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# *Insecure Property Rights and Government Ownership of Firms*

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# Insecure Property Rights and Government Ownership of Firms[1]

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## Abstract

China's remarkable economic growth occurred despite (1) the lack of rule of law to secure property rights against state encroachment; and (2) government ownership of most new and successful non-state firms. We develop a theory of ownership under state predation that incorporates these two considerations. In our theory, "private ownership" leads to excessive revenue hiding and "state ownership" fails to provide incentives for managers and local governments in a credible way. In contrast, "local government ownership" integrates local government activities and business activities together, which may not only provide incentives for local governments, but also involves less revenue hiding from the local government and less predation from the state. Furthermore, ownership diversity across localities and within a locality is possible. Our theory is consistent with empirical evidence from China. We thus interpret local government ownership as an organizational response to imperfect state institutions.

Key Words: Property Rights, Ownership, Multi-Task, Local Government, China

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# Insecure Property Rights and Government Ownership of Firms

## 1. Introduction

China's remarkable economic performance during its transition to markets has proposed some interesting questions about the prevailing theories on property rights and ownership of firms. Consider:

First, China lacks the rule of law and institutional constraints on the state. There is no independent judiciary system; parliament, the executive branch, and the courts are all under the control of the Party. In particular, there is no commitment based on law and institutions to prevent the state from encroachment on private enterprises or prevent higher levels of government from encroaching on lower levels. As the result, property rights (both cash flow and control over assets) are fundamentally insecure from state predation.

Second, until recently, private firms have yet to play an important role in Chinese growth; the majority of new entry "non-state" firms, in fact, involve some form of government ownership and control. One striking example are community government controlled enterprises in rural areas known as township-village enterprises (or TVEs), whose share in the national industrial output increased from 9% in 1978 to 27% in 1993. Other examples include joint ventures between foreign firms and government and new entrepreneurial firms affiliated with government agencies.

The conventional theories on property rights and ownership regard property rights secure from state encroachment as essential to growth (e.g., North and Weingast 1989, and North 1990) and government ownership as an obstacle to reform (e.g., Shleifer and Vishny 1994). China's economic success would appear to contradict the conventional wisdom. To address the paradox, we develop a theory of the ownership of firm, taking into account possible state predation. This enables us to obtain a new insight that views a certain form of government ownership as an organizational response to insecure property rights.

We consider a model in which the economy has two types of activities: the business activities that generate revenues, and the local government activities that provide local public goods to enhance

revenues. The premise of our theory is that the state has the discretionary power to extract any observable revenue from managers who operate business projects and local governments who provide local public goods. As a result, revenue-based contracts are not feasible. However, ownership provides the owner with the control right to choose projects, thereby allowing him to hide and receive unobservable parts of the revenue. Ownership, therefore, could provide the owner with incentives which otherwise would not be available through revenue-based contracts.

We distinguish three types of firms ownership in such an institutional environment -- "private ownership," "local government ownership," and "state ownership." In private ownership, managers, who operate business projects, have such a control over the firm. Under "state ownership," the state, which has the predatory authority, controls the firm. These two types of ownership are standard in the literature. Our focus here is "local government ownership," under which it is the local government which provides local public goods that controls the firm. The distinction between state ownership and local government ownership is inspired by the Chinese experience, which reflects "ownership decentralization" in the state hierarchy and the integration of business activities with local government activities.

In our model, private ownership provides strong incentives for the owner-manager, but, under the threat of state predation, it fails to provide incentives for local governments and also leads to excessive revenue hiding by the owner-manager. State ownership has the advantage of reducing revenue hiding to the minimum and it enables the state to collect a large share of observable revenue, but at the cost of providing few incentives for both managers and local governments. Under local government ownership, local governments essentially integrate two activities: government activities (to provide local public goods) and business activities (to choose business projects and receive unobservable revenues). The integration of these two activities has two effects on the behavior of local government. First, in the absence of incentives provided by contracts, ownership rights entitle the local government to have unobservable revenue which is enhanced by local government activities, thus providing incentives to carry out government activities. Second, because carrying out government activities requires revenue, the local government can partially internalize the cost of revenue hiding,

and thus has the potential to reduce it. Therefore, local government ownership may lead to the following equilibrium. On the one hand, by integrating government and business activities, the local government can credibly engage in less revenue hiding than a manager; on the other hand, because the local government's activities benefit the state in terms of future revenues, the state can also credibly prey less on local government owned enterprises than on private enterprises.

In a setting with multiple localities, we show that local government ownership hides less revenue than private ownership, even when the state can freely redistribute revenues across localities. However, in this case, the state may have an interest in allowing a differential ownership structure across localities in order to commit itself to less redistribution. In a setting with multiple business projects within one locality, the state may allow ownership diversity within a locality in order to explore the comparative advantages of alternative ownership forms -- local government ownership for local public goods provision and private ownership for managerial incentives. Because of the externality of local public goods, a private owner of one business project would have less incentive to undertake government activities to reduce state predation than the local government which integrates many projects.

Our theoretical analysis is consistent with empirical evidence from China. Our theory predicts some comparative advantage of local government-owned firms under state predation. We show evidence of the prevalence of local government ownership of firms in the Chinese industry during the reform era. Our theory also predicts more security for local government ownership than private ownership, and a positive relationship between local government owned firms and the local government's revenue and local public expenditure. We also show evidence from the rural non-farm sector in China where a higher proportion of community government owned enterprises (TVEs) is indeed associated with a higher share of the community government's (observable) fiscal revenue.

Our paper addresses concerns about institutional responses to insecure property rights similar to those by Greif, Milgrom, and Weingast (1994). Using a repeated game framework, they argue that merchant guilds served as an institutional mechanism to protect merchants' property rights against abuses by the city governments of trading centers, which was achieved by coordinating punitive

actions among merchants against intruding city governments. In a similar spirit, our paper regards government ownership as an organizational response to the problem of state predation. Different from their institutional setting, managers in our context cannot escape the sphere of the state and they are not allowed to form organizations to punish it. However, organizational innovations involving appropriate government ownership of business firms provides interesting mechanisms to reduce losses from insecure property rights.

The idea of government ownership protecting firms in adverse political circumstances is also contained in some recent studies on China's TVEs (e.g., Chang and Wang 1994 and Li 1996). However, these papers assume, rather than explain, that the community government is being useful. Therefore, it is not clear why the community government is able to offer protection, and it is also impossible to assess the limit of the community government's roles. In this paper, we intend to endogenize the capability of community governments in securing property rights in the imperfect institutional environment by focusing on their tasks of carrying out government activities and the effects of integration between government and business activities.

Our model incorporates elements of the two main strands of the literature on the theory of firm -- the ownership models and multi-task models. First, our model shares some elements with the incomplete contract models of ownership (Grossman and Hart 1986 and Hart and Moore 1990) and government ownership of firms (e.g., Schmidt 1996, Shleifer and Vishny 1994, and Hart, Shleifer and Vishny 1996). But, our model has a different institutional setting where the constitutionally unconstrained state exists; furthermore, our model features a local public good and a liquidity/wealth constraint of the state (thus revenue-hiding has important implications). Second, our model relates to the multi-task models of Holmstrom and Milgrom (1991, 1994). In our model, there are multiple tasks -- one task for the government activity (to provide local public goods), and two tasks for the business activity (to operate a project and choose a project type). The allocation of these tasks, in connection with allocation of ownership, becomes crucial in determining incentives, revenue-hiding, and the extent of state predation.

The paper is organized as follows: Section 2 analyzes a simple model to highlight local

government ownership as an organizational response to state predation. Section 3 generalizes the model to a setting with multiple localities and multiple business projects to incorporate considerations of revenue redistribution across localities and the externality of local public goods within a locality. It discusses the possibility of ownership diversity both across localities and within a locality. Section 4 presents empirical evidence from China. Section 5 concludes.

