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Staff Papers

Staff Paper 116

July 1981

FARM TENANCY
LITERATURE REVIEW AND THEORETICAL FOUNDATION

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Foreward

A primary responsibility of a researcher initiating a new research project is to thoroughly review the literature in that subject. This review must include not only methodology employed in previous research, but relevant theory. The latter is necessary to provide a solid foundation for conceptualizing research and interpreting results.

Available literature on farm tenancy is rich and voluminous. As has been the case of much economic theory, tenancy theory has evolved over time. After doing the literature review for initiating research on farm leasing arrangements in Kentucky, the authors of this paper felt that other faculty members and graduate students in Agricultural Economics would be interested in reviewing, or examining for the first time, this theoretical evolvement. Taken from the unpublished M.S. thesis of Mr. Barnes, the following is presented with that purpose in mind.

FARM TENANCY
LITERATURE REVIEW AND THEORETICAL FOUNDATION

By

Robert N. Barnes, Fred Justus and Jeff Apland*

The institution of share tenancy has perhaps received more attention in the literature than any other form of firm organization. Share tenancy has persisted since at least the medieval period, and has been subjected to more criticism than support.

The concept of land being "rented" to others has long been a subject of economists, including classical economists, such as Ricardo and Malthus, who were intensely interested in agricultural rent. They saw rent as a reward for the natural properties of soil--a surplus income which land returns to its owner above costs. Although their theory (the essence of their theory being the assumption of unrestrained population growth and the inelastic supply, in the long run, of various grades of land) had a profound impact on economic thought at the time, they apparently never discussed the share contract (Johnson).

Classical Views

The share contract as a form of farm resource organization was first attacked by Adam Smith who wrote of the metayers (share-croppers) in

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France, which he believed were successors of the "slave cultivators of ancient times". Smith deplored the metayage system for its effects on production:

It could never, however, be the interest [of the metayers] to lay out in the further improvement of the land, any part of the little stock which they might have saved from their own share of the produce, because the lord, who laid out nothing, was to get one-half of whatever it produced. The tithe, which is found to be a very great hindrance to improvement. A tax, therefore, which amounted to one-half, must have been an effectual bar to it (Smith, p. 367).

Smith was also concerned with the "insecurity" of the farmers because of the expiration of the lease. "The possession even of such farmers, however, was long extremely precarious, and still is in so many parts of Europe". (Smith p. 368). He favored longer term fixed-rent contracts over share-cropping as was the law at the time in Great Britain.

Support for share-cropping at that time came from an Italian named Simonde de Sismondi:

The system of cultivation by metayers contributes, more than anything else, to diffuse happiness among the lower classes, to raise land to a high state of culture, and accumulate a great quantity of wealth upon it. Under this system, the peasant has an interest in the property as if it were his own. (Cheung, p. 38).

This endorsement of metayage is quite contradictory to Smith's analysis and it was John Sturart Mill who first synthesized the opposing arguments (Cheung). Mill argued that there was nothing inherently wrong with share contracting per se, but only in the way it was being

carried out. Mill agreed with Smith that the metayage system, as practiced at the time, was productively inefficient but the imperfections could be overcome by adjustment to the system. For Mill the main defect was that of security of tenure. Mill argued for a "tenant right" in the land so that the tenant would have the incentive to make "improvements". Rents paid should be fixed by law, he thought, since if the rents were competitively determined, any improvements made by the tenant might be used as an excuse by the landlord to increase rents.

The Neoclassical View

The conceptual notions of the classical writers were more fully developed by subsequent economists, who by the turn of the 20th century, had the tools of marginal analysis at their disposal.

Alfred Marshall renewed Smith's tax-equivalent argument, presumably because the analogy to a tax under share rent fit neatly into his marginal analysis.

When the cultivator has to give to his landlord half of the returns to each dose of capital and labor rent he applies to the land, it will not be to his interest to apply any doses the total return to which is less than twice enough to reward him. If, then he is free to cultivate as he chooses, he will apply only so much capital and labor as will give him returns more than twice enough to repay himself: so that his landlord will get a smaller share of those returns than he would have on the plan of a fixed payment (Marshall, p. 535).

