Thus, it is maximized at $a_i^* = c_0$ provided that $c_0 \geq (c_0 - 3t)/(1 - k_i)$.

Now we are ready to show that $a_1 = a_2 = c_0$ can be supported as an equilibrium for $3t < c_0 \leq \sqrt{\tau t/\mu}$. Given $a_j = c_0$, the participation constraint of manager i becomes

$$\frac{\beta_i\tau}{2t}\left(t + \frac{a_i - c_0}{3}\right)^2 - \frac{\mu a_i^2}{2} \geq 0,$$

which implies $\beta_i\tau > 9\mu t$. As long as the participation constraint is satisfied, manager i chooses $a_i = c_0$ provided that $c_0 \geq (c_0 - 3t)/(1 - k_i)$. To maximize

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[13] This suffices to motivate manager i to cut costs to the minimum level, which is zero.

[14] Note that $c_0 \leq (\tau/3\mu)$ and $\tau < 9\mu t$ imply $c_0 < 3t$. Hence the participation constraint, $(\beta_i\tau t/2) - (\mu c_0^2/2) > 0$, is met for $\beta_i = (3\mu c_0/\tau)$.

revenue, local government i sets the after-tax residual profit share such that the participation constraint is binding; that is, $\beta_i = (\mu c_0^2/\tau t)$. Note that $c_0 = (c_0 - 3t)/(1 - k_i)$ and $\beta_i \in [(9\mu t/\tau), 1]$. Granting a residual share higher than $(\mu c_0^2/\tau t)$ cannot induce any further cost cutting. The only other alternative for government i is to choose $\beta_i = 0$, which results in $a_i = 0$, $x_i = 0$, and $\pi_i = 0$. To summarize, we have the following proposition.

PROPOSITION 3. *If* $3t < c_0 \leq \sqrt{\tau t/\mu}$, $(\beta_1^*, \beta_2^*, a_1^*, a_2^*, p_1^*, p_2^*)$, *where* $\beta_1^* = \beta_2^* = (\mu c_0^2)/(\tau t)$, $a_1^* = a_2^* = c_0$, *and* $p_1^* = p_2^* = 1$, *is a subgame perfect equilibrium.*

The equilibrium actions in Proposition 3 are first-best actions.[15] Note that the conditions in Proposition 3 imply $9\mu t < \tau$. Thus, when competition is sufficiently intense, the first-best action is achievable. Again, as in Proposition 2, full residual transfer to management is not necessary due to the fact that the potential for full cost reduction is limited. In both Propositions 2 and 3, β_i^* increases as τ decreases; thus the degree of privatization will be higher when the tax rate is higher. If the local government is able to collect more tax effectively, it need not or better not rely on profit remittance as much as when tax revenue is lower.

Let us use a numerical example to illustrate Proposition 3. Suppose $t = 1$, $\tau = 0.64$, $\mu = 0.01$. Then for $c_0 \in (3, 8]$, Proposition 2 holds. Take $c_0 = 6$, we have $\beta_1^* = \beta_2^* = (9/16)$. Now suppose t becomes 0.64. We then have $\beta_1^* = \beta_2^* = (225/256)$. In both Propositions 2 and 3, β_i^* is positively correlated with c_0. Thus, a higher intrinsic cost requires that a larger residual share go to the manager to induce full cost cutting. Although a higher intrinsic cost may imply a higher degree of private ownership, it may not affect efficiency.

For competition to work effectively, regional governments cannot erect trade barriers, but they must have the autonomy to make other economic decisions to respond to competitive pressures. Thus far we have assumed that regional governments have full autonomy to set after-tax residual shares. When the autonomy of regional governments is restricted by the central government, the privatization process may be slowed down. Indeed, in the following proposition, we show that, if all the rights of setting after-tax residual shares are in the hands of the central government, public ownership will prevail.

Suppose that the central government, rather than local governments, sets the after-tax residual shares and treats the two regions equally. Equal treatment implies that $\beta_1 = \beta_2$ and hence $a_1 = a_2$. It follows that the total revenue of the government, including all levels and all regions, becomes $(1 - \tau + (1 - \beta_i)\tau)t$,[16] which is maximized at $\beta_i = 0$. Thus, we have the following proposition.

