

# The New Palgrave Dictionary of Economics Online

## sharecropping

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### Abstract

Sharecropping is a form of land leasing contract between a tenant and a landlord who share the production. It has a variety of forms and is sometimes linked with credit, lending, or insurance. The apparent inefficiency of sharecropping due to the fact that the tenant receives only a share of the marginal productivity of his labour has attracted economists' attention since Adam Smith. Within the principal-agent paradigm, sharecropping is now thought of as trading off incentives and risk sharing or as reducing transaction costs for a landlord willing to lend out a piece of land.

### Keywords

agency costs; arbitrage; collusion; contract repetition; cost sharing; credit; fixed-rent contracts; fixed-wage contracts; incentive contracts; insurance; Laffont, J.-J.; land leasing contracts; lending; limited liability; linear contracts; marketing agreements; monitoring costs; moral hazard; multitask moral hazard models; nonlinear contracts; peasants; principal and agent; risk aversion; risk neutrality; risk sharing; sharecropping; shirking; Stiglitz, J.; tenancy ladder; transaction costs

### Article

Sharecropping is a form of land leasing contract in which the tenant shares the final product with the landlord as a partial or total payment of the rent. A landowner leasing his land to a tenant may use several forms of land renting contracts. 'Sharecropping' usually designates all particular forms of land tenancy contracts in which the landlord allows the tenant to cultivate his land in return for a stipulated fraction of the product (the 'share'), possibly combined with other side payments. This institutional contractual agreement prevailed in many parts of the world and many different periods in the history of agriculture, from antiquity (Egypt, Mesopotamia and Greece), the Middle Ages and Renaissance in Europe, through to contemporary economies. Sharecropping is currently most commonly found in less developed countries where agriculture and land rental markets are more active, but it also still exists in many developed countries. The sharecropping relationship assumes a variety of forms and is sometimes linked to agreements involving not only land and labour transactions but also credit, lending, insurance or marketing agreements. Indeed, within sharecropping arrangements landlords may also determine the crops to be grown, may choose to monitor some of the key moments of the agricultural process, and may defray a greater or lesser share of the costs of some inputs (other than labour) with a pre-specified fraction that may not necessarily be equal to the fraction of output retained by the landlord in the payment rule.

### Is sharecropping inefficient?

Since Adam Smith, economists have taken an interest in sharecropping because of its apparent inefficiency based on the simple observation that the sharecropper receives only a share of the marginal productivity of his labour but bears its full marginal cost. The persistence of such institutions has thus puzzled many economists. More recently, sharecropping has also constituted the typical example of the principal-agent model, the basic paradigm of contract theory. Similar economic relationships occur in both developed and less developed countries when some party (the principal) delegates the use of some capital to another party in exchange for compensation depending on the returns obtained by the other party (the agent). Examples abound in capital markets (stock markets) where investors may let others use their capital in return for a share of the profits, in vertical relationships between producers and retailers in many industries (food and other consumption goods, or rental services), and in some labour contracts within firms where wages may depend on some measure of performance. Researchers working on the theory of rural organization have attempted to explain not only the persistence of sharecropping but also the particular features it exhibits.

### Sharecropping as an efficient risk-sharing contract

Concerns about the efficiency of sharecropping relationships have gone through several stages in the history of economic thought. While it was first thought to be an inefficient institutional arrangement, since Stiglitz (1974) it has been understood as possibly representing an efficient risk-sharing mechanism in environments where production is risky and other forms of insurance are not available. Sharecropping has the advantage over fixed-rent land leasing contracts of relieving the tenant of some of the risk. By sharing the product, the landlord and tenant also share its fluctuations due to risks related to the weather, diseases and other unpredictable factors affecting agricultural production. Through the payment of a rent contingent on agricultural production, the risk associated with variations in prices of marketed commodities is also shared by both parties. However, if the landlord is less risk averse, he should further protect the risk-averse peasant by simply using wage contracts. Moreover, the same risk-sharing opportunities could be provided without sharecropping simply by having workers combine wage

contracts and rental contracts.

