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*A Theory of Ambiguous Property Rights
in Transition Economies:
The Case of the Chinese Non-State Sector*

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Comments Welcome

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Abstract

Can ambiguous property rights sometimes be efficient? Ambiguous property rights arises when owners' rights are not guaranteed before hand. Instead, owners have to fight for actual control, ex post. We show that China's highly successful non-state sector is a major example of ambiguous property rights. We then propose a theory of ambiguous property rights, which argues that ambiguous property rights arise due to an imperfect market environment. We argue that the immature market environment in China makes ambiguous property rights often more efficient than unambiguously defined private property rights.

JEL Classification Codes: D23, O12, P21.

1. Introduction

A widely held belief in economics is that institutions of clearly-defined property rights are preconditions for economic prosperity. Based on this conventional wisdom, rapid privatization has been proposed and widely accepted as a necessary step for the post-socialist transition. Correspondingly, most of the current discussions of transition are based on one premise, i.e., that ownership and property rights will soon be clearly defined. The remaining concern is who should be the owner or who should enjoy the newly-established property rights.

The Chinese experience, however, seems to have constituted a major contradiction to the conventional wisdom on property rights. The surprise comes from China's non-state sector, which has been the locomotive of the Chinese economic growth (Singh, Xiao, and Ratha, 1993). Loosely defined, the non-state sector includes all firms except the traditional state-owned enterprises. Over a period of 15 years, the performance of China's non-state sector is striking. With output growing at over 20 percent per year on average, the non-state sector accounted for over 50 percent of the nation's output by 1994. However, no one can claim that the Chinese non-state sector enjoys clearly-defined property rights. Most of the non-state firms are collectives and other kinds of non-private firms. The owners of these collective firms are often loosely specified, e.g., all residents in a community. Moreover, in all cases, including private firms, the rights of the owners are ambiguously specified and poorly protected. Most surprisingly, many econometric analyses reveal that a firm's registered ownership form does not cause differences in the firm's productive efficiency (Svejnar, 1990, Weitzman and Xu, 1994). Thus, the existence of ambiguous property rights in the highly prosperous Chinese non-state sector has become a challenge to traditional theories of property rights.

The purpose of this paper is two-fold. First, it tries to distill a concept of ambiguous property rights from the experiences of transition economies. As a major example of

ambiguous property rights, the paper discusses in detail property rights arrangements in China's non-state sector. Second, the paper proposes a theory of ambiguous property rights. The theory rationalizes ambiguous property rights in transitional economies by relating the property rights arrangement within a firm to the firm's market environment.

Motivated by experiences in transition economies, we develop a concept of ambiguous property rights from a control rights perspective. Conventionally, clearly-defined property rights entitle the owner unequivocal control rights in all circumstances, except those specified by an *ex ante* contract.² With ambiguous property rights, the owner's control rights are not guaranteed. The owner has to fight or bargain for the actual control *ex post*. In other words, *ex ante*, it is uncertain who will be in control. Notice that our concept of ambiguous property rights is different from that of contingent control rights, which are extensively discussed in the literature on corporate finance. Contingent control rights, e.g., the creditor's rights which are activated when the firm is in financial distress, are allocated to one party or another depending on observed economic outcomes such as negative profits.³ Under ambiguous property rights, owners have to fight for control in every circumstance. In other words, with ambiguous property rights, there are no pre-agreed and binding rules as to who will be in control in various *ex post* contingencies.

Our theory of ambiguous property rights focuses on the relation between the firm's property rights arrangements and the market environment. It argues that ambiguous property rights are response to high transactions costs and high uncertainties in the market place. The theory can be explained intuitively. To begin with, agent E identifies a profitable project and makes initial investment k_E in the project. In the next period, either the effort of E or the effort of another agent G is needed in the project, depending on the realization of the uncertainty. Unable to enter into contingent contracts, E decides whether to solely own the firm or to bring in G as an ambiguous owner and

then fight against G for actual control in the next period. For E , the benefit of being a sole owner is that when the project is productive in the next period, E can reap all the profit, instead of engaging in bargaining with G . On the other hand, the cost of being the sole owner is that when, in the next period, G 's effort is needed, E has to negotiate with G . Not being in the same firm, such negotiations may be more costly than those when E and G share the ownership. As a result, E may not get the service of G . In net, the choice of ownership form is dependent on how likely G is to be productive and how E and G negotiate when G is not an ambiguous owner.

