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An Economic Theory of Both Tenant and Landlord: A Philippine Case

by

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An Economic Theory of Both Tenant and Landlord: A Philippine Case*

Mahar Mangahas**

1. Introduction

About twenty years ago, share tenancy was being decried as inefficient in the use of resources, in comparison to conditions of the leaseholder or the owner-operator. A typical statement of the theory is Johnson (1950), in which the share tenant is pictured as making all the farm decisions and bearing all the costs; the experience leading to this theory was American. Later the theory was modified to allow for the landlord bearing part of the costs, but still leaving all decisions on inputs to the share tenant. In this case efficient resource use might or might not be attained, depending on whether the product share and the cost share were equal or not.

However, the implications of this theory have not at all been supported by the Philippine facts. Productivity on share tenant farms is very often no different from that on owner-operated or leasehold farms, and, where different, is almost

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always greater. Neither have share tenants lagged behind with respect to adoption of high-yielding varieties of rice. The data supporting this case have come from the Agricultural Censuses, and from several surveys (Estanislao, 1965; Ruttan, 1966; Mangahas, 1970; Sandoval and Gaon, 1971; de los Reyes, Mangahas and Murray, 1973).

Cheung (1968) has introduced a theory in which the landlord makes all the decisions, including how much of the tenant's own labor he is to apply to the land, and imposes an income-maximizing rental share, subject to the restriction that the tenant earns the equivalent of his opportunity wage income. He then came to the conclusion that share tenancy, owner-operatorship and leasehold are equally efficient. The experience cited by Cheung was Chinese. Attention of economists began to turn to the determination of the distribution of contracts according to tenure, some analysts concentrating on the implications of different types of contracts for the landlord (Cheung, 1969), and others on the implications for the tenant (Hiebert, 1972).

Although the Philippine experience would be more consistent with the conclusions of Cheung model, the assumptions of the model simply do not sit too easily in the mind. There does appear to be a substantial amount of landlord participation in decision-making at least as far as choice of plant variety and choice of fertilizer is concerned (Table 1),

But it is not necessary to turn to a model which assigns all decision-making powers to the landlord. More recently, Bardhan and Srinivasan (1972) of India have proposed that optimizing behavior of tenant and landlord be studied separately, leading to separate preference schedules for farm size, labor and other inputs, as functions of the rental share and other contractual parameters. The meeting of tenant and landlord in a competitive market then determines equilibrium contractual terms.

This paper follows the Bardhan-Srinivasan approach in that the tenant and landlord are analyzed separately. Each party will have certain preferences regarding the inputs to be applied to the land, given a proposed contract which is characterized by a set of revenue and finance-sharing parameters. Obviously, the landlord owns the land, the tenant owns his labor, and neither owns material inputs. Yet each party will express his views as to how these resources ought to be combined, and such statements are of the nature of an offer of his own resources for that of the other.[1/] The setting is the Philippines, principally the province of Nueva Ecija in Central Luzon. As much as possible, economic

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1/ This analytical symmetry is not meant to contradict the assertion that tenancy involves an "asymmetric patron-client contract" (Lewis, 1971).

and socio-anthropological research is used as a source of *a priori* judgement concerning the relationships which are to enter in the model of the landlord-tenant contract.

2. The farmer's utility function

In the first place, what constitutes a 'realistic' farmer utility function? Consider Table 2,which contains rankings of items that mean a "good life," freely mentioned most frequently by Nueva Ecija rice farmers. This evidence suggest two basic variables contributing to total farmer welfare: (1) *consumption* ("enough food and money for subsistence"; "job other than farming"; "money for farm expenses and equipment"; "bigger harvest"; "improvement of house"; and "education for children"--interpreted as a means of raising the family's future income stream); and (2) *wealth*, which can be negative more often than not (a good life means "not being indebted"). Lessees and share tenants rank farm ownership as fourth or fifth, whereas owner-operators rank it as eighth; this clearly suggests a diminishing marginal utility of wealth. It might be noted that the data in Table 2 in no way indicate that *leisure* is a variable of relevance to farmer welfare.

Given his income, the farmer can be considered to allocate it between consumption and saving such that he maximizes utility jointly from consumption during the income period and wealth at the end of the period. In Figure 1, Case I depicts allocation E out of income OY such that saving

is positive and wealth is increased. The indifference curve, which has a horizontal portion indicating minimum permissible consumption, is constructed with reference to a wealth axis. If the wealth axis point of origin is A, then AO was (positive) wealth at the beginning, which is increased by the amount saved. If the point of origin is B, then OB represents net indebtedness at the beginning, which is somewhat reduced by the positive saving. In Case II, the income is too small for even the minimum consumption level, and dissaving occurs, either reducing beginning wealth or increasing the beginning level of indebtedness. Table 3 gives an indication of the difficulty farmers have in reducing their level of indebtedness over time.

Whatever the current level of consumption and wealth/indebtedness, it is clear that larger income will make the farmer better off. The following sections proceed on this basis.

3. The revenue and finance-sharing system.

Table 4 gives an overview of the share rental system under various rental rates. The rental ratio is applied to yield net of certain deductions. Agad (literally: "immediately") is a small portion of the produce which the farm family harvests for its own consumption, before the general harvesting with the hired workers takes place. Higher rental rates are seen to be partially compensated by a larger agad privilege. The "deductible operating expenses"

include payments in kind for harvesting and threshing and repayments to both landlord and tenant for some of the expenses incurred. An interest rate is implicit in these repayments to the extent that the repayment value differs from the original cost of the inputs which are being repaid. It is well known that these interest rates are rather large, e.g., in the 1972 wet season, mean interest rates on loans obtained by Nueva Ecija rice farmers were 61% for owner-operators, 54% for lessees and 44% for share tenants (de los Reyes, Manganas and Murray, 1973, Table 16.) The dispersion of interest rates is wide, however, ranging from zero to over 200%. Relative frequency distributions for share tenants and lessees are charted in Figures 2 and 3.

As the rental rates declines, so do "deductible operating expenses" and "landlord operating expenses," suggesting that the magnitude of total landlord finance declines with the rental rate. It should be noted that the last column, "tenants' share plus agad" is still gross of certain tenant expenses (weeding, land preparation, etc.) not among the tenant's portion of "deductible operating expenses."

In general, the data are not inconsistent with the thesis (1) that the tenancy contract consists of a set of parameters governing cost and revenue sharing, and (2) that compensating changes can be made in parameters of the

set such as not to disturb net incomes accruing to landlord and tenant. In col. (9), "net return to landlord," the unusually low figure of 9.8 sacks is accounted for by the unusually low yield (35.9 sacks per ha.) attained by farmers in the category. In col. (11), there is a note that the three largest figures are gross of harvesting expenses, whereas the three smaller figures are not.

A more detailed view of finance-and-cost-sharing arrangements can be found in Table 5. Some general points can be observed:

(1) In operations where the landlord shares in finance at all, the typical sharing rate is 50:50. Part of the financial cost can be considered proportional to farm size (seeds, transplanting), part is proportional to production (all harvesting and post-harvesting expenses), and part is "freely" variable (farm chemicals and fertilizer).