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[15] This is because $c_0 \leq \sqrt{(\tau t/\mu)} < (\tau/3\mu) < (1/2\mu)$ and, hence, $a^{FB} = c_0$.

[16] Note that profits are independent of the symmetric actions of the managers.

PROPOSITION 4. *If the central government sets the after-tax residual shares and treats the two regions equally, then the maximization of total government revenue results in $\beta_1^* = \beta_2^* = 0$ and, accordingly, $a_1^* = a_2^* = 0$, $p_1^* = p_2^* = t + c_0$.*

The outcome from centralization of decision making is equivalent to that from joint maximization by two local governments. If the two regions collude perfectly, they achieve jointly the same result as found in Proposition 4. The intuition is simple. From (3), at the symmetric equilibrium, both market share x_i and profits π_i are independent of actions and ownership structure so that $x_i = \frac{1}{2}$, $\pi_i = t/2$. By colluding at $\beta_1 = \beta_2 = 0$, each local government can collect full profits equal to $\tau t/2$. However, such collusion cannot be an equilibrium in general. In particular, when $t < t^*$, we have $(\partial g_i/\partial \beta_i)(\beta_i, 0) > 0$ for sufficiently small β_i from (5). That is, given that government j chooses $\beta_j = 0$, the best response for government i is to set $\beta_i > 0$. Each local government is tempted to cheat on its rival with respect to privatization until equilibrium is restored; i.e., $\beta_1^* = \beta_2^* = 1$ for $2\tau/9\mu < t < t^*$. In other words, when competition in the product market is sufficiently intense, two local governments have to compete with each other regarding the privatization of their firms.

Summarizing the propositions, when the degree of competition is sufficiently low, public ownership will prevail because the distribution effect dominates the incentive effect. When the degree of competition is sufficiently high, full or partial private ownership will occur, depending on whether the intrinsic cost is high or low. When the intrinsic cost is sufficiently high, full private ownership is needed to induce the manager to cut costs. When the intrinsic cost is sufficiently low, partial private ownership will be sufficient to induce full cost-cutting.

Second, when the profit tax rate is sufficiently high, private ownership will be less likely to occur, because there is little incentive effect through the manager's after-tax profit, and hence, the distribution effect will be dominant.[17] In the extreme case of a 100% profit tax rate, the manager will get zero after-tax profit; thus there will be no incentive effect and public ownership will prevail. A lower tax rate may promote private ownership because it increases the incentive effect through the manager's after-tax profit. However, too low a tax rate may reduce the local government's incentive to privatize.[18] The intuition is that if the local government is unable to collect more tax effectively, it is better for it to rely more on profit remittance. In fact, as the tax rate approaches zero, the local government will lose incentive to privatize fully, since it will get nearly zero tax revenue and almost zero profit revenue if the share to the manager is close to 1. Thus, the effect of the tax rate on privatization is not linear; similar to the Laffer curve, it is inverse U-shaped.

Third, a larger share of tax revenue to the local government promotes private

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[17] Recall that the critical t^* is negatively correlated with the tax rate $(1 - \tau)$.
[18] Recall that β_i^* is positively correlated with $(1 - \tau)$.

ownership, because it increases the incentive effect through the local government's tax revenue.[19] However, a sufficiently high tax share, even 100%, does not guarantee privatization, which depends also on competition intensity and tax rate. On the other hand, a zero share of tax revenue to the local government erodes its incentive to privatize fully. When the central government cannot collect taxes effectively, the share of tax revenue to the local government may rise and the effective tax rate may become lower, as in the case of China. While the first effect promotes privatization, the second has an ambiguous effect on privatization; thus the overall effect is indeterminate.

Thus far we have interpreted a larger β_i as a higher degree of privatization of existing SOEs, which is one of the two elements contributing to the rise of a private ownership system. The other component is competition for the establishment of new firms. By similar reasoning, more intense product competition can result in the setting up of more new private enterprises and fewer new SOEs. Rather than assuming that the two local governments consider to what extent they want to privatize their existing SOEs, we assume that they consider what types of new firms, i.e., private vs state-owned, they want to approve. Then the results of our model apply when we ignore the funding issue for the new firm as we do in our model. In reality, new start-up firms require funding. The local government must finance new start-up SOEs from its own budget. Consequently, the local government has even less incentive to approve the establishment of new SOEs if the funding issue of a firm is taken into account. Therefore, our analysis suggests that more intense interregional competition induces a faster growth of the private ownership system in a region by facilitating both privatization and the establishment of new private firms.

