

To the Graduate Council:

I am submitting herewith a thesis written by Toby Matthew Boring entitled "Economic Efficiency of Land Leasing Agreements." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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ECONOMIC EFFICIENCY OF LAND LEASING AGREEMENTS

A Thesis

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ABSTRACT

In 1978, 46 percent of all Tennessee farm land was being leased by 30 percent of the total farm operators in the state. With such a large proportion of farm land being leased, the type and structure of leasing agreements in existence have immense economic implications. Leasing agreements affect the distribution of crop revenue between landowners and tenants as well as the allocation of resources among competing uses. The objectives of this study are: (1) to ascertain the nature of cash and crop-share leasing arrangements in Tennessee; (2) to show how the manner in which components of leases are employed affects the economic efficiency of agricultural production--hence the income of both landowners and tenants.

Data were obtained by using a pre-structured questionnaire and included 124 cash leases and 125 crop-share leases. Information concerning these leases was obtained from a total of 88 farm operators in three West Tennessee counties, Crockett, Fayette, and Lake.

An optimal crop-share lease will specify that the parties to the lease share in the same proportion variable expenses and crop revenue. Many of the crop-share leases examined did not allow for the proportionate sharing of variable costs and revenue. It was not unusual for tenants to pay 100 percent of certain variable costs of production. In addition to proportionate sharing of revenue and variable costs, each competitive crop should be shared in the same proportion. Landowners received equal shares of gross production for competitive crops grown on the same leased tracts in all but four leases examined. The form of the

lease introduced additional uncertainty into the production process in the majority of the crop-share leases examined. Fifty-six percent of all crop-share leases studied were for one year, with no provisions for automatic renewal. Only 14 percent of the crop-share leases studied were written agreements. Fifteen percent of crop-share leases in the study contained reimbursement agreements.

None of the cash leases were adjusted by indices to account for changes in input costs, crop prices or yields. As such changes occur, one party to a lease may be receiving income from the productivity of the other's resources. Only a few leases in one county, Lake, adjusted cash rental payments in the event of flooding. Disaster clauses such as exist in Lake County will moderate the influence of crop failure on operator equity. Nonetheless, additional uncertainty seems to have been created by most cash leases examined. Forty-five percent of these leases were one year in duration and contained no provision for automatic renewal. Of all cash leases examined, only 45 percent were written. Sixteen percent of the cash leases in this study contained reimbursement agreements.

Results of a multiple regression model employed in this study indicated that the productivity of the cash leased tracts was significantly related to cash rental rates. There was a significant positive relationship between the percent of total acres that were tillable on cash leased tracts and the cash rental amounts. In addition, cash rent per tillable acre was positively related to the size of cash leased tracts measured in tillable acres.

Important components of an optimal lease were treated in less than efficient and/or equitable manners by many of the leases examined. Careful consideration of the leasing agreements by all parties should lead to improvements in the economic efficiency of crop production and result in a more equitable distribution of crop revenues.



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CHAPTER I

INTRODUCTION

In 1978, 46 percent of the 13,150,498 acres of farm land in Tennessee were leased (3, p. 2). Farm operators who owned no land themselves numbered 8,410 (9 percent of all farm operators) and leased 835,970 acres (3, p. 2). An additional 5,267,675 acres were leased by 20,640 part-owners (21 percent of all farm operators) (3, p. 2). These figures indicate that leased land comprises a significant portion of Tennessee farm land. Both crop-share and cash leases are prevalently employed by row-crop farmers seeking use of additional land.

An equitable crop-share lease will provide for a division of returns that is proportionate to the productivity of the resources provided by each party to the lease. Under those conditions, returns to each party represent the marginal value product of all inputs contributed, and efficiency in resource allocation occurs (10, pp. 589-590). A comparison of current leasing practices with optimal practices should provide a relative measure of leasing efficiency.

Cash leases should provide a long-run rental rate closely related to the productivity of the land. Productivity of a given tract may change over time due to shifts in cropping systems, mechanization, or general economic conditions which necessitate rental adjustments. Just as enterprise combinations vary from farm to farm and over time, so must leasing arrangements if they are to efficiently allocate resources among competing uses and equitably distribute the income from production

between landowners and tenants. Research is needed in determining major imperfections that exist in cash and crop-share leases in Tennessee, so that efficiency and equity can be improved.

Objective

The objectives of this study are twofold:

1. to ascertain the nature of cash and crop-share leasing arrangements in Tennessee.
2. to show how the manner in which components of leases are employed affects the economic efficiency of agricultural production--hence the income of both landowners and tenants.

In meeting these objectives, economic theory relevant to land leasing will be compared with primary data in evaluating cash and crop-share land leases for economic optimality. Several provisions common to both cash and crop-share leases will be reviewed. However, there is no one most equitable manner to treat each component of a lease without considering the lease in its entirety. Economic theory also reveals four principles necessary to attain an efficient crop-share lease. For the cash lease, it is necessary to consider adjustments which introduce flexibility to rental rates to reflect changing economic conditions. How various items in the lease must be handled to conform to economic theory will be outlined. Sufficient data was obtained to show the direction of possible income transfers on an item-by-item examination.

Literature Review

Most of the literature concerning agricultural land leases can be categorized as economic theory or investigation of leasing efficiency

under specific farm resource situations. Through discussions of economic theory pertaining to leases were published by Earl O. Heady (10, pp. 587-638). Only limited additional insight into the economic theory of leasing has been presented by more recent literature. Heady conducted numerous analyses which supported his statement that "Imperfections of the lease resulting in inefficiencies are not inherent in the lease type. Rather they have grown up through custom and tradition." (9, p. 636). Virgil L. Hurlburt ascertained that "the problem is to determine the terms that are necessary in the lease to allow and encourage an efficient combination of resources and to distribute the income of the owners of the resources in accordance with the productivity of the resources." (13, p. 85). H. R. Moore and J. I. Falconer analyzed forms of crop-land leases and presented sample lease forms for Ohio (6, pp. 33-35). Research concerning reimbursement agreements for farm improvements was conducted by John F. Timmons (29, pp. 90-95). Franklin J. Reiss has published numerous bulletins concerned with leasing arrangements (16, 17, 18, 19, 20). In addition to discussions of economic theory, Reiss reported the leasing practices implemented in Illinois on a yearly basis.

Recent articles in Delta Farm Press, by Glen Rutz, were closely aligned to the objectives of this study (21, pp. 10-11; 22, pp. 32-33). Material compiled by The University of Tennessee Extension Service was used in these articles to explain provisions necessary for efficient cash and crop-share leases. Such explanatory articles are essential to the adoption of efficient and equitable leases by agricultural producers.

Methodology

Recording of Primary Data

A questionnaire developed by F. J. Reiss and Robert E. Lahne, at the University of Illinois, was useful in development of the document used for this research.¹ Even though that questionnaire served as an excellent model, many modifications and additions were necessary before a document suited for this research was completed. This pre-structured document was used to obtain information from selected farm operators during 1980. Limitations of the data obtained are discussed in Appendix A.

The document consisted of three separate sections (Appendix B). The first few questions concerning the operator and his overall farming operation comprised the General section of the document. The next section pertained to the provisions of cash leases to which each operator was a party. Characteristics of crop-share leases were dealt with in the final section. The lay-out of the document was such that data concerning up to 5 cash leases and 5 crop-share leases could be recorded on one form. Generally, this length was sufficient to handle the information from each operator.

Unfortunately, the data collected with the document could not be detailed enough to calculate the actual dollar losses, income transfers, and intra-firm cost transfers that occur because of imperfections in the

¹Reiss, F. J., and R. E. Lahne. Farm Leasing Practices in Six Northwestern Illinois Counties in 1979. Agr. Exp. Sta., Univ. of Illinois, Bulletin AE-4483, August 1979.

leases. Nonetheless, weaknesses of existing leases are illustrated by the data collected.

Soil Based Productivity Indices

Soil Based Productivity Indices were derived for leased tracts in Lake and Fayette Counties in an effort to quantify the ability of these tracts to produce corn, cotton, soybeans, and wheat.² Other measures of productive capacity were also used in this study, including Farmer Estimated Productivity Indices and yields per acre of the major crops. Such measures were necessary to compare the crop production potential among counties, among different tracts, and in determining the relationship between soil productivity and cash or crop-share rental payments.

The first step in deriving the Soil Based Productivity Index was to obtain estimated yields for soybeans, cotton, corn, and wheat for each soil type.³ These crop yield figures were converted to indices by setting the highest estimated yields for the respective crops equal to 100.⁴ Thus, an index of productivity was obtained for each of the four crops on all soil types. A soil type with a crop index number of 100 would have maximum production capacity for that crop in West Tennessee,

²Soils data was not available for Crockett County at the time primary data was collected.

³The source of these estimates was: Buntley, G. J., and Frank F. Bell. Yield Estimates for the Major Crops Grown on the Soils of West Tennessee. Agr. Exp. Sta., Univ. of Tennessee, Bulletin 561, July 1976.

⁴These yields projected by Buntley and Bell were: 46 bu. of soybeans/acre, 900 lbs. of cotton lint/acre, 125 bu. of corn/acre, and 56 bu of wheat/acre.

assuming a high level of management. In order to arrive at a single index number for each soil type, the four crop indices were weighed by the proportion of total cropped acreage used in the production of each crop in Lake and Fayette Counties for the 1978 and 1979 production periods.⁵ This system made it possible to compare the productivity of tracts located in different counties. Each operator surveyed in Lake and Fayette Counties was asked to outline the tracts he leased on soil maps. From this outline, a grid measuring scale was employed to ascertain the acreage of each soil type on the tracts. The percent of each tract included in the various soil types was then estimated. For each soil type on a given tract, the percentage was multiplied by the productivity value. The sum of these products for each tract yielded the Soil Based Productivity Index that is referred to throughout this study. An example of the steps discussed above is shown in Appendix C.

Farmer Estimated Productivity Indices

Each operator was asked to estimate the average yield for the 1977, 1978, and 1979 production periods for crops grown on the leased tracts. As with the Soil Based Productivity Indices, these average yields were converted to indices by setting the highest estimated yields

⁵The sources of this data were:
Tennessee County Estimates, Corn 1980 Preliminary.
 Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 8, 1981.
Tennessee County Estimates, Cotton 1979-1980. Tennessee
Crop Reporting Service, U.S. Dept. of Agr., May 28, 1981.
Tennessee County Estimates, Soybeans 1980 Preliminary.
 Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 21, 1981.
Tennessee County Estimates, Wheat 1980 Preliminary.
 Tennessee Crop Reporting Service, U.S. Dept. of Agr., March 16, 1981.

for West Tennessee equal to 100. The Farmer Estimated Productivity Indices were then derived by weighing these indices according to the percent of total acres on a given tract devoted to each crop (Appendix C).

Study Area

Three counties (Crockett, Fayette, and Lake) were selected for this study, not to be representative of Tennessee, but because of the importance of cotton, soybeans, corn, and small grains produced in each of them. Also, the relatively high rate of tenancy and part-ownership in these counties contributed to their selection. The Agricultural Extension agents and the Agricultural Stabilization and Conservation Service in each of the three counties were extremely helpful in providing names and addresses of tenants and part-owners. The respondents were selected on the basis of availability without regard to randomness or representativeness.