(2) In the majority of cases, the landlord's contribution is deductible from the gross before sharing of the product, i.e., the contribution is in the nature of a loan rather than a bearing of the cost. An interest rate will be implicit in the agreed repayment rate, e.g., X sacks of palay per sack of fertilizer. The tenant's contribution is likewise deductible, and at the same repayment rate as the landlord's, and therefore the tenant receives the same interest rate.

(3) Where the tenant is solely responsible for finance, his costs are not deducted from the gross before sharing of the product. The operations involved are mainly seedbed preparation, pulling of seedlings, land preparation and weeding, which are labor-intensive and functions primarily of the size of the farm.

4. Models of the tenant and the landlord

The share tenant. Suppose the farmer's production function is

(1) $Q = Q(H, X, L_1)$

where H is the size of the farm in hectares, X represents material inputs, and L_1 measures farmer labor applied on the farm. It will be convenient to assume that Q is measured net of harvesting, threshing, and other similar costs which are paid directly from the produce and do not pose a financial or cost-sharing problem. Other production costs will be represented by $tH + PX$, where t is the per hectare cost of seeds, land preparation, etc., and P is the price of X, both t and P measured in units of the product.

Assume that the landlord finances a proportion b_1 of tH and another proportion b_2 of PX. We have seen that b_1 refers to those farm operations or elements of t which require cash payments; in order of magnitude, the range of b_1 is probably from 15 to 25%.[2/] On the other

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[2/] Cf. de Guzman and Dimaano (1967), Tables 7 and 8.

hand, b_2 is typically 50%. Further, assume that the entirety of the landlord's contribution is deductible from the gross, i.e., it is merely a loan and is fully repayable, with some implicit interest i. The total amount deductible is then $(1 + i)(b_1tH + b_2PX)$.

This is a somewhat monopolistic treatment of the credit open to a share tenant. Some share tenants borrow from relatives, some from private moneylenders, and a few from financial institutions. However, the great majority borrow from only one source,[3/] and it may not be too unrealistic an assumption that the share tenant cannot easily turn from one source to another in search of better credit terms.

On the tenant's part, we assume that his share in hectarage-linked expenses, $(1 - b_1)tH$, is not deductible from the gross. However, his share in the cost of material inputs is deductible according to the same terms as the landlord, i.e., $(1 + i)(1 - b_2)PX$ is deductible from the gross. Finally, assume that the tenant has an opportunity

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3/ In Nueva Ecija, 85% lessees and 87% of share tenants have only one source of credit. Share tenants' loans, distributed according to source, are: landlords, 47%; private moneylenders, 33%; kinsmen, 20%; and institutions, 14%. Lessees' loans are distributed: landlords, 20%; private moneylenders, 45%; kinsmen, 19%; and institutions, 33%. See de los Reyes and Lynch, 1972, p. 35. In the 1972 wet season, the proportions of Nueva Ecija rice farmers who were totally self-finance were 27% among share tenants, 29% among lessees, and 42% among owner-operators (de los Reyes, Mangahas, and Murray, 1973, Table 12.)

wage, such that his off-farm income is $w(L - L_1)$, where w is the wage rate and L is the total (fixed) amount of labor time the tenant has in the relevant period. We neglect any notion of variable leisure. If income from wage labor is considered less risky than that from farming, let w be a wage rate incorporating an adjustment to compensate for the risk differential.

To summarize, the tenant's income from both farm and off-farm activity is

$$C = (1 - r)\,[Q - (1 + i)\,(b_1 tH + b_2 PX) - (1 + i)\,(1 - b_2)PX] - (1 - b_1)tH + i\,(1 - b_2)PX + w\,(L - L_1)$$

$$(2)\quad C = (1 - r)\,[Q - (1 + i)\,(b_1 tH + PX)] - (1 - b_1)tH + i\,(1 - b_2)PX + w\,(L - L_1)$$

where r is the landlord's rental share.

We implicitly take tenant opportunity interest income to be zero. The set of parameters r, i, b_1 and b_2 constitute the contractual arrangement between landlord and tenant. We assume that the tenant regards them as fixed and attempts to maximize C with respect to X, H and L_1.[4/] His necessary

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[4/] C is not restricted to be positive. If negative, then there must be some automatic refinancing arrangement to allow the minimum consumption level. Cf. Anderson (1962).

conditions for an interior maximum are then

(3) $(1 - r)Q_X + i(1 - b_2)P = (1 - r)(1 + i)P$

(4) $(1 - r)Q_H = (1 - r)(1 + i)b_1 t + (1 - b_1)t$

(5) $(1 - r)Q_L = w$

where Q_X, Q_H and Q_L are marginal products of material inputs, land, and labor respectively.[5/]

Where his contribution is non-deductible (non-repayable), the tenant's marginal revenue equals his revenue share times the marginal product. He earns an interest income on his share of the financing of material inputs due to its deductibility aspect. His marginal cost of material inputs depends on the rental rate and the rate of interest. However, his marginal cost of land depends as well on the proportion he bears of the land-linked expenses.

In the common case $r = b_2$, then condition (3) reduces to $Q_X = P$, which is the same as the condition as it would appear to an owner-operator. Condition (4) indicates that the tenant has no intention of seeking to acquire land to the point of its marginal product becoming zero, since there are some expenses which he bears which are distinctly related to farm size. According to condition (5), we expect the share tenant to spend more of his time on off-farm

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[5/] Obtaining these conditions does not presuppose that the tenant is in complete control of X, H and L. We may assume that he controls L_1, but of course needs the landlord's consent regarding H and further the landlord's financing regarding X. What these conditions do represent is a statement of the tenant's demands for X and H jointly with an offer of L_1 on his own part.

activities than the owner-operator.

The effects of changes in r, b_1, b_2 and i on the tenant's demands of X, H, and L_1 can be found in the usual way. Taking total differentials through (3) - (5) with respect to r, and solving, we find that the signs of dX/dr, dH/dr, and dL_1/dr are indeterminate. Were it not for the interest income term in (3), $i(1 - b_2)P$, they would all be negative, on the assumption that the matrix of second derivatives of the production function is negative definite (See Appendix). Since the interest income term cannot be very large in magnitude, we may judge that the effect of an increase in the rental share is indeed to lower the tenant's demands for material inputs, hectarage, and own-labor.

The signs of dX/di, dH/di and dL_1/di are likewise indeterminate. They are all negative provided that $b_2 \geq r$, and as we know that $r = b_2 = 1/2$ in general, we expect that an increase in the interest rate lowers the tenant's demands for every input. The signs of dX/db_1, dH/db_1 and dL/db_1 are positive provided that $i/(1 + i) < r$. For $r = 1/2$, an increase in the proportion financed by the landlord of hectarage-linked expenses is generally encouraging to the tenant's demand for inputs, provided that the rate of interest is below 100% (per season), a condition which is usually satisfied.