3. APPLICATION: THE CHINESE EXPERIENCE

In this section, we apply our theory to explain China's transition to capitalism. We then conduct a formal empirical test using China's industrial census data.

3.1. China's Road to Capitalism

In the past two decades, and particularly since the early 1990's, privatization in China has been accelerating. However, this has not been a deliberate policy of the central government. Our theory sheds light on this unintended rise of a private ownership system.

The authority of the central government began to expand in 1949; it dominated local governments in almost all major economic decision making until the late 1970's. Partly as a result of such a high degree of centralization, public ownership was predominant from the mid-1950's to the early 1980's. The fiscal budget was centralized and the majority of SOEs were under central government control.

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[19] Recall that t^* is positively correlated with ρ.

The economic reform launched in 1978 can be characterized as an evolutionary process of reassigning the economy's residual claims and control rights from the central to the local government and from the government to firm managers.

China's decentralization policy has had two major components. The first is a fiscal revenue-sharing system (*caizheng baogan*) between adjacent levels of governments, under which lower-level governments have an obligation to hand over a fixed amount or a fixed proportion of their revenues to the superior government, while keeping for themselves the remaining revenues. This fiscal decentralization was accompanied by the second major component, a delegation of state enterprises to local governments (*qiye xiafang*). By 1996, state-owned industrial enterprises controlled by the central government accounted for only 1.6% of the total number of firms at or above the township level and 17.8% of the total industrial output (*China Industrial Census,* 1996).

The decentralization policy granted local government officials great autonomy over their economies, including the autonomy to set prices, to make investment with self-raised funds, and, more importantly, the autonomy to restructure their firms and issue licenses to newly established firms. Overall, decentralization has delimited better the property rights between governments at different levels, such that the government at each level becomes the real residual claimant and controller of its own public economy. Thus, each region acts as a conglomerate or as a holding company. This system boosted the local governments' incentives to make profits, and, more importantly, it forced local governments to compete with one another, thus contributing to the marketization of the entire economy. Although local governments may still use some planning mechanisms to control their enterprises, they can conduct business with other regions only through a bargaining process, since no one region has authority over the others. The relationships among provinces, municipalities, counties, townships, and villages are more or less marketized.

At the early stage of decentralization, many local governments attempted to protect their enterprises from competition with other regions by erecting trade barriers. However, as the size of each local economy became smaller and the number of local economies increased at lower government levels,[20] the erection of trade barriers by a local government became more costly and, hence, competition became more intense. Protectionism often failed because efficiency gains from specialization and exchange exceeded significantly the net benefits of erecting trade barriers as both informal and formal arrangements emerged to capture the gains. Since the late 1980's, local governments have begun to sign treaties pledging to protect one another's enterprises as their own (Yang, 1989; Clarke, 1996). In 1993, the central government enacted the "Law of Anti-

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[20] China's administrative divisions are as follows. At the provincial level, there are thirty-one jurisdictions, many of which are larger than medium-sized countries. At the county level, there are more than two thousand jurisdictions. At the township level, there are more than 50,000 jurisdictions.

improper Competition," prohibiting local governments from erecting trade barriers.

All government bureaucrats seek rents and are reluctant to give up their power. However, without a monopoly, rents can be guaranteed only by improving the efficiency of their firms. As our model predicts, because the competitiveness of each local economy depends on its cost effectiveness relative to that of its rivals, competition eventually forces local governments to grant more residual shares to their enterprises and, finally, to privatize.

Under the planning system, SOEs remitted all of their earnings to the government, so that there was no distinction between taxes and profits. In 1984, SOEs began to remit taxes and profits to governments separately. A few years later, the contract management responsibility system emerged, under which local governments at various levels decide how after-tax profits will be shared between the government and managers. This contracting system can be viewed as a form of partial privatization; it has boosted greatly managerial incentives in state enterprises (Zhang, 1997). However, it has also induced pervasive short-term behavior, which is harmful to long-run competitiveness. In particular, intensified competition has made SOEs less and less profitable compared to the non-state sector, so that local governments have become burdened with the increased losses of their SOEs. Thus, various forms of privatization began to emerge and to accelerate in the 1990's (China Reform Foundation, 1997; Wang and Xu, 1996).