However, the landlord's ability to monitor the tenant's labour has also been called into question. In most places where absentee landlords delegate the use of land to a tenant, it seemed implausible that a contract precisely specifying the labour to be applied could be enforceable. Stiglitz (1974) shows that sharecropping could be an institutional arrangement designed both to share risks and to provide incentives in a situation where monitoring effort (labour supply) is costly. Sharecropping results, then, from a trade-off between incentives and risk sharing. Fixed-rent contracts provide 'perfect' incentives by giving the full marginal product to the tenant but at the cost of shifting all the risk on to the tenant, while fixed-wage contracts protect the tenant against production risk but also remove direct incentives to provide effort. However, the two necessary ingredients of this trade-off have been successively challenged. Cheung (1969) criticizes the need to provide incentives through contracted remuneration, arguing that contracts could simply specify the optimal level of labour that the tenant should provide. Wage contracts would not then imply any inefficiency in the provision of effort and would completely insure tenants against income fluctuations. However, this reasoning implicitly assumes that monitoring is not costly, and empirical tests have shown in some contexts that input provision was actually lower under share contracts than under fixed-rent contracts (see, among others, Shaban, 1987). Conversely, the other side of the trade-off was also challenged by the apparent paucity of evidence as to the effect of risk on contractual forms. In fact, until recently a great deal of empirical work had failed to present evidence as to the effect of risk on the contract incentives that would be consistent with the alleged trade-off. This was mostly due to the significance of other trade-offs determining the choice of contracts (which we examine below) but also to the failure to recognize that the choice of contracts had to be modelled within a more general understanding of how land rental markets function. Dubois (2002) shows that taking into account the endogeneity of the choice to delegate use of land was important in the empirical analysis of contractual choices in order to avoid problems of selection bias in econometric estimates. Akerberg and Botticini (2002) show that not taking into account the endogenous matching of landlords and tenants could also lead to an apparent absence of correlation between the incentive power of contracts and the crop risk. Referring to direct evidence on risk sharing in village economies using consumption data linked to contract choices, Dubois (2000) demonstrates that the sharecropping institution could actually play a role in consumption risk sharing.

Thus, in order to reduce shirking, the landlord could either expend resources in monitoring the worker or prefer to resort to a sharecropping contract. The persistence of sharecropping can thus be explained by this argument together with a number of other observed features. For example, the landlord has an incentive to encourage the tenant to use inputs (such as fertilizer or manure) which raise the worker's marginal product, therefore resulting in higher worker effort. This explains why, as is often observed in sharecropping contracts, the landlord may be prepared to bear a fraction of the costs of inputs that exceeds the fraction of the product received. Obviously, to implement cost sharing, costs have to be observable and verifiable. Why then does the landlord not simply enforce a specific level of input provision by the tenant? This relates to the information structure as to the appropriate level of input, about which the tenant may have better knowledge given the conditions of production. Sharing costs thus remains a useful incentive.

Another argument against interpreting sharecropping as a risk-sharing contract is that the terms of the contracts should logically vary with the level of risk represented by the specific environment, the crops grown, and both parties' degree of risk aversion. Empirical observation, however, shows that in practice the terms of sharecropping contracts exhibit little variation, especially when it comes to the share of the product, which is often one-half and sometimes one-third or two-thirds. This could be seen to be the result of an approximation process of optimal contracts, but Allen (1985) provides an interesting explanation of this phenomenon. In a model where landlords initially screen tenants with heterogeneous abilities before entering into fixed-rent contracts with only the more able farmers, a sharecropping contract emerges endogenously in a state of equilibrium. Interestingly, the optimal share of production for the tenant in this case has to be a trade-off between the gains accrued from shirking and leaving the relationship after a given period and the gains from not shirking and being taken on again with a fixed-rent contract following a period of screening. This trade-off clearly depends on the farmers' time preferences. Allen (1985) shows that, given the usual interest rates that apply in less developed countries, the optimal share has to be close to one-half.

