TRANSACTION COSTS, RISK AVERSION, AND CHOICE OF TENURE REVISITED

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INTRODUCTION

Is allocative efficiency affected by the type of leasing or employment contract that tenants and landlords negotiate on rental and owner-operated farmland? How do tenants and landlords determine their choice of contracts? This article examines why risk-averse tenants and landlords pick the type of contracts they do

Until recently, the consensus among economists was that a tenant who manages his own farm would achieve greater efficiency by renting land for a fixed rental payment than by receiving a share of farm revenue In other words, a fixed rental contract would allocate resources more efficiently than a share contract Moreover, the efficiency of the fixed rental contract was viewed as equal to that of the fixed wage contract, under which a landowner/farm manager pays a tenant/employee a contractually fixed salary Therefore, the fixed wage contract was also considered more efficient than the share contract (1, 3, 4, 6, 9, 13, 18) [1]

The share contract is thought to be less efficient in that the share tenant receives only a fraction of the marginal product of all variable inputs He therefore employs fewer inputs than does either the fixed rental tenant or the fixed wage landlord In this article, the reduction in input employment caused solely by

The related questions of how tenants and landlords choose leasing contracts and how these contracts affect efficient allocation of resources continue to divide economists This article rejects answers suggested by transaction cost models developed by Cheung and by Ip and Stahl and argues that among risk-averse farmers, contract choice is determined by the relative intensities of tenant and landlord aversion to risk The risk model examined here suggests that all contract forms— whether fixed rent, fixed wage, or crop share—can generally achieve the same allocative efficiency

Keywords

Leasing contracts
Tenure
Allocative efficiency
Transaction costs

the share tenant's receipt of only a fraction of the marginal product will be referred to as "shirking"

CHEUNG'S THEORY

Recently, a number of economists have challenged this traditional condemnation of the share contract Cheung has argued that in a competitive economy rational landlords do not permit share tenants to determine unilaterally a level of variable input use that is less than the optimum under alternative tenure forms They act to prevent shirking 'Moreover, as the share contract enables risk-averse landlords and tenants to increase the utility of their incomes by sharing the risk of uncertain farm output and prices, risk-averse landlords and tenants always, Cheung stated, prefer the share contract as

a method of counteracting uncertainty Formally proving this latter argument, Sutinen further proved that the utility-maximizing share contract will actually achieve a greater allocative efficiency than either of the two nonshare contracts (20) Specifically, he proved that the risk-averse landlord who shares risk with his or her tenant under a share contract will employ more resources and produce more than under any nonshare contract (19, 20)

Cheung and Sutinen recognized that their new theories of share contracting raised new questions (7, 19) If landlords act to prevent shirking, and if share contracts can always disperse risk, why is share contracting not the only observed tenure form? One answer is that some landlords and tenant farm managers are either neutral as to risk or willing to gamble A risk neutral decisionmaker has no incentive to share risk and, therefore, factors unrelated to risk determine choice of contract A risk-preferring landlord or farm manager has an incentive to assume the entire risk under a fixed wage contract, whereas the risk-preferring tenant will want to assume the entire risk under a fixed rental contract

Studies by Wolgin, Wiens, and Moscardi and deJanvry (22, 21, 14) suggest, however, that at least in peasant agriculture, most small farmers are risk averse Therefore, the important question is that which Cheung first addressed and that which is also the subject of this article Why do risk averse landlords and tenants in peasant agriculture so often choose fixed rental or fixed wage contracts, despite their obvious preference for risk sharing?

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[1] Italicized numbers in parentheses refer to items in References at the end of this article

Cheung's answer was that choice of tenure primarily depends on the extent to which risk sharing and transaction costs offset each other The share contract would indeed always be preferred by risk-averse peasants, however, it requires transaction costs that are substantially higher than costs under fixed wage and rental contracts Peasant farmers choose the share contract only if these higher transaction costs are compensated for by gains they expect from risk sharing Alternatively, they choose a fixed wage or rental contract if the higher transaction costs of the share contract would more than off set its risk-sharing advantages

Sutinen suggested that transaction costs may sometimes be less under share contracts than under nonshare contracts, but he agreed with Cheung that, where transaction costs are "greater for share leasing , a share lease may not be preferred even when risk and risk aversion exist" (20, p 616) Sutinen further argued, however, that even if transaction costs are equal for all contracts, peasant farmers may still choose nonshare contracts because other more effective risk dispersal methods, such as crop insurance or future markets, may be available (20, pp 616 617)

