



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

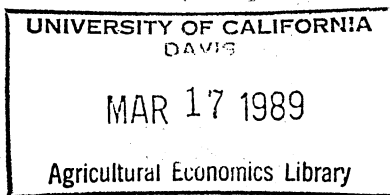
*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

from [unclear]

INTERLINKED LAND-LABOR CONTRACTS: THEIR RATIONALITY IN A
LATIN AMERICAN CONTEXT

Alain de Janvry and Elisabeth Sadoulet*

1988



Tenancy

*Alain de Janvry is professor and chairman and Elisabeth Sadoulet is a lecturer, Department of Agricultural and Resource Economics, University of California at Berkeley.

3030

Alain de Janvry, 1958

INTERLINKED LAND-LABOR CONTRACTS: THEIR RATIONALITY IN A
LATIN AMERICAN CONTEXT

Abstract

The rationality for interlinkages between land and labor contracts, where rent is paid in labor services, is explored. These contracts emerge in a structural context of large farms and dualism when there is either a risk of default on rents, involuntary unemployment, or costly transactions costs on the labor market. The resulting size of land plots leased is analyzed with Chilean data. Reforming these contracts without transforming the causes of their existence has led to efficiency and welfare losses.

INTERLINKED LAND-LABOR CONTRACTS: THEIR RATIONALITY IN A LATIN AMERICAN CONTEXT

Latin American history is replete with situations where legal interventions have been used to change social relations in agriculture, expectedly to the benefit of greater efficiency in resource use and greater welfare for peasant households. This included the banning of sharecropping in Argentina under Peron and of land rental involving payments of rents in labor services in Chile and Ecuador. Elimination of these forms of contracts was justified by exposing them as archaic remnants of feudal relations that had to give way to modern contracts with rents paid in cash and employment paid in wage.

We argue in this paper that legal elimination of these contracts, without having properly understood the types of market failures that had created their rationality for the parties involved, was eventually a source of efficiency and welfare losses. For that reason, these changes were often resisted not only by the affected landlords but also by the peasant households supposed to be "benefited." While what Vernon Ruttan calls the "new agrarian studies" has been helpful in revealing the rationality of interlinked contracts in agriculture, these studies have mainly emerged from an Asian context (Bardhan). For that reason, they have principally focused on credit markets and on interlinkages, according to who the moneylender is, between land and credit, labor and credit, and products and credit.

In Latin America, interlinked contracts assume an eventually different form due to two markedly specific features of the agrarian structure. One is the strong landed monopolies associated with very large commercial landholdings, particularly until the land reforms of the 1960s; the other is the deep dualism in technology and in access to institutions that characterizes the peasantry as opposed to the commercial sector.

We use these structural features to explain the commonly observed inter-linkage between land and labor contracts whereby tenants pay rents in labor services. This was not only widespread all over Latin America before the 1960s but is still observed today in a number of places, particularly for skilled labor employment.

I. Models of Interlinked Contracts

Based on the historical accounts explaining why rent in labor services tends to emerge in Chile (Schejtman), we explore here three situations where interlinking is beneficial at least to the landlord and possibly to the peasants as well because it creates a net social gain above separate land and labor contracts. In the first case, the probability of default in payment of the land rent by peasants creates inefficiency in land use and prevents the landlord from extracting the total monopoly rent which interlinking can in certain conditions recover. In the other two cases, involuntary unemployment and costly transactions costs on the labor market can be eliminated by interlinking which then increases the surplus that the landlord can extract.

1.1. Separate Transactions on Land and Labor

Consider a landlord with land assets A and local monopoly power over the land market.^{1/} With a limited amount of fixed factors of production K , he will choose to rent out part of his land to landless peasant households. The rental contract is set out in a principal-agent framework in line with the landlord's monopoly power. The terms of the contract which include a rental rate r and an entry fee B or, equivalently, a decreasing rental rate $r + B/a$ with plot size a are determined by the landlord with full knowledge of the peasant decision behavior.

Consider then the conditions faced by the peasant household and his decision process. The assets of the household include \underline{L}_f units of captive labor and one unit of free labor (the male head of the household). Only free labor has access to labor market opportunities. Each household has an identical utility function $u(y, e)$ defined over its income y and the labor effort e of family labor and a reservation level $\underline{u} = u(\underline{w}, 0)$, where \underline{w} is the wage that free labor could get in the labor market before engaging in the rental contract with the landlord. However, once the household decides to rent land on the hacienda, free labor has lost some mobility and restricted itself to a local labor market in which the opportunity wage w^* is generally lower than \underline{w} .