Another argument calling into question the aforementioned rationale for sharecropping is that the theory of contracts predicts that optimal incentive contracts should depend on output in general in a nonlinear way. However, nonlinear contracts imply that different tenants would face different marginal prices for their production, giving opportunities for arbitrage and incentives to collude among farmers. Linear contracts may then be a way to avoid this problem in environments where monitoring harvest and trade between tenants may be difficult. Moreover, the gains represented by the use of nonlinear contracts may not be worth the potential additional costs of implementing them.

In addition to such attempts to determine the rationale of sharecropping, the expected effect of this kind of rural organization on agricultural innovation and development has been investigated. The adoption of innovations in agriculture in developing countries in particular has been a major preoccupation. Whether the contractual form affects the adoption of innovations, and if so how, have been the subjects of much investigation.

### Sharecropping within the principal-agent paradigm

Most theoretical analysis of sharecropping contracts has been cast within the principal-agent paradigm, in which the landlord is generally considered to be the principal having the bargaining power to make a take-it-or-leave-it offer to the agent (the tenant). This analysis does not explain the decision of the landlord to delegate the use of land and the way landlords and tenants meet in the land rental market. It is only recently that these decisions have been taken into account in the analysis of sharecropping contracts, from both empirical and theoretical points of view. In this light, let us consider a model where the agricultural production function is linearly homogenous in land area (as generally admitted: see Stiglitz, 1974, and Otsuka, Chuma and Hayami, 1992) because agriculture is a spatial activity and induces constant returns to scale in the cultivated area. For a fixed amount of land, denote  $y$  the agricultural output of the next crop period,  $e$  the tenant's work effort (which can be considered as a measure of efficient labour time),  $x$  a state variable as, for example, land fertility at the beginning of the agricultural period, and define an agricultural production function  $f$  such that  $y = \varepsilon f(x, e)$  where  $\varepsilon$  is a multiplicative positive random variable with mean one representing weather uncertainty. The effort  $e$  can represent labour tasks or other agricultural inputs and can be multidimensional. Its cost is  $C(e)$ . Assume also that an investment function controls land fertility dynamics such that the next period land fertility is  $g(x, e)$  (adding a multiplicative positive random variable with mean one to represent the influence of the weather or other externalities on land fertility or ground quality would not change the following results). According to the contract signed, the principal pays the agent  $T(y) = \alpha y + \beta$ . The contract parameters  $(\alpha, \beta)$  allow the landlord to propose different kinds of contract, from a fixed-wage contract where

$\alpha = 0$ ,  $\beta = w$  with  $w$  the wage, to a fixed-rent contract where  $\alpha = 1$ ,  $\beta = -R$  with  $R$  the rent paid to the landlord, through sharecropping contracts where  $0 < \alpha < 1$  and  $\beta$  can be zero or not. Concerning preferences, we define  $U(T(y)) - C(e)$  and  $y - T(y)$  the agent's and principal's utility functions. We assume that  $U$  is increasingly concave because of risk aversion, while we treat the principal as risk neutral.

### Moral hazard in sharecropping

When the agent's actions are unobservable to the principal or monitoring costs are prohibitively high, a moral hazard problem arises leading to effort shirking by the agent. The worker chooses his effort level to maximize his expected utility, given the terms of the contract and his outside wage opportunities. Thus, for a crop season, the principal proposes a contract to maximize his welfare given the agent's incentive compatibility (*IC*) constraint and its individual rationality (*IR*) constraint guaranteeing him an exogenous reservation utility denoted  $\bar{U}$ . The maximization programme of the landlord can thus be written as

$$\underset{\alpha, \beta}{\text{MaxE}}[(1 - \alpha)y - \beta]$$

subject to

$$e^* \in \arg \max_e EU(\alpha y + \beta) - C(e) \quad (1)$$

$$EU(\alpha y + \beta) - C(e^*) \geq \bar{U} \quad (2)$$

Denoting  $f_e$  and  $f_{ee}$  the first and second derivatives of the production function with respect to effort, we can show that the solution to this programme is such that the individual rationality constraint (*IR*) is binding and the optimal share of production  $\alpha^*$  satisfies the following equation

$$\alpha^* = 1 + \left(1 - \frac{E\epsilon U'}{EU'}\right) \frac{f[\alpha^* f_{ee} - C'']}{f_e^2}$$

where  $e_\alpha$  is the derivative of effort with respect to the share of output  $\alpha$  received by the tenant and that satisfies  $e_\alpha = \frac{f_e}{\alpha^* f_{ee} - C''}$ . Because of the concavity of  $U$ ,  $0 < \frac{E\epsilon U'}{EU'} < 1$ . Moreover, with concavity of production with effort and convexity of cost of effort, the optimal share  $\alpha^*$  is strictly lower than 1, thus corresponding to a sharecropping contract.