FOCUS OF INVESTIGATION

This article, as mentioned, focuses on farming regions in developing countries, where risk aversion is the norm As farmers in these areas typically lack access to futures markets

and private or government crop insurance, I assume that share contracting is the only feasible method available for sharing risk I will argue that Cheung's transaction cost theory is an inappropriate explanation of tenure choice in this environment I will then propose that choice of tenure among risk-averse farmers depends on differences between the intensities of landlord and tenant risk aversions This theory will also confirm Cheung's view that allocative efficiency should generally be the same under all tenure forms Finally, the analysis will determine which of the conflicting theories of tenure choice is most consistent with the available empirical evidence of transaction costs under different tenure forms

INCONSISTENCIES IN THE CHEUNGIAN THEORY

Cheung argued that transaction costs are higher under share contracting than under either fixed wage or fixed rental contracting because more time must be devoted to negotiating and enforcing contract terms under the former Share tenants and landlords must devote substantial time to negotiating contract terms that specify in great detail the duties both parties will perform Moreover, they must agree on such terms as the "rental percentage, the ratio of nonland input to land, and the types of crops to be grown," whereas under "fixed rent[al] and wage contracts , given the market prices, one party alone can decide how much of the other party's resources he shall

employ and what crops shall be grown " In addition, share landlords, unlike fixed rental landlords, must devote substantial time to supervision to prevent tenants from shirking (7, pp 67-68)

Cheung failed to explain exactly how the higher transaction costs of the share contract might operate to offset its risk-sharing advantages Perhaps recognizing this short coming, Ip and Stahl proposed an explanation which views the typical landlord's labor supply curve as the basic measurement of transaction costs Like Sutinen, Ip and Stahl believed that risk sharing by itself makes the allocative efficiency of the share contract higher than that of the nonshare contract They argued, however, that, given their labor leisure preferences, most landlords are unwilling to devote the time to contract negotiation and enforcement that is necessary to completely eliminate shirking by tenants The less the tenant shirks, the more inputs the tenant will employ Yet landlords will continue their efforts to prevent shirking only as long as the expected utility of their share of the additional output exceeds the disutility of their additional efforts (12, pp 22 24)

The marginal disutility of landlords' work increases as the time they devote to contract negotiations and monitoring tenant activities increases At the same time, the marginal product of the additional variable inputs tenants employ decreases as employment of resources increases Therefore, the marginal utility of the landlord's share of

This article examines why risk-averse tenants and landlords pick the type of contracts they do

output is likely to equal the marginal disutility of contract negotiation and supervisory work at a point where a significant amount of shirking by the tenant still occurs This residual amount of shirking offsets the gains from risk sharing, according to Ip and Stahl

Residual shirking may be a valid measure of the higher transaction costs of share contracting envisioned by Cheung Unlike Cheung, Ip and Stahl were not concerned about why different landlords and tenants choose different tenure forms They wanted instead to explain why empirical studies have shown that allocative efficiency is generally the same under all forms of agricultural tenancy (2, 5, 10, 11, 17), despite Sutinen's proof that share contracting can always allocate resources more efficiently because risks are shared Ip and Stahl wanted to determine how the share tenant, who shirks despite landlord supervision, might still produce as much as the nonshirking owner-operator farmer who hires no wage labor They suggested that the amount by which residual shirking reduces optimum output equals the amount by which risk sharing increases output under the share contract In other words, net production is the same under the share contract as it is under owner cultivation (12, pp 23-24)

Moreover, although they did not say so explicitly, Ip and Stahl intended this reasoning to explain why allocative efficiency should be the same under share contracting as it is under fixed rental and fixed

wage contracting [2] Like the owner-cultivator, the fixed rental tenant and the fixed wage landlord have no incentive to shirk Yet, they produce no more than share tenants because their assumption of the entire risk has the same negative impact on production that residual shirking has under the share contract

Ip and Stahl's treatment of residual shirking differs from Cheung's transaction cost theory in not viewing transaction costs as the key factor determining choice of tenure Risk sharing and residual shirking offset each other to the point that share contracting is equally as efficient as the nonshare tenure forms, Ip and Stahl suggest Then we are left with no explanation of why one tenure form may be preferred over another