The peasant household which engaged in a rental contract chooses the plot size a and the allocation of free labor time between work on his own plot $(1 - \ell)$ and on the labor market (ℓ) to maximize its utility:

$$\text{Max}_{a, \ell} u[pq(a, \underline{L}_f, 1 - \ell) - ra - B + w^*\ell, e]$$

where p is the market price of the peasant's product and q its production function.

Assume now that there are diseconomies of scale in the cost of recruitment of tenants and management of these rental and let $C(N)$ be the total cost for the landlord of renting N plots, with $C'(N) > 0$, $C''(N) \geq 0$. For his own cultivation, the landlord recruits labor in the labor market in which he has no particular advantage at the ongoing wage rate \underline{w} .

The landlord's decisions regarding the number of peasants with whom to enter in a land rental contract, the terms of the contract, and the level of employment for his own cultivation derive from the following maximizing problem:

$$\text{Max}_{N,r,B,L} PQ(A, \underline{K}, L) - \underline{w}L + N(ra + B) - C(N)$$

subject to

$$A + Na = \underline{A}$$

$$a = a(\underline{L}_f, -r/p, -w^*/p)$$

$$u(y, e) \geq u(\underline{w}, 0),$$

where Q is the landlord's production function, P is the price of the products he sells, and L is the number of workers he hires.

1.2. Probability of Default in the Rental Payment

We examine the case where the tenant defaults on the rental payment whenever his income falls below a minimum subsistence level.

The risk of default originates in the stochastic nature of the peasant's production and income. Assuming, for simplicity, additive risk in production,

$$q(a, \underline{L}_f, 1 - \lambda) + \theta \quad \text{with} \quad E(\theta) = 0, \text{var}(\theta) = \sigma^2,$$

the peasant defaults whenever his net income falls below a minimum level D , which happens whenever the stochastic element θ falls below the minimum level θ_0 :

$$\theta \leq \theta_0 = (D + ra + B - \underline{w}\lambda - pq)/p.$$

The peasant's optimum strategy is to

$$\text{Max}_{a,\lambda} pq - f(\theta_0) (ra + B) + \underline{w}\lambda,$$

where $f(\theta_0)$ is the probability of nondefault, $f(\theta_0) = \text{prob}(\theta \geq \theta_0)$. This leads the peasant to perceive a marginal cost of land lower than r and,

therefore, to rent more land than in the nondefault case. The marginal productivity of land on the peasant's plot is

$$pq'_a = r[f + f'(ra + B)]/[1 + f'(ra + B)],$$

while no bias is introduced in the labor market, $pq'_\ell = \underline{w}$.

The landlord's optimum choice is now written as:

$$\text{Max}_{N,L,r,B} PQ(\underline{A} - Na, \underline{K}, L) - \underline{w}L + N f(\theta_0) (ra + B) - C(N)$$

subject to

$$pq - f(\theta_0) (ra + B) + \underline{w}\ell \geq \underline{y}.$$

Two locally optimum solutions of this system are, respectively, given by

I. Constrained Optimum

$$N = \lambda$$

$$PQ'_A = fr$$

$$C'(N) = fB$$

$$pq - f(ra + B) + \underline{w}\ell = \underline{y}$$

II. Nonconstrained Optimum

$$f + (ra + B) f' \theta'_{0B} = 0$$

$$PQ'_A = fr$$

$$C'(N) = fB$$

$$\lambda = 0 \text{ and } pq - f(ra + B) + \underline{w}\ell > \underline{y}.$$

The nonconstrained optimum II will be the landlord's solution if f' is sufficiently small for the condition $f + (ra + B) f' \theta'_{0B} = 0$ to hold for values of B below the maximum given by the peasant's income constraint.

The possibility of default payment introduces two discrepancies with the standard model. First, inefficiency in land allocation results from different

perceptions of the marginal cost of land by the landlord and by the peasant (in both cases I and II). Secondly, if the probability of default increases rapidly with rental costs, the landlord may not be able to set B to the maximum value that allows him to capture all of the peasant's surplus. The optimum strategy consists in a lower than maximum B which leaves the peasant household's income above its reservation level (case II).