## 2. Local Government Ownership As An Organizational Response to State Predation

We first consider a simple model with one business project in one locality in order to highlight the mechanism of how local government ownership may lead to more secure property rights compared with private ownership.

### Basic Assumptions

The technology of the economy consists of two activities involving two periods. The first activity is a "business activity." One task of the business activity concerns an "operation decision" on a business project (e.g., running a machine). We call the individual who operates the business project a "manager" (denoted by M). The manager's (unobservable) "effort," $a$, enhances the first period return, $R_1(a)$, which is increasing and concave in $a$, at a cost, $D(a)$, which is increasing and convex in $a$. The second period return is independent of $a$ for simplicity. Each of the two period returns, $R_1$, and $R_2$, has an "observable" part and an "unobservable" part. The division of $R_2$ is fixed, $(1-\lambda)R_2$ is observable, and $\lambda R_2$ is not. The division of $R_1$ between the observable part and the unobservable part is determined by project type q ($0 \le q \le 1$): For any given q, $(1-q)R_1$ is observable and $\alpha(q)R_1$ is not. Another task of the business activity concerns a "control decision" of choosing the type of a business project, q. Because revenue hiding is costly, we assume that $\alpha(0)=0$, $\alpha(q) \le q$, and $\alpha(q)$ is concave and $\alpha'(1)<0$. We may think of high q projects as smaller scale, more liquid, or more cash-intensive projects.

Ownership of a business project is defined as (i) the rights of undertaking the task of control over the project type ("push a button"); and (ii) the rights of receiving an unobservable part of the

revenue ("cream off," as it is called in Hart 1988). This definition of ownership combines the notion of control and income together. Here, income (part (ii)) is naturally linked to control (part (i)) because if the owner of the project chooses a technology to hide some parts of the revenue, then he is the one who knows how to recover it. The decision of choosing the type of projects is irreversible: once a particular type of projects is chosen and revenue is hidden (i.e., the button is pushed), it is too late for someone else to take that decision back. Furthermore, ownership cannot be shifted between periods; one way to think about it is that the decision to hide revenue involves where to hide period 1 and period 2 revenues, which is decided at the beginning of period 1.

The second activity is local "government activity" which involves the task of providing local public goods. The local public goods have the potential to increase the second period return, $R_2$. The task of providing local public goods requires one individual to operate (e.g., driving a police car), whom we call "local government" (denoted by G). The effectiveness of local public goods provision in enhancing business projects depends on two factors: local government's (unobservable) effort, g, at cost C(g), which is an increasing and convex function of g, and a local budget, E, spent on the government activity. Consider $0 \leq g \leq 1$ where g represents a probability that the government activity can be revenue enhancing, and 1-g, a probability that the government activity is useless. Then we write $R_2 = gh(E)$, where h is an increasing and concave function of E. That is, higher effort increases the probability of successful provision of local public goods; and the larger budget makes the quality of local public goods better. In reality, local government activities have a wide range, from maintaining social order (e.g. preventing riots) to providing basic living conditions (e.g. sanitary facilities), and from building local infrastructure (e.g. road) to coordinating development in the locality.

There is "the state" in the economy (denoted by S). To capture the idea that both the state and local government are not constrained by the rule of law, we assume that G can take away any observable revenue from M, and S can take away any observable revenue from either M or G. However, as is standard in the literature, we impose a "limited liability" constraint on both M and G, that is, the maximum amount S or G can take away is limited to the observable amount of revenue.

Notice that, given our assumption of a lack of credibility of any revenue-based contracts, there naturally arises a liquidity/wealth constraint for the state, that is, the state cannot spend in the second period more than what it collects in the first period.

We assume that one person can only do one task between operating a business project and providing a local public good, in addition to exercising ownership rights (which involves another task of control over the project type). This implies that M and G cannot be the same person. Without loss of generality, we assume that S does not undertake the tasks of either operating a business project or providing a local public good.[2] Then the economy we consider has three players: M, G, and S.

Let $I_{i1}$ and $I_{i2}$ be the net income received by i (i=M, G, S) in period 1 and 2 respectively, and $\delta$ be the common discount factor. The utility functions of the three players are specified as follows:

$$U_M = [I_{M1} - D(a)] + \delta I_{M2};$$

$$U_G = [I_{G1} - C(g)] + \delta I_{G2}; \text{ and}$$

$$U_S = u_1(I_{S1}) + \delta u_2(I_{S2}).$$

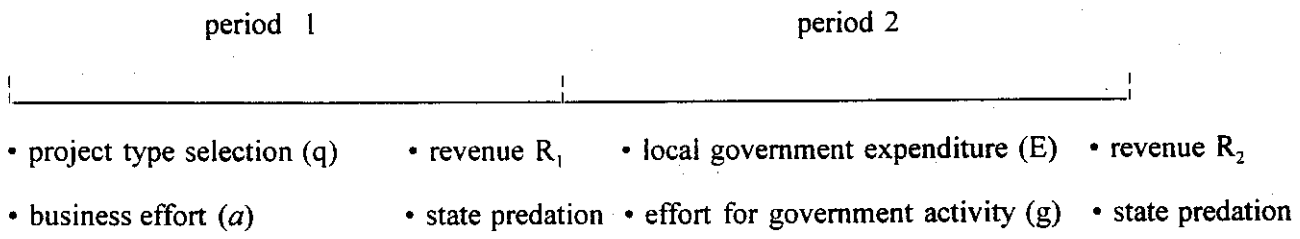
Note that there is no intrinsic difference between G and M in terms of their preferences, and the state is only concerned with its own revenue/consumption, not social welfare.

Our model is one with moral hazard and limited liability but involves no uncertainty or asymmetric information. We consider three types of ownership: private ownership when M has control over project type q and receives unobservable revenues; local government ownership when G has those rights; and state ownership when S has those rights. The sequence of the play is as follows. At the beginning of period 1, the owner of the business project selects type q project and M makes an effort decision, $a$. At the end of period 1, the first period return is realized, $(1-q)R_1$ is observable and $\alpha(q)R_1$ is not. Then the state preys on observable revenues from managers and local governments and receives its budget, $B=(1-q)R_1$. At the beginning of period 2, the state decides on how much

[2] In a more general setting with multiple localities and multiple business projects (as in section 3), the state has to delegate all the tasks (except for one, perhaps) of providing local public goods and operating business projects to managers and local governments, given our maintained assumption that one person can do only one such a task. Hence, our framework always entails "decentralization" of these tasks, and in this sense, our model is not set up to develop a theory of federalism.

expenditure E is given to G for government activities out of its budget B (we later allow the local government to spend e from its unobservable revenue for government activities), and simultaneously local government decides to put effort g into the government activities. At the end of the second period, the second period return is realized, $(1-\lambda)R_2$ is observable and $\lambda R_2$ is not. The state again preys on the observable part. The time line is represented by the following figure:

Figure 1




**The first-best allocation**

Because revenue hiding is costly, $q^* = 0$ in the first best allocation. The first-best allocation maximizes total social surplus $U_M+U_G+U_S$ by choosing non-negative $a$, g, E, $I_{M1}$, $I_{G1}$, $I_{S1}$, $I_{M2}$, $I_{G2}$, and $I_{S2}$ (no storing is possible):

$$\max [I_{M1} + I_{G1} + u_1(I_{S1}) - D(a) - C(g)] + \delta[I_{M2} + I_{G2} + u_2(I_{S2})]$$

$$\text{s.t. } I_{M1} + I_{G1} + I_{S1} + E \le R_1(a),$$

$$I_{M2} + I_{G2} + I_{S2} \le gh(E).$$

It is clear that in the first best allocation,

$$R_1'(a^*) = D'(a^*);$$

$$h(E^*) = C'(g^*);$$

$$u_1'(I_{s1}^*) = \delta u_2'(g^*h(E^*))g^*h'(E^*) \ge 1.$$

If revenue based contracts were enforceable, the first best allocation could be achieved under private ownership provided $R_1(a^*)$ is sufficiently large and $\lambda$ is sufficiently small. To see this, let

manager M control over q. Because E is observable, E* can be enforced. Let a contract awarded to the manager be such that the manager receives $w^m(a^*)$ if the first period observable revenue equals $R_1(a^*)$ and zero otherwise. Let a contract awarded to the local government be such that the local government receives $w(g^*)$ if the second period observable return is $(1-\lambda)g^*h(E^*)$ and zero otherwise. Finally, let the state be rewarded with all the residuals.

