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by
Tian Zhu

Division of Social Science
Hong Kong University of Science and Technology
Clear Water Bay
Kowloon, Hong Kong

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in Public Enterprises Under Reformed
Socialism: The Case of China's TVEs

Tian Zhu¹

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¹Assistant Professor, Division of Social Science, Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong. Tel: (852)2358 7834. Fax: (852)2335 0014. E-mail: sotimzhu@uxmail.ust.hk. I thank James Kung, Zhigang Tao and seminar participants at HKUST for helpful comments.

Abstract

A Theory of Contract and Ownership Choice in Public Enterprises Under Reformed Socialism: The Case of China's TVEs

We construct a formal model on the general lines of the rent-seeking theory to explain the pattern of contractual and ownership arrangements and its evolution in China's township and village enterprises. We show that because local government officials are not the residual claimants of TVEs and are corruptible, they may have incentives to make inefficient choices. But market competition will force them increasingly to adopt efficient arrangements.

Key Words: Incentive Contract, Ownership, Corruption, Profit-Sharing, Public Enterprise, Socialism

JEL Classification: P26, P31, D23, L32.

1 Introduction

All economic systems face the tasks of coordination and motivation (Milgrom and Roberts, 1992). A traditional socialist economy relies on central planning, command and ideology while a typical capitalist economy relies on market and incentives. Economic reform by a socialist (or communist) government often aims at introducing market mechanisms and incentive structure. Under reform, command and ideology as the motivating factors have gradually given way to economic incentives. But under the banner of socialism, public enterprises are in general the dominant ownership form. Such is the case in China where market mechanisms have been introduced, and managers of public enterprises enjoy considerable decision autonomy and are typically provided with performance-based monetary incentives (Groves *et al.*, 1994). However, Chinese government has openly rejected the idea of privatization; and the dominance of public ownership is written into the constitution.

A distinctive feature of China's economic reform is that its high growth rate has been generated mostly by public enterprises, in particular, rural township and village enterprises (TVEs) (Walder, 1995b). A TVE is in principle owned by all the residents in a township or village but controlled by the township or village government, or more precisely, the government officials. The government, on behalf of all the residents, is entitled to income generated by the TVE after paying out certain portion of profit for managerial compensations and the enterprise's reinvestment (Chang and Wang, 1994). It is these TVEs that have been the major driving force of China's economic growth since the beginning of economic reforms in 1978.

Naturally, therefore, they have drawn increasing attention from researchers.

The success of TVEs appears to pose a puzzle to received economic theory. Namely, how can public enterprises achieve such a level of success while we have been taught that private property rights are the cornerstone of efficiency and growth? While some authors see the success of China's TVEs as an example that refutes the property rights theory and shows the importance of cooperative culture (Weitzman and Xu, 1994), still others believe that China's TVEs are basically quasi- or disguised private enterprises (Nee, 1992). The majority of researchers, however, do not appear to subscribe to these two opposing positions. They attribute the success story to various factors such as local governments' financial incentives, their relatively hard budget constraints, managerial incentive contracts, and market competition (Naughton, 1995; Oi, 1992; Walder, 1995a). Most authors seem to agree that privatization should be the eventual step for China's transition to a market economy, but they also believe that public or collective ownership is an efficient organization form that has adapted well to a particular political or economic environment (Chang and Wang, 1994; Li, 1996; Oi, 1997).

We agree with the viewpoint that the incentive structure associated with TVEs is capable of generating economic growth compared to typical public enterprises under traditional socialism. However, we will argue in the current paper that the contractual and ownership arrangements of China's non-state sector are not necessarily efficient. Such arrangements are largely made by government officials, who themselves are not the owners of TVEs and, in general, will not act as one even if

personal compensations and other benefits such as promotion are considered. The use of incentives is certainly superior to command and ideology. But it does not imply that the incentive structure and its evolution in TVEs have been optimally adapted to a changing environment. In this paper, we try to construct a formal, stylized model on the general lines of the rent-seeking theory to show that it is possible that government officials may, in pursuing their own self-interest, intentionally choose inefficient contractual and ownership arrangements.