If one agrees with Cheung that transaction costs *do* determine choice of tenure, how do we then explain the evidence that all tenure forms use resources equally efficiently? One might argue that the share contract achieves maximum utility and is the preferred tenure form only when the output gain from risk sharing exceeds the loss attributable to residual shirking

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[2] Some of the empirical studies cited by Ip and Stahl compare share contracting only with fixed rental and fixed wage contracting rather than with owner cultivation without wage labor For example, in a study of farm tenure in Malaysia (cited by Ip and Stahl as an example of the "equal efficiency" school of thought (12, p 23)), Huang showed that share tenants produced at least as much or more per acre as did both fixed wage landlords and fixed rental tenants (11, pp 706-15)

Fixed rental and fixed wage contracts would be chosen when the loss from shirking exceeds the output gain from risk sharing This explanation clearly implies that farms operating under share contracts should actually achieve a greater allocative efficiency—contrary to the empirical evidence—than farms operating under fixed wage or fixed rental contracts, because of the net gain attributable to risk sharing Thus, the possibility that both residual shirking and risk sharing would determine choice of tenure contradicts the theory that all tenure forms are equally efficient

Thus far no theory has been posed that can consistently answer both the choice of tenure issue and the allocative efficiency issue To develop such a new approach, I first present a modified form of Sutinen's proof that, in the absence of transaction costs and other more effective risk sharing methods, the share contract will always be the utility maximizing choice of tenure among risk-averse farmers, and it will always achieve a greater allocative efficiency than any nonshare contract I will also propose an alternative choice of tenure theory, consistent with Ip and Stahl's findings of equal efficiency

THE SUTINEN MODEL

Sutinen showed how the share contract can always achieve a greater expected utility and a greater allocative efficiency than the nonshare contracts To do so, he derived the necessary conditions for the maximization of a risk-averse landlord's expected utility of income subject

to a constraint This constraint was that the risk-averse tenant's expected utility of income from any particular tenure form had to equal the expected utility of the tenant's opportunity income (20)

In this article, I modify Sutinen's approach by maximizing both the tenant's and the landlord's expected utility The person whose expected utility is being maximized is assumed to act as the decisionmaking party When the landlord's expected utility is maximized, I assume that the tenant acts as an employee with no managerial responsibilities Maximizing the landlord's expected utility will, therefore, be appropriate for determining the allocative efficiency of both the fixed wage contract and also any share contract that assigns all managerial responsibilities to the landlord and none to the tenant Alternatively, I maximize the tenant's expected utility to determine the allocative efficiency of both the fixed rental contract and any share contract that assigns all managerial responsibilities to the tenant

Maximization from the land lord's point of view is defined as maximization of the expected utility of the landlord's income, $\pi = r_l pqu - c(q) - \theta$ A condition is that the expected utility of the tenant's income, $\phi = r_t pqu + \theta$, must equal the expected utility of the income, I, which the tenant could earn by employing his or her assets elsewhere The landlord's share of total revenue is r_l, and the tenant's share is r_t, where $r_t = 1 - r_l$ Total revenue is represented by pqu, u is a nonnegative random variable which accounts for variations in either the output price, p,

or environmental factors, such as weather and disease, both of which effect output, q As the expected value of u is a constant, the expected total revenue is simply pq E(u) [3] θ is a shift variable "which acts to adjust the (tenant's) expected income to a level where he is in different about employing his assets in this farming activity or elsewhere in the economy" (20, p 615) C(q) equals the total variable costs of producing expected output q, with the first and second derivatives $C'(q)$ and $C''(q)$, both being positive The decisionmaking landlord pays all variable costs, since one decision will be the amount of each variable input to employ Both the landlord and tenant are assumed to have continuous, concave utility functions, $U(\pi)$ and $U(\phi)$, such that $U'(\pi)$ and $U'(\phi)$ are both positive while $U''(\pi)$ and $U''(\phi)$ are negative