In Crockett County, usable data base recordings were completed from 29 operators (full tenants and part-owners). These operators gave data for 63 crop-share and 28 cash leases. Thirty operators in Fayette County provided information on 34 crop-share and 38 cash leases. Twenty-nine operators were contacted in Lake County and added 28 crop-share and 58 cash leases. The total number of responses included 125 crop-share and 124 cash leases

CHAPTER II

CHARACTERISTICS OF CROP-SHARE AND CASH LEASES THAT RESULT IN EFFICIENT ALLOCATION OF RESOURCES AND EQUITABLE DISTRIBUTION OF INCOME

The Efficient and Equitable Crop-Share Lease

In the long run, the tenant should attempt to lease a tract of land that is "optimum when combined with his own constant set of resources." (10, p. 593). Likewise, the landowner should attempt to select a tenant "who will cause the marginal value product of his own resources to be greatest." (10, p. 593). If either party is to maximize returns with fixed resources, he must seek additional resources of the other party to the point where the marginal value productivity becomes zero (10, p. 596). However, once the tenant has selected a farm to rent, or the landowner selected a tenant, decisions of both parties are then short run (or for the leasing period). It is for this short-run period that the ensuing principles apply.

Principles

Theoretically perfect leases can be discussed only in conjunction with underlying assumptions. First, competition and private ownership of resources are prevalent in the agricultural sector (10, p. 589). Second, "the pricing system is looked upon as the appropriate means for expression of consumer preference and, hence, for allocation of resources in the most efficient manner." (10, p. 589).

There are four rules or principles, the application of which will tend to assure an optimal crop-share lease. These principles will be applied to crop production at a later point in this chapter.

The first principle is that "all variable expenses should be shared in the same proportion as the crop is shared." (10, p. 29). "The general equi-marginal criterion requires that the ratio of the value of the marginal product to the price of an input be equal for all inputs in all uses." (5, p. 167). The mathematical notation for n inputs and m outputs is:

$$\frac{VMP_{X_1 Y_1}}{P_{X_1}} = \dots = \frac{VMP_{X_n Y_1}}{P_{X_n}} = \frac{VMP_{X_1 Y_2}}{P_{X_1}} = \dots = \frac{VMP_{X_n Y_2}}{P_{X_n}} = \dots =$$

$$\frac{VMP_{X_1 Y_m}}{P_{X_1}} = \dots = \frac{VMP_{X_n Y_m}}{P_{X_n}}$$

When all ratios equal to one, input levels are optimal in all enterprises (5, p. 167). However, if capital is limited, it may not be possible to purchase inputs to the point where the ratios equal one. "When the ratios are equal but greater than one, the marginal earnings per dollar of cost are equal for all inputs in all enterprises." (5, p. 167). Thus, a least cost combination of inputs will be employed even when capital is limited.

Assume that one crop enterprise (Y) existed on a crop-share leased tract of land, and enterprise Y used two different variable inputs (X_1 and X_2). Marginal returns per dollar spent on inputs should be the same for both inputs in that enterprise (5, p. 165).

$$\frac{VMP_{X_1 Y}}{P_{X_1}} = \frac{VMP_{X_2 Y}}{P_{X_2}}$$

However, suppose that the landowner received $1/3$ of the production of Y , paid $1/3$ of the cost of X_1 , and paid none of the costs associated with X_2 .

$$\frac{2/3VMP_{X_1Y}}{2/3P_{X_1}} \neq \frac{2/3VMP_{X_2Y}}{1P_{X_2}} \neq \frac{1/3VMP_{X_1Y}}{1/3P_{X_1}} \neq \frac{1/3VMP_{X_2Y}}{0P_{X_2}}$$

TENANT LANDOWNER

Under those terms, the minimum cost combination of variable inputs would not be employed if the landowner and tenant maximize profits as to the inputs he furnishes. Since the tenant paid the entire cost of variable input X_2 , he would prefer to use less than the minimum cost combination quantity of X_2 . Conversely, because the landowner paid none of the cost of X_2 , he would prefer to employ X_2 beyond the least cost combination level. The minimum cost combination of variable inputs would have been employed had the landowner also paid 1/3 of the cost of X_2 . The following ratios illustrate the conditions necessary to attain the desired combination of inputs:

$$\frac{\frac{2/3VMP_{X_1}Y}{2/3P_{X_1}}}{\text{TENANT}} = \frac{\frac{2/3VMP_{X_2}Y}{2/3P_{X_2}}}{\text{LANDOWNER}} = \frac{\frac{1/3VMP_{X_1}Y}{1/3P_{X_1}}}{\text{LANDOWNER}} = \frac{\frac{1/3VMP_{X_2}Y}{1/3P_{X_2}}}{\text{LANDOWNER}}$$

The second principle for a perfect crop-share lease is that both parties should share each competitive crop in the same proportion (11, p. 601). "In share leases, any differences between shares of two

products that result in the highest profit from the combined resources of landlord and tenant." (13, p. 89). Assume that two competitive enterprises (Y_1 and Y_2) existed on a crop-share leased tract, and that both enterprises used two inputs (X_1 and X_2). The general equi-marginal criterion requires that the following relationships exist:

$$\frac{VMP_{X_1 Y_1}}{P_{X_1}} = \frac{VMP_{X_2 Y_1}}{P_{X_2}} = \frac{VMP_{X_1 Y_2}}{P_{X_1}} = \frac{VMP_{X_2 Y_2}}{P_{X_2}}$$

Now consider a situation in which the landowner paid 1/3 of the cost of each X_1 and X_2 but received 1/3 of the production of Y_1 and 1/4 of the production of Y_2 .

$$\frac{2/3 VMP_{X_1 Y_1}}{2/3 P_{X_1}} = \frac{2/3 VMP_{X_2 Y_1}}{2/3 P_{X_2}} \neq \frac{3/4 VMP_{X_1 Y_2}}{2/3 P_{X_1}} = \frac{3/4 VMP_{X_2 Y_2}}{2/3 P_{X_2}}$$

TENANT

$$\frac{1/3 VMP_{X_1 Y_1}}{1/3 P_{X_1}} = \frac{1/3 VMP_{X_2 Y_1}}{1/3 P_{X_2}} \neq \frac{1/4 VMP_{X_1 Y_2}}{1/3 P_{X_1}} = \frac{1/4 VMP_{X_2 Y_2}}{1/3 P_{X_2}}$$

LANDOWNER

As the above ratios indicate, by producing additional Y_2 and less Y_1 the tenant would receive more revenue per dollar spent on inputs X_1 and X_2 than he would with the minimum cost combinations of inputs being used in both enterprises. Conversely, the landowner would benefit from increased production of Y_1 and decreased production of Y_2 . Had the rental amounts received by the landowner been 1/3 of production for each Y_1 and Y_2 , the general equimarginal criterion would have been satisfied and resulted in the optimal level of production of both enterprises, as is illustrated by the following ratios:

$$\frac{2/3VMP_{X_1Y_1}}{2/3P_{X_1}} = \frac{2/3VMP_{X_2Y_1}}{2/3P_{X_2}} = \frac{2/3VMP_{X_1Y_2}}{2/3P_{X_1}} = \frac{2/3VMP_{X_2Y_2}}{2/3P_{X_2}}$$

TENANT

$$\frac{1/3VMP_{X_1Y_1}}{1/3P_{X_1}} = \frac{1/3VMP_{X_2Y_1}}{1/3P_{X_2}} = \frac{1/3VMP_{X_1Y_2}}{1/3P_{X_1}} = \frac{1/3VMP_{X_2Y_2}}{1/3P_{X_2}}$$

LANDOWNER

Third, uncertainty must not be created by the lease itself (2, p. 4). Weather, disease, changes in input prices, and changes in product prices always result in a degree of business risk for agricultural producers. Leasing practices may introduce additional uncertainty caused by the actions of others (13, p. 228). For example, a decision by a landowner to increase the rent or sell the leased tract may drastically affect a tenant's earning capacity (13, p. 228). "Not only must the tenant discount the future in terms of time and the uncertainties which face the owner, but he must also discount future production possibilities of the future because of tenure uncertainty." (10, p. 613). Long-term leases, reservation of specific rights, and reimbursement guarantees are ways through which this additional uncertainty can be minimized.

The fourth principle states that the "share of income going to each party of the lease must represent the product of the resources furnished by this person." (11, p. 601). These contributions include not only variable costs, but also the fixed costs that each party contributes. It is the valuation of a number of these contributions and choice of appropriate rates of return that makes it difficult to conform precisely

with this principle. In practice, an effort must be made to closely approximate the true contributions of both parties.

"The rates of payment and the division of costs and expenses are the most important points of decision in any leasing arrangement." (13, p. 117). Division of expenses and returns are all important in gaining optimum economic efficiency and maximizing net income for the tenant and landowner.

Division of Costs and Contributions to Production

The various contributions necessary for crop production are classified as either fixed, variable, or associated costs. Not all items clearly belong in a particular class due to overlap, and as a result, some arbitrariness in classification will follow. Nonetheless, proper classification will enhance the ability to construct an efficient and equitable lease.

Fixed Costs:

1. Land

Land comprises the most significant portion of the landowner's fixed contributions. The valuation of land is one of the major determinants of how the returns and variable expenses should be shared. A leased tract of land that is highly productive and contains a high percentage of tillable land will ideally have a relatively high market value and should return the landowner a larger percent of the returns than would a less productive tract. Since the operator's labor and machinery contributions will not change significantly regardless of the

land's productivity, it is evident that land quality, and thus the magnitude of the landowner's contribution, is a major factor in determining an equitable crop-share rent (17, p. 7). "The tenant's share of the value of the crops produced tends to remain at a fairly constant number of dollars per acre." (17, p. 7).

For corn, a tenant faces a requirement for greater seedbed preparation and higher harvesting costs per acre, with the result that the land factor is a smaller fraction of the total input than is the case with small grains and soybeans. (19, p. 49).

Variability of the value of each contribution, due to various cropping systems, should be accounted for when determining rental shares.

Included in the land classification are interest and depreciation on residences and farm buildings, as well as property taxes, property insurance, and liability insurance. The value of a residence should not be included in calculating the contributions of each party, but the operator should make a cash payment for use of the residence. "As a fixed cost the premium does not alter the structure of marginal cost within the firm and consequently encourages the most efficient resource allocation." (10, p. 618). Other buildings on the leased tract should be included in valuation of landowner's contribution only if they are functional for the enterprises on that tract. A cash payment is more appropriate for buildings utilized by a tenant but not functional for the farm enterprises. Property taxes, property insurance, and liability insurance are also fixed costs and, as such, should be paid in entirety by the landowner in order to maintain efficient allocation of resources.

2. Machinery

Just as land is a major contribution of the landowner, one of the most significant contributions of the tenant is the machinery necessary to produce the crop(s). Generally the tenant furnishes all machinery, but this item may be shared by the landowner if the tenant is not receiving the marginal value product of his inputs. Taxes and insurance on machinery are classified as fixed costs and usually borne entirely by the operator. Equitable cost sharing of variable machinery expenses should lessen the need for landowners to contribute to fixed machinery costs.