We have the peculiar result that the signs of dX/db_2,

dH/db_2 and dL_1/db_2 are all negative, i.e., the tenant will seek to apply less of every input when the landlord finances more of the material inputs. This result stems from the assumption that both tenant and landlord shares in the cost of material inputs are fully deductible. The lower the tenant share, the less he stands to earn interest income through the repayment mechanism.

It may be readily observed that a number of features of the landlord-share tenant relationship are absent from the model. One such item is agad, plus any other fringe benefits received by the tenant which are not directly related to land, labor, or material inputs and which would not affect the marginal conditions (3) - (5), although they would affect the share tenant's total income. Such benefits include food loans (rasyon), gathering of fallen grains at the threshing floor, use of the farm land and home lot for secondary crops without charge, financing of some education of the tenants' children by the landlord, assistance (which is a form of insurance) from the landlord in case of need for employment, or some emergency. There are, of course, some other duties and services expected of the tenant in return. The socio-anthropological literature is replete with description of the extra implications of the "patron-client" relationship which is the tenancy contract (cf. McLennan, 1969).

The share tenant's landlord

We assume that the typical landlord has two sources of income, namely his land and a fixed amount of financial wealth. He allocates his land entirely to share tenants, but apportions his financial wealth partly to loans to his tenants and partly to some alternative carrying an opportunity earnings rate of i_*.

If income from the alternative use of funds is less risky, we assume that i_* has been adjusted upwards to compensate for the risk differential.[6/] Assuming that the share tenants are more or less homogeneous, and that his land is likewise homogeneous (cf. Cheung, 1968), he divides his farm estate into equal-size tenant farm plots and has identical contractual terms with each of his tenants. Then he maximizes his total income, which is

$$G = \frac{E}{H}\left\{ r\,[Q - (1 + i)\,(b_1 tH + PX)] + i\,(b_1 tH + b_2 PX)\right\} + \\ + i_*\,[W - \frac{E}{H}\,(b_1 tH + b_2 PX)],$$

where E is the (given) size of his estate, and W his (given) stock of wealth. Maximizing G is equivalent to maximizing $(G - i_*W)/E = N$, or income from land per hectare owned:

$$(6)\quad N = \left\{ r\,[Q - (1 + i)\,(b_1 tH + PX)] + (i - i_*)\,(b_1 tH + b_2 PX)\right\}/H$$

6/ The rate i_* is the opportunity earnings rate adjusted to the riskiness of farm income. Suppose the risk-free institutional rate is 6% in six months (one season), and suppose the landlord expects to lose both interest and principal from a farming loan about once in ten seasons; then he would have to charge 18% in order to earn 6% on the average. Setting 10% (0) + 90% $(1 + i_*)$ = 1.06, then i_* = 0.18.

The landlord's function is to contribute land and finance to the farming operation. We assume, however, that he understands the relationship of finance to the underlying inputs, and likewise understands the contribution of the inputs to the product, of which, after appropriate deductions, he is to receive a stipulated proportion. Given the farm size allotted to a tenant, in particular, the landlord recognizes a one-to-one correspondence between his finance and the amount of material inputs to be applied, and the amount of finance offered is an expression of preference for a given amount of X on the tenant farm. Indeed, the preference is often explicitly stated when a landlord contributes say fertilizer in kind. Maximizing N, therefore, with respect for X, H, and L_1 the landlord's necessary conditions are

(7) $rQ_X + (i - i_*)\, b_2 P = r\,(1 + i)\, P$

(8) $rQ_H + (i - i_*)\, b_1 t - r\,(1 + i)\, b_1 t = N$

(9) $rQ_L = 0$

The first condition equates the marginal return from a unit of X to its marginal cost. The return has two sources: the marginal product of X and the differential between the farm rate of interest and the opportunity rate of interest. (We assume the presence of capital market imperfections which maintain the differential.) Note that the income from the inherent differential induces the landlord to demand a <u>greater</u> amount of X than say an owner-operator

who had to borrow at interest rate i in order to finance X. The left-hand-side of condition (8) is the landlord's marginal net return per hectare allotted to one tenant if the allotment were fixed; at the optimum the landlord must equate this to his net income per hectare of the entire estate, i.e., if the net income were less, then he should raise the number of hectares per tenant by reducing the number of tenants. Finally, condition (9) states that the landlord's desire is that the tenant apply his labor to the farm up to the point of zero marginal product.

As in the case of the share tenant, we can consider the landlord in isolation and determine how he might respond to a change (dictated by the market) in one or another of the contractual parameters. The conclusions are as follows:

(1) A reduction in the rental rate will lead to a reduction in his demand for X, in the farm size allotted per tenant, and in the amount of farm labor desired of the tenant, provided that the interest rate differential $(i - i_*)$ is not too large. (If the differential is large enough, he will attempt to obtain more of his income from the lending operation, which is repaid before the share rental is applied, and less from the land rental per se.)

(2) The effect of the interest rate is rather indeterminate. If $b_2 = r$, then the effect on

X, H and L_1 is nil; this serves as a first hypothesis. If $b_2 > r$, then there is a partial tendency for X to increase but for H to decrease; it is difficult to make a conclusion as to the general result when all three relations (7) - (9) are taken into account.

(3) The proportion of b_1 only enters condition (8). After the differentiation, we find that any change in b_1 will have no effect on the landlord's preferences regarding X, H or L_1. Essentially this is due to the assumption that the size of the landlord's estate is assumed fixed.

(4) The effect of an increase in b_2 is to raise the landlord's demands for all inputs. By our assumptions, it simply implies a greater opportunity for the landlord to exploit the interest rate differential and to earn income from the lending operation.

The leaseholder

A leaseholder, or lessee, by definition pays a fixed rental of R units of the product per hectare. We assume that the landlord may likewise share in the financing of the crop, charging a rate of interest. The interest rate and financing shares may differ, of course, from the share tenancy situation. De los Reyes and Lynch report, from the lessees' side: "Yet in one expectation (the sharing of

farm expenses), lessees are much like the share tenants--they want the landlord to finance their farming (p.19)." And from the landlords : "Contrary to the popular belief that landlord and lessees have no 'special relationship,' 61 percent of the landlord respondents who have lessees report that at least one of their lessees has asked to borrow money. Eight out of ten of the landlords so approached say that they have granted the loan, at least in part (p. 19)."

Given that he likewise has an opportunity wage income, he will seek to maximize

$$D = Q - RH - (1 + i)(b_1 tH + b_2 PX) - (1 - b_1)tH - (1 - b_2)PX + w(L - L_1)$$

$$(10) \quad D = Q - (R + t)H - PX - i(b_1 tH + b_2 PX) + w(L - L_1)$$

With respect to X, H, and L_1. Since he has no specifically deductible expenses, he earns no implicit interest. (Clearly, there will be no change in the model if the financing is assumed to come from a non-landlord.) His necessary conditions for a maximum are then

$$(11) \quad Q_X = P(1 + ib_2)$$

$$(12) \quad Q_H = R + t(1 + ib_1)$$

$$(13) \quad Q_L = w$$

The total differentiation exercise indicates that the effects of R and i on X, H, and L_1 are all negative. (So are the effects of b_1 and b_2 negative, but this is somewhat artificial, since the leaseholder supposedly bears no

interest cost on his own expenses.)