Following Sutinen's approach, I assign specific functional forms to the utility functions, $U(\pi)$ and $U(\phi)$, and a specific probability law to u Let

$$U(\P) = -e^{-\alpha\P} \text{ and } U(\phi) = -e^{-\beta\phi},$$

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[3] E(u) $\gtrless$ o are all possible When E(u) > 1, marginal returns to random inputs, such as weather conditions, are increasing When E(u) = 1, or E(u) < 1, marginal returns are constant or decreasing, respectively Increasing marginal returns encourage decisionmakers to increase production (8, pp 27-28) However, if decisionmakers are risk averse, this increase will be partly or completely offset by the negative impact that income variance has on production The net effect of uncertainty and risk aversion on production depends on the specifications of the production and utility functions

where α and β equal the absolute risk aversions of the landlord and tenant, respectively (20, p 617) Also assume that u follows the gamma probability law, which defines the following probability density function

$$f(u) = \frac{\Lambda^\rho}{\Gamma(\rho)} u^{\rho - 1} e^{-\Lambda u}$$

for $u \geqslant$ o, with parameters $\rho = 1,2$, and $\Lambda > 0$ (15, p 180)

In terms of the Lagrangian, the landlord maximizes

$$L = E(- e^{-\alpha\pi}) + \lambda[E(- e^{-\beta\phi}) - E(U(I))]$$

or

$$L = - \int_0^\infty e^{-\alpha\pi} f(u) \, du +$$

$$\lambda[- \int_0^\infty e^{-\beta\phi} f(u) \, du +$$

$$\int_0^\infty e^{-\beta I} f(u) du]$$

Substitution of $\pi = r_l pqu - C(q) - \theta$, $\phi = r_t pqu + \theta$, and $f(u) = \Lambda^\rho u^{\rho - 1} e^{-\Lambda u}/\Gamma(\rho)$ yields

$$L = - \Lambda^\rho [\alpha r_l pq + \Lambda]^{-\rho}$$

$$e^{\alpha[c(q) + \theta]} +$$

$$\lambda \{\Lambda^\rho [\beta r_t pq + \Lambda]^{-\rho} e^{-\beta\theta}$$

$$- e^{-\beta I} \}$$

The first order conditions are

$$L_r = -\Lambda^\rho(-\rho)(\alpha pq)$$

$$[\alpha r_l pq + \Lambda]^{-\rho-1}$$

$$e^{\alpha[C(q)+\theta]} +$$

$$\lambda \Lambda^\rho(-\rho)(-\beta pq)$$

$$[\beta r_t pq + \Lambda]^{-\rho-1}$$

$$e^{-\beta\theta} = 0 \qquad (1)$$

$$L_\theta = -\Lambda^\rho \alpha[\alpha r_l pq + \Lambda]^{-\rho}$$

$$e^{\alpha[c(q)+\theta]} +$$

$$\lambda \Lambda^\rho(-\beta)[\beta r_t pq + \Lambda]^{-\rho}$$

$$e^{-\beta\theta} = 0 \qquad (2)$$

$$L_q = -\Lambda^\rho(-\rho)(\alpha r_l pq)$$

$$[\alpha r_l pq + \Lambda]^{-\rho-1}$$

$$e^{\alpha[C(q)+\theta]} - \Lambda^\rho(\alpha C'(q))$$

$$(\alpha r_l pq + \Lambda)^{-\rho}$$

$$e^{\alpha[C(q)+\theta]} +$$

$$\lambda \Lambda^\rho(-\rho)(\beta r_t p)$$

$$[\beta r_t pq + \Lambda]^{-\rho-1}$$

$$e^{-\beta\theta} = 0 \qquad (3)$$

$$L_\lambda = \Lambda^\rho[\beta r_t pq + \Lambda]^{-\rho}$$

$$e^{-\beta\theta} - e^{-\beta I} = 0 \qquad (4)$$

Using equations (1) and (2) we can calculate the optimum value for the landlord's share rate r as

$$r_l = \frac{\beta}{\alpha+\beta} \qquad (5)$$

Since $\alpha > 0$ and $\beta > 0$ (both landlord and tenant are risk averse), it is clear that $0 < r_l < 1$. Thus, Sutinen concluded that the landlord will always maximize expected utility by choosing a share contract rather than a fixed wage contract (20, pp 615-17)