3. Labor

Operator and family labor are contributions made entirely by the operator. Hired labor, however, cannot be viewed entirely as a variable or fixed cost. Situations may occur where tenants (especially part-owners) use more hired labor than is required by the operation as planned (17, p. 16). When the hired labor employed is in excess, treating it as a variable cost would lead to inequitable income transfers between the parties. Thus, being neither a variable or fixed expense, hired labor is often termed an associated cost. Equitable sharing of associated costs can only be determined by examination of the total contributions of both parties.

Variable Costs:

1. Seed and Fertilizer

The cost of seed, fertilizer, and trace elements clearly should be shared by both parties proportionate to their share of returns. Also, seed inoculant for soybeans (a relatively small expense) should be included as part of the seed expense.

2. Weed and Insect Control

Insofar as these practices increase yields, the benefits are shared according to the way the crop is shared. However, insofar as they are substitutes for other costs, such as mechanical control of weeds, they may benefit the tenant more than the landlord. (16, p. 19).

Thus, for a no-till crop, the landowner should pay less than his proportionate share of herbicide costs. The actual amount paid would depend on how intensely the chemicals are used and the response of the soils to their use. Brush control on the leased tract (i.e., fence rows, roadways, etc.) would be an associated cost or bargaining item between the two parties. Insecticides are clearly variable expenses, and their costs should be proportionately shared by the parties.

3. Fuel, Repairs, and Maintenance of Machinery

The extent to which fuel, repairs, and maintenance of machinery can be considered variable expenses depends on several factors. When these expenses are associated with harvest, they undoubtedly vary with output. Yet, the influence of output upon fuel, repairs, and maintenance costs is less pronounced in stages of production other than harvest. Fuel usage is influenced by the production systems utilized (tillage and planting methods). In early stages of crop production, herbicides act as strong substitutes for fuel and other machinery expenses. A rise in repair and maintenance costs may also be attributed to a relatively low fixed machinery expenditure by a tenant. As machinery ages, repair and maintenance costs increase.

A problem arises in that these expenses are not easily ascertained. Even when satisfactory records enable these expenditures to be calculated,

equitable sharing would require that cropping systems and production methods be clearly stated in the lease agreement. An equitable solution would be for the landowner to pay a cash sum to the operator approximating his proportionate share of the normal custom rate for the processes involved in crop production (16, p. 16). In order to provide some protection to the tenant from unusually low crop yields, a minimum set amount could be specified in the lease.

4. Storage, Drying, and Transportation of the Product

Costs incurred for fuel, electricity, and other variable items involved with drying, storage, and marketing should be shared in proportion to the share of the crop each party receives. Cotton ginning costs are not unlike the drying of grains and should be handled in the same manner as storage and drying of crops.

5. Fence and Building Repair and Maintenance

Although fences and buildings (other than for grain storage) will not normally yield any return in a row crop enterprise, they may exist on a leased tract of land. For the purpose of row crops, interest and depreciation related to fences and buildings cannot be considered as a contribution of the landowner. However, leases often specify that the tenant maintain the existing fences and buildings. If they were in bad condition, the landowner might furnish the material, and the operator improve them in slack labor periods and be reimbursed for his labor (2, p. 38). Various other arrangements are possible, but the important aspect of repairs and maintenance of both buildings and fences is that they are neither fixed nor variable costs. They are often termed associated

costs. As such, they are items commonly bargained on by both parties. Ideally, associated cost items should be used to balance the contributions of the two parties with the share of returns each receives.

6. Lime

Lime is not clearly a variable cost in that benefits from its application are realized over several production periods and depend on soil quality and crop rotation system implemented. Therefore, cost sharing cannot be handled in the same manner as variable costs. An acceptable solution for sharing the expense would be for the landowner to pay the entire cost, with the tenant making a cash payment for his share of the annual cost (as determined by the division of crop returns). Other acceptable methods for the cost sharing of lime are discussed in the section concerning reimbursement clauses.

7. Management

The management inputs of both parties should be included as contributions to the enterprise. As such, some value must be placed on these services. This valuation is subjective in nature and thus is an item which lends itself readily to the bargaining process. Nonetheless, the farming experience and material participation of each party would have to be important aspects in determining the magnitudes of contributions. In order to retain a degree of management, the landowner should specify items he wishes to control in the section on reserved rights in the body of the lease. The lease may specify "the basic cropping system, acres of major crops each year, the kind and amount of fertilizer each year, and participation in government programs." (16, p. 36).

Returns:

"In order to assure that both expenses and income from a certain farm business are shared equitably, the contributions of the two parties need to be appraised." (2, p. 24). Once values have been established for fixed and variable inputs, two methods are available to adjust the lease so that it is equitable. First, the share of income which each party receives can be fixed, and associated costs can be allocated between the landowner and tenant until the total contributions of each party are proportionate to his income (2, p. 24). A second method is to determine the proportion of total costs contributed by each party to the lease and divide the income in the same proportion (2, p. 24). Either method will insure that income and expenses are shared in the same proportion. "Changes in cost sharing should always be made in the associated costs (neither fixed or variable) because the share of variable expenses should be kept in line with the rent share of crops." (17, p. 16).

Cotton, corn, and soybeans are considered competitive crops in Tennessee. Principle 2 for an optimal crop-share lease, as discussed *infra*, suggests that these crops be shared in the same proportion between landowner and tenant (11, p. 601). Therefore, if two or more of these competitive crops are raised under the terms of the same lease, the variable costs and returns should be shared identically for each enterprise. Small grain crops alone are not considered to be competitive with corn, cotton, or soybeans. It is not essential that the variable costs and returns involved with small grain production be shared in the same proportion as are costs and returns with corn, cotton, and soybeans. Yet,

This section introduces the characteristics of a straight cash lease and factors which influence rental rates under such a lease. Weaknesses of this form of cash lease can be rectified by adjusting the lease to the changing value, or productivity, of inputs. Also, a method of adjusting rental payments to guard against risks associated with crop failure or drastic price declines is incorporated.

Advantages and Disadvantages of a Cash Lease to the Landowner

The landowner may prefer a cash lease because he knows in advance the amount of rent payment he will receive (2, p. 13). Also, with a straight cash lease, the landowner bears none of the risks associated with changing product prices, input costs, and crop yields. Another characteristic of a cash lease which appeals to some landowners is that they do not need to closely supervise the farming operation (2, p. 13). A cash lease generally results in fewer controversies between the parties to a lease than a crop-share lease does because cash leases are simpler (2, p. 13).

Certain characteristics of the cash lease may also be disadvantageous to landowners. If a tenant experiences a period of low income and/or the uncertainty of tenure is significant, his time preference for short-run returns will increase which can result in exploitation or depletion of the land (2, p. 13; 12, p. 90). Also, the landowner bears no risk so he generally receives a smaller portion of the returns than under some other lease type (2, p. 13).

Advantages and Disadvantages of a Cash Lease to the Operator

With a cash lease, the operator usually enjoys a great deal of independence in planning production (2, p. 13). Also, an operator with superior managerial ability may combine his assets with those of the landowner in such a manner that he realizes a return above that possible with any other lease type (2, p. 13). Adjustments for cash leases should be made so that gains from superior management of a tenant are not shifted to the landowner. Because the operator bears all the risk with a cash lease, he should generally receive greater net returns than with a crop-share lease. Yet, in poor crop years it is precisely this risk that can force financial burdens or bankruptcy upon an operator with limited capital (2, p. 13).

The cash rental paid by the operator is a fixed expenditure. Therefore, the operator receives the total marginal value product of his inputs. The rational operator will apply his non-durable assets until their marginal productivity equals their marginal factor cost. Conversely, the landowner receives no direct benefit from applying additional durable resources during the span of the leasing agreement. Therefore, the profit-maximizing landowner will invest in additional durable resources "only to the point where their marginal cost equal the marginal increment in rent the tenant is willing to pay." (23, p. 190). These combinations of resources may not be optimal for the entire farm operation (23, p. 190).

Determination of an Equitable Cash Rent

The cash rent payment is strongly influenced by local custom and the relative bargaining positions of the parties. However, there are limits within which the payment should range to be equitable in the distribution of income between landowner and tenant.

The rent payment should cover the landowner's costs associated with insurance premiums and taxes on his resources, as well as interest on his investments in durable assets (i.e., land and buildings) (15, p. 2). Any return above this amount is certainly desirable from the landowner's viewpoint but is subject to the bargaining process. On the other hand, after the rental amount is deducted from the operator's gross returns, he should be able to cover all fixed and variable costs of production, as well as some return to his managerial input, in order to continue production (15, p. 2). So, by calculating the contributions of both parties, limits can be established for an equitable rental.

The Flexible Cash Lease

"The fixed-fee cash lease is quite satisfactory when prices and yields are stable over time." (1, p. 344). Yet, such stability has been the exception rather than the rule in the agricultural sector. Uncertainty about the level of income that will be realized is ever present. A fixed-fee rental contract for one or more years does not reflect farm income changes during the life of the agreement (4, p. 3). Fluctuating prices for farm products and inputs cause the marginal value product of inputs and net farm income to change. These changes make a straight cash

lease imperfect in its distribution of income. To the extent that the marginal value product of land rises over time, flexible rents should maintain factor returns in line with the productivity of resources owned by either the tenant or landowner (10, p. 624). Otherwise, neither party may receive adequate returns to justify his investments.

Over time net farm income will vary more than land prices. That is, net farm income may change considerably from year to year, whereas the land prices are more a reflection of a moving average net farm income plus expectations concerning the long-term direction in net farm income. Rent is the result of net farm income which is manifested back into the price of land. It may appear that rent is based on the price of land which in the short-run may be true, but in the long-run net farm income is what determines rent and is what determines land values. Since net farm income varies more quickly than land values, an adjustment basis could be included in the rental agreement which would provide the needed flexibility in cash rent.

The Disaster Clause

Since it is unlikely that farm real estate values would decline immediately as a result of a crop failure or product price decline, a prudent operator should request a disaster clause in the lease. The disaster clause might become effective when gross returns decline to some specified percentage of the average for the previous three years for the same crop acreage. The rent may then be determined on the following basis:

$$\text{actual rent} = \text{expected rent} \times \frac{(\text{current county yield})}{(3 \text{ yr. aver. county yield})} \times \frac{(\text{current price})}{(3 \text{ yr. aver. price})}$$

(4, p. 29). The landowner and operator must agree upon a method of price determination before the fact (i.e., on a specified date and market) if a disaster clause is included in a lease. A disaster clause will moderate the influence of crop failure or price declines on operator equity (8, p. 671). Thus, the operator will place a lower premium on enterprises characterized by short production periods (8, pp. 671-672). Even though a disaster clause may lessen benefits to the landowner in a given year, this "adjusted level is usually better than to allow unpaid rent to stand as an accumulated debt over which resentment between landlord and tenant is likely to develop." (2, p. 34).