Comparing (11) and (3), we find after a little manipulation that, supposing i and b_2 to be the same for leaseholder and share tenant, the share tenant's marginal product is equated to a lower marginal real cost than the leaseholder's; i.e., other things equal, the share tenant's demand for X is greater. This holds regardless of the size of the rental share r. Comparing (12) and (4), it is not clear to what extent a leaseholder's demand for land is different from a share tenant's, since the absolute value of R is crucial to the comparison. Comparing (13) and (5), it does seem, partially, that the leaseholder, with the same opportunity wage, will allocate more of his labor time to work on his own farm. Considering the systems (3) - (5) vs. (11) - (13), there is no clear indication of either the size or the direction of differences between a leaseholder and a share tenant with respect to the demands for material inputs, land, or own-labor.

The analysis is similar if the farmer is an "amortizing peasant," where the annual amortization per hectare is R.[7/]

[7/] Presidential Decree No. 27 of October 1972 states that all share tenants and lessees are to be converted to amortizing owners, who will pay 15 equal annual installments for land to be valued at 2.5 times the "normal" harvest, with interest of 6% per annum on remaining principal. Both land value and the amortization are thus stated in units of the product. The annual amortization implied is (intentionally) approximately one-fourth of the "normal" harvest, i.e., equal to the rental stipulated for land-reform lessees in R.A. 3844 (Sec. 34), as amended by R.A. 6389 (Sec. 5). See Medina (1973).

The difference is that amortizations have a terminal date, and it would become interesting to bring in farmer decisions regarding investments in farm improvements, etc., all of which has been neglected here.

The leaseholder's landlord

This type of landlord earns a total income of

$$\frac{E}{H} [RH + i(b_1 tH + b_2 PX)] + i_* [W - \frac{E}{H} (b_1 tH + b_2 PX)]$$

Clearly, the size of the individual leaseholder's farm will be of no importance to him. The landlord's finances will earn a constant marginal revenue in either farm lending or in outside investing, and he will allocate as much finance to his leaseholders as they will bear, if the interest rate differential is positive, or none at all if it is negative.[8/] The analysis would, again, be similar for the amortization-receiving landlord, for the duration of the payment period.

[8/] On the determination of the distribution of contracts by tenure, there is some evidence which supports the "transactions cost" argument, though from the standpoint of the opportunity cost to the landlord. Lessee landlords have characteristics which would mark them as having higher opportunity costs, hence less time for supervision, than share landlords. The former are wealthier, have larger farms, which were acquired through inheritance rather than bought, have more tenants to oversee, are more involved in politics, more exposed to mass media, and take longer-distance trips. See de los Reyes and Lynch (1972) pp. 15-16.

Bargaining between share landlord and tenant

Given competition among landlords for tenants and among tenants for land and for financial resources, we may imagine demand or offer schedules represented by (3) - (5) and by (7) - (9), such that in the long run, equilibrium contractual terms r, b_1, b_2 and i are reached, consistent with the preferences and resources of both parties. Of course, when there are more parameters to the contract than inputs to be agreed upon, one expects many sets (r, b_1, b_2, i), characterized by compensating differences across parameters, each consistent with the equilibrium. Construction of a mathematical model representing the equilibrium process itself has not proved a simple task. At this point, some observations and judgements regarding the equilibrium will only be attempted.

First, we note that the demand schedules of both parties are dependent on the same underlying agricultural production function. This contrasts with the usual case in which supply is based on production considerations whereas demand is based on consumption considerations. The theory would be simpler by far if the decision regarding a farm input could be made by one party with the complete acquiescence of the other. However, the theoretical implications of the simpler theory might be rather different and unrealistic. This is an important lesson to be drawn from the Bardhan-Srinivasan work.

Secondly, it would be more realistic to consider a contractual period that differs according to the input. Obviously, the amount of fertilizer to be applied can be decided afresh with every season; but it does not seem plausible that the farm size itself is subject to modification as often as that. There is evidence, at least, that movement of tenants across landlords is rather infrequent.[9/]

Shifts in various exogenous factors will be expected to upset the equilibrium. Land reform is a chief factor of interest, the effect of which will depend on its conception and implementation. In the latter sixties the strategy was to increase the proportion of leaseholders and decrease the proportion of share tenants. This would change the composition of the tenant group and hence the aggregate of the offers being made to landlords. At the same time, it would change the offers being made by landlords. The net effects are not yet too clear. Published reports indicate that the most common share rental rate has remained at 50:50 over the past fifteen years (Table 7). However, preliminary computations with Bureau of Agricultural Economics survey data would indicate that the mean ratio of rentals to gross output has been falling among share tenants: 40% in the 1969 wet season, 38% in the 1970 dry season, 35% in the 1970 wet season, and 31% in the 1971 dry season.

9/ Von Oppenfeld et al. (1957, p. 96) reported that the average tenant had been operating the same farm for the past 12 years.

An inkling of the recent state of equilibrium is also provided by a view of the "role expectations" which tenants have both for themselves and for landlords, and which landlords have both for themselves and for tenants (Table 6). Congruence between rankings of role expectations would suggest an equilibrium situation. By this criterion, there would appear to have been a disequilibrium situation among lessees, in contrast to an equilibrium situation among share tenants, in Nueva Ecija in 1971.[10/]

[10/] Cf. de los Reyes and Lynch, 1972, p. 19.

Table 1. Loci of decisions as to plant variety and fertilizer, Philippines, 1954/55, 1965 and 1971

	Choice of variety	Choice of fertilizer
Philippines, 1954/55, 3255 tenant farms (Von Oppenfeld et al., 1957, p. 96)		
Tenants	74%	30%
Landlords	15	10
Joint	7	7
Unknown	4	53
Bulacan and Nueva Ecija, 1965, 112 share landlords (Bernal, 1967, p. 66)		
Tenants	33%	32%
Landlords	56	47
Joint	23	30
Nueva Ecija, 1971 (de los Reyes and Lynch, 1972, p. 19) 34 share landlords:		
Tenants	38%	37%
Landlords	27	33
Joint	35	30
18 lessee landlords:		
Tenants	82%	93%
Landlords	6	7
Joint	12	0

Table 2. Rankings given to selected items that mean a good life, freely mentioned most frequently by IPC/BAEcon Nueva Ecija rice-farmer respondents, classified by item, crossclassified by tenure status (February 1971)

Average rank order	Selected item	Owner operator (N=114)	Lessee (N=403)	Share tenant (N=363)	Part owner (N=66)	Lessee-share tenant (N=40)
1	Enough food and money for subsistence	1 (56)[a]	1 (281)	1 (247)	1 (54)	1 (26)
2	Education for children	2 (46)	8 (54)	4 (94)	2 (28)	2 (22)
3	Job other than farming	3 (35)	3 (127)	2 (125)	6 (12)	5 (8)
4	Not being indebted	5 (26)	2 (149)	3 (109)	5 (14)	6 (7)
5	Money for farm expenses and equipment	7 (14)	5 (79)	8 (44)	3.5 (16)	3.5 (13)
6.5	Owning a farm	8 (9)	4 (103)	5 (75)	7 (11)	3.5 (13)
6.5	Bigger harvest	4 (28)	6 (63)	6 (65)	3.5 (16)	8 (5)
8	Improvement of house	6 (15)	7 (56)	7 (55)	8 (5)	7 (6)

[a]The figure in parentheses is the frequency with which an item was freely mentioned.

