

## An organizational economics approach to the existence of sharecropping

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**Abstract:** The paper provides a new explanation for the existence of sharecropping in agriculture from the perspective of organizational economics. Similar to a multinational enterprise's decision of whether to enter a joint venture or to choose a wholly owned subsidiary, we can see sharecropping as a joint venture and a fixed rent contract as a wholly owned subsidiary when we stand in the tenant's position. Our analysis shows that when the landlord has a strong enough comparative advantage in exerting one type of effort, he/she tends to choose the share contract.

**Key words:** share contract, fixed rent contract, bargaining power

Economists have paid attention to sharecropping for several decades. Marshall (1920) concludes that sharecropping is inefficient compared to a fixed rent contract because the tenant cannot obtain the full marginal product in a share contract. However, sharecropping is very popular in many countries and regions in some periods (Cheung 1968, 1969a, b; Byres 1983; Bardhan 1984). Many economists are attracted by this seemingly contradictory phenomenon and put forward different economic explanations. All of these explanations can be mainly divided into several directions. The first direction focuses on risk sharing, which highlights that the risk dispersion can lead to sharecropping (Cheung 1969a, b; Stiglitz 1974; Braverman and Stiglitz 1982; Sen 2011). The second direction centres on self-selection effects, which holds that sharecropping results from the adverse selection problem (Hallagan 1978; Allen 1982). The third direction concentrates on moral hazard, which stresses that sharecropping is a relatively effective measure to deal with the opportunistic problem on the part of the landlord or the tenant or both of them (Eswaran and Kotwal 1985; Laffont and Matoussi 1995; Agrawal 1999; Ghatak and Pandey 2000; Dubois 2002). The fourth direction puts emphasis on the role of limited liability in determining the existence

of sharecropping (Basu 1992; Sengupta 1997; Ray and Singh 2001; Dam and Perez 2012). Although the existing literature provides different explanations from different directions, it pays little attention to the role of sharecropping as an organizational form in agriculture. The aim of this paper is to fill in this research gap from the perspective of organizational economics.

The paper develops a new theory for the existence of sharecropping. As we know, the organization of multinational activities is a hot point that has always attracted the attention of many theoretical economists. The multinational enterprises face the decisions of whether to enter a joint venture or to choose a wholly owned subsidiary (see, e.g., Mugele and Schnitzer 2008). In joint ventures, revenue sharing is common in practice (see, e.g., Wang and Zhou 2005). Inspired by the organization of the multinational enterprises, we try to use the similar analytical tool to explore the choice of contractual arrangements in agriculture. If sharecropping is seen as a joint venture and a fixed rent contract is seen as a wholly owned subsidiary on the tenant's standpoint, then we can provide a new explanation for the emergence of sharecropping. In doing so, we should point out that there are three points worth

mentioning. Firstly, our approach emphasizes the role of efforts in multiple tasks, just as Eswaran and Kotwal (1985), Holmstrom and Milgrom (1991) and Dam and Perez (2012) do. Secondly, although this paper is similar to Eswaran and Kotwal (1985) in adopting a Cobb-Douglas function, we focus our attention not on the relative importance of the landlord and the tenant different effort inputs, but on the difference of effort costs between the landlord and the tenant, just as Mugele and Schnitzer (2008) do. Thirdly, the choice of organizational forms in agriculture is based on whether the landlord's comparative advantage in exerting effort is sufficiently strong or not, which is greatly different from the existing viewpoints.

## MATERIAL AND METHODS

### Basic setup

We will provide the analytical framework in the following exposition. The crop production process needs two types of effort inputs. The first type is  $T$ -effort, which means that the tenant has a comparative advantage in spending it.  $T$ -effort can be seen as an effort related to financing and other interlinking activities in the Braverman and Stiglitz's (1982) sense. The second type is  $L$ -effort, which implies that the landlord has a comparative advantage in exerting it.  $L$ -effort can be seen as an effort related to cultivating and fertilizing. In order to avoid an unnecessary complexity and to make our analysis as simple as possible, we assume that both these two effort inputs are of equal importance, that is to say, the output could be expressed as  $Q = T^{\frac{1}{2}}L^{\frac{1}{2}}$ , where  $Q$  is the output,  $T$  and  $L$  are the first type effort and the second type effort, respectively. It should be noted that the more generalized form of the production function can be described as  $O = T^{\alpha}L^{1-\alpha}$ , where  $0 < \alpha < 1$ . Here, in order to neglect the role of  $T$  and  $L$ 's relative importance in sharecropping, we set  $\alpha = \frac{1}{2}$ . The price of crop is normalized to 1.