Interlinking can protect the landlord/employer against these losses of defaulting by transforming the rental payment, at least partially, in payment in labor services. Depending on the relative sizes of the opposite transactions $ra + B$ and $w\ell$, the net payment will be either a rent or a wage. With very limited employment opportunities for the peasant (w low), the land rental contract is dominant, $ra + B > w\ell$, and the two contracts (r, B) and (w) can be replaced by an interlinked contract with

$$r^* = r - (w\ell - B)/a, B^* = 0, w^* = 0.$$

However, to avoid the inefficiency in input choices that the distorted prices r^* and w^* will induce, the contract needs to also specify the correct amount of land a which the peasant can rent and the amount of labor ℓ which he has to provide free of wage. The interlinked contract (r^*, a, ℓ) can be interpreted as the rental contract of a plot of land of size a at a reduced rate r^* plus payment in kind of a prespecified quantity of labor on the landlord's estate. With increasing wage on the labor market and decreasing plot size for the peasant, such that $ra + B$ becomes lower than $w\ell$, the interlinked contract evolves toward a labor contract (a, ℓ, w^*) at a reduced wage

$$w^* = w - (ra + B)/\ell$$

and a complementary payment in land usufruct. Again, to avoid inefficiency, the contract needs to specify the plot size a and the amount of work l which the peasant has to provide.

A landlord engaged in a dualistic utilization of his estate, with small plots of land rented out to tenants and direct cultivation with hired labor, will consequently have an advantage in hiring his own tenants as workers. Dualism, thus, becomes functional in the sense that it is through the labor market transaction that the full rent of peasant family labor can be extracted. The individual contract may, however, be dominated by either the land or the labor transaction as we have seen it above. The overall pattern of contracts given by any landlord depends upon the relative size of the supply of labor by his tenants (N_l) and his demand for labor (L). As observed in the Chilean sequence of contracts (Schejtman), starting from a pure land rental contract, interlinked contracts spread as the share of land in own cultivation increased; and a mix of interlinked contracts and complementary pure labor contracts diffused when land use became dominated by direct cultivation.

1.3. Involuntary Unemployment Among the Peasants

Consider, now, the initial model in which the opportunity cost of the peasant's labor is w^* below the market wage \underline{w} . This will occur, in particular, when there is open unemployment and each peasant has only a certain probability of finding employment, while the market wage is maintained at \underline{w} . The difference $\underline{w} - w^*$ can be thought of as a transactions cost in getting access of the labor market.

Interlinking by the landlord who hires his own tenants allows him to recover this transactions cost. At which wage should the transaction be settled?

If ℓ is fully absorbed in the landlord's labor force and the wage rate is w , $w^* \leq w \leq \underline{w}$, the benefit accruing to the landlord is

$$\underbrace{\Pi_{\underline{L}_f}(\underline{L}_f, r, w) - (\underline{y} - \underline{w}) - (\underline{w} - w)}_{\text{on the rental market}} + \underbrace{(\underline{w} - w) \ell}_{\text{on the labor market}}$$

$$= pq[a, \underline{L}_f, 1 - \ell(w)] - ra - \underline{w}(1 - \ell) - (\underline{y} - \underline{w})$$

which is maximum for $w = \underline{w}$.

The optimum contract will then consist in offering to the peasant the wage \underline{w} , increasing by this his labor supply on the market and raising his productivity on his plot, and then to capture a higher rent from him by increasing B .

The interlocker enjoys a privileged situation that neither the employer nor the landlord could create. Compared to an employer, he can recover part of the cost $(\underline{w} - w^*)$ of this labor force through the rental market. Compared to a pure landlord, he can raise the income of the free labor by $(\underline{w} - w^*)$ and increase surplus extraction by the same amount.

The landlord may choose to rearrange this optimum contract (r, B, \underline{w}) with part of the rent paid in labor services. As in the previous case, the contract will then also need to specify the quantity of the transaction.

The functionality of the interlinkage is quite clear, but the role of the labor and the land transactions are very symmetric. One can see the land rental as performing the function of decreasing the cost of labor to the landlord from the market level \underline{w} to the lower w^* or the labor market as raising the opportunity cost of free labor from w^* to \underline{w} and, hence, allowing to recover the full rent of the family labor on the land market.

1.4. Labor Scarcity and Recruitment Costs

A very symmetric case of transactions costs on the labor market occurs where there is labor scarcity. The landlord needs to incur high recruitment cost c to find employees in sufficient number for his direct cultivation, in particular for highly seasonal activities. Therefore, there exists a difference between the labor cost $\underline{w} + c$ to the landlord on the demand side and the price \underline{w} received by workers on the supply side, a transactions cost that the landlord can avoid by hiring his own tenants.