As a special case, China's non-state sector can be analyzed by our theory. In China, the market environment can be characterized as a gray market. A gray market is one in which transactions may be blocked due to residual government regulations.⁴ However, a government bureaucrat or a government agency can properly work around the obstacles and make the transaction possible. Thus, the gray market gets its name due to the uncertainty regarding whether the transaction will be in a white (i.e., normal) or black (i.e., difficult) state. Facing a gray market, the entrepreneur may want to include the government as an ambiguous owner. Thus, the otherwise private firm is optimally chosen to have ambiguous property rights. The benefit of ambiguous property rights is that when the state of nature is black, the firm can get help from bureaucrats easily. In other words, the arrangement of ambiguous property rights is a response to the grayness of the market, which is a form of market imperfection.

The proposed theory of ambiguous property rights is related to the theory of ownership of Grossman-Hart-Moore (Grossman and Hart, 1986 and Hart and Moore, 1990). Following the Grossman-Hart-Moore paradigm, we maintain that contracts are unavoidably incomplete and therefore, control rights are the fundamental components of ownership. However, our theory departs from this framework by emphasizing that property rights arrangements also affect information flows. That is, the control rights holder, in

general, has better information about the firm and can manipulate such information. As a result, negotiations between the firm's insider and an outsider can be inefficient. When the market is not effective in overcoming such transactions costs, ambiguous ownership arises as a second-best solution.

Our assumption that ownership arrangements affect information flow echoes similar arguments by many theorists of the firm, including Williamson (1985) and Holmström and Tirole (1989, p.75). After a long survey and discussions of the relation between ownership and information, Holmström and Tirole (1989) write:“(W)e conclude that organizational changes affect the cost of information flows. Incomplete contracting provides the proper framework in which to discuss implications on information flows due to ownership change.” The firms we discuss are small start-up companies in transition economies, where, due to the lack of market infrastructure, such as independent agents for accounting, auditing, and evaluation, property-rights holders enjoy an informational advantage over outsiders. In fact, because of this reason, collecting taxes from private firms proves to be very difficult.⁵

Several previous works have been concerned with the ambiguous ownership of China's non-state firms. Weitzman and Xu (1994) first raise the issue of ambiguous property rights in the context of Chinese rural enterprises, or the Township Village Enterprises (TVEs), which are a large component of China's non-state sector. In explaining reasons for these firms' success despite their ambiguous property rights, Weitzman and Xu (1994) rely on the alleged cooperative nature of the traditional Chinese culture. Chang and Wang (1994) explain the emergence of TVE's based on local governments' political ability to provide key inputs for the TVE's. Focusing on land markets, Naughton (1996) provides empirical evidence of the importance of market imperfections for the rise of TVEs. Che and Qian (1995) depart from the above papers by treating the whole township or village as a large TVE corporation and argue that the imperfect environment of

both market and government give rise to these large corporations. Our theory focuses on the micro-micro control right structure within each individual firm. We are especially interested in why a new start-up firm is interested in joining a large TVE corporation and subsequently face ambiguity in property rights arrangements.

The next section looks into the details of ambiguous property rights in the Chinese non-state sector. Section 3 proposes a theory of ambiguous property rights. Finally, section 4 summarizes the arguments, raises issues for further research, and discusses implications of the paper.

2. Ambiguous Property Rights in China's Non-State Sector

2.1. Ambiguous Property Rights

The non-state sector in China refers to all the enterprises in the economy, excluding the traditional state-owned enterprises. Purely private enterprises constitute only less than 13 percent of the non-state sector. The biggest component, 74 percent, of the Chinese non-state sector consists of collective enterprises (Jefferson and Rawski, 1994, Table 1).⁶ Most of the rural enterprises, the Township and Village Enterprises (TVEs) fall into the category of collective enterprises.

The best illustration of ambiguous property rights in the non-state sector is the joint control of firms by entrepreneurs and the local government. Typically, a non-state firm is founded by entrepreneurs. In principle, the entrepreneurs can choose the organizational form of the firm: collective, private, or other form. The local government, on the other hand, has access to many of the necessary factors of production and can provide services to the enterprise. Thus, by choosing to register the firm as a collective one, entrepreneurs intentionally invite the local government to share the control rights. Once the local government is involved in the operation of the firm, it is difficult to pre-assign control rights and the division of control becomes blurred, and control rights are

ambiguous.

Decisions about daily operations represent the first area of ambiguous property rights. They are shared between the entrepreneur and the local government. In a sample of 40 enterprises, Lin, He, and Du (1992) found that on average, 60 percent of production decisions of entrepreneurs are subject to local government interference. In their sample, many enterprises are coal mines. These coal mines have to "contend as much as possible for planned freight car quota from local governments" (p253). This is one of the many reasons for government intervention. In general, there is an economic rationale for the joint control of daily operation. The entrepreneur has a natural advantage in controlling the daily operation, due to her managerial skills. The local government, on the other hand, is also valuable, since, many times, it can step in to facilitate transactions when market mechanisms fail.