The landlord can choose either a fixed rent contract or a share contract. The choice of contractual forms is based on the fact which of them can bring more utility to the landlord. Although the mathematical method applied in this paper is borrowed from Mugele and Schnitzer (2008) to a certain extent, we make our own contribution in that we specifically set the exogenous and endogenous variables according to the actual contractual forms in agriculture.

When it is under the share contract, the landlord gets  $1 - \mu$  proportion and the tenant gets  $\mu$  proportion,

where  $0 < \mu < 1$ . In this case, the landlord spends the first type effort  $L$  at the cost of  $\frac{1}{2}L^2$ , and the tenant exerts the second type effort  $T$  at the cost of  $\frac{1}{2}T^2$ . According to Otsuka et al. (1992) and Pi (2013), this is a "pure" share contract since the fixed payment is set equal to zero, and what's more, it is also known as the most common form of sharecropping tenancy in practice.

When it is under the fixed rent contract, the tenant exerts two types of efforts at the cost of  $\frac{1}{2}L^2$  and  $\frac{c}{2}T^2$  where  $c > 1$ . It should be noted that  $c > 1$  implies that the tenant is less expert than the landlord with respect to exerting the first type effort  $L$ . In this case, the landlord gets a fixed rent  $R > 0$ . Generally speaking, most times the landlord has a dominant bargaining power, that is to say, the landlord has the power to set the fixed rent  $R$ . In our extended analysis, we will loosen this assumption.

### Share contract

When it is under the share contract, the landlord's utility will be:

$$U_L^S = (1 - \mu)T^{\frac{1}{2}}L^{\frac{1}{2}} - \frac{1}{2}L^2 \quad (1)$$

The tenant's utility will be:

$$U_T^S = \mu T^{\frac{1}{2}}L^{\frac{1}{2}} - \frac{1}{2}T^2 \quad (2)$$

The superscript  $S$  stands for the share contract and the subscript  $L$  and  $T$  denote the landlord and the tenant, respectively.

The first order conditions of Equations (1) and (2) are:

$$L = \left[ \frac{1}{2} (1 - \mu) T^{\frac{1}{2}} \right]^{\frac{2}{3}} \quad (3)$$

$$T = \left( \frac{1}{2} \mu L^{\frac{1}{2}} \right)^{\frac{2}{3}} \quad (4)$$

From two above reaction functions (3) and (4), we obtain:

$$L = \frac{1}{2} \mu^{\frac{1}{4}} (1 - \mu)^{\frac{3}{4}} \quad (5)$$

$$T = \frac{1}{2} \mu^{\frac{3}{4}} (1 - \mu)^{\frac{1}{4}} \quad (6)$$

Substituting Equations (5) and (6) into Equations (1) and (2), and maximizing  $U_L^S + U_T^S$  with respect to  $\mu$ , we get:

$$\mu^* = \frac{1}{2} \quad (7)$$

Therefore, the landlord's equilibrium utility under the share contract is:

$$U_L^{S*} = \frac{3}{32} \quad (8)$$

The tenant's equilibrium utility under the share contract is:

$$U_L^{S*} = \frac{3}{32} \quad (9)$$

Throughout the paper, the superscript \* stands for the equilibrium state.