In this situation, the manager will choose $q = q^* = 0$ and $a = a^*$ if and only if

(ICM) $$w^m(a^*) - D(a^*) \geq \max_{q,a} [\alpha(q)R_1(a) - D(a)],$$

and the local government will choose $g = g^*$ if and only if

(ICG) $$\delta w(g^*) - C(g^*) \geq 0.$$

This set of contracts is feasible if and only if

(FS) $$w^m(a^*) \leq R_1(a^*)-E^*; \text{ and } C(g^*) \leq \delta(1-\lambda)g^*h(E^*).$$

Combining (FS) with (ICM) and (ICG), we conclude that there exists a set of incentive compatible contracts if and only if

$$R_1(a^*) - E^* - D(a^*) \geq \max_{q,a} [\alpha(q)R_1(a) - D(a)], \text{ and } \delta(1-\lambda)g^*h(E^*) \geq C(g^*),$$

which are guaranteed if $R_1(a^*)$ is sufficiently large and $\lambda$ sufficiently small.

We assume from now on that revenue-based contracts are not feasible. We present private ownership and state ownership as two benchmark cases before focusing on local government ownership.

**Private ownership**

We denote $(q_M, a_M, g_M, E_M)$ as the equilibrium choice under private ownership. Under private ownership, the manager has control over q and receives an unobservable part of revenue $\alpha(q)R_1(a)$ in the first period and $\lambda gh(E)$ in the second period. In the second period, because the local government is deprived of ownership, it cannot be motivated in the absence of revenue-based contracts, thus $g_M=0$. Because the local government's effort is essential to the second period revenue, expecting $g_M=0$, the state leaves nothing for the local government, that is, $E_M=0$. At the end of the first period, the state expropriates all observable revenues from the private firm. Anticipating this, at the beginning of the

first period, M chooses q and $a$ to maximize $\{\alpha(q)R_1(a)-D(a)\}$, which gives $\alpha'(q) = 0$ and $\alpha(q)R_1'(a) = D'(a)$.

Proposition 1: Under private ownership:

(i) the manager hides revenue to the maximum degree ($q_M = \bar{q}$ , where $\alpha'(\bar{q})=0$);

(ii) the manager has moderate incentives to exert effort ($0 < a_M < a^*$ );

(iii) the local government has no incentive for government activities ($g_M=0$); and

(iv) the state leaves the local government G no expenditure for government activities ($E_M =0$).

Under the threat of state predation, if q were low, the manager would have no incentives to supply $a$. The manager chooses high q to hide revenue: although it is productive in terms of providing incentives for $a$, it is inefficient because resources are wasted on revenue hiding. At the same time, the state cannot motivate the local government to exert effort g for government activities. This double inefficiency characterizes the situation of private ownership under state predation: excessive revenue hiding and an under-supply of effective local government services.

**State ownership**

We denote ($q_S$, $a_S$, $g_S$, $E_S$) as an equilibrium choice under state ownership. Now S has control over the choice of q and receives the unobservable part of the revenue. As the state receives both the observable and unobservable revenues, it has an incentive to reduce the inefficiency from revenue hiding to the minimum. However, under state ownership, both the manager and local government are deprived of ownership, thus, in the absence of revenue-based contracts, the state is unable to motivate either the manager or the local government in a credible way. Therefore, their incentives are low. Anticipating this outcome, the state will not leave any budget to the local government in the first place. We have

Proposition 2: Under state ownership:

(i) the state does not hide any revenue ($q_S = 0$);

(ii) the manager has no incentives to exert effort ($a_S = 0$);

(iii) the local government has no incentive to exert effort for government activities ($g_S = 0$); and

(iv) the state leaves the local government no expenditure for government activities ($E_S = 0$).

**Local government ownership**

We denote ($q_G$, $a_G$, $g_G$, $E_G$) as an equilibrium choice under local government ownership. Now, the local government chooses q and receives an unobservable part of the revenue. In the second period after q and $a$ are chosen, the local government chooses g to

$$\max \delta\lambda gh(E) - C(g).$$

This gives a reaction curve g(E). The state chooses E to

$$\max u_1(B-E) + \delta u_2((1-\lambda)gh(E)),$$

where $B=(1-q)R_1(a)$. This gives another reaction curve E(g, B).

Any solution (E, g) to g(E) and E(g, B) constitutes a Nash equilibrium. Obviously, (E= 0, g=0) is always one equilibrium. However, we are interested in a "nontrivial" equilibrium (E, g) where E>0 and g>0. We note that the reaction curve, g(E), is always upward sloped and the reaction curve, E(g, B), increases in B. It is easy to derive (see the proof of Lemma 2(ii)):

Lemma 1: Suppose $\partial E(g, B)/\partial g < 1/\{dg(E)/dE\}$ at a nontrivial equilibrium (E, g). Then (E, g) increases in B.

Using Lemma 1, we derive:

Proposition 3: Suppose $\partial E(g, B)/\partial g < 1/\{dg(E)/dE\}$ at equilibrium (E, g) under local government ownership with $E > 0$ and $g > 0$ for all $q < 1$. Then:

(i) the local government hides less revenue than an owner of a private firm ($q_G < q_M = \bar{q}$); and

(ii) the manager has no incentives to exert effort ($a_G = 0$).

Proof: $a_G = 0$ is obvious. In the first period, the local government chooses q to

$$\max \alpha(q)R_1(0) + \delta\lambda g(q)h(E(q)) - C(g(q)).$$

The first order condition is given by, using the envelope theorem,

(1) $$\alpha'(q)R_1(0) + \delta\lambda g(q)(\partial h/\partial E)(\partial E/\partial q) = 0.$$

By Lemma 1, $\partial E/\partial q < 0$. Hence $\alpha'(q_G) > 0$, which implies that $q_G < \bar{q}$.■

Local government ownership allows the local government to integrate government activities and business activities together. The first consequence of this integration is the incentive effect. Ownership rights allow the local government to receive unobservable revenues, and thus to receive benefits from government activities in a credible way, so it provides the local government with incentives for performing government activities. Such incentives cannot be provided under both private and state ownership because revenue-based contracts are not feasible. Because of this incentive effect, the state has an interest in leaving some expenditure to the local government, that is, to prey less on local government-owned firms.

The second consequence of the integration of the two activities concerns the task of control over project choice and the extent of revenue hiding. Given the incentive effect, the state will increase local government expenditure E as long as its budget B increases (as a result of relaxing the liquidity constraint). On the other hand, under local government ownership, the local government can receive the second period unobservable revenue, thus can benefit from any increased local expenditure E. Notice that the local government and the manager under private ownership share the same technology, and furthermore, at the maximum hiding under private ownership, the marginal net benefit of hiding is zero ($\alpha'(q_M)=0$). Consequently, with the additional benefits coming from the increased local expenditure as a result of less revenue hiding, the local government, when allocated with the task of control over project choice, will hide less revenue as compared to a private owner. In this sense, the local government, by integrating business and government activities, partially internalizes the cost of revenue hiding and thus reduces efficiency losses. If revenue-based contracts were possible, the cost of revenue hiding would be internalized through explicit contracting between the manager and the

local government. However, under state predation, such contracts are not enforceable, and integration of the two activities under local government ownership is an alternative arrangement.