A similar conclusion can be derived for the tenant who maximizes the expected utility of income, $\phi = (r_t) pqu - C(q) - \theta$, subject to the condition that the expected utility of the nonmanagerial landlord's income, $\pi = rpqu + \theta$, equals the expected utility of the income, Y, which the landlord could earn by employing assets elsewhere

In exponential form, maximizing the tenant's expected utility requires maximizing

$$L = -\Lambda^\rho[\beta(r_t)pq + \Lambda]^{-\rho}$$

$$e^{\beta[C(q)+\theta]} +$$

$$\lambda\{\Lambda^\rho[\alpha r_l pq + \Lambda]^{-\rho}$$

$$e^{\alpha(-\theta)} - e^{\alpha Y}\}$$

where

$$E\{U(\phi)\} = \frac{-\Lambda^\rho e^{\beta[C(q)+\theta]}}{[\beta r_t pq + \Lambda]\rho}$$

and

$$E\{U(\pi)\} = \frac{-\Lambda^\rho e^{\alpha(-\theta)}}{[\alpha r_l pq + \Lambda]^\rho}$$

The first order conditions are

$$L_r = -\Lambda^\rho(-\rho)(-\beta pq)$$

$$[\beta r_t pq + \Lambda]^{-\rho-1}$$

$$e^{\beta[C(q)+\theta]} +$$

$$\lambda \Lambda^\rho(-\rho)(\alpha pq)$$

$$[\alpha r_l pq + \Lambda]^{-\rho-1}$$

$$e^{-\alpha\theta} = 0 \qquad (6)$$

$$L_\theta = -\Lambda^\rho(\beta)[\beta r_t pq + \Lambda]^{-\rho}$$

$$e^{\beta[C(q)+\theta]} +$$

$$\lambda \Lambda^\rho(-\alpha)(\alpha r_l pq + \Lambda)^{-\rho}$$

$$e^{-\alpha\theta} = 0 \qquad (7)$$

$$L_q = -\Lambda^\rho(-\rho)(\beta r_t p)$$

$$[\beta r_t pq + \Lambda]^{-\rho-1}$$

$$e^{\beta[C(q)+\theta]} -$$

$$\Lambda^\rho(\beta C'(q))$$

$$[\beta r_t pq + \Lambda]^{-\rho}$$

$$e^{\beta[C(q)+\theta]} + \lambda \Lambda^\rho(-\rho)$$

$$(\alpha r_l p)[\alpha r_l pq + \Lambda]^{-\rho-1}$$

$$e^{-\alpha\theta} = 0 \qquad (8)$$

$$L_\lambda = \Lambda^\rho[\alpha r_l pq + \Lambda]^{-\rho}$$

$$e^{-\alpha\theta} - e^{-\alpha Y} = 0 \qquad (9)$$

Using equations (6) and (7), we can calculate the optimum value of the tenant's share rate as

$$r_t = \frac{\alpha}{\alpha + \beta} \qquad (10)$$

Again, as $\alpha > 0$ and $\beta > 0$, $0 < r_t < 1$ Therefore, the tenant will always maximize his or her expected utility by choosing a share contract rather than a fixed rental contract (20, pp 615-617)

Let us now compare the optimum marginal costs achieved under each tenure form in equilibrium to see why Sutinen further concluded that the utility maximizing share contract will always achieve a greater allocative efficiency than any non maximizing, nonshare contract Consider first the managerial land lord who views the fixed wage and share contracts as the two major tenure alternatives For the fixed wage contract, we use equation (2) to solve for λ, and substitute λ into equation (3) to derive

$$C'(q) = P \left[\frac{E(U'(\pi)u)}{E(U'(\pi))} \right]_{r_l = 1}$$

$$= P \left[\frac{\rho}{\alpha pq + \Lambda} \right]_{r_l = 1} \qquad (11)$$

We use the same procedure to derive the optimum marginal cost under the landlord-managed share contract

$$C'(q) = P \left[\frac{E(U'(\pi)u)}{E(U'(\pi))} \right]_{0 < r_l < 1}$$

$$= P \left[\frac{\rho}{\alpha r_l pq + \Lambda} \right]_{0 < r_l < 1} \qquad (12)$$