For example, assume the production function of a share-leased farm to be:

$$1. \quad Q = f(X_1, X_2, \bar{X}_3)$$

where X_1 and X_2 are variable inputs into the production of Q and \bar{X}_3 is land which is fixed. Assume further the landlord shares the output with the tenant on a one-half basis. The farm sells its output at the price P , and the tenant pays P_1 and P_2 for the variable factors. As Marshall's tenant is "free to cultivate as he chooses", then the tenant in the short-run would maximize the profit function:

$$2. \quad \Pi = 1/2PQ - P_1X_1 - P_2X_2$$

Differentiating with respect to X_1 and X_2 obtains the first order conditions:

$$3. \quad 1/2P \frac{\partial Q}{\partial X_1} = P_1$$

$$4. \quad 1/2P \frac{\partial Q}{\partial X_2} = P_2$$

which explains Marshall's declaration, since the first order conditions can be rewritten:

$$5. \quad 1/2(VMP)_1 = P_1$$

$$6. \quad 1/2(VMP)_2 = P_2$$

These results led several contemporary writers to center their analysis of farm leasing almost exclusively on the issue of the efficiency of resource allocation under share tenancy. Rainer Schickele and Earl Heady furthered the "tax approach" in their analyses of the share lease and attempted to "rank" various land tenure arrangements in terms of their

relative inefficiencies. Heady developed his rankings by comparing the relative efficiencies of different leasing systems to a "theoretically perfect lease" based on the neoclassical profit maximization assumption. The "perfect lease" would, according to Heady, result in the same organization of inputs in production as under the situation of the owner-operated farm. Thus, he concluded that:

(1) the fixed-rent or cash lease would lead to the same farm plan as the perfect lease since the rent paid was not a function of output;
 (2) only if the share-lease was such that all variable costs are shared in the same proportion as returns are shared could the share-lease lead to the efficiency conditions of the perfect lease. This latter condition can easily be shown by rewriting equation (2) to reflect proportional cost sharing. Now the tenant, in the short-run, maximizes:

$$7. \quad \Pi = 1/2PQ - 1/2P_1X_1 - 1/2P_2X_2$$

the optimum conditions will exist for efficient input allocation,

$$8. \quad (VMP)_1 = P_1$$

$$9. \quad (VMP)_2 = P_2 \qquad \qquad \qquad Q.E.D.$$

For several years following work done by Heady, most of the literature in share tenancy was oriented toward practical methods of "improving" leasing systems with most emphasis on writing guides on "equitable" contract making (see, for example, Reiss).

The General Equilibrium Approach

Much of the latest literature on share tenancy has been in its defense. The defense is generally based on the argument that if share tenancy is an inherently inefficient method of resource control and allocation, why does it persist, particularly in American agriculture where tenancy has been so widespread and productivity so progressive.

The ultimate conclusion of many writers taking a general equilibrium approach is that share-cropping is chosen for its efficiency, not in spite of its inefficiency. Share tenancy is equivalent to share contracting with each resource owner having private property rights in a free market. Thus, as the argument goes, if all resource owners are maximizing wealth, observed leasing arrangements are consistent with the theory of choice. In this context the rental or share percentage (and other contract stipulations) is determined in the "contract market", not as was previously assumed fixed by the landlord.

Steven Chueng in his book, The Theory of Share Tenancy, was the first to do a comprehensive analysis of share tenancy along these lines. In his model, the rental percentage was a "contracted percentage"--a variable which is determined under competitive conditions.

Although his model was later attacked on mathematical grounds, its conceptual arguments have been supported (Bray; Day; and Roumasset). Drawing from the experience in China and Taiwan, Chueng argued that "the inefficiency argument is illusory". Past writers, he thought, failed to realize that the percentage shares and area rented under

share tenancy are not fixed but are determined in the market. By specifying the nature of property rights, participants then mutually agree to abide by the terms of the contract. Rental contracts are simply another "commodity" which is traded in the market place.

Chueng's concepts were later more fully developed by Joseph E. Stigitz. Whereas, Chueng's mathematical model had the landlord, via the contract, determining the amount of tenant labor (and other inputs) and an equilibrium determined by the landlord's maximization with respect to the rental share (r). Stigitz argued that each "atomistic landlord" and each "atomistic tenant" would take r as given, and out of the aggregate maximization decisions r would be determined. Conceptually, Stigitz's model was equivalent to Chueng's with the former's more explicitly formulated. Other writers have developed similar models (Bardhan and Srinivasam; Day; Reid; Roumasset) to Chueng's and Stigitz with many of the same conclusions.