Source: de los Reyes and Lynch, 1972, p. 73.

es under different rental rates, Bulacan and Nueva Ecija,
f palay per ha.

oduce ject to aring)=(2))-(4)	Landlord share (6)=(5) x (1)	Landlord operating expenses (7)	Overseer payment (8)	Net return to landlord (9)=(6) -(7)-(8)	Tenant's share (10)=(5) - (6)	Tenant's share plus agad (11)=(10) + (3)
45.5	25.0	3.6	0.9	20.4	20.4	22.4
39.4	19.7	3.1	0.5	16.2	19.7	20.2
50.7	22.8	3.0	0.4	20.3	27.9	29.6[a]
57.5	23.0	0.5	-	22.5	34.5	34.5[a]
32.6	9.8	0.0	-	9.8	22.8	22.8
54.6	13.6	-	-	13.6	41.0	41.0[a]

were borne solely by the tenant.

Table 5. Frequency distribution of 64 share tenants having a 50% rental share system, by landlord's share in finance, Nueva Ecija, November 1972.

Operation	Landlord's share in finance(B)								Not applicable[b]
	100%		75%		50%		0%		
	Deductible[a]	Non-deductible[a]	Deductible[a]	Non-deductible[a]	Deductible[a]	Non-deductible[a]	Deductible[a]	Non-deductible[a]	
Seeds	12	2	-	-	43	2	2	3	
Seedbed preparation	-	-	-	-	1	-	-	63	
Pulling of seedlings	-	-	-	-	10	5	-	49	
Land Preparation	-	-	-	-	3	2	-	59	
Transplanting costs	2	33[c]	-	1	13	13	-	2	
Farm chemicals	-	1	-	-	21	17	-	15	10
Fertilizer	1	1	-	-	37	17	-	3	5
Weeding	-	-	-	-	1	1	-	62	
Harvesting	-	1	-	-	27	4	-	32[c]	
Threshing	-	1	-	-	54	7	-	2	
Hauling	-	1	-	-	15	32	-	14	2
Sacks	-	-	-	-	-	2	-	3	59
Irrigation	-	-	-	-	8	10	-	3	43

[a]Deductibility is with reference to the produce before the rental share is applied. Landlord and tenant contributions are equally deductible on non-deductible.

[b]E.G., did not use fertilizer.

[c]These cases of transplanting costs fully borne and non-deductible by landlords correspond to the cases of harvesting costs (on a wage basis) fully borne and non-deductible by tenants.

Source: IPC Pilot Survey.

Table 6. Role expectations of landlords and tenants, classified by landlord and tenant, Nueva Ecija, 1971.

	Ranked role expectations of an ideal landlord			
	By share tenants	By share landlords	By lessees	By lessee landlords
Shares farm expenses	1	4	2	1
Provides fringe benefits	2	1	7	3
Extends credit	3.5	3	6	6.5
Is courteous or pleasant	3.5	2	1	2
Asks a just interest on loans	5	6	5	5
Has a good farming arrangement	6	7.5	3	6.5
Is solicitous, or helpful in general	7	7.5	8	8
Is law-abiding	8	9	4	9
Paternalistic	-	5	-	4

	Ranked role expectations of an ideal tenant			
	By share tenants	By share landlords	By lessees	By lessee landlords
Is industrious	1	1	2	2
Is honest, especially in complying with sharing agreement	2	2	1	1
Is courteous to superior	3	6	4	6
Is a good subordinate	4	5	6	5
Has technical knowhow	5	3	3	3.5
Is a good farmer in general	6	4	5	3.5
Is courteous to others in general	7	7	7	7

Source: de los Reyes and Lynch 1972, Tables 6, 7, 10, 11 and 12.

Table 7. Relative frequencies of various rental shares, Philippines, 1956/55, 1965 and 1971

Landlord's rental share	1610 tenant farmers, Philippines, 1954/55 (1)	112 landlords, Bulacan and Nueva Ecija, 1965 (2)	32 share landlords Nueva Ecija, 1971 (3)
25%	-	3%	-
30	2%	-	-
33	4	-	-
35	-	7	-
40	5	3	3%
45	4	3	19
50	76	72	67
55	-	12	-
Other/n.a.	9	-	12
	100%	100%	100%

Sources: (1) Von Oppenfeld et al. (1957), p. 99;
(2) Bernal (1967), computed from data on p. 55;
(3) de los Reyes and Lynch (1972), p. 16.