**An Example**

To illustrate the mechanism, consider the following example. There are two types of a project: type A leads to first period returns ($10, $100) and type B leads to ($50, $80), where the first components are observable and the second are not. The local government's effort has only two levels: zero or positive, and the latter is costly. The local government activity needs a budget of either $4 or $12, which enhances the second period return to ($8, $8) and ($40, $40) respectively if the local government exerts a positive effort, where, again, the first components are observable and the second components (net of effort) are not; the second period returns are all zero if the local government does not exert an effort. The manager's effort is assumed to be irrelevant in this example.

Under private ownership, the local government's effort is zero since it cannot be compensated in a credible way. Then the manager would never choose a type B project since the state would take away $50 and leave nothing to the local government, which makes the second period returns zero. Thus, the manager chooses a type A project and the state takes away all of the $10 and does not provide any budget to the local government.

Under local government ownership, if the local government chooses a type A project, the state gives back $4 to the local government and the local government exerts an effort to enhance the business project return. As the result, in the second period, the state gets $8 and the local government gets $8 (net of effort). This is the incentive effect, which also gives rise to less state predation in the first period. Overall, the state gets net $(10-4+8)=$14 and the local government gets net $(100+8)=$108.

Moreover, the local government now may want to choose a type B project, which is more efficient since it involves less revenue hiding. If a type B project is chosen, after receiving $50 instead of $10, the state gives the local government $12 (as a result of relaxing the liquidity constraint), which enhances the second period returns of the project, $40 to the state and $40 (net of

effort) to the local government. As \$(40-12)>\$(8-4), the state will give \$12 rather than \$4 to the local government. Because \$(80+40)>\$(100+8), the local government will choose a type B project over a type A project. This is the less-revenue-hiding effect. In the end, the state gets a two-period net revenue \$(50-12+40)=\$78 and the local government gets \$(80+40)=\$120. Both are better off compared to choosing a type A project. Clearly, in this example, it is in the state's own interest to sustain local government ownership rather than private ownership.

**Using Unobservable Revenue for Local Government Expenditure**

Proposition 3 assumes that the unobservable revenue is not used as part of local government expenditure. Will the result still hold if a local government-owned firm hides less revenue than a privately owned firm if the local government can use the unobservable revenue for local public goods expenditure as well? To address this issue, suppose that the state and local government choose simultaneously the amounts of expenditure for local government activities from their own budgets. That is, the state chooses E from its budget $(1-q)R_1$ and the local government chooses e from the unobservable part of revenue $\alpha(q)R_1$. Apparently, there exists strategic substitution between the expenditure from the state and from the local government, which may reduce the incentives of the state to leave funds for the locality, and consequently, the local government's incentive to hide less revenue. However, our result remains even in this case. This is because less revenue hiding always has a zero marginal cost at $q = \bar{q}$ but a positive marginal benefit to the local government since it strictly increases the budget given by the state.

Proposition 4: When the local government uses its unobservable revenue for local public goods expenditure in addition to the budget provided by the state, revenue hiding under local government is still smaller than under private ownership.

Proof: See Appendix.■

**Essence of the Mechanism**

Table 1 summaries the results thus far.

| Table 1 | | | |
|---|---|---|---|
| first best | private ownership | state ownership | local government ownership |
| $q^* = 0$ | $q_M = \bar{q}$ | $q_S = 0$ | $q_G < \bar{q}$ |
| $a^*>0$ | $0 < a_M < a^*$ | $a_S = 0$ | $a_G = 0$ |
| $g^*>0$ | $g_M = 0$ | $g_S = 0$ | $g_G > 0$ |
| $E^*>0$ | $E_M=0$ | $E_S = 0$ | $E_G > 0$ |

In our model, the state cares about revenue, and therefore cares about both business and government activities. Lack of credible commitment of the state prevents it from extracting the "first best" amount of revenue. The model has the feature that the second period benefit requires effective government services that combine both revenue expenditure E and effort g. Thus government activity plays the potential role that aligns the interests of the state and the local government. At equilibrium, local government ownership can credibly engage in less revenue hiding than private ownership, and at the same time the state can credibly prey less on local government owned enterprises than on private enterprises.

However, the difference between the two activities is not that government activity uses revenue and business activity does not. The model can be generalized in such a way that business projects also require investments at the beginning of the second period to enhance the second period return. The mechanism remains that the government activity of providing local public goods always enhances the second period return *in addition to* private investments. Indeed, what matters are the conditions under which an individual who integrates two activities (the local government here) is *more* useful to the state than an individual (the manager here) who only does one (business) activity.

**Allocation of Ownership by the State**

In our model, the state not only preys on cash flow, but also has the ultimate right to determine whether to allow alternative ownership to exist. Therefore, we consider the situation in which the state chooses alternative assignments of tasks and ownership in order to maximize its utility. Specifically, before period 1, the state assigns individuals (i) tasks of operating business projects or providing local public goods; and (ii) the ownership rights to business projects. Then, only if the state prefers one ownership form to another, does that ownership form become "self enforcing" and thus the control rights become "secure."

Table 2 gives the utilities of the manager M, the local government G, and the state S under each of the three ownership forms:

Table 2

| | private ownership | state ownership | local government ownership |
|---|---|---|---|
| $U_M$ | $\alpha(q^-)R_1(a_M)$-$D(a_M)$ | 0 | 0 |
| $U_G$ | 0 | 0 | $\alpha(q_G)R_1(0)$-$C(g_G)$+$\delta\lambda g_G h(E_G)$ |
| $U_S$ | $u_1((1-q^-)R_1(a_M))$ | $u_1(R_1(0))$ | $u_1((1-q_G)R_1(0)-E_G) + \delta u_2((1-\lambda)g_G h(E_G))$ |

Examining Table 2, it is clear that the necessary conditions for local government ownership to be in the best interest of the state is when the state is quite patient (i.e., $\delta$ is large) or the manager's effort is not very significant (i.e., $R_1(a_M)/R_1(0)$ is small). Furthermore, the state has an interest in allowing local government ownership rather than private ownership to exist, provided the first period revenue under local government ownership is greater than under private ownership (i.e., $R_1(a_M)/R_1(0) < (1-q_G)/(1-q^-)$), and $\lambda$ is large enough to provide sufficient incentive to the local government but small enough to give a sufficient share of the second period returns to the state.

Table 2 also tells us that total social surplus (i.e., $U_M+U_G+U_S$) under the three ownership forms depends on parameter values. First, local government ownership dominates private ownership only if

$\delta$ is sufficiently large. Indeed, a larger $\delta$ provides higher benefits to the local government in the second period (than what a private manager would obtain in the first period), and it is also a necessary condition for local government ownership to be in the best interest of the state. Second, local government ownership dominates state ownership if $q_G$ is small. When both $q_G$ (revenue hiding by the local government) and $q_M=q^-$ (revenue hiding by a private owner) are sufficiently large, state ownership dominates both private and local government ownership. Finally, private ownership dominates both state and local government ownership if the managerial effort is crucial (i.e. $R_t(a_M)/R_t(0)$ is large).

It is useful to note that because we have treated the problem as one of assignment design by the state, all individuals are "agents" of the state and the difference between two individuals labeled as "manager" and "local government" lies in their different task assignments: the former operates a business project and the latter provides a local public good. In this setup, we do not distinguish between "public" and "private" provision of public goods, but we make a distinction between those who carry out government activities (called governments) and those who operate business projects (called managers).

## 3. Multiple Localities and Multiple Business Projects

The above simple model with one business project in one locality highlights the mechanism in which local government ownership may provide incentives for local governments, reduce costly revenue hiding, and discourage state predation. We now generalize the model into a setting with multiple localities and multiple business projects. Introducing multiple localities gives rise to the possibility of revenue redistribution by the state across localities, thus inducing free-riding among local governments. Introducing multiple business projects in one locality, on the other hand, highlights the externality nature of local public goods. In this section, we first consider the case with N localities (N>1) while maintaining the assumption that each locality has only one business project (L=1) and one local public good. We then analyze the case of one locality (N=1) with L business projects (L>1) and one local public good, the latter enhancing all L projects symmetrically. We maintain our assumptions

about the preferences of individuals and the state and that each individual can do only one of the two tasks: operating a business project or providing a local public good.