### Fixed rent contract

When it is under the fixed rent contract, the landlord's utility will be:

$$U_L^F = R \quad (10)$$

The tenant's utility will be:

$$U_{LT}^F = T^{\frac{1}{2}}L^{\frac{1}{2}} - \frac{1}{2}T^2 - \frac{c}{2}L^2 - R \quad (11)$$

The superscript *F* stands for the fixed rent contract. The first order conditions of Equations (11) are:

$$L = \left(\frac{1}{4c^2}T\right)^{\frac{1}{3}} \quad (12)$$

$$T = \left(\frac{1}{4}L\right)^{\frac{1}{3}} \quad (13)$$

From Equations (12) and (13), we obtain:

$$L^* = \frac{1}{2}c^{-\frac{3}{4}} \quad (14)$$

$$T^* = \frac{1}{2}c^{-\frac{1}{4}} \quad (15)$$

Therefore, the tenant's equilibrium utility under the fixed rent contract is:

$$U_T^{F*} = \frac{1}{4}c^{-\frac{1}{2}} - R \quad (16)$$

Because the landlord has the power to set rent, he/she will set Equation (16) equal to Equation (9), that is to say:

$$R = \frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{32} \quad (17)$$

Thus, the landlord's equilibrium utility under the fixed rent contract is:

$$U_L^{F*} = \frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{32} \quad (18)$$

Furthermore, the tenant's equilibrium utility under the fixed rent contract is:

$$U_T^{F*} = \frac{3}{32} \quad (19)$$

## RESULTS AND DISCUSSION

### Comparative analysis

We will conduct a comparative analysis of the outcomes obtained under the fixed rent contract and under the share contract.

By comparison, we can obtain the following proposition. According to Ray (1999, pp. 55–56), "A single theory cannot explain all the aspects of share tenancy. That is why in the literature we find alternative explanations of share tenancy each highlighting some specific aspect of it."

**Proposition 1:** When  $1 < c \leq \frac{16}{9}$ , it is optimal for the landlord to choose the fixed rent contract. However, when  $c > \frac{16}{9}$ , it is optimal for the landlord to choose the share contract.

**Proof:** From (8) and (18), we obtain:

$$U_L^F - U_L^S = \frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{32} - \frac{3}{32} = \frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{16}$$

If  $1 < c \leq \frac{16}{9}$ , then  $U_L^F - U_L^S \geq 0$

If  $c > \frac{16}{9}$ , then  $U_L^F - U_L^S < 0$

The economic meaning of Proposition 1 is as follows. When the landlord's comparative advantage in exerting effort is strong enough, the landlord tends to choose the share contract. However, when the landlord's comparative advantage in exerting effort is sufficiently weak, the landlord tends to choose the fixed rent contract.

### Extended analysis

In our benchmark models, we assume that the landlord has the power to set the fixed rent *R*. Here, we will relax this assumption. We assume that the tenant's bargaining power is  $\tau$ , and the landlord's bargaining power is  $1 - \tau$ , where  $0 \leq \tau \leq 1$ . If the share contract is seen as an outside option of the fixed rent contract, according to Equations (8) and

(9), we can regard the landlord's reservation utility as  $\frac{3}{32}$  and the tenant's reservation utility as  $\frac{3}{32}$ . In fact, these two reservation utilities can be seen as two disagreement points. The cooperative surplus is  $(U_L^{F^*} + U_T^{F^*}) - (U_L^{S^*} + U_T^{S^*}) = U_L^{F^*} = \frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{16}$ .

If  $\frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{16} \geq 0$ , then the landlord's utility under the fixed rent contract is  $\frac{3}{32} + (1 - \tau)\left(\frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{16}\right)$ , and the tenant's utility under the fixed rent contract is  $\frac{3}{32} + \tau\left(\frac{1}{4}c^{-\frac{1}{2}} - \frac{3}{16}\right)$ . It is obvious that if  $1 < c \leq \frac{16}{9}$ , then the outside option will not be initiated, and both the landlord and the tenant had better choose the fixed rent contract, and if  $c > \frac{16}{9}$ , then the outside option will be initiated, and both the landlord and the tenant had better choose the share contract, which is just in line with Proposition 1.

## CONCLUSION

In this paper, we provide a new explanation for the existence of sharecropping in agriculture from the perspective of organizational economics. Similar to a multinational enterprise's decision of whether to enter a joint venture or to choose a wholly owned subsidiary, when we stand in the tenant's position, we can see sharecropping as a joint venture and a fixed rent contract as a wholly owned subsidiary. The findings of this paper are as follows. Firstly, when the landlord's comparative advantage in exerting effort is strong enough, it is optimal for the landlord to adopt the share contract. Secondly, when the landlord's comparative advantage in exerting effort is sufficiently weak, it is optimal for the landlord to choose the fixed rent contract.

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