We derive similar equations for the managerial tenant who views the fixed rental and share contracts as his major tenure alternatives We solve equation (7) for λ, substitute λ into equation (8) and derive the following values for the optimum marginal costs under fixed rental and tenant-managed share contracts, respectively

$$C'(q) = P \left[\frac{E(U'(\phi)u)}{E(U'(\phi))} \right]_{r_t = 0}$$

$$= P \left[\frac{\rho}{\beta pq + \Lambda} \right]_{r_t = 0} \qquad (13)$$

$$C'(q) = P \left[\frac{E(U'(\phi)u)}{E(U'(\phi))} \right]_{0 < r_t < 1}$$

$$= P \left[\frac{\rho}{\beta r_t pq + \Lambda} \right]_{0 < r_t < 1} \qquad (14)$$

The bracketed expressions in equations (11) through (14)—the risk factors—measure the impact of uncertainty on the decision-maker's optimum employment of resources Because $\rho/\alpha r_l pq + \Lambda$ under the landlord-managed share contract exceeds $\rho/\alpha pq + \Lambda$ under the fixed wage contract, and $\rho/\beta r_t pq + \Lambda$ under the tenant-managed share contract exceeds $\rho/\beta pq + \Lambda$ under

the fixed rental contract, it is clear that the optimum marginal cost is also higher under the utility-maximizing share contract than under any nonshare contract Moreover, this higher marginal cost translates into a higher optimum production level, which measures the amount by which the allocative efficiency of the optimum share contract exceeds that of the nonshare contracts (20, pp 617-619)

RISK AVERSION AND CHOICE OF TENURE

Now reconsider the question of why some risk-averse landlords and tenants forego the risk sharing benefits of the share contract and select instead the fixed wage or rental contract One explanation can be derived from an analysis of the inverse relationship in equations (5) and (10) between the optimum values of r_l and r_t and the relative values of the landlord and tenant's risk aversions This relationship will be used to develop a new theory of tenure choice that does not rely on hypotheses (such as Cheung's) concerning the transaction costs of different tenure forms

First, assume that a nonmanagerial tenant willing to let the landlord act as decisionmaker is likely to be either equally or more risk averse than the landlord This assumption is important because equation (5) reveals that the lower the value of the landlord's risk aversion relative to the tenant's risk aversion, the greater the landlord's optimum share rate, r_l, and the lower the tenant's optimum share rate, r_t Moreover, as the risk aversion of the tenant increases over that of the landlord

and the optimum value of r_l increases towards $r_l = 1$, the optimum value of θ needed to satisfy the tenant's constraint equation (4) will increase towards $\theta = W$ Thus, the more closely will the utility-maximizing share contract resemble the fixed wage contract

Eventually, the tenant's risk aversion will exceed the landlord's to the point that the landlord will actually maximize expected utility by choosing the fixed wage contract The landlord will choose this rather than the standard share contract, under which r_l is significantly less than 1, and θ is significantly less than W

A similar conclusion can be derived for the decisionmaking tenant This tenant is likely to be as risk averse or less risk averse than the nonmanagerial landlord Equation (10) shows that the lower the value of the tenant's risk aversion relative to the landlord's, the greater will be the tenant's optimum share rate, r_t, and the lower will be the landlord's optimum share rate, r_l Moreover, as the risk aversion of the landlord increases over that of the tenant, and the optimum value of r_t increases towards 1, the optimum value of θ needed to satisfy the landlord's constraint equation (9) will increase towards $\theta = R$ Thus, the more closely will the utility maximizing share contract resemble the fixed rental contract

Eventually, the landlord's risk aversion will exceed the tenant's to the point that the tenant will maxi mize his expected utility by choosing the fixed rental contract The tenant will choose this rather than a stan- dard share contract, under which r_t is significantly less than 1, and θ is sig- nificantly lower than R

The relationship between risk aversion and the expected utility of different tenure forms suggests that tenure choice depends on the relative values of landlord and tenant risk aversions The greater the difference between landlord and tenant risk aversions, the more closely will the utility-maximizing contract resemble a fixed wage or rental contract rather than a standard share contract A landlord who is much less risk-averse than the tenant and who chooses a fixed wage contract does so, not be- cause transaction costs under share contracting will be prohibitively high, but because the landlord can maximize expected utility by assum- ing the entire risk Similarly, less risk averse tenant/farm managers who choose a fixed rental contract do so because they can expect to maximize utility by assuming the entire risk On the other hand, a landlord and tenant who choose a standard share contract do so be- cause the difference between their risk aversions is small enough to make risk sharing attractive [4]