**Redistribution Across Localities**

When the state can freely redistribute its revenues across these localities, the local governments may free ride each other. Clearly, the incentive effect always remains. To examine the issue of whether local government ownership still leads to less revenue hiding than private ownership, we consider the case of $N > 1$ (multiple localities) and $L = 1$ (one business project in each locality). Under local government ownership in all N localities, let $B = (N-\Sigma q_i)R_1(0)$ be the budget of the state at the end of the first period and $E_i$ be the budget provided to the ith local government in the second period. The state chooses $(E_1,.., E_N)$ to

$$\max u_1(B-\Sigma E_i) + \delta u_2((1-\lambda)\Sigma g_i h(E_i)).$$

In the second period, the ith local government chooses $g_i$ to

$$\max \delta\lambda g_i h(E_i) - C(g_i),$$

which gives the same increasing reaction function $g_i = g(E_i)$ (as in the previous section) for all i.

Lemma 2: (i) Reaction functions $E_i(g_1,...,g_N, B)$ $(i=1,...,N)$ are symmetric in $(g_1,...,g_N)$, are increasing in B, and are decreasing in $g_j$ $(j \neq i)$; and

(ii) suppose $(\partial g/\partial E)\ \Sigma_j(\partial E_i/\partial g_j) < 1$ at a nontrivial symmetric equilibrium $(E_1, ..., E_N, g_1, ..., g_N)$, then the equilibrium is increasing in B.

Proof: See Appendix. ■

Using Lemma 2, we establish:

Proposition 5: At a symmetric Nash equilibrium when the condition in Lemma 2 holds:

(i) revenue hiding under local government ownership in all localities is smaller than that under private

ownership; and

(ii) revenue hiding by all local governments, $q_G$, increases as N increases.

Proof: See Appendix.■

Proposition 5 states that when the state can freely redistribute all the observable revenues across localities for local expenditures, the incentive for each local government to hide less revenue might be reduced because they free ride each other. However, Proposition 5 also says that a local government always hides less than a private owner, as long as N is finite.[3]

**Ownership Diversity Across Localities**

The concern for free-riding may affect the state's optimal choice of ownership structure across localities. We now examine the possibility of ownership diversity across localities to serve as a commitment device to reduce the free-riding problem. Let the state assign proportion $\gamma$ of the N localities with local government ownership, proportion $\eta$ localities with state ownership, and proportion $\mu$ with private ownership, where $\gamma + \eta + \mu = 1$. For simplicity, we further assume that both $u_1$ and $u_2$ are linear.

Evidently, localities with either private ownership or state ownership will have no local public goods provision and no second period return. Therefore, the state prefers private to state ownership if and only if the former generates more first-period observable revenues than the latter. Thus, ownership of a project, if not assigned to the local government, will be assigned to a manager if $(1-q^-)R_1(a_M) \geq R_1(0)$ and to the state if $(1-q^-)R_1(a_M) < R_1(0)$.

Consider the case $(1-q^-)R_1(a_M) \geq R_1(0)$. Then the state chooses an ownership structure ($\gamma$, 0, $1-\gamma$) with $\gamma N$ localities of local government ownership and $(1-\gamma)N$ localities of private ownership. We

[3] When the model is applied to China's TVEs, localities are townships and the state can be viewed as the county government. County is one level above township in Chinese hierarchy. China has, on average, less than 20 townships per county.

focus on a symmetric Nash equilibrium (q, E, g) among these $\gamma N$ localities. Notice that for a given state's budget B, ownership structure across localities does not affect the state's reaction function $E_i(g)$. Accordingly, a symmetric Nash equilibrium (q, E, g) is the same as the one analyzed in Proposition 5. As both $u_1$ and $u_2$ are linear, $\partial E/\partial B > 0$ if and only if

$$\delta(1-\lambda)gh'(E) > 1. \tag{6}$$

That is, the state increases its expenditure in each of the $\gamma N$ localities as its budget increases, provided investing in the future promises higher marginal benefits than consuming today. Furthermore, under condition (6), the state spends all its budget on localities with local government ownership, thus

$$E = [N(1-\gamma)(1-\bar{q})R_1(a_M) + N\gamma(1-q(\gamma))R_1(0)]/N\gamma.$$

In the first period, for the ith local government, given the choice of all other local governments, the choice of $q_{Gi}$ is given by, using the envelope theorem,

$$\partial U_G/\partial q = \alpha'(q_{Gi})R_1(0) - \delta\lambda g_i(q_{Gi})(\partial h/\partial E)R_1(0)/(N\gamma) = 0. \tag{7}$$

Before the first period, the state makes an optimal choice of $\gamma$ to

$$\max \ \delta N\gamma(1-\lambda)g(E)h(E)$$

$$\text{s.t. } E = (\gamma^{-1}-1)(1-\bar{q})R_1(a_M) + (1-q(\gamma))R_1(0).$$

The first order condition for an interior solution is given by:

$$gh + [(\partial g/\partial E)h + g(\partial h/\partial E)]\gamma(dE/d\gamma) = 0. \tag{8}$$

Proposition 6: Suppose $(1-\bar{q})R_1(a_M) \geq R_1(0)$ and inequality (6) holds. Then at the optimal ownership structure $(\gamma, 0, 1-\gamma)$, the more localities having local government ownership, in those localities:

(i) the less incentive to hide less revenue ($dq/d\gamma > 0$);

(ii) the smaller the budget is given by the state ($dE/d\gamma < 0$); and

(iii) the less incentives to exert effort for government activities ($dg/d\gamma < 0$).

Proof: See Appendix. ■

With the help of Proposition 6, equation (8) illustrates both the marginal benefit and marginal

cost of having local government ownership vis-a-vis private ownership across localities. The marginal benefit of having more local government owned firms is that local public goods will be available in more localities (captured by the first term in (8)). The marginal cost of having more local government ownership is the decline of the state's budget, which in turn reduces the effective local public goods provision in those localities with local government ownership (captured by the second term in (8)). Here the state budget declines for two reasons. First, revenues coming from a smaller number of localities with private ownership are now shared by a larger number of localities with local government ownership. Second, as local government ownership increases, the local governments' incentives for less revenue hiding is weakened, and thus each locality with local government ownership contributes less to the state's budget. Therefore, our analysis implies that by allowing some localities to have private ownership, the state credibly commits not to give budgets to these localities, thus reducing the incentives for free riding among those localities having local government-owned firms.

**Ownership Diversity Within a Locality**

The government activity of providing local public goods has a positive externality on all enterprises within a locality regardless of their ownership. We now focus on how such an externality gives rise to the possibility of ownership diversity within a locality. To this end, we consider the case of N=1 (one locality) and L>1 (multiple business projects in one locality) and the state assigns ownership of proportion $\gamma$ of the L projects to the local government, proportion $\eta$ to the state, and proportion $\mu$ to $\mu L$ managers, where $\gamma + \eta + \mu = 1$.

Again, we assume that both $u_1$ and $u_2$ are linear. Then $\partial E/\partial B > 0$ if and only if

$$\delta L[(\gamma+\mu)(1-\lambda)+\eta]gh'(E) > 1. \tag{9}$$

When inequality (9) holds, the state in the second period gives its entire budget B to the local government, where

$$B = L\{\gamma(1-q_G)R_1(0) + \eta R_1(0) + \mu(1-\bar{q})R_1(a_M)\}.$$

The local government's choice of g is determined by the first order condition:

$$\delta\lambda L\gamma h(B) = C'(g),$$

which leads to $g_G = g(B,\gamma)$, where $\partial g/\partial B > 0$ and $\partial g/\partial \gamma > 0$.

In the first period, the local government's choice of $q_G$ is given by, using the envelope theorem:

$$\alpha'(q_G) - \gamma\delta\lambda g(B,\gamma)(\partial h/\partial B) = 0,$$

which gives $q_G = q(\gamma)$.