We believe that a formal economic model is useful in helping us to clarify some of the intuitions and implicit assumptions in informal discussions. A formal model will certainly have to abstract away from some of the complexities of the real world. However, a formal model has its advantage in providing us with a clear and logically coherent story. In many informal discussions, it is often, explicitly or implicitly, assumed that local government officials have incentives to choose efficient contractual and ownership arrangements because they are rewarded for their work done in various ways. At least, it is maintained, such an assumption is a good approximation. In contrast, our model shows that this assumption can be problematic, and the approximation may not be good enough because the reward local officials receive may simply not be sufficient.

We start from the fact that a township or a village cannot directly control and monitor a public enterprise but must delegate the task to a government official. The official, however, is not perfectly accountable to the township or village, which virtually has no control over the official's decision. The official may be rewarded for

the revenue accrued to the local government treasury, but he can also manipulate profit and embezzle the government's income or acquire personal benefits in the form of bribes and other non-pecuniary benefits such as traveling and dining at the firm's expense. Of course, there is a cost to the official for corruption, namely, the cost associated with the possibility of being caught and punished or the cost of manipulating profit in order to reduce the chance of being caught. For simplicity, we assume in the model that all he does is to appoint and negotiate an incentive contract with the manager of a TVE or simply sell the firm to a competitive bidder. We assume away the possibility that the government official may directly contribute to the firm's final output¹. He chooses between two types of contract, namely, profit-sharing versus rental. The latter can also be interpreted as a sales contract that transfers the ownership of the firm to the manager. In a deterministic setup in which risk-sharing is not a factor, we show that the efficient rental contract will not be adopted by the official and a less efficient profit-sharing contract will be chosen when the official does not have a sufficiently significant stake in the government's revenue or when the cost of corruption is low. This is because, loosely speaking, the

¹Many authors (Chang and Wang, 1994; Li, 1996; Chen and Rozelle, 1995) assume instead that government officials do make direct contributions to TVEs under their jurisdiction by using their power or connections to help acquire bank loans or settle contract disputes, etc. This is certainly what has happened in perhaps the majority of cases, particularly at the early stage of reform. We assume it away for two reasons. First, the contributing role of government officials have been declining over time in the course of reform. Second, our purpose is to show that even if officials are not helpful to the enterprises, they may still have incentives to keep the firms under their control.

cost of corruption (e.g., under-reporting the profit) to the manager is higher with a clear-cut contract such as a rental contract than with a less clear-cut one such as a profit-sharing contract.

However, inefficient contractual or ownership arrangements may not be able to survive in the long run when the force of market competition comes on the scene. We show that efficient arrangements will emerge and dominate when market becomes increasingly competitive. Therefore, when officials increasingly opt for efficient organizational arrangements, it may not be because they are benign or the reward for their actions is high enough but because they are forced to do so by the pressure of market competition.

Our prediction of the use of profit-sharing contracts in public enterprises is confirmed by some recent empirical researches. Kung and Lu (1996) find that rental or lease contracts are rarely used by Chinese township enterprises; instead, profit-sharing contracts are mostly adopted. Chen and Rozelle (1996) also find more profit-sharing contracts than rental contracts in their sample of TVEs. At first glance, the observation that profit-sharing is the dominant contractual form does not seem surprising. According to the traditional principal-agent theory, profit-sharing contracts optimally trade off the benefits of risk-sharing and that of adequate incentives (Tirole, 1990, Chapter 0). However, empirical evidence also shows that over time in the course of economic reform, the percentage of township enterprises adopting rental contracts has increased steadily in China's township enterprises (Chen and Rozelle, 1996). Moreover, there is a noticeable trend of privatization among TVEs.

especially the less well-off ones (Kung, 1997; Oi, 1997). The risk-sharing argument would therefore predict that market risk in China has been decreasing in the course of reform. Short of empirical evidence, there is no obvious reason why this should be the case. By incorporating the role of market competition in driving inefficient firms out of business, however, our model suggests that the evolutionary pattern of contractual and ownership arrangements is due to the fact that, in post-reform China, market has become increasingly competitive.

This paper is, in spirit, closely related to Shleifer and Vishny (1992). In that article, the authors develop a theory of pervasive shortages under socialism based on the assumption that the planners are self-interested. Applying the general ideas in the literature of rent-seeking (Tullock, 1967; Krueger, 1974), they argue that because the planners cannot keep the official profits that firms earn, it is in their interest to create shortages and to collect bribes from consumers. Similarly in our paper, the government official cannot keep the official profits from a public enterprise; so he chooses a type of incentive contract that makes it easier for him to embezzle the government's money.