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[4] On farms jointly managed by landlords and tenants, the standard share contract is likely to be the preferred tenure form because the sharing of management responsibil- ities is inconsistent with the assump- tion of the risk by only one party Moreover, the difference between the risk aversions of landlords and tenants who are willing to share management responsibilities is likely to be small enough (perhaps zero) to make risk sharing under a standard share contract feasible Indeed, the output share assigned to each party is likely to reflect the amount of management responsibil- ities each party has assumed

RISK AVERSION AND EMPIRICAL STUDIES

This theory of tenure choice confirms empirical studies which demonstrate that all three tenure forms are equally efficient Ip and Stahl's transaction cost model suggests that this is so because the greater efficiency of the share contract—as a result of risk disper- sion—is offset by the residual shirking of the decisionmaking share tenant or landlord [5] The choice of tenure theory I am proposing here suggests that the three tenure forms are equally efficient because land- lords and tenants choose different tenure forms to adjust for differ- ences in their attitudes toward risk

I demonstrate this theory by comparing the risk factor value of each tenure form when it is the utility-maximizing, or "rationally chosen," contract Let equation (11) now represent the optimum marginal cost achieved by the fixed wage contract only when tenant risk aversion exceeds landlord risk aver- sion to the point that the expected utility of the fixed wage contract is higher than that of the standard share contract under which r_l is sig- nificantly less than 1 Now let equa- tion (12) represent the optimum marginal cost of the standard share

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[5] Ip and Stahl were concerned only with share contracting on tenant-managed farms However, their transaction cost model clearly predicts that residual shirking by the landlord decisionmaker will occur under share contracting on landlord- managed farms and that this shirking will also offset any increase in output induced by risk sharing

contract only when the difference between the tenant's and the land lord's risk aversion is small enough (perhaps zero, in which case $r_l = 1/2$) to make the standard share contract the expected utility-maximizing tenure form

To compare the values of the risk factors in these two equations, note that in both the risk factor depends on the landlord's risk aversion, α, as well as the landlord's share rate, r_l This is important, because for any given value of β, α should be greater under the share contract, represented by equation (12), than under the "rationally chosen" wage contract, represented by equation (11) More-over, as equation (5) indicates, the higher the value of α, the lower the optimum share rate, r_l Thus, the amount by which α in equation (12) exceeds α in equation (11) determines the amount by which r_l in equation (11) exceeds r_l in equation (12)

I derive a similar relationship for the tenant-managed farm Recall that the fixed rental contract is the rational choice when landlord risk aversion exceeds tenant risk aversion to the point that the fixed rental contract will have a higher expected utility than the standard tenant-managed share contract Let equation (13) represent this utility maximizing fixed rental contract, and let equation (14) represent the utility-maximizing standard share contract As the excess α over β is greater under the fixed rental contract than under the standard share contract, β in equation (14) should exceed β in equation (13) for any given value of α More over, as equation (10) indicates, the

amount by which β in equation (14) exceeds β in equation (13) deter mines the amount by which r_t in equation (13) exceeds r_t in equation (14)

The inverse relationships be tween the risk aversion of the decisionmaking tenant or landlord and the rational choice of r_t and r_l may explain why all tenure forms are equally efficient The different risk aversions and different optimum values of r_l and r_t characterizing each tenure form when rationally chosen have offsetting effects on the value of the risk factor The inverse rela-tionship between r_l and α suggests that among all decisionmaking land lords, the average amount by which r_l on farms operating under the fixed wage contract exceeds r_l on farms operating under the share contract approximates the average amount by which α under the share contract exceeds α under the fixed wage contract Thus, the average values of both the risk factor and the opti-mum marginal cost, $C'(q)$, as shown in equations (11) and (12), are the same under fixed wage contracting as under share contracting Similarly, the inverse relationship between r_t and β suggests that among all decisionmaking tenants, the average amount by which r_t on farms oper-ating under the fixed rental contract exceeds r_t on farms operating under the share contract approximates the average amount by which β under the share contract exceeds β under the fixed rental Thus, the average values of both the risk factor and the optimum $C'(q)$, as shown in equations (13) and (14), are the same under fixed rental contracting as under standard share contracting