Before the first period, the state makes an optimal choice of $(\gamma, \eta, \mu)$ to

$$\max \delta L((\gamma+\mu)(1-\lambda) + \eta)g(B(\gamma,\eta,\mu),\gamma)h(B(\gamma,\eta,\mu)),$$

$$\text{s.t. } B = L\{\gamma(1-q_G)R_1(0) + \eta R_1(0) + \mu(1-\bar{q})R_1(a_M)\},$$

$$\gamma + \eta + \mu = 1.$$

In the second period, all types of firms produce gh(E) for any given g and E. Because the state receives a 100 percent share of the second period return from state firms but only $(1-\lambda)$ share from private and local government firms, from the perspective of the state, state firms enjoy an absolute advantage over private and local government firms in exploiting the externality of the local public good. Therefore, unless private firms deliver more first period observable revenues than state firms (i.e., $(1-\bar{q})R_1(a_M) > R_1(0)$), private ownership is dominated by state ownership. On the other hand, this advantage of state firms diminishes when $\lambda$ becomes sufficiently small. In such a case, the state prefers state ownership only if state firms can enhance the state's first period budget (i.e., $(1-\bar{q})R_1(a_M) < R_1(0)$).

Proposition 7: Suppose inequality (9) holds. Then at the optimal ownership structure $(\gamma, \eta, \mu)$:
(i) if local government firms exist ($\gamma>0$), then the more local government firms, the more incentive the local government has to exert effort for government activity ($dg/d\gamma>0$);
(ii) if private firms exist ($\mu>0$), then the more private firms, the larger the state's budget ($dB/d\mu>0$); and
(iii) if state firms exist ($\eta > 0$), and if further $\lambda$ is sufficiently small, then the state's budget is nondecreasing in the number of state firms ($dB/d\eta \geq 0$).

Proof: See Appendix.■

Proposition 7 helps identify the marginal benefits and costs of alternative ownership from the perspective of the state. First, local government ownership has a marginal benefit in increasing local government's effort g. Second, private firms may exist *only* because they increase the state's first period budget. Third, state ownership may exist, *either* because it can better take advantage of the positive externality from local government ownership *or* because it increases the state's first period budget. Since the increment of one ownership form always crowds out another ownership form, the marginal costs of one ownership are therefore the marginal benefits of the other ownership. Our analysis implies that, on the one hand, the state may allow private ownership to exist for the larger first period revenue; one the other hand, because in the absence of revenue-based contracts the effective local public goods provision would be reduced as a result of increasing private ownership, the state may not desire a complete privatization of local government firms.[4]

**The Nature of Local Governments**

Suppose that the state still assigns ownership rights but individuals may choose to undertake the tasks of operating business projects or providing local public goods. In such a situation, will an individual who owns one business project have an incentive to carry out government activity in order to shield his business from state predation? To answer this question, we again consider the case of N=1 (one locality) and L>1 (multiple business projects in one locality). Let an individual own one business project, hire another individual to operate the project, and carry out the government activity himself. Because he is only able to capture a small portion of the social benefits of local public goods, his incentive for doing so is low. Thus an owner of one project is not credible for carrying out government activities effectively because he is unable to internalize the externalities from local public

[4] A similar idea is explored in a different model by Bai and Tao (1997). They show that, in a multi-agent, multi-task firm where one task generates a company public good ("goodwill"), it is optimal for the owner to offer a contract mix of high-powered incentives (franchised units) and low powered incentives (company-owned units) to ex ante homogeneous agents.

goods. On the other hand, an individual who owns many business projects together (in the same location) has a higher incentive, the highest incentive coming from that individual who integrates all L business projects (in the same location).

Proposition 8: The incentive of an individual to carry out government activities effectively monotonically increases with the number of business projects he owns. In particular, under

$$(1-\lambda)h(E) < C'(0) < L(1-\lambda)h(E),$$

an individual who owns one project has no incentive to undertaking government activities effectively and an individual who owns all L projects has such an incentive.

Therefore, in order to provide an individual with the incentive to carry out government activities effectively, he should be able to receive a large enough portion of the benefits for the local public goods, that is, to "cream off" revenues from a large number of business projects which are enhanced by the local public goods. In our model, the only way such incentives are provided is through ownership. Therefore, the ultimate difference between a "local government" and a "private owner" here concerns the extent of integration of business projects in one locality.

Conceivably, in an alternative setup with the rule of law, such an incentive can be provided to an entity who is given the authority to cream off, legally, a portion of the revenues of business firms. This entity is then called a local government and this portion of revenue is called a local tax. An individual without such authority does not completely internalize the externality of the local public goods unless he owns all the business projects in the same locality.

## 4. Empirical Evidence from China's Transition to Markets

Our theory predicts government ownership in the environment where there is a lack of state commitment. Our theory predicts the degree of security of property rights in local government-owned firms and in private firms and the relationship between local government ownership of firms and local government revenue/expenditure. In particular, our theory implies that local government-owned firms

have more secure property rights than private firms; and the higher the proportion of local government-owned firms relative to private firms, the higher the local government's (observable) revenue, and the higher the local public goods provision. We present below empirical evidence from China's transition to markets in supporting these results.

**Prevalence of Government Ownership of New Firms in the Non-State Industrial Sector**

Chinese firms fall into one of three ownership categories (see Table 3). State-owned enterprises (SOEs) are enterprises legally owned by all of the people in the country, and most of them were present during the planning era. Although supervision authority of most SOEs is delegated to provincial, city, and county governments, the ultimate control rights over the assets of SOEs are allocated to the central government. For example, all SOEs are subject to nationwide unified accounting regulation, wage control, welfare obligations, taxation, etc.[5] Between 1978 and 1993, without any privatization, SOEs had some slow growth in absolute terms. However, their relative share in national industrial output declined from 78% in 1978 to 43% in 1993. SOEs in China are known to be inefficient.

All other firms are called "non-state" enterprises, which accounted for 57% of the national industrial output in 1993. In 1993, about one quarter of non-state industrial output, or 15% of the national total, was produced by enterprises which are truly privately owned. These include "urban small private enterprises," "rural private enterprises," and large private enterprises and foreign enterprises in the "others" category. Although impressive in growth, pure private firms have yet to play important roles in Chinese industry.

In 1993, about three quarters of the non-state industrial output, or 42% of the national total (about equal in size to SOEs), was produced by non-state enterprises involving some form of government ownership and control. Within this category, the rural "township-village enterprises"

[5] The ultimate state control rights of SOEs was reasserted in the important Party document issued in November 1993: "For State-owned property in enterprises, the system will be for unitary ownership by the State, supervision by governments at various levels and independent management by the enterprises" (p.1, Supplement, *China Daily*, November 17, 1993)

(TVEs) represent the largest subsector, and the importance of TVEs is seen from the fact that they alone accounted for about one half of the industrial output within the non-state sector. Extensive evidence shows that TVEs are enterprises with the community (township or village) government in control (Chang and Wang 1994, Che and Qian 1995, and Li 1996). Although managers of individual TVEs run the daily operation, it is the community government which makes "strategic decisions" in areas such as as finance, investment, and selecting and rewarding managers.

In the urban areas, the urban collectives are enterprises set up by SOEs or government agencies (e.g. statistical bureaus and police bureaus) and government affiliated units (e.g. universities and hospitals). While some old urban collectives were set up before reform and resemble SOEs, many new urban collectives are more like TVEs. Other non-state firms with government control take mixed ownership forms such as state-foreign joint ventures, limited liability companies, joint stock companies, and holding companies.