The decision right over the disposition of profit is the second aspect of ambiguous rights. To begin with, the tax collection rule is never clear. Instead, bargaining and negotiation are prevalent. From case studies and statistical analysis, Lin, He, and Du (1992) conclude that "there is no stable relationship between an enterprise's retained profits and its business achievements. Profit retention, subject to unpredictable changes through *ad hoc* decisions, is finally determined through bargaining after profits have been earned" (p.260). Moreover, the disposal of the after-tax-profit is also subject to bargaining. For example, all collective firms have to put aside about 15 percent of its profit in a collective accumulation fund (Whiting, 1995). There are no clear rules on how this funds should be invested or paid out. Disbursements from this fund require complicated negotiations among the entrepreneur, the local government, and workers.⁷

Investment decisions constitute another important aspect of ambiguous property rights. Capital markets in China are yet to be fully liberalized. The majority of financial institutions is state-owned and administratively controlled. Thus, the local government

enjoys a clear advantage over individual entrepreneurs in the capital market, while entrepreneurs may have a better understanding of the intrinsic value of the investment. Thus, local governments are heavily involved in most of the investment decisions. Lin, He, and Du (1992) find that "investment activities decided by government accounted for 55.6 percent, those decided by enterprise themselves but subject to government approval accounted for 21.2 percent, and those decided solely by enterprises accounted for 23.2 percent" (page 264).

2.2. The Role of Local Governments in the Gray Market

Chinese local governments have strong incentives to promote local economic development. With rapid growth of the local economy, increased tax revenue benefits local bureaucrats in various ways.⁸With good performance of the local economy, there is also more chance for the local officials to be promoted to higher ranks.⁹In addition, by being directly involved in business activities, many local bureaucrats are actually preparing for new careers as businessmen after retirement from the politics. All of these reasons and others explain local officials' enthusiasm for business development.

Market imperfections form the basis for local governments' active intervention in local firms. The gray market phenomenon is prevalent. Transactions in these markets are costly. Factor markets are leading examples of the gray market. In addition, some product markets also fit the definition of gray market. Prices of electricity, transportation services, and some scarce raw materials are not fully decontrolled.¹⁰The gray market phenomenon also extends to contractual relations. The signing and implementation of contracts is the basis of market economies. However, during the transition from a bureaucratic economy to a market one, the infrastructure to support a contract system takes time to establish. Meanwhile, bureaucratic intervention into the execution of contracts is natural. Thus, in the Chinese context, a private firm cannot always get good treatment when it is involved in a contract dispute with a state-owned enterprise.

Protection from the local bureaucrats thus becomes very helpful.

Given the prevalence of the gray market, an emerging non-state firm may find it highly beneficial to include the local government as part of the firm. This gives rise to ambiguous property rights. When the gray market becomes black, i.e, when the firm has trouble with market transactions, the local government can step in and intervene on behalf of the non-state firm. For a purely private firm, asking for help from the local government may not be as easy, because the firm and the government do not share inside information of the firm.

The inclusion of the government in the firm is not costless. Once the local bureaucrats obtain direct control rights over the firm, they are unlikely to resist the temptation to distort the operation of the firm to their own benefit. In particular, they can easily exercise their control rights to divert resources from the firm to their own use. Wang (1990) surveyed both township leaders and collective firm directors. He found that "the objectives of the TVCE (i.e. collective firms) differ sharply from those set by these governments" (p. 225). On the other hand, a private firm can easily avoid such intrusions by not sharing its information with the local government. In reality, this translates into lower ability for the government to tax private business.

In summary, given the gray market, the local government can become productive for local firms. The benefit of ambiguous property rights is better protection for the enterprise. However, the cost is the potential for excessive intervention of the local government. The entrepreneur has to balance the cost and benefit in choosing the optimal property rights form. The next section develops a formal theory based on this intuition.

3. A Theory of Ambiguous Property Rights

The Chinese experience of non-state sector can actually be generalized and thus, we propose a theory of ambiguous property rights. Instead of using the entrepreneur and

the government, let us call the two parties E (she) and G (he). E and G can be any economic agents involved in a project or a firm. At time 1, E and G are not sure who will be productive in the project at time 2. Also, at time 1, E and G find it either too costly or impossible to have explicit and complete contracts specifying who will get the control right contingent on what will happen at time 2. Thus, the only relevant choice is either one of E and G becomes a sole owner of the firm, or E and G become co-owners, in which case, E and G fight for actual control when time 2 comes.¹¹

Also, at time 1, E and G can fully negotiate the ownership arrangement. Therefore, by the Coase Theorem, the ownership arrangement is most efficient at time 1 when taking both parties' welfare into account.