Although our model characterizes central–local government relations, the same logic can be applied to any two adjacent levels of governments.[21] However, competitive pressures and their impact on privatization vary at different levels of government. The effectiveness of cross-regional competition depends on the following factors: the leverage of regional governments to protect their products and to erect trade barriers, the degree of autonomy of regional governments to make decisions in reaction to competitive pressures, the number of competitors, and the costs of contract enforcement and transportation of their products. In general, the lower the level of jurisdiction, the greater the effectiveness of competition from the above-mentioned factors and, hence, the higher the degree of privatization for the following reasons.

First, a lower-level government has less leverage, i.e., administrative and legal means, to protect its enterprises and to erect trade barriers. Second, a lower-level government and its firms tend to have more autonomy. Typically, firms controlled by lower-level governments produce fewer strategic products, such as arms, and thus, they are less subject to central planning and political control. Third, a lower-level government and its firms face more homogeneous competitors. Enterprises controlled by the same level of government tend to produce

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[21] Unlike at the central government level, which is a monopoly, regional competition can induce decentralization at local levels.

products of similar complexity and technology. Finally, firms controlled by lower-level governments produce more simple, standardized products, such as basic consumption goods, and hence, enforcement of contracts is easier.

County-level governments are the lowest-level jurisdictions that can issue licenses to firms. Licenses to individual business and private firms are issued mostly by the administration for commerce and industry of the county-level governments. Due to intense cross-county competition, most counties have permitted or encouraged the establishment of new private firms in the reform era, especially since the early 1990's. The share of the private sector expanded quickly as both privatization and the establishment of new private firms accelerated during the early to mid-1990's. However, the share varied significantly from county to county due to different intensities of competition; hence, we have a good opportunity to test our theory.

3.2. An Empirical Test

We now conduct an empirical test of our theory using newly available Chinese industrial census data from 1993 to 1995. The censuses are conducted by the State Statistical Bureau of China and cover all manufacturing firms subordinate to the township government or above. The number of firms included varies between 400,000 and 500,000. In 1995, the output of these firms accounted for 91% of the total industrial output of all firms with independent accounting systems (*Chinese Industrial Census,* 1995; *China Statistical Yearbook,* 1996, p. 414). Firms not included in the census are the very small, often family-run, workshops. Thus, the firms included cover basically the entire population of China's manufacturing industry. The data set contains ownership type, level of government control, geographic location, revenue, and other performance and demographic variables. In China, virtually all firms are subordinate to (*lishu*) governmental organizations at different levels.[22] There are five levels of government control in terms of *lishu,* central, provincial, municipality or prefecture, county, and township. The firms subordinate to a government may be state-, collective-, or even privately owned. In general, SOEs are subordinate to county governments or above; COEs are subordinate to county-level governments and above or to township governments and village committees (TVEs); private enterprises are generally subordinate to village committees, to township and county governments, or to some semi-official business associations.

For the test, we use the regression equation

$$B_{it} = h_0 + h_1 T_{i,t-k} + h_2 Z_{i,t-k} + h_3 B_{j,t-k} + h_4 B_{i,t-k} + \epsilon_{it},$$

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[22] "Firm A *lishu* government X" means that A is under the jurisdiction of X, and the latter is responsible for administering the former. If A is a public firm, X has the authority to make essentially all decisions for A. In other words, X is similar to a board of directors of A.

where B_{it} is the share of the private sector in region i at year t, $T_{i,t-k}$ is the index of transportation in region i at year $t - k$, $Z_{i,t-k}$ is the degree of autonomy of region i at year $t - k$, $B_{j,t-k}$ captures the neighborhood effect ($j \neq i$), and $B_{i,t-k}$ is the self-effect. The transportation index and the degree of autonomy are proxies for the intensity of interregional competition, which is not observable directly. The initial private sector share serves as a control variable. If our theory holds, we should observe all the explanatory variables exerting a positive effect on B_{it}. Higher $B_{j,t-k}$ and $T_{i,t-k}$ imply stronger competition from private firms in the neighboring regions. A higher $B_{i,t-k}$ implies stronger competition from private firms within the region. A higher $Z_{i,t-k}$ means that region i has more autonomy, namely, more freedom to restructure its SOEs and to establish new private firms. Thus, it is more responsive to cross-regional competition. Our theory predicts that all these factors contribute to a higher private-sector share by facilitating privatization and the establishment of new private firms through intensifying competition.