Provisions Which may be Included in Crop-Share and Cash Leases

How some items in the lease are handled can and should vary according to the particular conditions involved in each case. Some seem self-evident but merit discussion. This section consists of six parts: reasons for a written lease, length of tenure, notice of termination and automatic renewal clauses, rights that may be reserved by landowner and operator, reimbursement clauses, and arbitration.

Reasons for a Written Lease

Planning a detailed lease that is enforceable by law is an important step in attaining a perfect lease. The process of committing a lease agreement to paper in a mutually satisfactory manner insures that each

party has given thought to what they consider equitable and that communication between the two parties has taken place. Otherwise, it is possible that neither party to an oral agreement has a clear understanding of the provisions that should be included in the lease. A written lease is less likely to lead to a misunderstanding by either party within the life of the lease or to errors affecting the economic efficiency of the lease (13, p. 118). In case of the death of either party, a written lease protects the other party from detrimental acts of the heir or representatives of the deceased. Over time adjustments in the lease may be necessary and having provisions specified in writing facilitates making such changes (2, p. 5). Without a written lease, both parties may experience severe legal complications should a disagreement arise.

Length of Tenure

The length of tenure specified in a lease has a major impact on the enterprises undertaken and on the efficiency of the operation. Principally, the length of tenure influences the uncertainty facing the operator. "Tenure uncertainty may have many effects upon the efficiency with which resources are used. Mainly it places a premium on short run investments and cropping systems by the tenant." (9, p. 651). Ideally, uncertainty under leasing arrangements should be minimized to that which is normally present because of market and weather variations. Optimum economic efficiency cannot be attained unless the marginal productivity of durable and non-durable factors of production are equal. The length of the lease is only one factor that helps minimize the loss of production

efficiency due to tenure uncertainty. Reimbursement agreements also lessen the detrimental effects of uncertainty.

Although there are definite advantages to a long-term lease, such leases also have disadvantages. Long-term leases tend to make rental payments unresponsive to changing conditions that affect yields, costs of inputs, and prices received for products. A short-term lease may also make a positive contribution to resource efficiency. "The landlord often holds lease termination as a threat over the tenant's head." (10, p. 616). This may minimize exploitation of the landowner's fixed contributions.

A lease of moderate length (for example, three years) should reduce the inherent uncertainty of leasing and at the same time insulate against excessively rigid rental agreements (16, p. 39). Cash leases should contain some form of rent adjustment which takes account of wide variations in yields, costs, and prices even if they are of moderate tenure.

Notice of Termination and Automatic Renewal

A notice of lease termination by either party should be given far enough in advance to enable the other party to satisfactorily act upon other alternatives open to them. The proper termination notice should minimize losses incurred by either the landowner or the operator. Six months is normally sufficient notice provided that the date of termination comes well before any crop expenses accrue to either party.

If either party fails to give notice of termination prior to the specified date, the lease should automatically continue for another term

(16, p. 37). Automatic renewal clauses reduce uncertainty for both parties and "a one year lease with automatic renewal clause may have the merit of more frequent review and adjustment than a longer term lease with no provision for renewal." (6, p. 15).

Rights that May be Reserved by Landowner and Operator

An operator may want a provision in a lease which permits him to farm additional land and/or to hold off-farm employment. These rights become important to an operator when the leasehold of concern is not large enough for efficient utilization of his equipment and/or labor (2, p. 7). Additionally, the operator may reserve the right to remove crop residues, hay, and moveable improvements he made if such items are not specified in a reimbursement agreement (16, p. 41). Provisions for the operator to raise livestock or a garden on the leased tract for personal consumption should also be specified in a lease.

Some landowners want a lease to include a provision which limits the amount and kind of livestock in order to prevent encroachment of livestock enterprises on the production of cash crops (6, p. 6). Leases may also include statements prohibiting subleasing by the operator, right of entry for mineral development, and rights of entry to work the soil and prepare for new crops after notice to terminate the lease has been given (16, p. 41). Often hunting rights are also specified by the landowner. Other needed reservations should be included in those cases where the concern will affect performance of the lease agreement.

Reimbursement Clauses

An operator will be unlikely to make capital investments for farm improvements if the returns to those investments will not be realized within the lease period unless the lease contains a reimbursement clause. There are several kinds of arrangements that may be made between the landowner and operator in order to obtain necessary improvements. First, if the improvement is of a moveable nature, the operator can bear all costs associated with it and take the improvement with him at the end of his tenure (2, p. 36). Second, the landowner can reimburse the tenant for his labor and materials and take possession of the improvement (2, p. 36). A third way is for the landowner and operator to share the cost according to the benefits each receives from the improvement. For example, the benefits of lime are usually not fully realized within one production period or before expiration of the lease agreement. Therefore, the landlord might well assume costs proportionate to the benefits which remain after the tenant leaves the farm or the lease expires (29, p. 90). Another very applicable reimbursement method, especially in the case of a long-term improvement, is for the operator to make the improvement and be compensated for any unused benefit when he leaves the farm (29, p. 93). "Since the costs of making the same improvement may change over the period of expected benefits, it might be well to consider shifting the basis for compensation from original cost to replacement cost." (29, p. 93). Even if the landowner will not receive any direct benefit from the improvement, he may still be willing to make the improvement and receive an improvement rent from the operator on a predetermined basis. No

single arrangement is ideal in all situations, yet any one may be acceptable and consistent with the optimal lease when adapted to the particular circumstances. The party(ies) making the contribution(s) should either receive full use value during the lease or be compensated for the remaining use value benefit. The contribution-reward principle must be preserved.

Arbitration

Regardless of the care taken in developing a lease, the possibility of a dispute arising always exists. A lease should provide for settlement of unforeseen problems.

A simple and satisfactory method of providing for arbitration is for each party to select one arbitrator and for the two arbitrators to jointly select a third. The three arbitrators then recommend the basis for settling the difference. (2, p. 36).

In order to be legal or enforceable, arbitration must be binding on all concerned parties, and the arbitration method should be specified when the lease is originally made.

CHAPTER III

CHARACTERISTICS OF THE LAND AND OPERATORS IN THE STUDY AREA

Information on the Operators

As previously noted, 88 operators (part-owners and full tenants) in Crockett, Fayette, and Lake Counties were included in this study. Operators owned an average of 286 acres of land (Table 1). Operators in Fayette County owned an average of 370 acres of land. Lake County operators owned 215 acres, the lowest average acreage of the three counties.

Data was collected on 124 cash leased tracts of land. The average number of cash leased tracts per operator was 1.41. From the data it appears that the cash lease is most dominant in Lake County, where the average was 2.00 cash leases per operator. Data concerning 125 crop-share leased tracts was obtained in the three counties. The average number of crop-share tracts leased per operator was 1.42. The average number of tracts leased on a crop-share basis ranged from .97 per operator in Lake County to 2.17 per operator in Crockett County.

Only seven of the 88 operators studied had their base of operations on leased tracts of land. As indicated in Table 1, 5 of these farm bases were on cash leased tracts, while 2 were on crop-share leased tracts. The operators studied leased tracts from an average of 2.6 landowners. Two and three landowners per operator were the most common situations. The landowner-operator ratio is understated due to

Table 1. Characteristics of Selected Operators in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Operators	29	30	29	88
Average Acres Owned	271	370	215	286
Cash Lease Tracts Studied				
Number	28	38	58	124
Percent of All Tracts In Study	(31)	(53)	(67)	(50)
Average Number of Cash Lease Tracts Per Operator	.97	1.27	2.00	1.41
Crop-Share Lease Tracts Studied				
Number	63	34	28	125
Percent of All Tracts In Study	(69)	(47)	(33)	(50)
Average Number of Crop-Share Lease Tracts Per Operator	2.17	1.13	.97	1.42
Operators with Farm Base on Cash Leased Tracts				
Number	0	1	4	5
Percent	-	(3)	(14)	(6)
Operators with Farm Base on Crop- Share Leased Tracts				
Number	0	0	2	2
Percent	-	-	(7)	(2)
Number of Landowners Operators Lease from				
1 Landowner	4	6	8	18
2 Landowners	5	15	7	27
3 Landowners	9	8	9	26
4 Landowners	7	0	3	10
5 Landowners	3	1	1	5
6 Landowners	1	0	0	1
9 Landowners	0	0	1	1
Average Number of Landowners, Rented From Per Operator	3.10	2.20	2.60	2.60

some operators omitting information on additional tracts that they leased.

Information on Cash Leased Tracts

Total and tillable acres cash leased in this study were highest by far in Lake County (Table 2). The prevalence of the cash lease in Lake County may be partially due to the high productivity of the land. Operators may feel that the greater risk of poor crop production associated with a cash lease is outweighed by the profit potential with this type of lease on highly productive soil. A much higher percentage of the tracts which were cash leased by operators studied in Lake County were double-cropped than were similar tracts in Crockett and Fayette Counties.

The average total size of all cash leased tracts studied was 161 acres. Average tillable acres was 153, with Fayette County having the lowest percent of total acres that was tillable (Table 2). Soybeans was the most common crop produced on the cash leased tracts and wheat was a distant second. Only on the leased tracts in Crockett County was the soybean acreage less than the acreage of some other crop (cotton). Lake County had the highest estimated yields for each of the four row crops.⁷ A comparison of average Soil Based Productivity Indices with average Farmer Estimated Productivity Indices in the study area could be interpreted as an indication of managerial ability of the operator. Since the Soil Based Productivity Index is calculated under the assumption of

⁷Limited importance should be given the estimated corn yield due to the very small amount of acreage involved.

Table 2. Characteristics of Selected Cash Leased Tracts in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Tracts	28	38	58	124
Total Acres in Tracts Studied	3,174	6,312	10,441	19,927
Tillable Acres in Tracts Studied	3,043	5,585	10,387	19,015
Average Size of Tract				
Total Acres	113	166	180	161
Tillable Acres	109	147	179	153
Percent Tillable	(96)	(89)	(99)	(95)
Total Acres of Crops on Studied Tracts ^a				
Corn	0	567	170	737
Cotton	1,411	715	475	2,601
Soybeans	1,347	3,746	9,739	14,832
Wheat	533	180	5,484	6,197
Tracts Double-Cropped				
Number	6	5	41	52
Percent	(21)	(13)	(71)	(42)
Farmer Estimated Crop Yields Per Acre ^b				
Corn (bu.)	-	91	130	100 ^c
Cotton (lbs.)	472	497	525	487
Soybeans (bu.)	26	27	32	30
Wheat (bu.)	42	30	43	43
Average Soil Based Productivity Index Values Per Acre	-	70.20	78.60	75.70 ^d
Farmer Estimated Average Productivity Index Values Per Acre	56.00	59.90	71.90	66.20
Kinship Between Tenant and Landowner				
Number of Tracts where Tenant and Landowner were				
Not Related	26	29	31	86
Distantly Related	1	2	9	12
Closely Related	1	5	18	24
Percent of Tracts Rented by Tenant Related to Landowner	(7)	(19)	(47)	(30)

Table 2 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Average Number of Years of Occupancy Per Tract	9.10	6.60	12.20	9.88
Average Distance from Operator Farm Base Per Tract (mi.)	4.70	4.80	4.60	4.70 ^e
Number of Tracts that were Owned				
Fee Simple	24	34	49	107
Life Estate	0	1	2	3
Estate or Trust	4	2	5	11
Corporate	0	1	2	3
Percent of Tracts Owned Other than Fee Simple	(14)	(11)	(16)	(14)
Cash Lease Tracts Which Need Improved Soil Conserving Structures				
Total Number	9	13	11	33
Percent	(32)	(34)	(19)	(27)
Number Owned Fee Simple	8	12	11	31
Number Owned Other Than Fee Simple	1	1	0	2

^aSome crop acreage reported was double-cropped.