Notice that the model is much more general than the story of the Chinese non-state sector. That is, G may not be the government, and the situation in which G is productive may not be the gray market scenario. For instance, G can be a lawyer who will be productive when the firm has to negotiate a deal with another economic institution.

The rest of the model builds more structure into the basic set-up. At time 1, only E has to make an investment, k_E , after choosing the form of property rights.¹² G cannot directly observe k_E , but G can calculate the optimal choice of K_E after E chooses the property rights form. As standard assumptions, the cost function $C(k_E)$ satisfies the following condition,

Assumption 1: $C(0) = 0$, $C'(k_E) > 0$, and $C''(k_E) > 0$.

At time 2, the profitability of the firm is revealed — only to the insiders or owners of the firm. As explained in the introduction, this assumption reflects arguments of many authors on the theory of the firm, and it is most appropriate in the current context, i.e., small new firms with no separation of ownership and control. In this case, lacking direct control over the operation of the firm, outsiders find it difficult to verify the true

profitability of the firm.

Let the profitability be measured by θ . For simplicity, assume that, at time 1, it is common knowledge that θ follows a uniform distribution. To summarize:

Assumption 2: At time 1, it is common knowledge that $\theta \sim \text{Uniform}[0, 1]$.

It should be noted that in a more general model, E may enjoy better knowledge of θ than G before E investing k_E . Thus, observing k_E , G can update his information on θ . In general, such an information update is not perfect, so that in the case that G is not an owner, he still has less accurate information than E . Basic messages from the following analysis should still go through. Therefore, to focus on the issue of the ownership choice, we will stick to the current simpler model.

At time 2, either a white state or a black state will arise. Thus, from time 1's perspective, the prospective state is gray. In the white state, only E is productive. In the black state, only G is productive. In reality, the black state can arise due to legal disputes with another firm, obstacles resulting from intervention of the central government, or difficulties in obtaining extra capital. Suppose that the common knowledge at time 1 is that the white state has probability p and the black state has probability of $1 - p$. Furthermore, this distribution of states is independent of the distribution of θ .

In the white state, the profit π_W depends on E 's effort level a_E , her productivity q_E , her initial investment level k_E , and the overall profitability θ . No effort from G is productive at all. Assume that the disutility of effort of E is $U(a_E)$. Furthermore, assume that

Assumption 3: $\pi_W = \theta q_E a_E^\alpha k_E^\beta$, $0 < \alpha, \beta < 1$.

q_E measures the productivity of E in the white state. This assumption is useful later for the purpose of comparative statics. Also, we add standard assumptions on $U(\cdot)$.

Assumption 4: $U(0) = 0$, $U'(a_E) > 0$, and $U''(a_E) < 0$.

In the black state, the firm's profitability is in jeopardy unless G steps in. G will

negotiate with E regarding the payment for G 's effort. In addition, assume that G 's effort comes in the form of additional capital k_G . k_G is fixed, in other words, if G is to rescue the firm, the effort must be k_G .¹³ k_G can also be re-interpreted as other kinds services. k_G can only be provided by G . The opportunity cost of k_G to G is $r_0 k_G$.

Suppose that with the help of k_G , the profit in the black state π_B depends on the investment k_E and profitability θ . Of course, the implicit assumption that E is not productive at all in the black state is extreme and is meant to highlight the effect of black states. In other words,

Assumption 5: $\pi_B = \theta k_E$.

How do E and G bargain to divide the profit? To fully answer this would require a more complicated structure. However, we will avoid this road, since the added structure may easily blur the main message. Instead, we will make very simple assumptions. For the case where E and G bargain with symmetric information, we will assume that E 's relative bargaining power in the Nash bargaining sense is δ_E .

Assumption 6: In the case of ambiguous ownership, when E and G bargain under perfect knowledge of θ , E gets $\delta_E > 0$ proportion of the total surplus.

It is not straightforward to extend this assumption to the case of private property rights case, since G is not as well informed about θ as E . It is commonly known that such an information asymmetry often leads to breakdown of bargaining and loss of efficiency. Again, looking for the simplest approach to capture such transactions costs, we will assume that G acts as a monopolist. In this case, the price set by G is so high that sometimes E cannot reach a deal with G .