In our test, B_{it} is measured by the proportion of revenues contributed by the private sector in a county in 1995. The $T_{i,t-k}$ is measured by two variables at the provincial level; one is the ratio of the length of the coastal line to the land area, and the other is the ratio of the length of railways to the land area in 1992. The $Z_{i,t-k}$ is measured by the ratio of the revenue of SOEs subordinate to county or lower-level governments to the total revenue of all SOEs in a county in 1994.[23] The $B_{j,t-k}$, is measured by the proportion of revenue of the private sector in the neighboring counties, excluding the county under evaluation, in 1993. Neighboring counties are all counties in the same prefecture as county i. There are 334 prefectures and 2,134 counties in China, with an average of 6.4 counties per prefecture (*China Statistical Yearbook,* 1996, p. 3). Here, $B_{i,t-k}$ is the proportion of revenue of the private sector in the county under evaluation, i, in 1993. The unit of analysis is the county. We aggregate information from all firms in 1993 (446,265), 1994 (485,052), and 1995 (450,233) at the county level and calculate indices of privatization and autonomy for all counties based on the industrial censuses. Then, we estimate the regression equation. Given the comprehensive coverage of our data, this is the most rigorous test we can design.

In one test, the private sector is broadly measured by the non-state sector, including privately owned firms, foreign-invested firms, domestic joint ventures, joint stock firms, and collectively owned firms.[24] The correlation coefficient between $B_{i,t-k}$ and $B_{j,t-k}$ is 0.471. In order to avoid possible multicollinearity between $B_{i,t-k}$ and $B_{j,t-k}$, we test three models. Model A uses both $B_{i,t-k}$ and $B_{j,t-k}$; Model B uses the share of revenue of the private sector in the entire

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[23] The data for $Z_{i,t-k}$ in 1993 are not available.

[24] Studies show that a large part, some 20 to 50% in various regions, of the collectively owned firms are in fact de facto privately owned firms, especially since the 1990's (Li, 1998). Thus, firms in the non-state sector can be seen as either fully private or partially private firms.

prefecture, including both the county under evaluation and the neighboring counties; Model C uses only $B_{j,t-k}$, the neighborhood effect.

Table 1 summarizes the regression results. All three models perform equally well. All the independent variables in each model influence the dependent variable in the hypothesized direction and are highly significant. According to Model A, a 1% higher private share in the neighboring counties triggers about a 0.2 to 0.24% higher private share in a county two years later (Tables 1 and 2). In order to test for the robustness and consistency of our theory, we use a different, narrowly defined, measure of the private sector, which excludes all SOEs, all COEs in 1993, and the COEs at the county level and above in 1995.[25] The degree of local autonomy is measured by the ratio of the revenue of SOEs and COEs subordinate to township-level governments to the revenue of all SOEs and COEs in 1994. The results, shown in Table 2, are very similar to those of Table 1 with R-squares ranging from 48 to 52%. The test results of different specifications and measures all provide very strong support for our theory.

One of the limitations of our model is that we ignore the effect of regional specialization. We assume different regions produce identical products, which are differentiated only by the transportation costs for consumers. In reality, there is a pattern of regional specialization in China, with many northern regions specializing in capital goods, southern regions in consumer goods, and other areas in raw materials and energy. In reaction to competition, a region may differentiate its products through specialization, thus reducing or delaying the effect of competition on privatization. That is, if there were no regional specialization, the degree of privatization would be higher. Thus, the effect of competition on privatization might be underestimated in our empirical investigation.