The relationship between the official and the manager in our model is different from that studied in the traditional principal-agent theory. That theory is primarily focused on cases where the principal is entitled to the income generated by his agent's unobservable actions while in our model, the official is not the residual claimant. Other related literature includes Tirole (1986), which analyzes a three-layer (principal-supervisor-agent) hierarchical structure, and Laffont and Ti-

role (1993, Chapter 16), which studies the commitment problem in regulation when the regulator as the principal is corruptible and not accountable to the government.

The remainder of the paper is organized as follows. In the next section, we present a simple stylized model. Section 3 characterizes the equilibrium contract and analyzes the role of competition. Section 4 concludes with remarks on some implications of the paper.

2 The Model

In this section, we present a simple, deterministic model in which, naturally, risk preference does not play a role. The model will be slightly modified in Subsection 3.2 to address the role of competition.

A local public enterprise's profit, Y , is determined by its manager's effort, e , which is assumed to be a nonnegative number. We assume, for simplicity, $Y = e^2$. The disutility of an effort e to the manager is $C(e) = e^2/2$. The effort is not directly observable to any party other than the manager herself, but the profit is observable to a government official who is delegated the task of designing an incentive contract for the manager. Since our purpose is to show how the government official may intentionally choose an inefficient contractual form, we restrict the contractual form to a linear function of Y . Specifically, the contract stipulates the manager's com-

²Here we implicitly assume that the firm can never make a loss. The role of this assumption will become clear later in Subsection 3.2, in which the assumption will be modified.

pensation scheme $t(Y - R)$, where $R \geq 0$ and $t \in [0, 1]$. If $t = 1$, the contract is called a *rental contract*; hence R can be interpreted as the rental fee the manager pays to the government. A rental contract can also be interpreted as a sales contract transferring the firm's ownership to the manager. If $R = 0$, the contract is called a *pure profit-sharing contract*. If $0 < t < 1$ and $R > 0$, the contract is called a *general profit-sharing* or simply a *profit-sharing contract*.

We further assume that the manager has no personal wealth before receiving her compensation. This assumption has two implications. First, financial constraint prevents the manager from bribing the official upfront in exchange for a favorable contractual term. Her promise to pay the official a bribe after production is not credible because such a promise, being illegal, is difficult to enforce³. The second implication is that the manager's contractual liability is limited to her financial wealth, which is assumed to be 0. In other words, if profit Y is less than R , the manager's compensation is 0.

The residual profit, after paying the manager, belongs to the government treasury. We assume, however, that the government cannot directly observe the true profit level. It is the official's responsibility to report it to the government. The point of departure of this model is that we assume the official is self-interested.

³Another situation in which paying bribes up front can be ruled out is when there is a competitive bidding for the contract. This is implicitly supposed when we assume the official has all the bargaining power in negotiating the contract. Competitive bidding limits the official's ability to offer anyone a favorable contract.

Specifically, we assume that the official derives a benefit αG , where $\alpha \in [0, 1]$, out of the government's revenue, G ⁴, but he can also embezzle some of the money that should go to the government by under-reporting the firm's profit. Embezzlement in general is not without its costs to the official⁵. For simplicity, we assume that the cost of under-reporting to the official is $\beta(Y - y)^2/2$, where β is a nonnegative cost parameter of cheating, Y is the true profit, while y is the reported profit.

Although the government cannot directly observe the profit, we assume both the manager and the official have the ability to reveal the true profit level to the government if they are willing to do so. It is in this sense that we can say that profit is verifiable. Otherwise, an incentive contract based on profit will not be enforceable. This guarantees that under-reporting by the official does not invalidate the manager's compensation contract. The manager is still entitled to the compensation specified in the contract based on the true profit because she, if necessary, has the ability to establish to the government the true profit level. For simplicity, we stipulate that the manager will not reveal the true profit to the government as long

⁴This will be the case if, for example, he receives explicitly a proportion of the revenue; the revenue will be used by the government in a way that benefits himself or his family; it may help his promotion; or he, to a certain extent, cares about other people in general.

⁵Either the official may be caught for corruption, or, in order not to be caught, he may have to direct the manager to manipulate accounting data, or he may have to limit himself to certain activities such as dining and travelling at the firm's expense instead of taking cash. Therefore, the act of under-reporting here should not be interpreted too literally. It is simply a way of modeling corruption.

as she receives what she is entitled to according to the contract.