Assumption 7: With private property rights, when E and G bargain in the market, the uninformed G acts like a monopolist.

Again, to reiterate, assumption 7 need not be taken literally, since it is a simple way to model transactions costs in asymmetric information bargaining, although in China's

non-sector, local governments do act this way when dealing with private entrepreneurs. Future research is definitely needed to advance the analysis in this aspect.

The firm's property-rights arrangement determines the control right structure at time 2. Given our model, the only relevant choice is either that E becomes the sole owner, or that both E and G share the ownership. If E privately owns the firm, E enjoys uncontested control in all states at time 2. We call it unambiguous property rights. If E and G co-own the firm, ambiguous property rights emerge, i.e., E and G will bargain for the actual control in each possible state at time 2.

3.1. Unambiguous Property Rights

Suppose that, at time 1, E chooses to set up the firm as a private one. In the white state, as the sole owner of the firm, she obtains all the profits from the operation. She chooses the optimal a_E to maximize her payoff. Thus, the payoff to her is

$$y_W = \text{MAX}_{a_E} \theta q_E a_E^\alpha k_E^\beta - U(a_E). \quad (1)$$

The first order condition for her optimal choice of a_E is

$$\theta \alpha q_E a_E^{\alpha-1} k_E^\beta - U'(a_E) = 0.$$

From the Envelope Theorem, we have

$$\frac{dy_W}{dk_E} = \theta \beta q_E a_E^\alpha k_E^{\beta-1}. \quad (2)$$

In the black state, E will end up with nothing unless she asks help from G . The issue is how much E pays for G for the service k_G . By assumption 7, G acts like a monopolist and will set an optimal charge rate r in order to maximize G 's expected payoff. With rate r , which E can still afford the service? It must be that

$$\theta : \theta k_E - r k_G \geq 0, \text{ or}$$

$$\theta : \theta \geq r \frac{k_G}{k_E}. \quad (3)$$

Therefore the expected payoff of G must be

$$E [rk_G - r_0 k_G \mid (3)] = (rk_G - r_0 k_G) \left(1 - r \frac{k_G}{k_E}\right)$$

and the optimal r must be

$$r = \frac{k_E + k_G r_0}{2k_G}. \quad (4)$$

Thus, in this case, E 's expected payoff conditional on being in the black state becomes, by the distributional assumption on θ :

$$\begin{aligned} E[\theta k_E - rk_G \mid (3), (4)] &= \frac{1}{2} \left(1 + \frac{k_E + k_G r_0}{2k_E}\right) \left(1 - r \frac{k_G}{k_E}\right) k_E - \left(1 - r \frac{k_G}{k_E}\right) \frac{k_E + k_G r_0}{2k_G} k_G \\ &= \left(1 - \frac{k_E + r_0 k_G}{2k_E}\right) \frac{k_E - r_0 k_G}{4}. \end{aligned} \quad (5)$$

Overall, the expected payoff to E after investing k_E becomes

$$\begin{aligned} Y_E &= p E_\theta [\theta q_E a_E^\alpha k_E^\beta - U(a_E)] \\ &+ (1-p) \left(1 - \frac{k_E + r_0 k_G}{2k_E}\right) \frac{k_E - r_0 k_G}{4}. \end{aligned} \quad (6)$$

Consequently, the investment k_E is based on the the solution to the following problem:

$$\begin{aligned} \text{MAX}_{k_E} \quad & p E_\theta [\theta q_E a_E^\alpha k_E^\beta - U(a_E)] \\ & + (1-p) \left(1 - \frac{k_E + r_0 k_G}{2k_E}\right) \frac{k_E - r_0 k_G}{4} - C(k_E). \end{aligned} \quad (7)$$

3.2. Ambiguous Property Rights

With ambiguous property rights, E and G will have to contest or bargain for the actual control in each state. In the white state, E is the only productive party. However, G has to agree to giving up his control right in order for E to be productive. The issue is how much payment G gets in return for relegating all control to E . If G does not

cooperate, the total profit is 0. If G gives up all of his rights, E has full incentive to produce:

$$y_W = \text{MAX}_{a_E} \theta q_E a_E^\alpha k_E^\beta - U(a_E).$$

With assumption 6, G can extort $1 - \delta_E$ proportion of the total payoff by getting tax

$$T = (1 - \delta_E)[\theta q_E a_E^\alpha k_E^\beta - U(a_E)],$$

where a_E is the solution to problem in equation (1). T in essence is a lump sum tax on E and it enables E to "lease" the enterprise and to fully exercise her control rights.