Summarizing the discussions and tests in this section, we conclude that our theoretical predictions are quite consistent with the observed characteristics in China. The economies of the coastal regions are more privatized than those inland because the former enjoy not only lower transportation costs, which facilitate cross-regional competition, but also, and more importantly, greater autonomy.[26] Similarly, SOEs in northeastern and southwestern China tend to be less privatized, since there are few private enterprises in neighboring regions, making competition less intense. These factors have contributed to the widening of the income gap between the coastal and inland regions in the reform era. Sectors with simple or standard contracts are more privatized than sectors with complex or specific contracts since the former involve lower enforcement costs and hence face stronger competition. The former include labor-intensive industries, such as textiles and consumer electronics. The latter generally include

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[25] For the 1993 data, we cannot distinguish the government level of the COEs; thus, we exclude all COEs from the private sector.

[26] In the 1980's, the central government granted much more autonomy to the coastal regions than it did to the inland regions.

TABLE 1

Regression Results of Privatization Determinants (Broad Definition of Private Sector) (Dependent Variable, Proportion of Revenue of the Private Sector in a County in 1995; Number of Cases = 2,002 (All Counties in China))

Models: Estimates	A			B			C		
R-square	36.1%;			28.3%			24.7%		
Adjusted R-square	35.9%;			28.1%			24.5%		
prob > F	0.0001			0.0001			0.0001		
	A			B			C		
Independent variables	Unstandardized	Standardized	(prob > |T|)	Unstandardized	Standardized	(prob > |T|)	Unstandardized	Standardized	(prob > |T|)
Intercept	0.151	0.000	(0.0001)	0.171	0.000	(0.0001)	0.189	0.000	(0.0001)
1. Coastal line/land (provincial level)	2.174	0.070	(0.0001)	2.340	0.075	(0.0001)	4.199	0.135	(0.0001)
2. Railway/land (provincial level) in 1992	1.766	0.092	(0.0020)	2.152	0.113	(0.0019)	2.226	0.117	(0.0001)
3. Local autonomy in 1994	0.156	0.243	(0.0001)	0.173	0.271	(0.0001)	0.182	0.285	(0.0001)
4. Proportion of revenue of the private sector in the neighboring counties in 1993	0.195	0.149	(0.0001)				0.390	0.298	(0.0001)
5. Proportion of revenue of the private sector in the county in 1993	0.371	0.394	(0.0001)						
6. Proportion of revenue of the private sector in the prefecture in 1993 (including the county under evaluation and the neighboring counties)				0.521	0.386	(0.0001)			

Sources. For variables 3 to 6, *China Industrial Census* (1993–1995); for variables 1 and 2, *China Statistical Yearbook* (1993, p. 515); and *Atlas of the People's Republic of China* (1989).

Note. The private sector includes privately owned firms, foreign-invested firms, domestic joint ventures, joint stock firms, and collectively owned firms. Local autonomy is measured by the ratio of the revenue of SOEs subordinate to county or lower-level governments to the total revenue of all SOEs in the county.

TABLE 2

Regression Results of Privatization Determinants (Narrow Definition of Private Sector) (Dependent Variable, Proportion of Revenues by the Private Sector in a County in 1995; Number of Cases = 2,002 (All Counties in China))

Models: Estimates	A			B			C		
R-square	52.0%;			49.3%			48.2%		
Adjusted R-square	51.9%;			49.2%			48.1%		
prob > F	0.0001			0.0001			0.0001		

Independent variables	A			B			C		
	Unstandardized	Standardized	(prob > |T|)	Unstandardized	Standardized	(prob > |T|)	Unstandardized	Standardized	(prob > |T|)
Intercept	0.125	0.000	(0.0001)	0.124	0.000	(0.0001)	0.127	0.000	(0.0001)
1. Coastal line/land (provincial level)	2.676	0.092	(0.0001)	3.397	0.117	(0.0001)	3.869	0.133	(0.0001)
2. Railway/land (provincial level) in 1992	0.720	0.039	(0.0132)	0.898	0.049	(0.0026)	0.895	0.049	(0.0030)
3. Local autonomy in 1994	0.612	0.580	(0.0001)	0.605	0.573	(0.0001)	0.604	0.572	(0.0001)
4. Proportion of revenue of the private sector in the neighboring counties in 1993	0.242	0.116	(0.0001)				0.467	0.223	(0.0001)
5. Proportion of revenue of the private sector in the county in 1993	0.422	0.236	(0.0001)						
6. Proportion of revenue of the private sector in the prefecture in 1993 (including the county being evaluated and the neighboring counties)				0.538	0.250	(0.0001)			

Sources. For variables 3 to 6, *China Industrial Census* (1993–1995); for variables 1 and 2, *China Statistical Yearbook* (1993, p. 515); and *Atlas of the People's Republic of China* (1989).