The government is assumed to be passive. In other words, the government is not a strategic player in this game and knows nothing about it except that it observes what contract has been signed and what profit is reported and that it is content with what it receives according to the contract based on the report.

In summary, the rule of the game is as follows. The official first proposes to the manager a take-it-or-leave-it incentive contract $t(Y - R)$. If it is rejected, the game is over. If accepted, the manager exerts an effort e , which costs her $e^2/2$, and delivers a profit $Y = e$. The manager then receives her compensation according to the contract. The manager's payoff function is $t(Y - R) - C(e)$. The official reports a profit level y and incurs a cost of cheating, $\beta(Y - y)^2/2$. The government receives a revenue $G = y - t(y - R)$ if $y \geq R$, or y if $y < R$. The official then embezzles the residual profit after paying the manager and remitting the government. The official's net personal payoff B is $Y - t(Y - R) - (1 - \alpha)G$.

3 The Contract Choice

3.1 Profit-Sharing versus Rental Contract

Given the setup in last section, the official's problem is to choose an incentive contract for the manager and a profit level to report to maximize his net personal benefit. As a typical exercise in a principal-agent model, we first investigate the constraints that have to be satisfied by any incentive contract, namely, the man-

ager's incentive compatibility constraint and her participation constraint.

Suppose a contract $t(Y - R)$ is accepted by the manager. Noting that $Y = e$, her payoff from making an effort e is $t(e - R) - e^2/2$ if $e \geq R$, or $-e^2/2$ if $e < R$. It is obvious that the manager would not have to be in a situation that forces her to choose $e < R$ because she could have rejected the contract in the first place. Now given $e \geq R$, the manager's objective is to choose an effort level to maximize her utility. Formally, her problem is the following:

$$MAX_e \quad t(e - R) - e^2/2. \quad (1)$$

The solution is $e = t$. This would be the first-best outcome only if $t = 1$, i.e., if the contract is a rental contract. With this solution, the manager's payoff becomes $t^2/2 - tR$. Suppose the manager's reservation utility level is normalized to be zero. Then the manager's participation constraint requires $t^2/2 - tR \geq 0$. This implies $t \geq 2R$ when $t \neq 0$. Apparently, the official should set $t = 2R$ so that the manager will not receive a positive rent.

The official's problem is to choose t and y to maximize his net payoff subject to $e = t$. It is obvious that $t = 0$ is not an optimal choice. Given a contract, the manager always receives her contractual compensation $t(t - R)$, noting that $Y = e = t$. The government receives a revenue $G = y - t(y - R)^+$, where $(y - R)^+$ equals $y - R$ if $y \geq R$ and 0 if $y < R$. The profit left for the official is $t - [y - t(y - R)^+] - t(t - R)$. After substituting $\frac{t}{2}$ for R , the official's net payoff to his choice (t, y) is

$$t - \frac{t^2}{2} - \frac{\beta}{2}(t - y)^2 - (1 - \alpha)[y - t(y - \frac{t}{2})^+]. \quad (2)$$

The official should maximize (2) subject to the constraints $y \geq 0$ and $t \leq 1$.

After solving the above optimization problem using Kuhn-Tucker conditions, we yield the following proposition.

PROPOSITION: (1) If $\alpha > \frac{1}{1+\beta}$, the official chooses a rental contract in which $t = 1$ and $R = \frac{1}{2}$, reports the true profit and acquires net personal benefit $B = \frac{\alpha}{2}$; (2) If $\alpha < \frac{1}{1+\beta}$, the official chooses a profit-sharing contract in which $t = \frac{1}{1+\beta}$ and $R = \frac{1}{2(1+\beta)}$, reports a zero profit and acquires net personal benefit $B = \frac{1}{2(1+\beta)}$; (3) If $\alpha = \frac{1}{1+\beta}$ but $\beta \neq 0$, the official is indifferent to the above two choices; (4) If $\alpha = 1$ and $\beta = 0$, the official chooses a rental contract, is indifferent to reporting any $y \in [0, 1]$, and acquires net personal benefit $B = \frac{1}{2}$.

PROOF: See Appendix.

A verbal translation of the proposition says that when the official's legitimate share of government's income is not sufficiently high or when the cost of corruption to him is low, he will choose an inefficient contractual form, and vice versa.