^bThe estimates obtained were average yields for the 1978, 1979, and 1980 production periods.

^cAcreages of the various crops varied among the counties. Therefore, these figures are not simple averages for the counties involved, but are weighed according to the number of acres in each county.

^dThis figure encompasses only Fayette and Lake Counties. Since soil maps were not available for Crockett County at the time the study was conducted, values for Crockett County could not be derived.

^eThe number of cash leased tracts surveyed per county varied. Thus, these figures are not simple averages of the three counties, but are weighed according to the number of cash leased tracts in each county.

a high degree of management, a Farmer Estimated Productivity Index that is close to the former index should indicate a high level of management. The average values of these two indices were closest in Lake County.

Approximately 30 percent of the cash leases involved kinship between the tenant and landowner. Operators leasing 27 of the 58 total cash leased tracts in Lake County were related to their landowners. The proportion of cash leases involving kinship was greater in Lake County than in either Crockett or Fayette Counties (Table 2). The average length of occupancy by the present operators on the tracts surveyed was 9.8 years. The average distance of the cash leased tracts from the operators' farming bases was 4.7 miles. These averages were almost identical for all three counties.

Fourteen percent of the cash leased tracts were owned in some form other than fee simple. A detailed categorization of the forms of ownership is presented in Table 2. Structures to control soil erosion were needed, or existing structures needed improvement, on 27 percent of the cash leased tracts studied. Only two of those tracts were not owned fee simple.

Information on Crop-Share Leased Tracts

There were 19,596 total acres of crop-share leased land in the study (Table 3). Of this amount, 17,441 acres, 89 percent of the total, was tillable. Of the three counties studied, tracts in Lake County contained the highest percentage of tillable acres. The average size of crop-share leased tracts for all three counties was 157 acres.

Table 3. Characteristics of Selected Crop-Share Leased Tracts in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Tracts	63	34	28	125
Total Acres in Tracts Studied	7,145	7,164	5,287	19,596
Tillable Acres in Tracts Studied	6,455	5,774	5,212	17,441
Average Size of Tract				
Total Acres	113	211	189	157
Tillable Acres	102	170	186	140
Percent Tillable	(90)	(81)	(98)	(89)
Total Acres of Crops on Studied Tracts ^a				
Corn	5	265	150	420
Cotton	4,505	1,695	220	6,420
Soybeans	1,870	3,629	4,742	10,241
Wheat	181	345	1,169	1,695
Tracts Double-Cropped				
Number	6	2	13	21
Percent	(10)	(6)	(46)	(17)
Farmer Estimated Crop Yields Per Acre ^b				
Corn (bu.)	55	86	73	81 ^c
Cotton (lbs.)	518	521	470	517
Soybeans (bu.)	26	25	28	27
Wheat (bu.)	40	-	42	42
Average Soil Based Productivity Index Values Per Acre	-	73.40	67.40	70.90 ^d
Farmer Estimated Average Productivity Index Values Per Acre	57.70	55.40	61.20	58.10
Kinship Between Tenant and Landowner				
Number of Tracts Where Tenant and Landowner were				
Not Related	49	25	22	96
Distantly Related	7	3	3	13
Closely Related	7	4	3	14
Percent of Tracts Rented by Tenant Related to Landowner	(22)	(22)	(21)	(22)

Table 3 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Average Number of Years of Occupancy Per Tract	9.30	7.40	12.20	9.50 ^e
Average Distance from Operators' Farm Bases Per Tract (mi.)	3.00	3.40	4.80	3.50 ^e
Number of Tracts that were Owned				
Fee Simple	59	26	23	108
Life Estate	0	2	1	3
Estate or Trust	2	1	3	6
Corporate	0	1	1	2
City-Owned	2	0	0	2
Percent of Tracts Owned Other than Fee Simple	(6)	(13)	(18)	(11)
Crop-Share Lease Tracts Which Need Improved Soil Conserving Structures				
Total Number	18	11	4	33
Percent	(29)	(37)	(14)	(27)
Number Owned Fee Simple	17	8	2	27
Number Owned Other than Fee Simple	1	3	2	6

^aSome crop average reported was double-cropped.

^bThe estimates obtained were average yields for the 1978, 1979, and 1980 production periods.

^cAcreages of the various crops varied among the counties. Therefore, these figures are not simple averages for the counties involved, but are weighed according to the number of acres in each county.

^dThis figure encompasses only Fayette and Lake Counties. Since soil maps were not available for Crockett County at the time the study was conducted, values for Crockett County could not be derived.

^eThe number of crop-share leased tracts surveyed per county varied. Thus, these figures are not simple averages of the three counties, but are weighed according to the number of crop-share leased tracts in each county.

As with cash leased tracts, soybeans was the most prevalent crop produced on tracts leased on a crop-share basis in all but Crockett County (Table 3). Seventeen percent of all crop-share leased tracts were partially or entirely double-cropped. Average Soil Based Productivity Indices and Farmer Estimated Productivity Indices were lower for crop-share leased tracts than for the cash leased acreage. This result supports the contention that farm operators prefer the most productive land to cash lease (p. 33).

Twenty-two of the tracts leased on a crop-share basis were rented by tenants who were related to their landlords. The proportion of kinship between the two parties for crop-share leases was greatest in Crockett County. The average length of occupancy by the present operators of crop-share leased tracts was 9.5 years. Tracts in Lake County averaged 12.2 years of occupancy, the highest average of the counties studied. The average distance of the crop-share leased tracts studied from the operators' farming bases was 3.5 miles.

Of the 121 crop-share responses to the form of ownership of the tracts, 13 tracts (11 percent) were not owned fee simple. Just as with the cash leased tracts (Table 2), 27 percent of crop-share leased tracts needed soil conserving structures built or improved. Eighteen percent of these tracts were not owned fee simple (Table 3).

CHAPTER IV

ANALYSIS OF EXISTING LEASES

The survey results pertaining to crop-share leases are contrasted to the four principles necessary for an economically efficient crop-share lease in the first half of this chapter. Imperfections in the existing crop-share leases become evident when the lease provisions are evaluated. The components, or characteristics, of the cash leases examined in this study are discussed in the next section. The last section contains an examination of the influence of selected factors on the amount of rental payment per tillable acre for cash leased tracts.

Crop-Share Leases

Principle 1 - Variable Expenses and Crop Revenue Should be Shared in the Same Proportion

In Crockett and Lake Counties, landowners generally received 1/3 of the crop revenues for rent. The most notable exceptions were reported in Lake County, where landowners received 1/4 of the cotton revenues in all 4 instances and 1/4 of the wheat revenues were shared in 29 percent of the leases involving wheat (Table 4).⁸ The relatively low cotton yields per acre on crop-share leased tracts in Lake County may partially explain the lower share as rent to land. With few exceptions, landowners in Fayette County received 1/4 of the revenues from all four crops included in this study.

⁸Table 3 indicates that 220 acres comprised the total crop-share lease cotton acreage studied in Lake County.

Table 4. Distribution of Crop-Share Leases by Share of Crops Received and Costs Paid by Landowner
in Three Tennessee Counties, 1980

Crop and Expense	Crockett County						Fayette County						Lake County						All Three Counties					
	Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner					
	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All
	Number	Percent					Number	Percent					Number	Percent					Number	Percent				
CORN																								
% Crop to Landowner	1				100		3			100			2			100			6			50		50
% Paid by Landowner																								
Seed	1	100					3	100					2	100					6	100				
Fungicide	1	100					3	100					2	100					6	100				
Herbicide	1	100					3	100					2	100					6	100				
Insecticide	1	100					3	100					2	100					6	100				
Nitrogen Fert.	1			100			3	33		67			2			100			6	17		33		50
Phosphate Fert.	1			100			3	33		67			2			100			6	17		33		50
Potassium Fert.	1			100			3	33		67			2			100			6	17		33		50
Harvesting Cost	1			100			3	100		67			2	100					6	100				
Lime	1			100			3	33		67			2	100					6	50				
COTTON																								
% Crop to Landowner	61		5	95			23		4	96			4			100			88		1	33		66
% Paid by Landowner																								
Seed	61	98		2			23	96		4			4	100					88	98		1		1
Fungicide	61	100					23	96		4			4	100					88	99		1		1
Herbicide	61	100					23	96		4			4	100					88	99		1		1
Insecticide	61	80		20			23	96		4			4	100					88	85		1		14
Nitrogen Fert.	61	5		95			23	39		61			4			100			88	14		21		65
Phosphate Fert.	61	5		95			23	39		61			4			100			88	14		21		65
Potassium Fert.	61	5		95			23	39		61			4			100			88	14		21		65
Harvesting Cost	61	100					23	96		4			4	100					88	99		1		1
Defoliant	61	80		20			23	96		4			4	100					88	85		1		14
Lime	60	27		30	42	2	23	35		57			4	100					87	32		15		21
SOYBEANS																								
% Crop to Landowner	38		10	90			26		4	96			27			11	89		91		1	35		64
% Paid by Landowner																								
Seed	38	97		3			26	100					27	100					91	99				1
Fungicide	38	100					26	100					27	100					91	100				
Herbicide	38	100					26	100					27	100					91	100				

Table 4 (Continued)

Crop and Expense	Crockett County						Fayette County						Lake County						All Three Counties					
	Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner					
	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All
	Number	Percent					Number	Percent					Number	Percent					Number	Percent				
WHEAT																								
% Crop to Landowner	7		29	71			3		100				13		15	85			23		30	70		
% Paid by Landowner																								
Seed	7	100					3	100					13	100					23	100				
Fungicide	7	100					3	100					13	100					23	100				
Herbicide	7	100					3	100					13	100					23	100				
Insecticide	7	100					3	100					13	100					23	100				
Nitrogen Fert.	7	29	71				3	67	33				11	54	36	10			21	48	5	43	5	
Phosphate Fert.	7	29	71				3	67	33				13	46	46	8			23	44	4	48	4	
Potassium Fert.	7	29	71				3	67	33				13	46	46	8			23	44	4	48	4	
Harvesting Cost	7	86	14				3	100					13	100					23	96			4	
Baling Straw	7	100					3	100					13	100					23	100				
Lime	7	43	43	14			3	67	33				13	100					23	78	4	13	4	
MISC. EXPENSES																								
% Paid by Landowner																								
Brush Killer	63	100					34	100					28	100					125	100				
Equip. Fuel	63	100					34	100					28	100					125	100				
Crop Drying	41	100					26	100					27	100					94	100				
Hauling Crop	63	100					34	100					28	100					125	100				
Paint for Buildings	1					100	1						100	2	50				50	4	25			75
Materials for Bldg. Repair	1					100	1						100	2	50				50	4	25			75
Labor for Repair and Painting	1					100	1						100	2	50				50	4	25			75
Materials for Fence Repair	1	100					14						100	0					15	7				93
Labor for Fence Repair	8	25				75	15	13					87	0					23	17				83

Table 4 (Continued)

Expense and	Crockett County						Fayette County						Lake County						All Three Counties						
	Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner						Share Received or Paid by Landowner						
	Percent						Percent						Percent						Percent						
	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	0	1/5	1/4	1/3	1/2	All	
Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	Number	
Maintenance on Drive	61	60		10	30	31	32			3	65	18	67				33	110	54					6	40
Maintenance on Terraces	63	35		2	27	36	30	20			3	77	15	47				53	108	32		1	17	50	
Maintenance on Other Non-serv. Street	62	36		27	37	30	13			3	83	18	67				33	110	35					16	49

Fertilizer costs were not shared by the landowner in over 50 percent of the crop-share leases in Lake County involving soybeans. Over 40 percent of landowners in Lake County did not contribute to the fertilizer costs for wheat. With such a leasing arrangement, the rational landowner would prefer heavier fertilizer applications than would the tenant. Approximately 1/3 of the landowners did not share fertilizer costs in Fayette County leases involving corn and cotton. In 50 percent of Fayette County leases involving soybeans and 67 percent involving wheat, the landowner shared none of the fertilizer cost. Crockett County crop-share leases best conformed to the concept of landowner and tenant sharing fertilizer costs in the same proportion as they share revenue.