Thus, the payoff to E is

$$y_E = \delta_E[\theta q_E a_E^\alpha k_E^\beta - U(a_E)]. \quad (8)$$

In the black state, E is useless and G becomes productive. In addition, both E and G can observe the actual return rate θ . With full cooperation, E gives up all of her rights and lets G take over. G maximizes his payoff:

$$\theta k_E - r_0 k_G.$$

The simple optimal solution is to invest k_G only if

$$\theta > r_0 \frac{k_G}{k_E}. \quad (9)$$

Of course, without the cooperation of E , G cannot invest k_G and both E and G get 0 payoff. Again, according to assumption 6, the payoff to E is

$$\delta_E(\theta k_E - r_0 k_G),$$

if (9) is satisfied; otherwise 0. Thus, in case of the black state, E 's time 1 expected payoff becomes:

$$y_E = E[\delta_E(\theta k_E - r_0 k_G) \mid (9)] = \delta_E \left[\frac{1}{2} \left(1 + r_0 \frac{k_G}{k_E}\right) \left(1 - r_0 \frac{k_G}{k_E}\right) k_E - \frac{1}{2} \left(1 - r_0 \frac{k_G}{k_E}\right) r_0 k_G \right]$$

$$= \delta_E \frac{1}{2} \left(1 - r_0 \frac{k_G}{k_E}\right) (k_E - r_0 k_G). \quad (10)$$

Overall, with ambiguous property rights, the *ex ante* investment level of k_E is based on the the solution to the following problem:

$$\begin{aligned} \text{MAX}_{k_E} Y_E &= p \delta_E E \theta [\theta q_E a_E^\alpha k_E^\beta - U(a_E)] \\ &+ (1-p) \delta_E \frac{1}{2} \left(1 - r_0 \frac{k_G}{k_E}\right) (k_E - r_0 k_G) - C(k_E). \end{aligned} \quad (11)$$

3.3. Property Rights and the Market Environment

Given that E and G can negotiate on the organizational form at time 1, the end outcome must be that E will choose the *ex ante* most socially efficient property arrangement. Before making predictions about which form of property rights arrangement E will choose, a useful exercise is to compare both cases with a bench-mark case, i.e. the first-best arrangement. The first-best situation arises when a social planner controls all relevant decisions. In our model, apparently, the first-best can be obtained when in the white state, the social planner gives complete control right to E . In the black state, he chooses the optimal financing policy k_G and gives all of the surplus profit to E . The reason is simple: E is the only party who makes an initial investment and it is necessary to keep all returns to E . To summarize:

Lemma 1 *The first-best outcome can be achieved when E obtains unambiguous control rights all the time and when E can have access to capital k_G at the interest rate of r_0 .*

Given this characterization of the best-best outcome, the following result is not surprising.

Lemma 2 *So long as $p < 1$, both private and ambiguous property rights arrangements give rise to too little investment k_E , relative to the first-best property right arrangement.*

The simple intuition is the following. When $p = 1$, the market is always white. Thus, G will never be productive. Thus, the private property rights case is first-best: E gets 100 percent of the return to its initial investment k_E . However, when $p < 1$, there is always a possibility of the black state. The market is genuinely gray from the time 1's perspective. Private property rights cannot be first-best, because in the black state, the firm cannot get full protection, since, with probability $1 - \delta_E$, G will be a monopolist and ration his supply of k_G . Thus, E under-invests. On the other hand, ambiguous property rights are also inefficient relative to the first-best. Because in the white state, E cannot get 100 percent of the return to her investment; E loses δ_E to G .

Given that none of the property rights forms is a first-best arrangement, which is relatively more efficient? Lemma 2 implies that the property rights arrangement that induces the higher investment k_E is relatively more efficient. We have following result.

Proposition 1 *Given q_E , r_0 , k_G and that $\delta_E > \frac{1}{4}$, there exists a $\bar{p} > 0$ such that, when $p < \bar{p}$, a firm with ambiguous property rights is more efficient than a firm solely owned by E .*

(All proofs of the propositions are in Appendix)

Proposition 1 explains that when the black state is more likely to arise, ambiguous ownership is more likely to be chosen over unambiguous ownership. This is simply because securing G 's service is more and more important than preventing G from sharing profits with E in the white state. Notice that δ_E reflects the overall bargaining skill of E when E shares ownership with G . Thus, when δ_E is too low, ambiguous ownership may never be more efficient than its alternative. One fourth as a value of δ_E turns out to be the lower bound. Again, this is a result of the restrictive Assumptions 6 and 7 and should not be taken literally.