The intuition of the proposition is clear. When $\alpha = 1$, the official becomes the residual claimant. When $\beta = 0$, the official is effectively but illegitimately the residual claimant. Therefore, in both cases, the efficient rental contract will be used. When both α and β are relatively high, the official will choose an efficient rental contract. This is because the official, with a large α , can derive sufficient legitimate benefit from the government's income and the illegitimate benefit from cheating is

not worth the high cost of corruption he must incur with a large β .

On the other hand, when both α and β are low, it becomes worthwhile for the official to cheat. The reason why a profit-sharing contract is chosen can be easily seen from the case where $\alpha = 0$. In this case, with a rental contract ($t = 1$, and $R = 1/2$), reporting $y \geq R$ yields no benefit to the official because the government will receive R as long as $y \geq R$. Therefore, the official should choose $y < R$. Now we show that, for a given level of benefit from cheating, the cost of cheating to the official is higher (i.e., he has to cheat more) with a rental contract than with a profit-sharing contract. Given t , the official's benefit from claiming $y < R$ is $t - y - t^2/2$, and the cost of cheating is $\beta(t - y)^2/2$. For a given benefit level Δ , $t - y = \Delta + \frac{t^2}{2}$. Hence the cost of cheating is $\frac{\beta}{2} (\Delta + \frac{t^2}{2})^2$, which is increasing in t . It is obvious that y must be set to zero in order for t to be set as small as possible. The proposition thus shows that profit-sharing contracts can still be used by the official even in the absence of risk-sharing consideration.

It is interesting to note that there is an analogy between the incentive contract here and financial contracts in finance literature. A rental contract is similar to a debt contract while a profit-sharing contract is similar to an equity contract. Townsend (1977) shows that a debt contract can be optimal when it is costly to verify the firm's income. Williamson (1988) sees debt payment as a hard budget constraint and equity payout as a soft budget constraint. In our context, the official who designs the contract would not want to impose a hard budget constraint on himself unless he cares a lot about the government's revenue or it is difficult or very

costly to embezzle public money.

3.2 The Role of Competition

In contrast to the risk-sharing theory, our approach to the contract choice problem in public enterprises can, by considering the role of market competition, explain the increasing share of more efficient contractual and ownership forms among TVEs.

To see this, note that in the model, we have implicitly assumed that the firm can always make a profit by defining $Y = e$ even with a very inefficient incentive contract. It is possible if the enterprise is in an industry with insufficient competition. In the course of China's economic reform, the intensity of market competition has steadily increased. Many of the inefficient public enterprises that used to make sizable profits are showing chronic deficits. It is a well-known theory that inefficient organizational arrangements will eventually be selected out in the evolutionary process of market competition. Clearly, competition from private enterprises and public enterprises that adopt more efficient contracts will drive down the profits of public enterprises that adopt less efficient contracts. Self-interested officials, therefore, will eventually be forced to choose efficient contractual arrangements.

In this subsection, we slightly modify the model used so far by defining Y to be the output and denoting the market price of the output as p . Suppose, in addition, there is a fixed cost F . Without loss of generality, we assume away other variable costs. Assume also that all incumbent and entering firms have the same technology. Thus the total profit for an individual firm net of the disutility of effort

is $pe - F - e^2/2$. For a firm that adopts an efficient rental contract, the manager exerts the first-best effort $e = p$. The net economic profit then becomes $p^2/2 - F$. When $p > \sqrt{2F}$, incumbent firms would be able to make positive profits if they are efficient. This will attract new firms to enter the market, and they can make a positive economic profit by adopting efficient incentive contracts. Entry will then drive down the price. The long-run equilibrium price with free entry is $p = \sqrt{2F}$, at which all efficient firms break even with zero economic profit.

In a firm that employs an inefficient profit-sharing contract, the manager will exert an effort $e = tp$, where $t < 1$. The net economic profit will be $(t - t^2/2)p^2 - F$, which is positive when $p > \sqrt{F/(t - t^2/2)}$. In other words, as long as market competition is not sufficiently strong and hence the price is high, an inefficient firm can still make a positive economic profit. However, when $p = \sqrt{2F}$, the inefficient firm's net profit becomes $(2t - t^2 - 1)F$, which is negative. This firm, therefore, will not be able to survive the competition. From the official's point of view, he cannot benefit from a money-losing enterprise. Hence when facing the pressure of competition, he will either have to adopt an efficient contract or let the firm go out of business.