In this case, interlinkage is justified by imperfection of the labor market, does not need the assumption of monopoly power and surplus extraction on the land rental market, and would exist even in the case of land surplus. The social welfare gain of the interlinkage may then be partly shared by the landlord through a subsidy to land rental. In this case the two separate contracts would have been a land rental contract ($r, B = 0$) at market rental rate r and a labor contract ($\underline{w} + c$) with market wage \underline{w} and recruitment cost c . The landlord may attract tenants by proposing an interlinked contract (a, \underline{w}) at a lower rental rate r^* equal to $(r - c/a < r^* < r)$ for a prespecified plot size a . This may even take the form of almost free usufruct of land for the promise of working a certain number of hours for the landlord. The rental of small plots to tenants, and thus dualism in the agrarian structure, is in this case actively sought by the landlords not for collecting any rent but to decrease labor costs.

II. Determinants of Plot Size in Land-Labor Contracts

We can verify some of the model predictions for the land-labor contracts using a 1966 survey of 258 inquilinos on large farms in the Central Valley of Chile

done by Schejtman. While the original data are no longer available, a number of two-way frequency distribution tables allow us to calculate correlations and simple regressions between the size of the land plot cultivated by the inquilino and a number of characteristics of both the landlord's estate and the inquilino. The results obtained are presented in table 1.

Among the landlord characteristics, the size of the land plot given as part of the land-labor contract changes as follows:

1. It increases with the size of the estate (A). With decreasing marginal returns in production, the opportunity cost of the land for the landlord decreases as farm size increases, and it is thus more logical for him to pay in land usufruct a higher share of the inquilino's labor income.

2. It decreases with land productivity on the estate (K). Rising productivity raises the opportunity cost of the land for the landlord and leads him to reduce the share of land in the inquilino's contract. As a result, it is in the more modern farms that the peasants are given the least access to land.

3. It increases with the degree of geographical isolation of the estate (measured as a dummy variable). Since this implies that access to the market is more difficult, farm-level product prices are lower and so is the opportunity cost of the land. This also leads landlords to increase land rights in the inquilino's labor income.

The size of the plot is also influenced by several characteristics of the worker's household.

1. It increases (significant at the 94 percent level) with the age of the head of household. Using this as a proxy for family size and assuming, as we have done above, that a given fraction of family labor is captive within the household, the productivity of land use on the tenant's plot increases with the age of the head of household. If the fixed reservation utility level of

Table 1
Determinants of Plot Size in Land-Labor Contracts, Chile, 1966

	Model variables or proxies	Units	Mean	Coefficient of variation	Correlation with a	Elasticity at means	t-statistic
Plot size	a	ha	1.6	0.97	1.00		
<u>Landlord characteristics</u>							
Size estate	A	ha	597	1.47	0.17	0.25	2.70
Land productivity	K	U. S. \$/ha	315	1.43	-0.31	-0.45	-5.16
Labor scarcity	w	1 = scarce	0.27	0.61	0.04	0.02	0.63
Isolation	P	1 = isolated	0.29	0.64	0.24	0.16	3.91
<u>Worker Characteristics</u>							
Age household head	L _f	years	41.7	3.64	0.10	0.18	1.54
Seniority	k	years	18.8	1.61	0.11	0.36	1.79

Source: A. Schejtman's 1966 household survey. Sample size: 258 households.

this household is the level of remuneration which the landlord must satisfy, it is cheaper for the landlord to give larger plots of land to those households with a greater captive labor force.

2. It increases with the worker's seniority measured by the number of years of continuous employment on the present estate. Since tenants gradually capitalize their plots with accumulated earnings, seniority is a proxy variable for capital intensity on the land plot (k). Such a variable was not explicit in the formal model but would play exactly the same role as L_f . Seniority then leads to higher productivity and to a larger share of labor income paid by landlords under the form of land usufruct.

III. Conclusions

There was clear rationality for both landlords and peasants to engage in interlinked land-labor contracts with rent paid in labor services. This was due to the structural features of the Latin American agricultural sector (large-scale farms and dualism) and to possibilities that peasants would default on fixed rent payments, to unemployment, and to transactions costs on the labor market. Eliminating these contracts by law without correcting the causes of their existence could only lead to efficiency and welfare losses.

Footnotes

¹Underlined variables indicate that they are fixed during the decision period.

References

- Bardhan, Pranab. Land, Labor, and Rural Poverty: Essays in Development Economics. London: Oxford University Press, 1984.
- Ruttan, Vernon. "Assistance to Expand Agricultural Production." World Development 14(1986):39-63.
- Schejtman, Alejandro. El Inquilino de Chile Central. Santiago, Chile: ICITA, 1971.