The next result analyzes the effect of r_0 and k_G on the relative efficiency of the two property rights arrangements. Notice that $r_0 k_G$ can be regarded as a measurement of

the opportunity cost to G of rescuing the firm in the black state. A decrease in this opportunity cost indicates that the government is more productive for the firm. Intuition seems to be that, when the government is more productive, involving G as an ambiguous owner is efficient. Indeed, this is the case.

Proposition 2 *Ceteris paribus, the lower the r_0K_G , the more likely that a firm with ambiguous property rights is more efficient than a privately-owned firm.*

Like the above result, when E is more productive, a pure private firm owned by E is likely to be more efficient than ambiguously owned firms, because E can keep all her marginal product in the white state. The following proposition states this result.

Proposition 3 *Ceteris paribus, the higher the productivity of E , q_E , the more likely that a private firm solely owned by E is more efficient than an ambiguously-owned firm between E and G .*

A characteristic of firms with ambiguous property rights is that these firms have more chance to get services from G in the black state than pure private firms. This corresponds well to empirical observations in China. For example, after studying financial status of 100 rural enterprises, Wang (1990) finds that "(M)oney-losing TVCEs (i.e. collective firms — author) typically stay in business, despite their inability to repay debts..." (page 225). To summarize, we have the following proposition. Notice that in our simple, the ex post profit (not counting initial investment k_E), is either 0 or positive.

Corollary 1 *Ceteris paribus, under ambiguous property rights, firms are more likely to have positive ex post profits (i.e., profits not taking initial investments into account) than under private property rights.*

Lastly, the theory implies a warning against any simple efficiency comparisons between ambiguously owned firms and private firms. Given that the choice of ownership

forms is endogenous, based on observed ownership form itself, one may not draw any conclusions as of which ownership form is more efficient. This is exactly the finding of many empirical works. For example, Svejnar (1990) concludes that “after differences in inputs and other variables are controlled, productive efficiency does not vary systematically with the four types of ownership examined (i.e., township, village, partnership or individual, and joint venture — author)”. The same finding is reported by Weitzman and Xu (1994) and Zhao (1994). As is clear from the model, these findings are not proofs of the *universal* efficiency of ambiguous property rights.

4. Conclusions and Further Discussion

The paper develops a theory of ambiguous property rights, by which it is meant that property owners have to fight for the actual control right in all circumstances. A major example of ambiguous property rights can be found in China’s highly successful non-state sector. This constitutes a challenge to conventional theories of property rights. Our theory rationalizes ambiguous property rights by high transactions costs in the market place. In other words, when transactions in the market place are costly, ambiguous property rights may prove to be more efficient than clearly-defined property rights. Our theory explains the prevalence of ambiguously-owned firms in China’s emerging non-state sector and provides lessons for other transitional economies.

The message of our theory needs careful interpretation. A narrow interpretation is that when governments may block market transactions, then it is efficient to invite a government to be an ambiguous owner of the firm. Although this is largely the case in China’s non-state sector, our theory is broader than this. In the theory, the two agents E and G can be any economic agents. In particular, G is any economic agent who may become productive *ex post* but has trouble negotiating with E if G is left out of the firm. Thus, G is not necessarily the government.

There are still puzzles remaining about the success of China's non-state sector. What is explained by our theory is that *given* market imperfections of various forms, ambiguous property rights may become efficient. The remaining puzzle is why China's state sector has been so successful despite market imperfections and the resulting ambiguous property rights. Can the unconventional arrangements of ambiguous ownership be justified in a larger context than market imperfections? These questions need to be addressed in future research.

There are several implications of the theory. First, it helps re-focus our attention on enterprise reform from the enterprise *per se* to the surrounding market environment. That is, property rights cannot be clarified without establishing a properly functioning market. Second, the theory implies that an unconditional call for clarifying the ownership and property rights of the enterprise, a popular slogan in China, may not be appropriate for transition economies. Given the grayness and imperfections of the market, a proper degree of ambiguity of property rights is perhaps necessary. Thus, in this sense, lessons of the Chinese non-state sector may bear some relevance to Eastern Europe and the former Soviet Union.

Appendix

All the lemmas, propositions, and corollary follow a comparison of first order conditions for k_E of the first-best, the private-ownership, and the ambiguous-ownership cases.