Expenses associated with seeds, fungicides, herbicides, and insecticides were generally borne entirely by the tenants. All but herbicide costs are normally classified as variable expenses and, in accordance to Principle 1, should have been shared by the landowners in proportion to crop revenues. Whether herbicide costs should be treated purely as variable expenses depends on how extensively it is used.

Only a very small percentage of landowners contributed to the costs of harvesting the crops. Fuel expenses for crop-drying and other stages of production were also left entirely to the tenants. Since these items are variable expenses, proportionate sharing by landowners would be ideal.

Cost-sharing arrangements for lime, brush killer, hauling of the products, and maintenance of buildings, fences and soil conservation

Table 5. Characteristics of Crop-Share Rental Payments in Selected Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Crop-Share Leases in which:				
Landowner Receives				
1/4 of Corn Crop (number)	0	3	0	3
Average Yield Per Acre (bu.)	-	86	-	86
Landowner Receives				
1/3 of Corn Crop (number)	1	0	2	3
Average Yield Per Acre (bu.)	55	-	73	73 ^a
Landowner Receives				
1/5 of Cotton Crop (number)	0	1	0	1
Average Yield Per Acre (lbs.)	-	350	-	350
Landowner Receives				
1/4 of Cotton Crop (number)	3	22	4	29
Average Yield Per Acre (lbs.)	540	526	470	520
Landowner Receives				
1/3 of Cotton Crop (number)	58	0	0	58
Average Yield Per Acre (lbs.)	517	-	-	517
Landowner Receives				
1/5 of Soybean Crop (number)	0	1	0	1
Average Yield Per Acre (bu.)	-	25	-	25
Landowner Receives				
1/4 of Soybean Crop (number)	4	25	3	32
Average Yield Per Acre (bu.)	25	25	29	25
Landowner Receives				
1/3 of Soybean Crop (number)	34	0	24	58
Average Yield Per Acre (bu.)	26	-	28	27
Landowner Receives				
1/4 of Wheat Crop (number)	2	3	2	7
Average Yield Per Acre (bu.)	39	-	39	39
Landowner Receives				
1/3 of Wheat Crop (number)	5	0	11	16
Average Yield Per Acre (bu.)	42	-	43	43

^aAcres of the various crops varied among the counties. Therefore, average yields are weighed according to the number of acres in each county.

However, custom and/or kinship may be strong in determining the proportionate share in the respective counties.

In each of four crop-share leases, landowners received different shares of competitive crops (Table 6). Data was not obtained concerning the acreage of crops grown prior to the 1980 production period. Therefore, no determination could be made as to whether or not these tenants had increased the acreage of the crops for which they paid landowners a lower crop-share.

One lease in Crockett County specified $\frac{1}{3}$ crop-sharing by the landowner for cotton and $\frac{1}{4}$ crop-sharing for soybeans and wheat. The average cotton yield per acre on this tract was 475 lbs., whereas the average cotton yield per acre was 517 lbs. for all leases in Crockett County in which the landowner received $\frac{1}{3}$ of the crop (Table 5). By specifying lower percentages of the soybean and wheat crops for rental payment, the parties to the lease may have been attempting to more equitably divide the combined revenue from all the crop enterprises.

Three leases in Lake County, involving two tenants, violated Principle 2. It should be noted that the cotton crops (shared $\frac{1}{4}$ - $\frac{3}{4}$) constituted a small percentage of the total acres on each of these leased tracts. As with the Crockett County cotton lease (shared $\frac{1}{3}$ - $\frac{2}{3}$) the average yields per acre for the three leases in Lake County were lower than the Lake County averages (Table 5). Although these leases show theoretical imperfections on a crop basis, the division of shares may have been an attempt towards an equitable distribution of the combined crop revenues between landowner and tenant.

Table 6. Characteristics of Selected Crop-Share Leases in Which the Landowners Receive Different Shares of Competitive Crops in Three Tennessee Counties, 1980

Items	Crops			
	Corn	Cotton	Soybeans	Wheat
Lease: Crockett Co. 14G				
Share of Crop Landowner				
Receives as Rent	-	1/3	1/4	1/4
Acres of Each Crop Grown	-	120	280	40
Yields Per Acre	-	475	25	35
Lease: Lake Co. 12F				
Share of Crop Landowner				
Receives as Rent	-	1/4	1/3	-
Acres of Each Crop Grown	-	30	568	-
Yields Per Acre	-	650	25	-
Lease: Lake Co. 15F				
Share of Crop Landowner				
Receives of Rent	1/3	1/4	1/3	-
Acres of Each Crop Grown	50	90	460	-
Yields Per Acre	50	400	25	-
Lease: Lake Co. 15G				
Share of Crop Landowner				
Receives as Rent	-	1/4	1/3	-
Acres of Each Crop Grown	-	60	440	-
Yields Per Acre	-	400	25	-

Data concerning when landowners receive crop payments is presented in Table 7. There appeared to be some flexibility on this item in many of the leases. This flexibility is probably necessary due to the influence adverse weather can have on harvesting. Generally, payments were due about the time the respective crops were harvested.

Principle 3 - Additional Uncertainty Must Not be Created by the Lease Itself

To determine whether the existing crop-share leases violated Principles 1 and 2, simple calculations were adequate. Unfortunately, the task of quantifying Principle 3 is not so easy. In order to give some indication of the degree of uncertainty existing with these crop-share leases, this section examines the length of the leases, whether these leases were written or oral agreements, the use of reimbursement agreements, and how frequently the parties to the leases reserved specific rights.

Fifty-six percent of the crop-share leases studied were for a term of one year and contained no provisions for automatic renewal (Table 8). Forty-four, or 70 percent, of the crop-share leases studied in Crockett County were 1 year leases without automatic renewal. An additional 20 percent of the crop-share leases studied were 1 year leases with automatic renewal clauses. Only 9 percent of the leases were for terms of 3 to 10 years. The tenants on 16 percent of the crop-share leased tracts indicated that the length of their leases was not even specified. Forty-five percent of the leases of unspecified length involved parties who were related to one another. Because of the large percentage of 1 year leases without automatic renewal (55 percent), as

Table 7. Time of Payment Specified for Crops Raised on Selected Crop-Share Lease Tracts in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Crop-Share Leases in which:				
Landowner Receives Payment for Corn in November (number)	0	2	0	2
Percent of Responses	-	(100)	-	(40)
Landowner Receives Payment for Corn in December (number)	1	0	2	3
Percent of Responses	(100)	-	(100)	(60)

Landowner Receives Payment for Cotton in October (number)	24	0	0	24
Percent of Responses	(40)	-	-	(29)
Landowner Receives Payment for Cotton in November (number)	35	3	0	38
Percent of Responses	(58)	(15)	-	(45)
Landowner Receives Payment for Cotton in December (number)	1	1	3	5
Percent of Responses	(2)	(5)	(75)	(6)
Landowner Receives Payment for Cotton when Harvested (number)	0	13	0	13
Percent of Responses	-	(65)	-	(15)
Landowner Receives Payment for Cotton when Marketed (number)	0	3	1	4
Percent of Responses	-	(15)	(25)	(5)

Landowner Receives Payment for Soybeans in October (number)	1	0	0	1
Percent of Responses	(3)	-	-	(1)
Landowner Receives Payment for Soybeans in November (number)	11	3	11	25
Percent of Responses	(30)	(16)	(42)	(31)

Table 7 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Landowner Receives Payment for Soybeans in December (number)	25	2	13	40
Percent of Responses	(67)	(11)	(50)	(49)
Landowner Receives Payment for Soybeans when Harvested (number)	0	13	2	15
Percent of Responses	-	(68)	(8)	(18)
Landowner Receives Payment for Soybeans when Marketed (number)	0	1	0	1
Percent of Responses	-	(5)	-	(1)

Landowner Receives Payment for Wheat in June (number)	6	0	11	17
Percent of Responses	(100)	-	(79)	(81)
Landowner Receives Payment for Wheat in July (number)	0	0	3	3
Percent of Responses	-	-	(21)	(14)
Landowner Receives Payment for Wheat when Harvested (number)	0	1	0	1
Percent of Responses	-	(100)	-	(5)

Table 8. Length of Leases and Notices of Termination of Selected Crop-Share Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Crop-Share Leases:				
One-Year Term (number)	44	18	6	68
Percent of Responses	(70)	(58)	(21)	(56)
Number Involving Kinship	9	4	2	15
One-Year Term w/Automatic Renewal (number)	9	5	10	24
Percent of Responses	(14)	(16)	(36)	(20)
Number Involving Kinship	0	0	1	1
Three-Year Term (number)	1	4	0	5
Percent of Responses	(2)	(13)	-	(4)
Number Involving Kinship	0	0	0	0
Five-Year Term (number)	0	1	2	3
Percent of Responses	-	(3)	(7)	(3)
Number Involving Kinship	0	1	0	1
Five-Year Term w/Automatic Renewal (number)	0	0	1	1
Percent of Responses	-	-	(4)	(1)
Number Involving Kinship	0	0	1	1
Ten-Year Term (number)	0	1	0	1
Percent of Responses	-	(3)	-	(1)
Number Involving Kinship	0	0	0	0
Indefinite Term (number)	9	2	9	20
Percent of Responses	(14)	(7)	(32)	(16)
Number Involving Kinship	5	2	2	9
Total Number of Crop-Share Leases Studied	63	31	28	122
Crop-Share Leases w/Automatic Renewal (number)	9	5	11	25
Landowner Termination Notice Required				
Three-Month Notice of Termination	0	2	0	2

Table 8 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Six-Month Notice of Termination	9	2	11	22
Unspecified	0	1	0	1
Operator Termination Notice Required				
Three-Month Notice of Termination	0	2	0	2
Six-Month Notice of Termination	9	2	10	21
Unspecified	0	1	1	2

well as a significant number of leases of unspecified length, it appears that the opportunity for additional uncertainty to be introduced into crop production was present.