**Different Degrees of Property Rights Security in Government Firms and Private Firms**

Evidence shows that property rights are more secure in government owned enterprises than in private enterprises. First, the state's regulations have been less hostile to TVEs than private enterprises. Collective enterprises (TVEs are part of them) have always been allowed to legally operate. As early as the mid-1970s amid the wave of "agriculture mechanization," many rural areas began to launch commune-brigade enterprises (the predecessors of TVEs) despite the fact that they were regarded as the "tail of capitalism" and faced all kinds of attacks (Byrd and Lin, p.10, 1990). Beginning in 1978, the state declared that commune-brigade enterprises should strive for greater development, and it encouraged provincial, city and county governments to adopt "a policy of allowing tax breaks or tax exemptions for commune and brigade enterprises in light of their situation."[6] In comparison, the state allowed private enterprises to operate only in 1981 but limited their hiring to no more than 8 employees per enterprise, although this restriction was removed in 1984.

[6] "Resolution on Several Questions about Speeding Up Agricultural Development," December 1978, as quoted by Byrd and Lin (1990).

Second, security of private property rights is not guaranteed even if there is legislation or regulations on paper favoring it. The state attacked private enterprises on several occasions during general political crackdown, which include the "anti-spiritual pollution" campaign of 1983, the "anti-bourgeois liberalization" campaign of 1987, and most recently, after the Tiananmen incident of 1989. In August, 1989, the state attacked "individual and private entrepreneurs who use illegal methods to seek huge profits and thereby create great social disparity and contribute to discontent among the public" and launched a series of investigations into the tax records of individuals and private firms.[7] In comparison, no such attack on TVEs is reported during the same time period.

**Local Public Goods Provision and Local Government Ownership: A Tale of Two Cities**

Wuxi of Jiangsu province and Wenzhou of Zhejiang province are well known in China because they represent two extremes of ownership structure in rural industries. In Wuxi, the community government-run enterprises (TVEs) have been dominant and private enterprises almost do not exist. As early as 1977, Wuxi "was achieving the best results of any of China's 2,100 counties in running commune and brigade industries [which were predecessors of TVEs], and the income from these enterprises became the chief source of funds for the county's rural communities. During 1971-78, Y148 million [or Y148 per capita] in profits from these firms went into agricultural machinery, bridges and power stations, field terracing, and other agricultural investments" (Song and Du 1990). This was a relatively high level of local public expenditure at the time.

On the other hand, Wenzhou has been dominated by private enterprises. Song and Du (1990) reported that [in 1983] township governments in Wenzhou were "impotent in performing their administrative functions," and "basic facilities and public works in the townships of Wenzhou Prefecture were rather backward, considering the rate of capital accumulation. Farmers were building three- and four-story houses with kitchens and bathrooms, but their kitchen slops were running in the streets for lack of sewers. Cultural, public health, and other public undertakings were lagging behind

[7] State Council document, August 30, 1989, as quoted by Whiting (footnote 100, p.109, 1995).

other areas." The poor road conditions remained in 1992 and 1994 when the authors of this paper visited Wenzhou.

**Local Government Revenue and Ownership: Econometric Evidence**

Using panel data from 28 provinces in China between 1986 and 1993, Jin and Qian (1997) econometrically investigated the relationship between the distribution of ownership of non-farm firms and the community government's revenue in rural China. In the rural areas, there are no SOEs, and non-farm firms are either privately owned or local government owned (TVEs). Combining both private enterprises and TVEs, rural non-farm enterprises in 1993 accounted for about one half of China's non-farm employment and produced more than one third of the national industrial output.

In their study, the independent variable is the TVE share in the rural non-farm employment, which is a measure of the relative importance of local government ownership to private enterprises in the rural non-farm sector. The dependent variables are shares of the state and community government's fiscal revenue in the total rural net income.[8] It should be noted that there is no prior reason why the share of TVEs should be positively correlated with the share of the state and community government's revenue. In fact, if the state or community government is equally good at taxing both private enterprises and TVEs, and if TVEs are less efficient than private enterprises, the relationship should be negative. Only when the community is able to extract more revenues from TVEs than from private enterprises and TVEs are not too inefficient, should we expect a positive relationship.

They found that the share of TVEs in rural non-farm employment had positive effects on shares of both the state and community government's revenue, after controlling for the level of per capita income. This means that both the state and community governments gained from government ownership. They also found that a one percent increase of the share of TVEs in rural non-farm

[8] According to Chinese statistics, the income of the rural economy is distributed among three entities: the state (all governments above the township level), the community (township and village) government, and households.

employment increased the share of the state by 0.1 percent while it increased the share of the community government by 0.2 percent. This means that the community government gained even more at the margin, and that TVEs are a vehicle for the community government to use to prevent revenues from being taken away by the state. The evidence supports to our theory.

## 5. Conclusions

In this paper we present a theory of ownership of firms under imperfect state institutions. We show that local government ownership can be perceived as an organizational response to state predation. Without revenue-based contracts, ownership can provide incentive because the owner can hide some revenue. Thus, giving ownership rights to local governments will have incentive effects. Moreover, by controlling two activities -- government and business -- together, the local government is able to credibly engages in less revenue hiding as compared to the owner of a private business, and the state may optimally prey less on local government-owned firms than on private firms in its own interest. We thus made a case for the integration of local government activity and business activity under state predation. This helps in understanding why the separation of local government and business activities is difficult to achieve during the transition process when state institutions remain imperfect. Our theory is consistent with the empirical evidence from China.

Three insights emerge from our study. First, a certain form of government ownership emerges as an organizational response to the imperfect state institutions, which may work better than either pure private or pure state ownership. Though not the first best choice, this type of ownership can reduce the adverse effects from state predation in the absence of institutions to constrain the state. The positive role of the government identified here is not to cure "market failure," but rather local government ownership is perceived to overcome "state failure."

Second, integrating local government and business activities can be efficiency enhancing when revenue-based contracts are problematic. While such an integration has no apparent advantage when complete contracts are feasible, under state predation integration helps internalize the externalities between alternative activities. In such a circumstance, allocation of tasks has interesting interactions

with allocation of ownership.

Third, ownership diversity across localities and within a locality may emerge in this institutional environment. The state may use a differential ownership structure as a commitment device to reduce the adverse effect from redistribution across localities. The state may also benefit from a mix of private and local government ownership because the latter may be the only credible way to provide local public goods while the former provides higher incentives to managers.[9]

[9] A natural question arises: Why do we not observe TVE-type firms in other developing and transition economies where state predation is also a serious problem? While a full answer requires another paper, it is useful to point out, in connection with our model, two crucial elements held in China under reform: (1) township and village governments have the authority to integrate government and business activities together; and (2) deep fiscal decentralization has the effect of little redistribution across counties. These elements may not hold up in other developing and transition economies where typically local governments are prohibited from doing business to benefit themselves and/or the state hierarchy is much too centralized.

Table 3

China: Ownership Structure by Industrial Output Value (1978-1993)

| | 1978 | 1993 |
|---|---|---|
| STATE-OWNED ENTERPRISES (SOEs) | **78%** | **43%** |
| | | |
| NON-STATE-OWNED ENTERPRISES | 22% | 57% |
| | | |
| • **Government Ownership and Control** | **22%** | **42%** |
| a. Township-village enterprises (TVEs) | 9% | 27% |
| b. Urban collectives | 13% | 10% |
| c. Others (mixed ownership with government in control such as joint ventures, stock companies, holding companies) | 0% | 5% |
| | | |
| • **Private Enterprises** | **0%** | **15%** |
| a. Rural private enterprises | 0% | 9% |
| b. Urban small private enterprises | 0% | 1% |
| c. Others (large private enterprises, foreign firms, mixed ownership with private in control) | 0% | 5% |
| | | |
| TOTAL | **100%** | **100%** |

Source: P.363, p.373, and p.375, *Statistical Yearbook of China*, 1994.

Remarks: The 50:50 division of the "others" category between government ownership and private ownership is our rough estimate.