Note. The private sector includes all firms except (1) all SOEs and (2) all collectively owned firms at the county level and above in 1995. Local autonomy is measured by the ratio of the revenue of SOEs and collectively owned firms subordinate to township-level governments to the revenue of all SOEs and collectively owned firms in 1994.

capital-intensive and contract-intensive industries, such as machine tools, banking, and insurance (Li and Zhou, 1999). For instance, in 1985 the output of SOEs accounted for 17 and 64% of the total output of the garment and machine tools industries, respectively. By 1995, the SOEs' share in the garment industry had shrunk to 6.9%, while the SOEs' share in the machine tools industry was still 40% (*China Statistical Yearbook,* 1986, pp. 242–43, 1996, pp. 414, 418). The privatization of TVEs has proceeded more quickly than that of SOEs because TVEs operate in more competitive markets and their township or village governments have no leverage to protect them.

Although our model focuses on product market competition, similar analyses can be applied to other markets, such as capital and labor markets. In reality, the direct motivation for privatization by local governments is often related to the financial health of their enterprises (Wang and Xu, 1996). This is a precise consequence of competition in various markets. Competition erodes the monopoly profits that SOEs enjoyed formerly. In many regions, local governments are unable to get funds from capital markets and to subsidize massive losses, so that they have to privatize those firms that incur losses. Another important reason for privatization is that SOEs and collective enterprises cannot keep good managerial teams and skilled workers because the more efficient private and foreign joint ventures are able to offer much higher salaries (Liu, 1995). For the same reasons, almost all new firms established by local governments in recent years have been private firms.

4. CONCLUSIONS

In this paper, we develop a theory of institutional change in the context of a transition economy. We show that the rise of a private ownership system occurs as a consequence of cross-regional competition. Initially the Chinese economic reforms were not intended to privatize state and collective enterprises. However, the decentralization policy triggered privatization eventually and the establishment of new private firms through cross-regional competition. In 1997, the Chinese Communist Party's Fifteenth Party Congress promoted the formation of joint-stock systems and various other organizational forms to bail out the vast majority of failing SOEs; this move is widely viewed as a covert act of privatization. Formal open privatization in China has thus far not been adopted as a central government policy for ideological reasons. However, competition is far more powerful than ideology. Regardless of whether or not the central government will draw up a blueprint for full privatization, both our theory and reality show that the privatization process will continue to accelerate with its own logic and vigor. China has reached a point of no return on the road to capitalism.

The Chinese experience demonstrates that the invisible hand is not only powerful in allocating resources; it is also powerful in creating institutions. Once decentralization begins, market competition may precipitate a self-enforcing

development of a private ownership system. The newly founded and privatized firms intensify, in turn, market competition. This is the major lesson that other transition and emerging economies may draw from China's experience.

Nevertheless, the emergence of a private ownership system requires a sound legal system to protect property rights. In particular, de facto ownership by managers must eventually become de jure private ownership. Commercial laws are also needed to enforce contracts between enterprises. Although China enacted the General Principles of Civil Law in 1986, the Law of Civil Litigation in 1991, and the Contract Law in 1999, and many other laws since these, there are two major problems in its current commercial law system. First, there are no clear and detailed rules to protect private property. To facilitate efficient private investments, detailed civil codes and procedures are needed to protect private property under different contingencies. Second, cross-regional commercial disputes are settled in local courts that are virtually controlled by local governments, in that the local governments provide the courts with both financial and personnel resources. To mitigate local protectionism and to facilitate interregional competition, local courts must become independent of local government control or major cross-regional commercial disputes must be settled by higher-level courts, whose jurisdiction is common to the regions.

We are only beginning to understand the driving forces behind institutional change, in general, and the rise of private ownership systems, in particular. Much work remains to be done. Although we have demonstrated how decentralization can promote the development of a private ownership system through competition, we do not yet have a theory to explain what drives decentralization, nor do we have a theory to explain how de facto property rights evolve into de jure property rights. Exploration of these topics will enhance our understanding of institutional change. This study provides a foundation on which to base such endeavors.

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