Twenty-five of the crop-share leases contained automatic renewal clauses (Table 8). All but 3 of these leases required the landowners to give the tenants notice of termination of the leases 6 months prior to the expiration date. Twenty-one of these leases specified a 6-month notice of termination on the part of the tenants.

The data in Table 9 (concerning the number of written crop-share leases in the study), suggests that additional uncertainty was created by the structure of the leases. A surprisingly low 14 percent of the crop-share leases were written. Generally, the tracts involving written leases contained substantially more tillable acres than those tracts leased by oral agreements. It is possible that tenants who leased the larger tracts realized the financial consequences of having a decreased number of acres over which to spread fixed costs. By having written leases which necessitate thorough planning by the parties involved, such risks were mitigated somewhat.

Sixty-three percent of the written crop-share leases surveyed were 3 to 10 years in duration (Table 9). Apparently, the tenants and/or landowners with written leases attempted to minimize the uncertainty that can be associated with leasing by having the leases in writing and also by procuring longer leases than the oral agreements. None of the written crop-share leases had an indefinite term.

Nineteen of the 125 crop-share leases studied contained reimbursement agreements (Table 10). Thirteen leases had methods of

Table 9. Characteristics and Length of Selected Written Crop-Share Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Total Number of Leases	63	34	28	125
Written Leases				
Number	1	14	3	18
Percent	(2)	(41)	(11)	(14)
Average Number of Tillable Acres Per Tract				
Written Leases	100	227	296	231
Unwritten Leases	103	130	173	124
Terms of Written Leases				
One Year (number)	0	4	0	4
Percent of Responses	-	(33)	-	(25)
One Year w/Automatic Renewal (number)	0	2	0	2
Percent of Responses	-	(17)	-	(12)
Three Years (number)	1	4	0	5
Percent of Responses	(100)	(33)	-	(32)
Five Years (number)	0	1	2	3
Percent of Responses	-	(8)	(67)	(19)
Five Years w/Automatic Renewal (number)	0	0	1	1
Percent of Responses	-	-	(33)	(6)
Ten Years (number)	0	1	0	1
Percent of Responses	-	(8)	-	(6)
Years of Occupancy by Present Tenant Per Tract				
Unwritten Leases	9.5	8.4	12.3	9.9
Written Leases	1.0	6.0	11.7	6.7

Table 10. Characteristics of Reimbursement Agreements in Selected Crop-Share Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Crop-Share Leases with Reimbursement Agreements	9	8	2	19
Number of Crop-Share Leases with Reimbursement for Lime	9	4	0	13
Operator Expenditure: 3 yr. benefit:				
1/3 Reimbursement per yr. not used	3	0	0	3
Operator Expenditure: 3 yr. benefit:				
1/6 Reimbursement per yr. not used	3	1	0	4
Operator Expenditure: 3 yr. benefit:				
2/9 Reimbursement per yr. not used	3	0	0	3
Operator Expenditure: 5 yr. benefit:				
1/5 Reimbursement per yr. not used	0	1	0	1
Landowner Expenditure: 4 yr. benefit:				
1/4 Reimbursement per yr. used	0	1	0	1
Landowner Expenditure: 4 yr. benefit:				
1/6 Reimbursement per yr. used	0	1	0	1
Number of Crop-Share Leases that Reimburse for Soil Conservation Structures				
Landowner Reimburses Tenant for All of Material & Equip. Costs	0	4	1	5
Landowner Reimburses Tenant for 1/3 of the Total Cost	0	0	1	1
Landowner Reimburses Tenant: 5 yr. benefit: 1/5 per yr. not used	0	1	0	1

Table 10 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Percent of Crop-Share Leases Containing Reimbursement Agree- ments with the Term of:				
One Year	100	62	50	79
Three Years	0	25	0	10.5
Indefinite Term	0	13	50	10.5
One-Year Crop-Share Leases				
Number	53	23	16	92
Number w/Reimbursement Agreements	9	5	1	15
Percent	(17)	(22)	(6)	(16)
Three-Year Crop-Share Leases				
Number	1	4	0	5
Number w/Reimbursement Agreements	0	2	0	2
Percent	-	(50)	-	(40)
Five-Year Crop-Share Leases				
Number	0	1	3	4
Number w/Reimbursement Agreements	0	0	0	0
Percent	-	-	-	-
Ten-Year Crop-Share Leases				
Number	0	1	0	1
Number w/Reimbursement Agreements	0	0	0	0
Percent	-	-	-	-
Indefinite Term Crop-Share Leases				
Number	9	2	9	20
Number w/Reimbursement Agreements	0	1	1	2
Percent	0	(50)	(11)	(10)
Percent of Crop-Share Leases with Reimbursement Agreements for Soil Conservation Structures Where:				
Additional Soil Conservation Structures are Needed	33	25	50	32
Additional Soil Conservation Structures are Not Needed	67	75	50	68

Table 10 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Crop-Share Leases Involving No Kinship				
Number	49	25	22	96
Number w/Reimbursement Agreements	9	7	2	18
Percent	(18)	(28)	(9)	(19)
Crop-Share Leases Involving Distant Kinship ^a				
Number	7	3	3	13
Number w/Reimbursement Agreements	0	0	0	0
Percent	-	-	-	-
Crop-Share Leases Involving Close Kinship ^a				
Number	7	4	3	14
Number w/Reimbursement Agreements	0	1	0	1
Percent	-	(25)	-	(7)

^aDistant kinship included cousins or cousins by marriage. Close kinship included father, son, grandfather, grandson, uncle, aunt, nephew, and all of the preceding by marriage.

reimbursement for the cost of lime. However, the data in Table 4, pp. 41-43, indicates that in many cases, lime expenses were shared by both parties, or paid entirely by landowners or tenants. This sharing of lime expenses eliminated the need for reimbursement. Only seven leases specified reimbursement for soil conservation structures. Sixty-eight percent of the leases with reimbursement agreements involved tracts of land that did not need any additional soil conservation improvements. The remaining 32 percent involved tracts that still needed improvements. The effectiveness of reimbursement agreements in minimizing exploitation of these tracts was not clearly shown by the data (Table 10).

As might be expected, 15 of the 19 crop-share leases with reimbursement agreements were 1 year leases. It would be more likely that benefits arising from improvements would be realized by tenants with longer leases. Thus, the need for reimbursement agreements would be lessened somewhat.

Of all the crop-share leases studied, only one lease which involved kinship between the two parties contained a reimbursement agreement. This absence of reimbursement agreements does not necessarily indicate that there was no need for such agreements in leases involving kinship, but apparently limited need was perceived by the parties.

Rights reserved by parties to the leases generally have less effect on uncertainty than do the items previously discussed. Nonetheless, omission from the leases of such sections can certainly increase uncertainty. The most frequent right reserved by the landowners prohibited subleasing the tracts (Table 11). By reserving this right,

Table 11. Rights Reserved in Selected Crop-Share Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Crop-Share Leases Studied	63	34	28	125
Crop-Share Leases in Which Neither Party Reserves Any Rights				
Number	62	7	18	87
Percent of All Crop-Share Leases	(98)	(20)	(64)	(71)
Number of Crop-Share Leases in Which the Landowner Reserves the Right to:				
Prohibit Subleasing	1	22	10	33
Enter for Mineral Development	1	0	2	3
Enter to Prepare New Crops After Notice of Termination is Given	0	0	2	2
Prohibit the Cutting of Trees	0	2	0	2
Hunt of the Leased Tract	0	1	2	3
Number of Crop-Share Leases in Which the Operator Reserves the Right to:				
Farm Additional Land	0	17	0	17

landowners insured themselves of tenants with managerial qualities that were acceptable to them.

Principle 4 - The Share of the Revenue Each Party Receives Should Represent the Product of the Resources Which Each Contributes

To estimate the value of resources each party contributed in a lease arrangement would require detailed information. Not only would this require a tract-by-tract appraisal of land values and permanent structures, but personal knowledge concerning the working relationships between the landowners and tenants would be necessary. Although such an analysis would be extremely informative, it was well beyond the scope of this study. Additional information about the contributions of landowners and tenants is presented in this section, but no attempt is made to determine how well the leases studied conformed to Principle 4.⁹

Three of the major cost items involved in leases are land, buildings, and fixed machinery expenses. Traditionally, land has been the major contribution of landowners in crop-share leases. Only six of the crop-share leased tracts included in this study had buildings or storage facilities on them that were used by the tenants (Table 12). Separate cash payments were not made for the use of the buildings or storage facilities under any of those six leases. All expenses associated with machinery (fixed or variable) were paid entirely by the tenants.

Another item that can be important when estimating the contributions of each party is the managerial input of the landowner and the

⁹Appendix D contains an example of how an individual lease can be examined for equitableness.

Table 12. Building Use and Managerial Input in Selected Crop-Share Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Crop-Share Leases Studied	63	34	28	125
Buildings on Tract Utilized by Tenants				
Number	2	1	3	6
Percent of All Crop-Share Leases	(3)	(3)	(11)	(5)
Cash Payment Made for use of Buildings (Leases)	0	0	0	0
Managerial Input by Landowners (Leases)				
Managed the Tracts Personally	0	0	0	0
Hired Agents/Managers	0	0	0	0
Let Tenants Manage for Them	47	26	21	94
Managed Mutually with Tenants	16	6	7	29
Maximum Tillable Acres Specified (Leases)	3	0	1	4
Crop Rotations Specified (Leases)	1	0	0	1
Leases in Which Participation in Government Programs Decided by:				
Landowner	1	0	2	3
Tenant	49	18	20	87
Both Parties	13	14	6	33
Distribution of Revenue from Government Programs to Tenant (Leases)				
All	2	4	5	11
3/4	3	23	3	29
2/3	52	0	13	65
1/2	0	0	1	1
None	1	2	0	3
3/4 from Cotton, 2/3 from Soy-beans and/or Wheat	2	0	3	5

tenant. Ninety-four of the tenants with crop-share leases (76 percent) indicated they had sole managerial responsibility for the farming operation on the tracts they leased (Table 12). Landowners did have an input into the management of leased tracts in 29 cases (24 percent).

Specification of the maximum number of leased acres that could be tilled was another indication of landowners' managerial input. Four of the crop-share leases in the study restricted tillage and only one lease required a crop rotation scheme.

Three of the tenants with crop-share leases stated that their landowner made all the decisions concerning participation in government cost-sharing programs. In 33 cases, both parties to the lease had input into making such decisions. However, in the large majority of the cases, the tenants had sole responsibility for making decisions concerning participation in government cost-sharing programs.

Cash Leases

Of the 124 cash leases studied, landowners in Crockett County received the highest average rent per tillable acre (Table 13). Tenants in Fayette County paid the lowest average rent per tillable acre. A comparison of these figures with Farmer Estimated Average Productivity Index Values per acre (Table 2, pp. 34-35) revealed that the cash leased tracts in Crockett County had the lowest Estimated Productivity Values but received the highest rents.