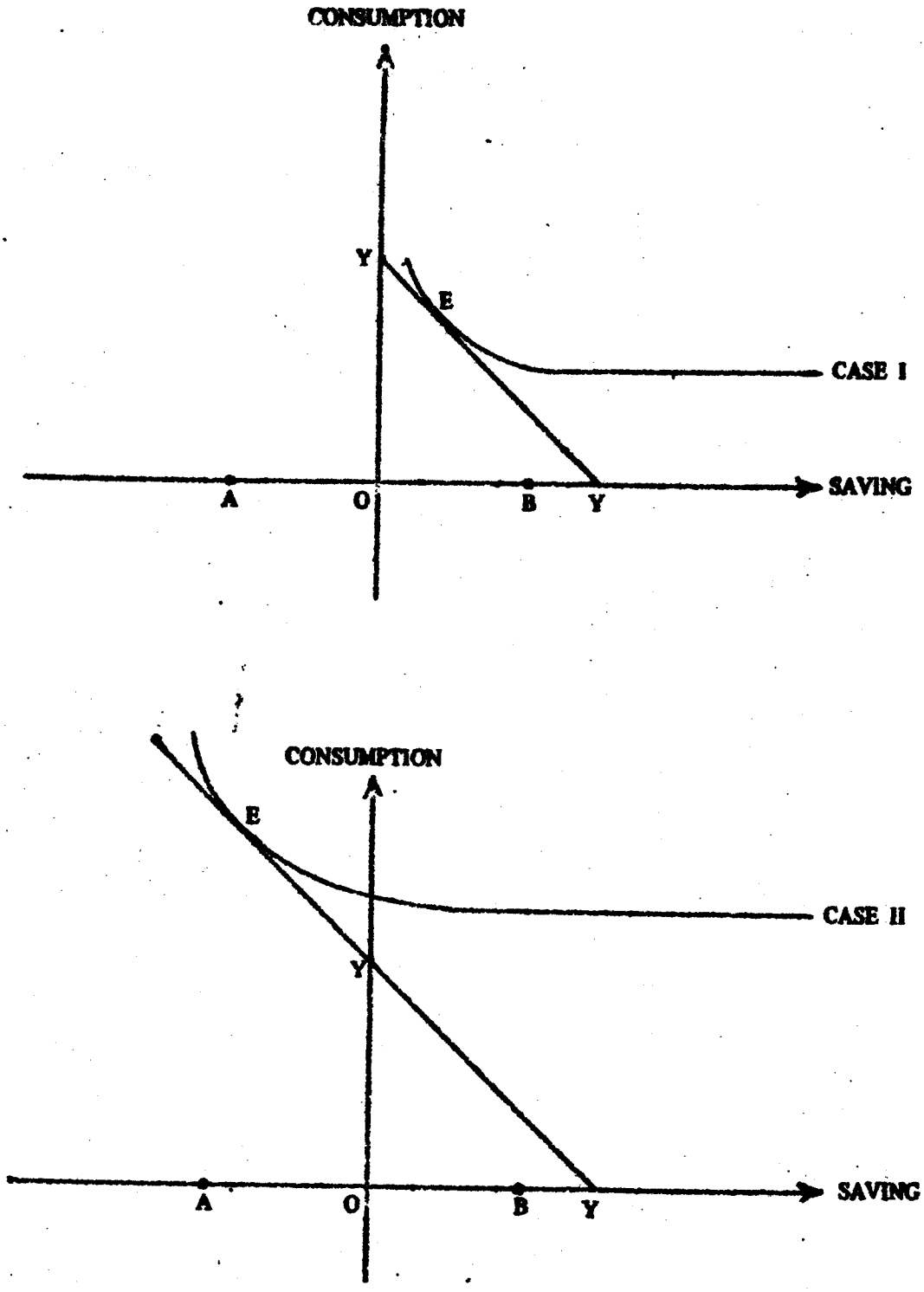
CONSUMPTION
Y
E
CASE I
SAVING
A
O
B
Y
CONSUMPTION
E
CASE II
Y
SAVING
A
O
B
Y

FIGURE 1

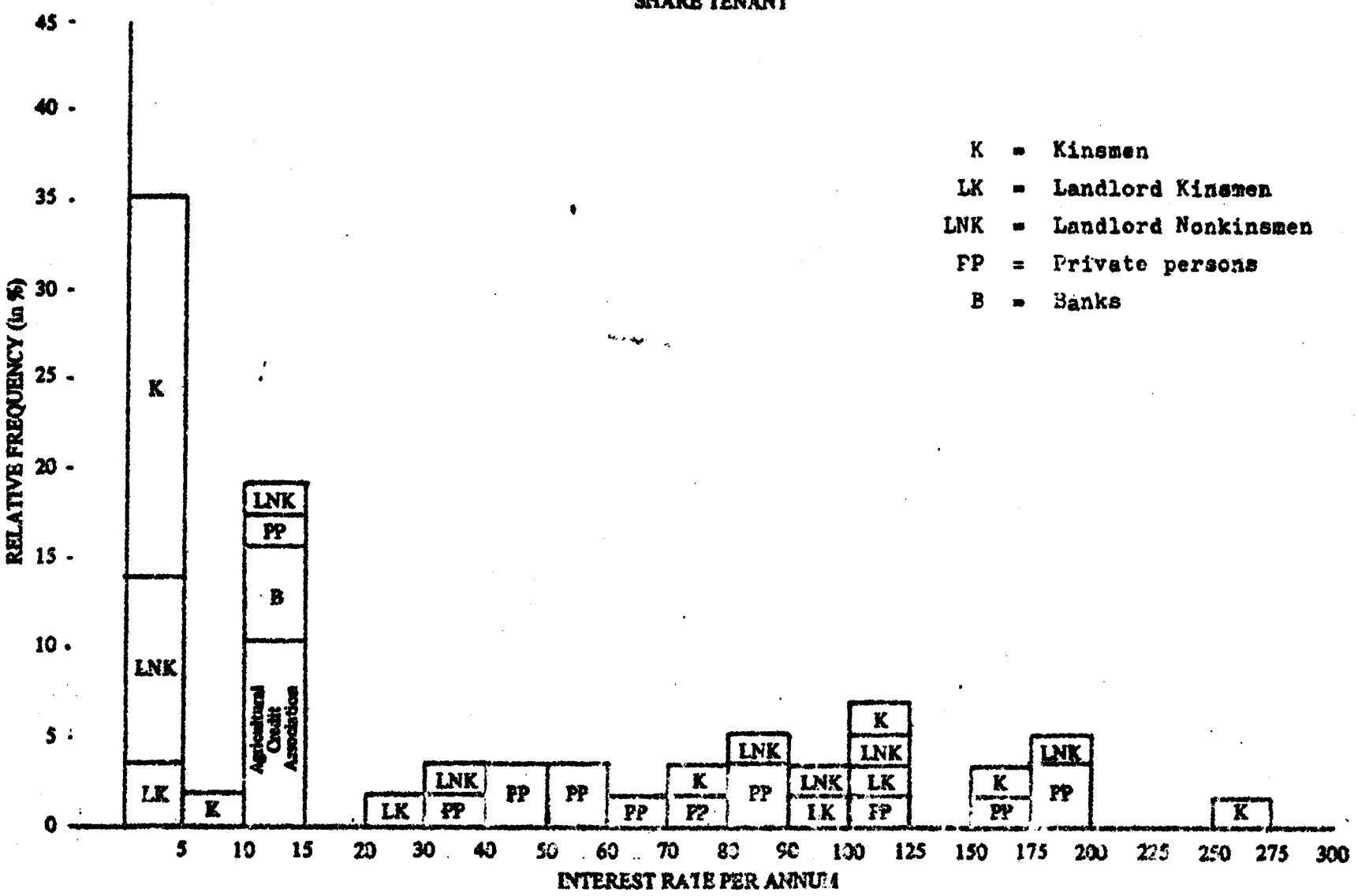
SHARE TENANT
K = Kinsmen
LK = Landlord Kinsmen
LNK = Landlord Nonkinsmen
PP = Private persons
B = Banks
RELATIVE FREQUENCY (in %)
INTEREST RATE PER ANNUM
Agricultural Credit Association