The exact form of the contract depends on both the properties of  $U$  and  $f$ , and the magnitude of uncertainty. First, the greater the (compensated) labour supply elasticity, that is, the more sensitive the worker is to incentives, the greater is the optimal share  $\alpha^*$ , that is, the closer is the optimal contract to a rental contract. Second, the trade-off between incentives and risk sharing depends on the riskiness of production through  $\epsilon$  and on risk preferences through  $U$ . With some assumptions on the distribution of  $\epsilon$  or on the shape of  $U$ , it can be shown that the optimal share is lower for more risk-averse agents or more risky environments (Stiglitz, 1974). At the limit, if the tenant is risk neutral, then  $\alpha^* = 1$  and a pure rental contract will be used. Conversely, the greater the risk aversion and the greater the risk, the closer the optimal contract is to a pure wage contract ( $\alpha^* = 0$ ,  $\beta^* > 0$ ). These predictions constituted the focus of many empirical tests that involved examining the determinants of the choice between sharecropping and fixed-rent contracts. A large number of empirical tests (Braido, 2005) have failed to provide evidence that the risk-sharing trade-off could explain the choice between fixed rent and sharecropping.

Also, these optimal sharecropping contracts ( $0 < \alpha^* < 1$ ,  $\beta^*$ ) involve a fixed payment  $\beta^*$  (either to or from the landlord). In practice, many contractual relations may have an implicit or explicit provision calling for such fixed payments. For example, payments from the landlord to the worker to finance stipulated inputs, like fertilizer, can be interpreted in this manner. However, the empirical observation and measurement of such fixed transfers is generally difficult, which explains why they have not been used for empirical testing of the theory.

In some contexts, given the relative paucity of evidence that the risk-sharing trade-off could explain the determinants of contract choice between fixed rent and sharecropping, other explanations related to transaction costs inherent to landlord-tenant relationships have been offered. One of the most significant transaction costs that seem to plague land rental contracts is linked to the question of land quality maintenance and investment. The risk-sharing argument remains completely silent about investment and land-maintenance problems that were often raised in transaction cost approaches with respect to land-rental contracts. Moreover, as already pointed out by Johnson (1950) and even

Adam Smith, the problem of land-fertility maintenance and land overuse can also be cited to explain the choice of contract by landlords. In fact, although observable, land fertility may not be contractible. It may also elude verification due to the complexity of specifying the agricultural tasks related to land-quality maintenance and to difficulties in objectively measuring land quality. A moral hazard problem in land maintenance may thus appear. Delegating farming may lead to land overuse if the landlord and tenant do not have the same opportunity cost of usage of land (Allen and Lueck, 1993). A share contract may then curb the farmer's incentive to exploit land attributes. One way to see this in the previous model is to take into account the value of the land in the landlord's objective. The landlord will then anticipate the consequences of delegating the use of land for the future returns obtained, since the tenant's actions may affect the future land value. The land value  $v(z)$ , an increasing function of the land fertility index  $z$ , can be seen as the result of the expected discounted sum of all future profits obtained by the landlord for a given plot of land of quality  $z$ . Then, if the objective of the landlord is now

$$\underset{\alpha, \beta}{\text{Max}} E[(1 - \alpha)y - \beta + v(z)]$$

subject to (IC) and (IR), the optimal share of output between the landlord and tenant (Dubois, 2002) is the solution to

$$\alpha^* = 1 + v'(z) \frac{g_e}{f_e} - \left(1 - \frac{E\varepsilon U'}{EU'}\right) \frac{f}{e_a f_e}$$

where  $z = g(x, e)$ . With risk neutrality of the tenant, the optimal share is thus below 1 if the effort of production reduces land fertility ( $g_e < 0$ ) because

$$\alpha^* = 1 + v'(z) \frac{g_e}{f_e}$$

The contract here shows low-powered incentives and generally corresponds to a sharecropping contract even if there is no risk-sharing issue.