Empirical Approaches

Most writers previously cited have attempted to show empirical support for their arguments. Heady, after sampling 146 farms in Iowa found "few significant differences in intensity of production" among tenure types, but that, "about one half of the farmers would operate farms differently if they owned them" (Heady and Kehrberg, 1952). Heady reconciled this apparent contradiction by hypothesizing that a tenant's capital position and therefore his ability to assume risk was responsible

for the choice of tenure arrangement. Later, Heady took another approach in his quest to prove that certain share-leasing arrangements lead to inefficiency (Heady, 1955). Heady thought that rental rates should approach the marginal productivity of landlord's resources. From another sample of 150 farms over a three year period, Heady estimated several production functions each representing a group of farms operated under different tenure situations. His idea was to use computed marginal products as a basis for allocating income to tenant and landlord. However, he concluded that the technique was not useful if data are based on farm aggregates. Also, in his study, he attempted to prove using comparative statistics that the marginal product of labor and capital under crop-share leases was higher than those under the cash lease and owner-operated farms. This result was expected based on his neoclassical marginal analysis, but when statistically tested the hypothesis was found to be nonsignificant.

In a later study Heady used linear programming to model two "typical" farms under various leasing and resource assumptions (Heady, 1956). By varying the amount of capital for both the landlord and tenant, he found that under the crop-share lease, each party can reach agreement on a farm plan which maximizes profit to the total farms resources only if their capital positions are roughly the same. He recommended the cash lease since, if agreement can be reached on the rental rate, the resulting farm plan will be the same as the owner-operator's plan and thus ensure efficient farm production.

To support his argument, that share tenancy could lead to efficient farm production, Chueng's supporting evidence draws from data on tenant farming in China in the late 1920's and 1930's. Evidence from United States agriculture was not used since, he argued, various government farm policies "result in different constraints on competition [and] might have affected resource use under different contracts in different ways", (Cheung, p. 60). Chueng quoted heavily from John Lossing Buck who surveyed 16,786 farms in China:

Contrary to the prevailing opinion that tenants do not farm as well as owners, a classification according to yields by different tenure types shows no significant variation in yields for most localities, and for the few in which a difference does occur, it is in favor of the tenant or partowner as often as for the owner [Cheung, p. 59].

Buck's data also showed, Chueng reported, the following crop indexes per acre: Owner-operated farms, 99 and 101; and tenant, 103 and 104, (Chueng, p. 59). Chueng also provided Japanese data (1932-38) which showed a higher labor-land ratio on tenant farms than on owner-operated farms, (Chueng, p. 60). After Chueng little empirical work has been done on share tenancy. The general equilibrium models which followed Chueng (Day; Reid; Roumasset; and Stiglitz) were purely mathematical expositions with each writer choosing to draw supporting evidence for their arguments from previous writers.

Broadly two approaches have been used in the study of share tenancy. Both approaches have centered on the efficiency debate. Early studies focused on the farm firms incentive conditions of various types of share tenancy. It has been clearly shown (eg. Heady) that certain types of sharing arrangements can lead the individual firm to depart from the optimum conditions of allocative efficiency as defined by the rules of neoclassical production economics. On the other hand, aggregate data fail to support the neoclassists argument.

Perhaps James O. Bray summarized most articulately:

The resource-efficiency argument is somewhat academic. The ability of tenants and their capital position are highly variable as are the quality of land and the size of farms... Agricultural production [has] been... associated with massive shifts in techniques....The concept of resource efficiency that defines economic progress is broader than the ordinary idea of economic efficiency based on factor proportions with standard production techniques. It must also offer promise that socially important and scarce economic opportunities will be seized and exploited. In the modern world this is likely to mean that all dimensions of economic organization need to be readily adjustable. The conflict between this concept of resource efficiency and the idea of economic security for farmers is distinctly obvious. To explain the performance of United States agriculture, however, is not to assert that farm operators or landlords found progress comfortable (Bray, p. 38).

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