After almost two decades of economic reform, China has seen a dramatic increase in the number of collective and private enterprises. Market has become increasingly competitive. Even once-profitable TVEs have started losing money. It is largely these firms that have been privatized. Why privatization? It must be because, in the language of our model, a sales contract (i.e., private ownership) is more efficient

than a profit-sharing contract under public ownership. Then why only privatize money-losers but not profit-makers? Our theory suggests that it may not be because money-losers are less efficient than profit-makers in terms of their incentive structure, but because money-losers are in a more competitive market. The officials then have no choice but to give up their control and privatize these enterprises. On the other hand, they will keep those profit-makers under their control until the day when competition turns them too into money-losers.

4 Concluding Remarks

This paper constructs a formal theory to explain empirical patterns of contract and ownership choice observed in China's township and village enterprises. The theory's point of departure is the assumption that government officials are self-interested and corruptible. In a stylized model, we show that because local government officials are not the residual claimants of TVEs, they may have incentives to choose an inefficient contractual or ownership arrangement. This is the case when the officials do not have significant stakes in the firms or when the cost of corruption is low. But we also show that market competition will force them increasingly to adopt more efficient organizational forms.

One implication of the paper is that, on the one hand, as long as firms are still publicly owned, the effectiveness of the use of explicit or implicit managerial incentive contracts should not be overestimated. Such contracts are designed by government officials who themselves are not owners of the enterprises. On the other

hand, even if government officials may also have an incentive pay arrangement of their own with the government, one should not automatically assume, even as an approximation, that they will behave like owners of private enterprises⁶.

The approach adopted in this paper can be fruitfully applied to the study of privatization in transitional economies. Our theory suggests that in the transitional process, government officials may likely resist straight privatization and favor some form of government control or choose some ambiguous, easy-to-manipulate ownership forms. They will also tend to privatize only those hopeless money-losing enterprises that cannot bring them much personal benefit. For a similar reason, government officials may favor short-term contracts over more efficient long-term ones so that they can extract personal benefits by exercising their power in the re-

⁶At this point, one might be tempted to argue that the relationship between government officials and managers of public enterprises in a socialist economy is not very different from that between the board of directors and the chief executive officers of joint stock companies in a capitalist economy. In other words, it is just a problem of the separation of ownership and control. This paper is not a place to address this important question. We just want to briefly make the following point. The separation of ownership and control in a capitalist economy is largely an outcome of an endogenous, evolutionary market process that is based on voluntary exchange of private property rights in pursuit of gains from specialization. In the process, various governance mechanisms have been developed to safeguard owners' interest from managerial infringement (See Hart, 1995). They are legal and economic institutions for owner-investors to have effective control over managers and assure themselves of a return from their investment (Vishny and Shleifer, 1996). It is precisely the lack of these institutions rather than the separation itself that has given rise to the governance problem of China's public enterprises.

newal of contracts. Therefore, the well-know "ratchet effect" in socialist economies arising from short-term contracts may not be entirely attributable to the stupidity or ignorance of the government officials. Rather, short-term contracts may serve their purpose of extracting rent very well.

Another implication of the paper is that the driving force of a gradual but relatively successful reform may come from the bottom. In other words, it is the power of competition unleashed from an initial partial removal of restrictions on spontaneous economic activities that, in the case of China, has been and will still be pushing the reform forward. It is in this sense that China's reform has been a process of "growing out of the plan" rather than a series of strategies by design (Naughton, 1995). China's current bid to thoroughly restructure its state sector after a mounting deficit from state-owned enterprises is another testimony to this bottom-up theory. The paper, therefore, lends a support to a gradualist approach to economic transition.

A Appendix: The Proof of the Proposition

The Lagrangian function for the maximization problem is

$$L(y, t) = t - \frac{t^2}{2} - \frac{\beta}{2}(t - y)^2 - (1 - \alpha)[y - t(y - \frac{t}{2})^+] + \lambda_1 y - \lambda_2(t - 1).$$

We define an index function $I(y)$ that takes the value of 1 if $y \geq t/2$ and 0 otherwise.