### Multitasks and contract repetition in sharecropping

But other features of agricultural activity and contractual relationships have been used to explain the observation of sharecropping. Several forms of multitask moral hazard models and dynamic considerations provide interesting insights into this form of contracting. First, the multitask moral hazard model of Holmström and Milgrom (1987), applied to sharecropping for example by Luporini and Parigi (1996), shows that low-powered incentives can be obtained as a way to mitigate the substitution of effort across tasks that cannot be monitored by the landlord even without risk aversion of the tenant. Luporini and Parigi (1996) consider the two distinct production tasks of subsistence crops and cash crops. In another kind of multitask model, with limited liability of the tenant instead of risk aversion, Ghatak and Pandey (2000) show that a sharecropping contract can be optimal when there is joint moral hazard in effort and in risk factor for output. Other quite different models with multiple labour inputs explain sharecropping differently according to a number of features that can be observed from time to time. In Bardhan and Srinivasan (1971) or Eswaran and Kotwal (1985), both the landowner and the tenant provide labour input. In Roumasset and Uy (1987), a model with an investment task, a production task and two periods provides a study in the reduction of agency costs by monitoring. Bardhan (1989, ch. 7) and Braverman and Stiglitz (1986) have a sharecropping model with a fertilizer input and non-observable labour effort. They determine the efficient incentives on both separable inputs through production sharing and cost sharing.

The other significant dimension of the landlord-tenant relationship that may explain the form of contracts is the fact that these contracts are often repeated and may have variable duration. The repetition of relationships between a landlord and a tenant actually called into question the rationale of supposedly short-term contracts of sharecropping generally observed empirically. Bardhan (1989, ch. 8) uses a two-period model to show the trade-off between production incentives, enhanced in the initial period by the threat of dismissal by the landowner, and land improvement incentives that decrease with a more powered contract. Dutta, Ray and Sengupta (1989) and Bose (1993) study a number of long-term contracts between landowners and landless peasants where infinitely repeated relationships with threats of eviction are examined. Eviction threats can actually serve as an incentive device in repeated sharecropping contracts (Banerjee, Gertler and Ghatak, 2002; Banerjee and Ghatak, 2004). Moreover, in a repeated moral hazard relation, spot-contract sequences may allow the outcomes of long-term contracts, which are Pareto-superior to short-term agreements, to be implemented (Fudenberg, Holmström and Milgrom, 1990; Malcomson and Spinnewyn, 1988).

Sharecropping is also sometimes considered to be part of a 'tenancy ladder' in agriculture allowing landless wage workers to become farmers before they become landlords. The farmer's financial constraints and limited liability may then play a significant role in explaining access to land rental markets and contractual forms (sharecropping with variable share or fixed-rent contracts) proposed by the landlord (Shetty, 1988; Ray and Singh, 2001; Laffont and Matoussi, 1995). In Laffont and Matoussi (1995), risk-neutral farmers are offered a sharecropping contract with more or fewer incentives rather than a fixed-rent contract, due to financial constraints that restrict the amount of working capital the tenant can use as affected by the rent and the share of inputs to be paid at the beginning of the crop season. Finally, many other forms of sharecropping contracts, including some side transfers or those interlinked with credit (Mitra, 1983; Braverman

and Stiglitz, 1982) or involving state contingent informal gifts and transfers (Sadoulet, Fukui and de Janvry, 1994), exist and may sometimes completely change the efficiency properties of such contracts. Thus, considerable care and attention should be devoted to describing contractual agreements so as to study such organizations and possibly recommend policy reforms for land rental markets.

### See Also

- access to land and development
- contract theory
- Laffont, Jean-Jacques
- peasants
- peasant economy
- principal and agent (i)
- principal and agent (ii)
- risk sharing
- Stiglitz, Joseph E.

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