Empirical studies have shown that the three tenure forms are equally efficient, but not because of a trade off between the greater efficiency of share leasing as a response to risk and the lower transaction costs of fixed rental and fixed wage contract-ing, as Ip and Stahl suggest The three tenure forms are equally effi-cient because, for any given level of transaction costs, the nonshare contract chosen when differences between landlord and tenant risk aversions are greater will generally achieve the same optimum marginal cost and the same total output as the standard share contract chosen when differences between landlord and tenant risk aversions are less

TRANSACTION COSTS AND EMPIRICAL STUDIES

Both my theory of tenure choice and theory of allocative efficiency contradict Cheung's conclusion that transaction costs are necessarily and consistently higher under share contracting than under the other two tenure forms I suggest that transaction costs may be the same for all tenure forms, because even in a zero transaction cost situation, share contracting as usually practised is not always the utility maximizing or the most efficient tenure form

Recent studies tend to support this conclusion In his analysis of post Civil War farming in the South, Reid confirms Cheung's view that landlords under share contracts incur substantial transaction costs in negotiating detailed contractual terms and in monitoring tenant performance to prevent shirking on

variable inputs However, his evidence reveals that fixed wage and rental contracts were also "costly to negotiate and enforce" (*16*, p 569)

Reid found that

> typical wage contracts re quired each laborer's attend ance to an overseer and specified in detail daily work schedules and a renumeration schedule related to each worker's satisfaction of his contractual obligations Rental contracts resembled their sharecropping counterparts in paying much attention to the details of land use and of maintenance duties Landlords often placed specific contrac tual restraints upon renters to guard against deterioration of land and capital (instructions regarding drainage, type of plowing permissible, number and type of crops allowed, maintenance of fences and buildings, use of manures and fertilizers, prohibitions on stock grazing in clover or fallow) To insure that renters would pay their rents and honor their contracts, land lords often supervised their work as well (*16*, pp 569-70)

Reid concludes that as

> all agricultural produc tion requiring cooperation among different factor owners necessitates costly negotiation and enforce ment , little plausibly differentiates the landlord's requisite transaction costs under self-cultivation with

hired labor or under renting from his transaction costs under sharecropping (*16*, p 570)

CONCLUSION

I have reviewed Cheung's theory that in a situation of zero transaction costs, risk averse landlords and tenants will always maximize their utilities by choosing some form of share contract rather than a nonshare contract I have also examined Sutinen's proof that the utility-maximizing share contract will always be more efficient than a non share contract as it will achieve a higher optimum marginal cost and a higher optimum expected output

My principal conclusion here is that the greater the difference between the risk aversions of the land-lord and tenant, the more closely the utility-maximizing contract will resemble a fixed wage or rental contract rather than a standard share contract On landlord-managed farms, the expected utility of the fixed wage contract will increase relative to that of the standard share contract as the risk aversion of the tenant over that of the landlord increases

Eventually, the increase will be so great that the fixed wage contract will be preferred to the standard share contract Similarly, on tenant-managed farms, the expected utility of the fixed rental contract will in crease relative to that of the standard share contract as the risk aversion of the landlord over that of the tenant increases Eventually, the increase

will be so great that the fixed rental contract will be the preferred tenure form Thus, landlord and tenant farm managers will choose the standard share contract only if the difference between landlord and tenant risk aversions is small enough to make risk sharing attractive

In this article, I have also developed an explanation of why empirical studies have shown all tenure forms to be equally efficient I have suggested that landlord and tenant decisionmakers who rationally choose fixed wage and fixed rental contracts are generally less risk averse than those who choose share contracts Therefore, even though the former assume the entire risk by themselves—that is, $r_l = r_t = 1$—they will still generally achieve the same optimum marginal cost and total output as do their share contracting counterparts

This conclusion and the choice of tenure theory on which it is based are clearly distinguished from Cheung's theory of tenure choice and Ip and Stahl's explanation of the equal efficiency findings by their rejection of the argument that transaction costs are necessarily higher under share contracts than under nonshare contracts I suggest that, even in a world where transactions costs are equal for all contracts, differences in the risk aversions of landlords and tenants and in the amounts of risk they assume are enough to ensure the continued existence of a wide variety of equally efficient contract forms

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