The Kuhn-Tucker conditions are

$$\frac{\partial L}{\partial y} = -(1 - \alpha) + (1 - \alpha)tI + \beta(t - y) + \lambda_1 = 0, \quad (3)$$

$$y \geq 0, \quad \lambda_1 \geq 0, \quad \lambda_1 y = 0, \quad (4)$$

$$\frac{\partial L}{\partial t} = 1 - t - \beta(t - y) + (1 - \alpha)(y - t)I - \lambda_2 = 0, \quad (5)$$

$$t - 1 \leq 0, \quad \lambda_2 \geq 0, \quad \lambda_2(t - 1) = 0. \quad (6)$$

We then search for all possible solution candidates.

First, suppose $\beta = 0$. This means that corruption is costless to the official; hence he effectively becomes a residual claimant. It is apparent that he will choose an efficient contract, i.e., a rental contract ($t = 1$). He will report $y = 0$ unless $\alpha = 1$. He is indifferent to any choice of $y \in [0, 1]$ when $\alpha = 1$ because in this case he is also a legitimate residual claimant. The above reasoning can be easily verified by strictly following the Kuhn-Tucker approach.

In the rest of the proof, we assume $\beta > 0$.

We first consider solution candidates in which $y \geq t/2$. Because $y > 0$, $\lambda_1 = 0$ by (4). Then (3) becomes

$$\frac{\partial L}{\partial y} = -(1 - \alpha)(1 - t) + \beta(t - y) = 0, \quad (7)$$

Suppose $t = 1$. Then (7) gives $y = t = 1$. We use S_1 to denote the first candidate for optimality: $S_1 \equiv \{t = 1, R = 1/2, y = 1\}$. It can be easily verified that the official's personal payoff $B_1 = \alpha/2$.

Suppose $t < 1$. From (6), $\lambda_2 = 0$. Then (5) becomes

$$\frac{\partial L}{\partial t} = 1 - t - \beta(t - y) + (1 - \alpha)(y - t) = 0, \quad (8)$$

Using (7) and (8) to solve for t , we have $t = \alpha + (1 - \alpha)y$. Substituting this into (7) yields

$$(1 - y)[\alpha\beta - (1 - \alpha)^2] = 0.$$

If $\alpha\beta \neq (1 - \alpha)^2$, then $y = 1$, which is impossible because $t = \alpha + (1 - \alpha)y < 1$ implies $y < 1$. If $\alpha\beta = (1 - \alpha)^2$, then y is indeterminate. But, with a somewhat tedious manipulation, one can verify, after substituting $t = \alpha + (1 - \alpha)y$ and $\alpha\beta = (1 - \alpha)^2$ into the official's objective function, that $B = \alpha/2$. But $\alpha\beta = (1 - \alpha)^2 < 1 - \alpha$, noting that α cannot be equal to either 0 or 1 here. Thus $\alpha < \frac{1}{1+\beta}$ and $B = \frac{\alpha}{2} < \frac{1}{2(1+\beta)}$, which will be shown later to be the payoff the official can acquire by choosing $t = \frac{1}{1+\beta}$ and $y = 0$.

Next we consider candidates in which $y < t/2$. Then the Kuhn-Tucker conditions (3) and (5) become

$$\frac{\partial L}{\partial y} = -(1 - \alpha) + \beta(t - y) + \lambda_1 = 0, \quad (9)$$

$$\frac{\partial L}{\partial t} = 1 - t - \beta(t - y) - \lambda_2 = 0. \quad (10)$$

Suppose $t = 1$. Then (10) implies $t \leq y$, which contradicts $y < t/2$.

Now suppose $t < 1$. By (6), $\lambda_2 = 0$. By (10), we have $t = \frac{1+\beta y}{1+\beta}$. We then consider two cases.

(1) If $y = 0$, then $t = \frac{1}{1+\beta}$. This gives us the second solution candidate $S_2 \equiv \{t = \frac{1}{1+\beta}, R = \frac{1}{2(1+\beta)}, y = 0\}$, yielding $B_2 = \frac{1}{2(1+\beta)}$.

(2) If $y > 0$, then $\lambda_1 = 0$. Solving (9) and (10), we have $t = \alpha$ and $y = \frac{\alpha+\alpha\beta-1}{\beta}$, yielding $B = \frac{\alpha^2}{2} + \frac{(1-\alpha)^2}{2\beta}$. But $y > 0$ requires $\frac{\alpha+\alpha\beta-1}{\beta} > 0$, implying $\alpha > \frac{1}{1+\beta}$. It can be easily verified that, when $\alpha > \frac{1}{1+\beta}$, $\frac{\alpha^2}{2} + \frac{(1-\alpha)^2}{2\beta} < \frac{\alpha}{2}$, which is the payoff the official would receive if he chooses S_1 . Therefore, we do not have a solution candidate here.