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## Appendix: Proofs of Propositions

Proof of Proposition 4: Note that in the first period, the local government chooses q to

$$\max \alpha(q)R_1(0) - e(q) + \delta\lambda g(q)h(e(q) + E(q)) - C(g(q))$$

$$\text{s.t. } \alpha(q)R_1(0) - e(q) \geq 0.$$

Suppose at $q_G$, the local government does not use the full amount of the unobservable revenue for local public goods expenditure, that is, $e(q_G) < \alpha(q_G)R_1(0)$. Then using the envelope theorem for both e and g, we derive the first order condition as follows:

$$\alpha'(q)R_1(0) + \delta\lambda g(q)(\partial h/\partial(E + e))(\partial E/\partial q) = 0,$$

which is exactly the same as (1). Since $\partial E/\partial B > 0$ despite the presence of expenditure e from the local government, we have $\partial E/\partial q > 0$. Thus the local government's choice $q_G < \bar{q}$.

Suppose the local government uses all the unobservable revenue for local public goods expenditure, that is, $e(q_G) = \alpha(q_G)R_1(0)$. Then the local government chooses q to

$$\max \delta\lambda g(q)h(\alpha(q)R_1(0) + E(q)) - C(g(q)),$$

and the first order condition is, using the envelope theorem for g:

$$h'(\alpha'(q)R_1(0) + \partial E/\partial q) = 0.$$

Since $h' > 0$ and $\partial E/\partial q > 0$ as we have argued above, $\alpha'(q) < 0$. That is, the local government will choose $q_G < \bar{q}$ as well.■

Proof of Lemma 2: (i) The first order conditions of the state's maximization problem are,

$$u_1'(B-\Sigma E_k) = \delta u_2'((1-\lambda)\Sigma g_k h(E_k))(1-\lambda)g_i h'(E_i), \tag{2}$$

for all i. That is, for all i and j

$$g_i/g_j = h'(E_j)/h'(E_i). \tag{3}$$

Consider an increase in B while fixing all $g_i$'s. If $E_1$ decreases, by (3), all $E_i$'s decrease, and $B-\Sigma E_k$ increases, and the left hand side of (2) decreases, but the right hand side of (2) increases, a contradiction. Thus, $E_1$ increases, and all $E_i$'s increases.

Consider an increase in $g_j$ while fixing B and all $g_i$ ($j \neq i$). Suppose $E_i$ does not decrease. By

(3), all $E_i$'s must not decrease. Then the left hand side of (2) does not decrease. But the right hand side strictly decreases as $g_i$ is fixed but $g_j$ increases and all $E_i$'s do not decrease. A contradiction.

(ii) Differentiate

$$E_i = E_i(g_1(E_1), \ \ldots \ , \ g_N(E_N), \ B),$$

we have, at any symmetric equilibrium (for $j \neq I$):

$$dE_i/dB = (\partial E_i/\partial g_1)g'(E_i)(dE_i/dB) + (N-1)(\partial E_i/\partial g_j)g'(E_j)(dE_j/dB) + \partial E_i/\partial B$$

$$dE_j/dB = (N-1)(\partial E_j/\partial g_i)g'(E_i)(dE_i/dB) + (\partial E_j/\partial g_j)g'(E_j)(dE_j/dB) + \partial E_j/\partial B.$$

From these equations we solve, using symmetry,

(4) $$dE_i/dB = (\partial E_i/\partial B)/\{1-g'(E_i)[(\partial E_i/\partial g_i)+(N-1)(\partial E_i/\partial g_j)]\},$$

which is positive under the specified condition by using (i).

Since g(E) increases in E, $dg/dB > 0$ as well.■

Proof of Proposition 5: (i) For any local government i, given the choice of all other local governments $q_j$ ($j \neq i$), the first order condition is given by, using the envelope theorem,

(5) $$\partial U_G/\partial q = \alpha'(q_{Gi})R_1(0) + \delta\lambda g_i(q_{Gi})(\partial h/\partial E)(\partial E_i/\partial q_i) = 0.$$

By Lemma 2(ii), $\partial E_i/\partial q_i < 0$. Hence $\alpha'(q_{Gi}) > 0$, which implies that $q_{Gi} < \bar{q}$.

(ii) Substituting (4) and $\partial E_i/\partial q_i = -R_1(0)(dE_i/dB)$ into (5), we obtain

$$\partial^2 U_G/\partial q\partial N = d\{-R_1(0)\delta\lambda g_i(q_{Gi})(\partial h/\partial E)(\partial E_i/\partial B)/\{1-g'(E_i)[(\partial E_i/\partial g_i)+(N-1)(\partial E_i/\partial g_j)]\}\}/dN > 0,$$

as $g'(E_i) > 0$ and $\partial E_i/\partial g_j < 0$ by Lemma 2. Thus $d(q_G)/dN > 0$.■

Proof of Proposition 6: By (7),

$$\partial^2 U_G/(\partial q\partial\gamma) = -\delta\lambda g_i(q_{Gi})R_1(0)[(\partial^2 h/\partial E^2)(\partial E/\partial\gamma)\gamma - (\partial h/\partial E)]/(N\gamma^2) > 0.$$

Therefore $dq/d\gamma > 0$.

Since $E = (\gamma^{-1}-1)(1-\bar{q})R_1(a_M) + (1-q(\gamma))R_1(0)$, we have

$$dE/d\gamma = -\gamma^{-2}(1-\bar{q})R_1(a_M) - (dq/d\gamma)R_1(0) < 0.$$

Furthermore, since $(dg/dE) > 0$, then $dg/d\gamma > 0$ as well.■

Proof of Proposition 7: (i) Since $g = g(B(\gamma),\gamma)$, $dg/d\gamma = (\partial g/\partial B)dB/d\gamma + \partial g/\partial\gamma > 0$. Since $\partial g/\partial\gamma > 0$ and $\partial g/\partial B > 0$, if $dB/d\gamma \geq 0$, then $dg/d\gamma > 0$. We are left to show that if $dB/d\gamma < 0$, then $dg/d\gamma > 0$.

Rewrite the state's objective function as

$$\max \delta L(1-\lambda + \eta\lambda)g(B(\gamma,\eta,\mu),\gamma)h(B(\gamma,\eta,\mu)).$$

Since $\gamma + \eta + \mu \equiv 1$, $d\eta/d\gamma \leq 0$. If $dB/d\gamma < 0$ and $dg/d\gamma \leq 0$, then according to the state's objective function, $\gamma = 0$. Contradiction. Therefore if $dB/d\gamma < 0$, $dg/d\gamma > 0$.

(ii) Again rewrite the state's objective function as

$$\max \delta L(1-\lambda + \eta\lambda)g(B(\gamma,\eta,\mu),\gamma)h(B(\gamma,\eta,\mu)).$$

The first order condition for the choice of $\mu$ is

$$\{[(\partial g/\partial B)h(B) + g(\partial h/\partial B)]dB/d\mu + (\partial g/\partial\gamma)(d\gamma/d\ \mu)\}(\eta\lambda + 1 - \lambda) + (d\eta/d\ \mu)\lambda gh = 0.$$

Since $\gamma + \eta + \mu = 1$, $d\eta/d\mu \leq 0$ and $d\gamma/d\mu \leq 0$ with at least one being strictly less than zero. Therefore $dB/d\mu > 0$.

(iii) According to the state's objective function

$$\max \delta L(1-\lambda + \eta\lambda)g(B(\gamma,\eta,\mu),\gamma)h(B(\gamma,\eta,\mu)),$$

the first order condition for the choice of $\eta$ is

$$\{[(\partial g/\partial B)h(B) + g(\partial h/\partial B)]dB/d\eta + (\partial g/\partial\gamma)(d\gamma/d\eta)\}(\eta\lambda + 1 - \lambda) + \lambda gh = 0.$$

Let $\lambda$ converge to 0, then at the limit the first order condition for the choice of $\eta$ is

$$[(\partial g/\partial B)h(B) + g(\partial h/\partial B)]dB/d\eta + (\partial g/\partial\gamma)(d\gamma/d\eta) = 0.$$

By $\gamma + \eta + \mu = 1$, $d\gamma/d\eta \leq 0$, therefore $dB/d\eta \geq 0$. ■