FIGURE 2

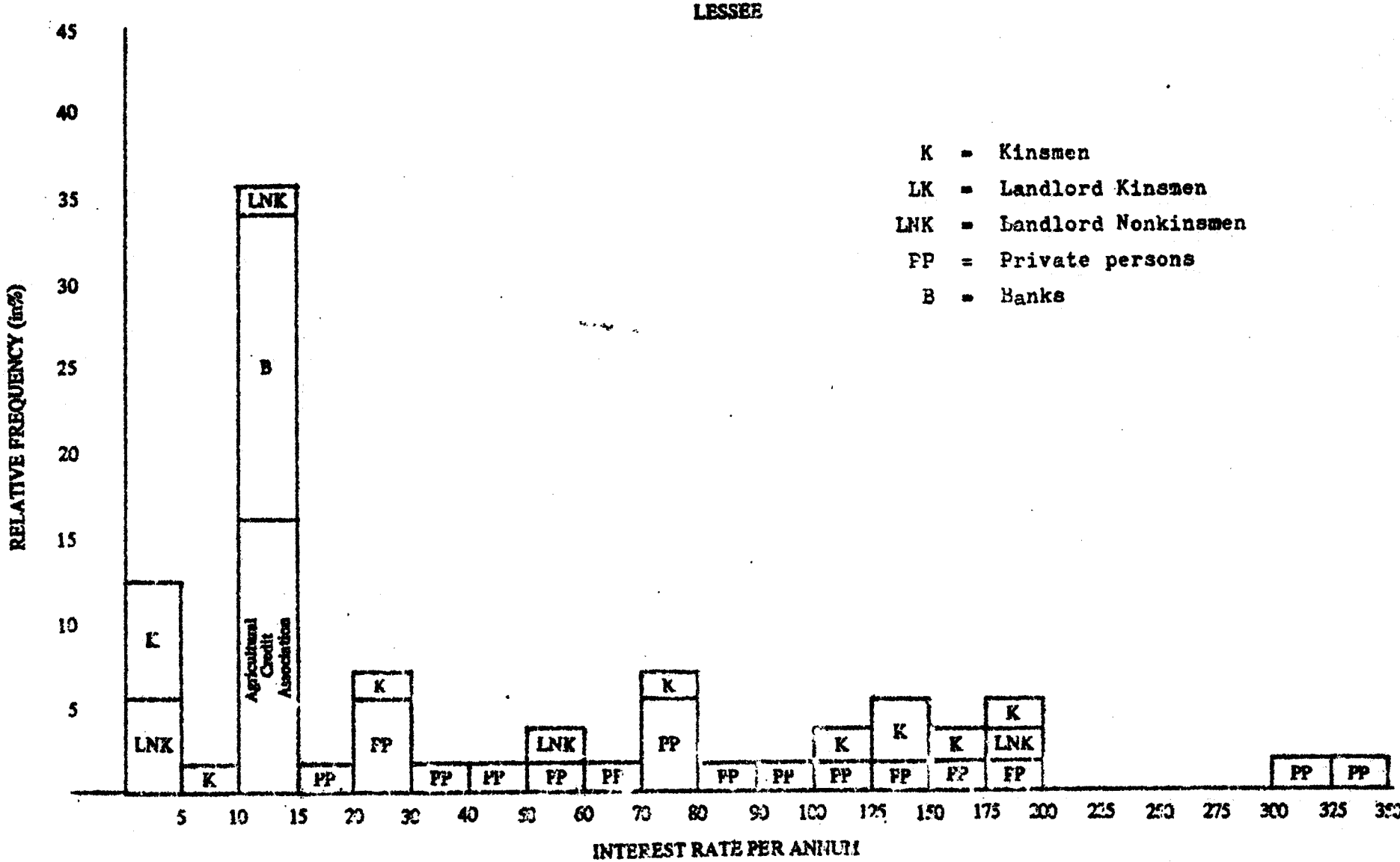
LESSEE
K = Kinsmen
LK = Landlord Kinsmen
LNK = Landlord Nonkinsmen
PP = Private persons
B = Banks
RELATIVE FREQUENCY (in%)
45
40
35
30
25
20
15
10
5
LNK
B
Agricultural Credit Association
K
LNK
K
PP
K
PP
LNK
PP
K
PP
PP
K
K
K
K
LNK
PP
PP
PP
PP
PP
PP
PP
PP
PP
PP
PP
PP
PP
PP
5
10
15
20
30
40
50
60
70
80
90
100
125
150
175
200
225
250
275
300
325
350
INTEREST RATE PER ANNUM

FIGURE 1

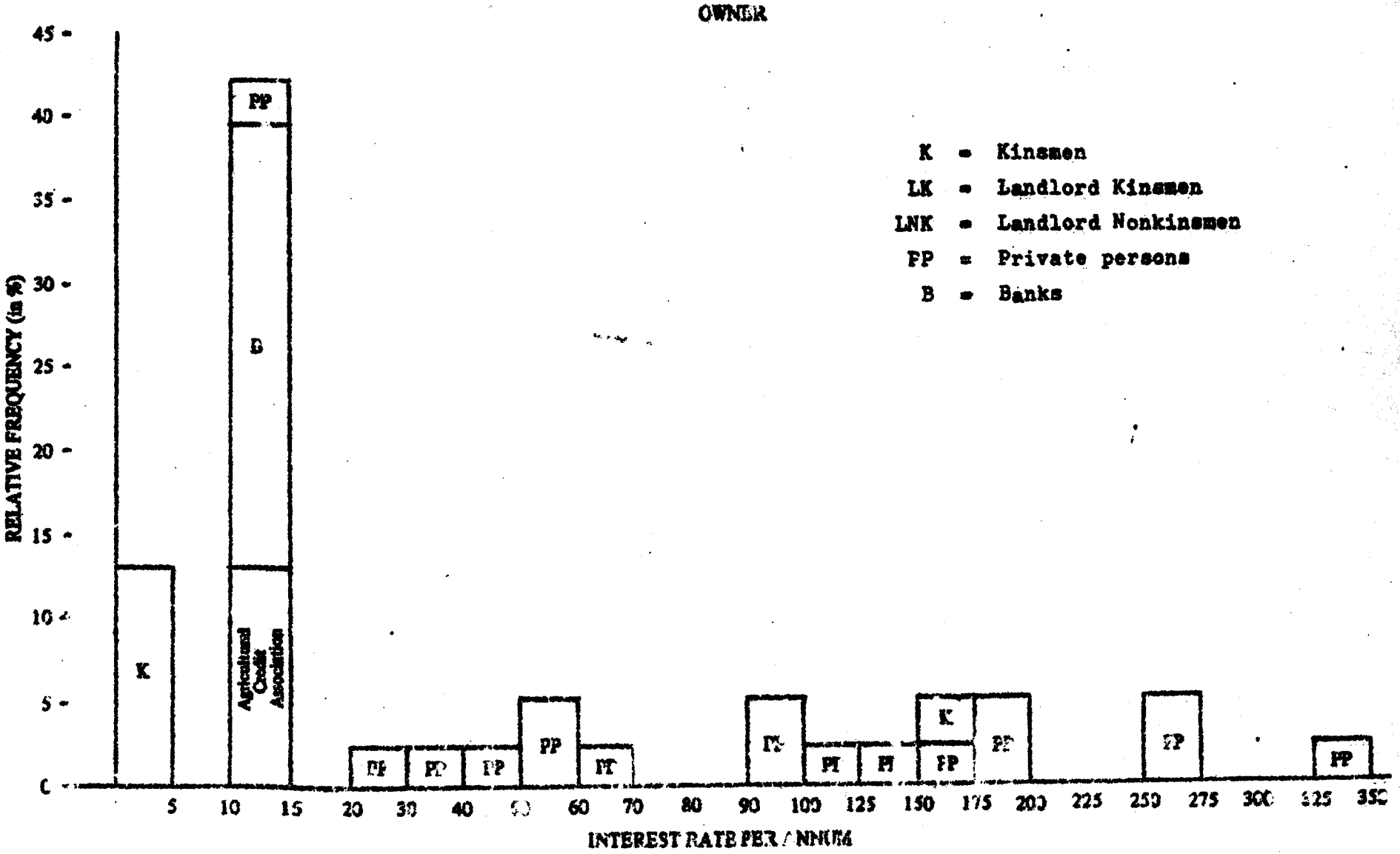
OWNER
K = Kinsmen
LK = Landlord Kinsmen
LNK = Landlord Nonkinsmen
PP = Private persons
B = Banks
RELATIVE FREQUENCY (in %)
45
40
35
30
25
20
15
10
5
0
PP
B
K
Agricultural Credit Association
5
10
15
20
30
40
60
70
80
90
100
125
150
175
200
225
250
275
300
350
INTEREST RATE PER ANNUM