Now we have found two solution candidates. It is straightforward that if $\alpha > \frac{1}{1+\beta}$, S_1 gives the official higher payoff than S_2 ; if $\alpha < \frac{1}{1+\beta}$, S_2 gives the official higher payoff than S_1 ; and if $\alpha = \frac{1}{1+\beta}$, the official is indifferent to S_1 and S_2 . This completes the proof. QED

References

- [1] Chang, C. and Y. Wang, 1994, The Nature of the Township-Village Enterprises, *Journal of Comparative Economics* 19, 434-452.
- [2] Chen H. and S. Rozelle, 1995, Local Leaders, Managers, and the Organization of Township and Village Enterprises in China, mimeo, Stanford University.
- [3] Groves, T., Y. Hong, J. McMillan and B. Naughton, 1994, Autonomy and Incentives in Chinese State Enterprises, *Quarterly Journal of Economics* 109, 183-209.
- [4] Hart, O., 1995, Corporate Governance: Some Theory and Implications, *The Economic Journal* 105, 678-689.
- [5] Krueger, A., 1974, The Political Economy of the Rent-Seeking Society, *American Economic Review* 64, 291-303.
- [6] Kung, J. and M. Lu, 1996, Ownership and Contractual Variations in China's Township-Village Enterprises: Evidence from a Township in South China, mimeo, Hong Kong University of Science and Technology.
- [7] Kung, J., 1997, The Structure and Evolution of Property Rights in China's Village Enterprises: The Case of Wuxi County, Working Papers in the Social Sciences, No. 4, Hong Kong University of Science and Technology.
- [8] Laffont, J. and J. Tirole, 1993, *A Theory of Incentives in Procurement and Regulation*, Cambridge: MIT Press.

- [9] Li, D., 1996, A Theory of Ambiguous Property Rights in Transition Economies: The Case of the Chinese Non-State Sector, *Journal of Comparative Economics* 23, 1-19.
- [10] Milgrom, P. and J. Roberts, 1992, *Economics, Organization, and Management*, Englewood Cliffs: Prentice Hall.
- [11] Naughton, B., 1995, *Growing Out of the Plan: Chinese Economic Reform, 1978-1993*. New York: Oxford University Press.
- [12] Nee, Victor, 1992, Organizational Dynamics of Market Transition: Hybrid Forms, Property Rights, and Mixed Economy in China, *Administrative Science Quarterly* 37, 1-27.
- [13] Oi, J., 1992, Fiscal Reform and the Economic Foundations of Local State Corporatism in China, *World Politics* 45, 99-126.
- [14] Oi, J., 1997, The Evolution of Local State Corporatism, Working Papers in the Social Sciences, No. 8, Hong Kong University of Science and Technology.
- [15] Shleifer, A. and R. Vishny, 1992, Pervasive Shortages Under Socialism, *RAND Journal of Economics* 23, 237-246.
- [16] Shleifer, A. and R. Vishny, 1996, Corporate Governance: A Survey, NBER Working Paper.
- [17] Tirole, J., 1986, Hierarchies and Bureaucracies: On the Role of Collusion in Organizations, *Journal of Law, Economics, and Organization* 2, 181-314.

- [18] Tirole, J., 1990, *Industrial Organization*, Cambridge: MIT Press.
- [19] Townsend, R., 1979, Optimal Contracts and Competitive Markets with Costly State Verification, *Journal of Economic Theory* 21, 265-293.
- [20] Tullock, G., 1967, The Welfare Cost of Tariffs, Monopoly and Theft, *Western Economic Journal* 5, 224-232.
- [21] Walder, A., 1995a, Local Governments as Industrial Firms: An Organizational Analysis of China's Transitional Economy, *American Journal of Sociology* 101, 263-301.
- [22] Walder, A., 1995b, China's Transitional Economy: Interpreting its Significance, *The China Quarterly* 144, 963-979.
- [23] Weitzman and Xu, 1994, Chinese Township Village Enterprises as Vaguely Defined Cooperatives, *Journal of Comparative Economics* 18, 121-145.
- [24] Williamson, O., 1988, Corporate Finance and Corporate Governance, *Journal of Finance*, 43, 567-591.