I. The First-Best Case

In the first-best case, the social welfare in the white state is

$$\theta q_E a_E^\alpha k_E^\beta - U(a_E).$$

In the black state, only when $\theta k_E > r_0 k_G$, will the firm be rescued. Thus, the expected social welfare, given k_E , in the black state is

$$E(\theta k_E - r_0 k_G \mid \theta k_E > r_0 k_G) = \frac{1}{2} \left(1 - r_0 \frac{k_G}{k_E}\right) (k_E - r_0 k_G).$$

Therefore, the total expected social welfare is

$$p E_\theta [\theta q_E a_E^\alpha k_E^\beta - U(a_E)] + (1-p) \frac{1}{2} \left(1 - r_0 \frac{k_G}{k_E}\right) (k_E - r_0 k_G) - C(k_E)$$

and the first order condition for the first-best k_E becomes

$$p E_\theta [\theta q_E \beta a_E^\alpha k_E^{\beta-1}] + (1-p) \frac{1}{2} \left(1 - \frac{r_0^2 k_G^2}{k_E^2}\right) = C'(k_E). \quad (a1)$$

Notice that we have used the Envelope theorem in obtaining the first term.

II. Private ownership by E

From maximizing expression (7), we get the first-order condition

$$p E_\theta [\theta q_E \beta a_E^\alpha k_E^{\beta-1}] + (1-p) \left[\frac{1}{8} \left(1 - \frac{r_0^2 k_G^2}{k_E^2}\right) \right] = C'(k_E). \quad (a2)$$

Notice that from our set-up, a_E in (a1) and (a2) is an increasing function of k_E .

Comparing (a1) with (a2), we can see the right-hand-sides are an increasing function of k_E by assumption 1. The left-hand-side of (a2) is lower relative to that of (a1) unless $p = 1$. Therefore, k_E defined by (a2) should be less than that in (a1).

III. Ambiguous Ownership Between E and G

From maximizing expression (11), we can get the following first-order condition

$$p \delta_E E_\theta [\theta q_E \beta a_E^\alpha k_E^{\beta-1}] + (1-p) \delta_E \frac{1}{2} \left(1 - \frac{r_0^2 k_G^2}{k_E^2}\right) = C'(k_E). \quad (a3)$$

Notice that from our setup, a_E in the first-order conditions is an increasing function of k_E .

As in the proof in II, we can get the the other half of Lemma 2; Lemma 1 is obvious.

IV. Propositions 1, 2, 3m and Corollary 1

These can be easily obtained by comparing the left-hand-sides of (a2) and (a3). Note that the right-hand-sides of (a2) and (a3) are all increasing functions of k_E . Therefore, if the

difference between the left-hand-sides of (a2) and (a3) is positive, i.e., for all k_E ,

$$(1 - \alpha_E) p E_\theta (\theta q_E \beta \alpha_E^\alpha k_E^{\beta-1} - (1 - p) (\frac{1}{8} - \frac{1}{2} \delta_E) (1 - \frac{r_0^2 k_G^2}{k_E^2})) > 0, \quad (a4)$$

then the solution K_E from (a2) is larger than that from (a3). The rest of proof can be readily obtain from analyzing (a4).

Footnotes

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2: The leading example is purely individual private ownership.

3: See Aghion and Bolton (1992) for a seminal theory of firm's capital structure based on the concept of contingent control rights. They rationalize the common arrangement that shareholders obtain control rights of a firm, until negative profit occurs and then creditors obtain the control.

4: The concept of gray market was first coined and analyzed by Chinese economists (see Fan, 1988).

5: For example, after studying public finance of local governments, Song and Du (1990) conclude: "the township government can safeguard public finances only by participating directly in the management of firms ..." (page 348).

6: By share in nominal output.

7: For a detailed discussion of the controversy of the accumulation fund, see Cui

(1994), a report on TVEs in a prefecture in Zhejiang province.

8: China's tax contract system during the reform allowed the local government to obtain a large proportion, on the margin, of tax collected in the local area. This system has greatly strengthened local bureaucrats' incentives to promote local economic development.

9: See Byrd and Gelb (1990) for a detailed study of the incentive of local government officials in economic development.

10: A common reason for the delayed price liberalization is to buy time for vested interest groups to adjust to higher prices.

11: Notice that we have ruled out the possibility that E and G sign profit sharing contracts. We rule this out, because we argue that, *ex post*, control right holders can also modify or even override such sharing rules. This is consistent with Grossman-Hart-Moore's arguments that financial benefits are by-products of control rights. Again, we believe that this assumption is most relevant for transition economies, where rules written in contracts are not nearly as creditable as in market economies.

12: More generally, the model can be expanded to the case that G also has to make initial investments. However, the only thing added is one more property rights form, i.e., G becomes a sole owner. We do not obtain any new insights with this expansion to the model.

13: This is a simplifying assumption. In general, letting k_G vary does not add insights to the model.

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