FIGURE 3

Appendix

Differentiating (3) - (5) with respect to r gives

$$(A1)\quad -Q_X + Q_{XX}X_r + Q_{XH}H_r + Q_{XL}L_{1r} = -(1+i)P$$

$$(A2)\quad -Q_H + Q_{HX}X_r + Q_{HH}H_r + Q_{HL}L_{1r} = -(1+i)b_1 t$$

$$(A3)\quad -Q_L + Q_{LX}X_r + Q_{LH}H_r + Q_{LL}L_{1r} = 0$$

where $X_r = dX/dr$, $H_r = dH/dr$, $L_{1r} = dL/dr$, and $Q_{ij} = dQ_i/dj$ for i, j = X, H, L_1. Eq. (A1) - (A3) become

$$[q]\begin{bmatrix} X_r \\ H_r \\ L_{1r} \end{bmatrix} = \begin{bmatrix} Q_X - (1+i)P \\ Q_H - (1+i)bt \\ Q_L \end{bmatrix} = \begin{bmatrix} -\dfrac{i(1-b_2)P}{1-r} \\ \dfrac{(1-b_1)t}{1-r} \\ \dfrac{w}{1-r} \end{bmatrix}$$

where [q] is the matrix of second derivatives of the production function. We assume that all cross-derivatives are positive (marginal products always rise as more of a different input is applied). Then

$$\det[q] \cdot X_r = \left[-\frac{i(1-b_2)P}{1-r}\right]\begin{vmatrix} Q_{HH} & Q_{HL} \\ Q_{LH} & Q_{LL} \end{vmatrix} - \left[\frac{(1-b_1)t}{1-r}\right]\begin{vmatrix} Q_{XH} & Q_{XL} \\ Q_{LH} & Q_{LL} \end{vmatrix} + \frac{w}{1-r}\begin{vmatrix} Q_{XH} & Q_{XL} \\ Q_{HH} & Q_{HL} \end{vmatrix}$$

The signs of three r.h.s. determinants are positive, negative and positive respectively. Hence X_r is negative provided that $i(1-b_2)P$ is small enough.

Similarly, we obtain

$$\det [q] \cdot H_r = \frac{i(1-b_2)P}{1-r} \begin{vmatrix} Q_{HX} & Q_{HL} \\ Q_{LX} & Q_{LL} \end{vmatrix} + \frac{(1-b_1)t}{1-r} \begin{vmatrix} Q_{XX} & Q_{XL} \\ Q_{LX} & Q_{LL} \end{vmatrix} - \frac{w}{1-r} \begin{vmatrix} Q_{XX} & Q_{XL} \\ Q_{HX} & QHL \end{vmatrix}$$

$$\det [q] \cdot L_{1r} = - \frac{i(1-b_2)P}{1-r} \begin{vmatrix} Q_{HX} & Q_{HH} \\ Q_{LX} & Q_{LH} \end{vmatrix} - \frac{(1-b_1)t}{1-r} \begin{vmatrix} Q_{XX} & Q_{XH} \\ Q_{LX} & Q_{LH} \end{vmatrix} + \frac{w}{1-r} \begin{vmatrix} Q_{XX} & Q_{XH} \\ Q_{HX} & Q_{HH} \end{vmatrix}$$

Writing $X_i = dX/di$, $H_i = dH/di$, $L_{ii} = dL,/di$, we have

$$\det [q].X_i = \frac{b_2-r}{1-r} p \begin{vmatrix} Q_{HH} & Q_{HL} \\ Q_{LH} & Q_{LL} \end{vmatrix} - b_1 t \begin{vmatrix} Q_{XH} & Q_{XL} \\ Q_{LH} & Q_{LL} \end{vmatrix}$$

$$\det [q].H_i = - \frac{b_2 - r}{1-r} \begin{vmatrix} Q_{HX} & Q_{HL} \\ Q_{LX} & Q_{LL} \end{vmatrix} + b_1 t \begin{vmatrix} Q_{XX} & Q_{XL} \\ Q_{LX} & Q_{LL} \end{vmatrix}$$

$$\det [q].L_{1i} = \frac{b_2-r}{1-r} \begin{vmatrix} Q_{HX} & Q_{HH} \\ Q_{LX} & Q_{LH} \end{vmatrix} - b_1 t \begin{vmatrix} Q_{XX} & Q_{XH} \\ Q_{LX} & Q_{LH} \end{vmatrix}$$

Writing $X_{b1} = dX/db_1$, $H_{b1} = dH/db_1$ and $L_{1b1} = dL_1/db_1$, we have

$$\det [q].X_{b1} = - (1 + i - \frac{1}{1-r}) t \begin{vmatrix} Q_{XH} & Q_{HL} \\ Q_{LH} & Q_{LL} \end{vmatrix}$$

$$\det [q].H_{b1} = (1 + i - \frac{1}{1-r}) t \begin{vmatrix} Q_{XX} & Q_{XL} \\ Q_{LX} & Q_{LL} \end{vmatrix}$$

$$\det [q].L_{1b1} = - (1 + i - \frac{1}{1-r}) t \begin{vmatrix} Q_{XX} & Q_{XH} \\ Q_{LX} & Q_{LH} \end{vmatrix}$$

Writing $X_{b2} = dX/db_2$, $H_{b2} = dH/db_2$ and $L_{1b2} = dL_1/db_2$. we have

$$\det [q].\ X_{b2} = \frac{iP}{1-r} \begin{vmatrix} Q_{HH} & Q_{HL} \\ Q_{LH} & Q_{LL} \end{vmatrix}$$

$$\det [q].\ H_{b2} = -\frac{iP}{1-r} \begin{vmatrix} Q_{HX} & Q_{HL} \\ Q_{LX} & Q_{LL} \end{vmatrix}$$

$$\det [q].\ L_{1b2} = \frac{iP}{1-r} \begin{vmatrix} Q_{HX} & Q_{HH} \\ Q_{LX} & Q_{LH} \end{vmatrix}$$

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