None of the case leases included in this study contained adjustments to account for changes in costs of inputs or prices received for the crops. However, six cash leases in Lake County contained a provision

Table 13. Characteristics of Cash Rental Payments in Selected Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Rental Rate per Tillable Acre	\$71.13	\$30.57	\$49.95	\$48.54
Leases Containing Rental Adjustment for Crop Failure	0	0	6	6
Cash Payment Not Due on Flooded Acreage	0	0	3	3
Flooding prior to a Specified Date Converts Lease to 1/3 Crop-Share	0	0	1	1
Unspecified Adjustment	0	0	2	2
Rental Rate per Tillable Acre				
Leases with Adjustments	-	-	\$51.35	\$51.35
Leases without Adjustments	\$71.13	\$30.57	\$49.81	\$48.39
Tillable Acres per Tract				
Leases with Adjustments	-	-	215	215
Leases without Adjustments	109	147	126	151
Lease Payment Dates				
Payment Due January				
Number	3	1	6	10
Percent	(11)	(3)	(10)	(8)
Payment Due October				
Number	2	0	0	2
Percent	(7)	-	-	(2)
Payment Due November				
Number	9	21	47	77
Percent	(32)	(55)	(82)	(63)
Payment Due December				
Number	11	14	3	28
Percent	(39)	(37)	(5)	(23)
Payment Due January & July				
Number	0	0	1	1
Percent	-	-	(2)	(1)

Table 13 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Payment Due January & October				
Number	1	0	0	1
Percent	(4)	-	-	(1)
Payment Due December & April				
Number	1	0	0	1
Percent	(4)	-	-	(1)
Payment Due December & June				
Number	1	0	0	1
Percent	(4)	-	-	(1)
Payment Due November or December				
Number	0	2	0	2
Percent	-	(5)	-	(2)
Total Number (Leases)	28	38	57	123

for adjusting rental payments when drastic reductions in crop production occurred. No rental payment was due on flooded acreage in 3 of these leases, and 1 lease contained a provision for conversion to a 1/3 crop-share lease in the event of flooding prior to a specified date. Rental payments per tillable acre were slightly higher for the six tracts leased under the rental adjustment provision than they were for all cash leased tracts in Lake County. The 6 tracts leased under an adjustment provision contained an average of 215 tillable acres to an average of 176 tillable acres for cash leased tracts without adjustments in Lake County.

November and December of 1980 were the most common dates for cash rental payments (Table 13). Only four of the cash leases in the study specified that rent was to be paid on two separate dates. Two of those tracts were double-cropped in the 1980 production period.

Fifty-seven cash leases, or 45 percent of those examined, were for terms of one year and had no provisions for automatic renewal. Of this number, 20 leases involved kinship between the landowners and tenants (Table 14). Eighteen of the cash leases (14 percent) were for terms of one year and had automatic renewal clauses. Only one of those 18 leases involved kinship between the parties to a lease. Seventeen cash leases, or 14 percent, were for 3 years. None of these 17 leases involved kinship. In 19 of the cash leases the term was indefinite and 13 of those leases involved kinship. Uncertainty of tenure may not have been as great as it seems with the leases of one year with no renewal clauses and with indefinite terms. Since many instances involved

Table 14. Length of Leases and Notices of Termination of Selected Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Cash Leases:				
One-Year Term (number)	18	11	27	56
Percent of Responses	(64)	(29)	(47)	(45)
Number Involving Kinship	1	3	16	20
One-Year Term w/Automatic Renewal Renewal (number)	6	1	11	18
Percent of Responses	(21)	(3)	(19)	(14)
Number Involving Kinship	0	1	0	1
Two-Year Term (number)	0	2	0	2
Percent of Responses	-	(5)	-	(2)
Number Involving Kinship	0	0	0	0
Three-Year Term (number)	3	14	0	17
Percent of Responses	(11)	(37)	-	(14)
Number Involving Kinship	0	0	0	0
Three-Year Term w/Automatic Renewal (number)	0	4	0	4
Percent of Responses	-	(10)	-	(3)
Number Involving Kinship	0	1	0	1
Four-Year Term (number)	0	1	0	1
Percent of Responses	-	(3)	1	(1)
Number Involving Kinship	0	0	0	0
Five-Year Term (number)	0	5	1	6
Percent of Responses	-	(13)	(2)	(5)
Number Involving Kinship	0	2	0	2
Five-Year Term w/Automatic Renewal (number)	0	0	1	1
Percent of Responses	-	-	(2)	(1)
Number Involving Kinship	0	0	0	0
Indefinite Term (number)	1	0	18	19
Percent of Responses	(4)	-	(30)	(15)
Number Involving Kinship	1	0	12	13

Table 14 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Total Number of Cash Leases Studied	28	38	58	124
Landowner Termination Notice Required				
Three-Month Notice of Termination	0	1	0	1
Six-Month Notice of Termination	6	2	12	20
Unspecified	0	2	0	2
Operator Termination Notice Required				
Three-Month Notice of Termination	0	1	0	1
Six-Month Notice of Termination	4	2	5	11
Unspecified	2	2	7	11

kinship between the landowners and tenants, the uncertainty of tenure may have been lessened.

Of the cash leases with automatic renewal clauses, six months was most often specified as the length of notice of termination required of both parties. One lease that had an automatic renewal clause required a three-month notice of termination (Table 14).

Fifty-six of the 124 cash leases studied were written (Table 15). Written leases involved tracts with slightly more acreage on the average than tracts without written leases. The written cash leases also tended to have longer terms than unwritten leases. Forty-eight percent of the written leases were for 2 years duration or longer, whereas only 41 percent of the total cash leases examined were for 2 years or more. Only three of the written leases had indefinite terms.

The average number of years of occupancy by tenants on cash leased tracts with written leases was 8.5 years, compared to an average of 10.9 years for cash leased tracts studied involving oral leasing agreements.

Twenty of the 124 cash leases contained some form of reimbursement agreements (Table 16). Fourteen of those 20 leases included reimbursement for lime and 5 included reimbursement for soil conservation structures. Sixty-five percent of the cash leases with reimbursement agreements were for a term of one year. Forty percent of the cash leases with reimbursement clauses involved either close or distant kinship between the landowners and operators.

In 64 percent of the cash leases examined, none of the parties to the leases reserved any specific rights (Table 17). In cases where landowners did reserve rights, they primarily prohibited subleasing of the

Table 15. Characteristics and Length of Selected Written Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Total Number of Leases	28	38	58	124
Written Leases				
Number	14	21	21	56
Percent	(50)	(55)	(36)	(45)
Average Number of Tillable Acres Per Tract				
Written Leases	119	181	181	166
Unwritten Leases	99	104	178	143
Terms of Written Leases				
One Year (number)	11	2	7	20
Percent of Responses	(79)	(10)	(33)	(36)
One Year w/Automatic Renewal (number)	0	0	9	9
Percent of Responses	-	-	(43)	(16)
Two Year (number)	0	1	0	1
Percent of Responses	-	(5)	-	(2)
Three Year (number)	3	12	0	15
Percent of Responses	(21)	(57)	-	(27)
Three Year w/Automatic Renewal (number)	0	2	0	2
Percent of Responses	-	(10)	-	(3)
Four Year (number)	0	1	0	1
Percent of Responses	-	(5)	0	(2)
Five Year (number)	0	3	1	4
Percent of Responses	-	(14)	(5)	(7)
Five Year w/Automatic Renewal (number)	0	0	1	1
Percent of Responses	-	-	(5)	(2)

Table 15 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Indefinite Term (number)	0	0	3	3
Percent of Responses	-	-	(14)	(5)
Years of Occupancy by Present Tenant per Tract				
Unwritten Leases	11.4	5.9	12.6	10.9
Written Leases	6.7	6.8	11.2	8.5

Table 16. Characteristics of Reimbursement Agreements in Selected Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Cash Leases with Reimbursement Agreements	5	7	8	20
Number of Cash Leases that Reimburse for Lime	4	2	8	14
Operator Expenditure: 3 yr. Benefit: 1/3 Reimbursement per yr. Not Used	4	2	0	6
Operator Expenditure: 4 yr. Benefit: Total Reimbursement First yr., 1/3 Reimbursement Each of Last 3 yrs. Not Used	0	0	8	8
Number of Cash Leases that Reimburse for Soil Conservation Structures	1	4	0	5
Landowner Reimburses Tenant for All of Material & Equip. Costs	0	3	0	3
Landowner Reimburses Tenant for 1/2 of the Total Cost	1	1	0	2
Percent of Cash Leases Containing Reimbursement Agreements with the Term of:				
One Year	100	0	100	65
Three Years	0	57	0	20
Four Years	0	14	0	5
Five Years	0	29	0	10
One-Year Cash Leases				
Number	24	12	38	74
Number w/Reimbursement Agreements	5	0	8	13
Percent	(21)	-	(21)	(18)
Two-Year Cash Leases				
Number	0	2	0	2
Number w/Reimbursement Agreements	0	0	0	0
Percent	-	-	-	-

Table 16 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Three-Year Cash Leases				
Number	3	18	0	21
Number w/Reimbursement Agreements	0	4	0	4
Percent	-	(22)	-	(19)
Four-Year Cash Leases				
Number	0	1	0	1
Number w/Reimbursement Agreements	0	1	0	1
Percent	-	(100)	-	(100)
Five-Year Cash Leases				
Number	0	5	2	7
Number w/Reimbursement Agreements	0	2	0	2
Percent	-	(40)	-	(29)
Indefinite Term Cash Leases				
Number	1	0	18	19
Number w/Reimbursement Agreements	0	0	0	0
Percent	-	-	-	-
Percent of Cash Leases with Reimbursement Agreements for Soil Conservation Structures where:				
Additional Soil Conservation Structures are Needed	0	57	12	25
Additional Soil Conservation Structure are Not Needed	100	43	88	75
Cash Leases Involving No Kinship				
Number	26	29	31	86
Number w/Reimbursement Agreements	5	6	0	11
Percent	(19)	(21)	-	(13)
Cash Leases Involving Distant Kinship ^a				
Number	1	2	9	12
Number w/Reimbursement Agreements	0	0	1	1
Percent	-	-	(11)	(8)

Table 16 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Cash Leases Involving Close Kinship ^a				
Number	2	5	18	25
Number w/Reimbursement Agreements	0	1	7	8
Percent	-	(20)	(39)	(32)

^aDistant kinship included cousins or cousins by marriage. Close kinship included father, son, grandfather, grandson, uncle, aunt, nephew, and all of the preceding by marriage.

Table 17. Rights Reserved in Selected Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Cash Leases Studied	28	38	58	124
Cash Leases in which Neither Party Reserves any Rights				
Number	27	14	39	80
Percent of All Cash Leases	(96)	(37)	(67)	(64)
Number of Cash Leases in Which the Landowner Reserves the Right to:				
Prohibit Subleasing	1	21	19	41
Enter for Mineral Development	1	0	2	3
Enter to Prepare New Crops after Notice of Termination is Given	0	0	6	6
Number of Cash Leases in Which the Operator Reserves the Right to:				
Farm Additional Land	0	20	0	20
Double-Crop Leased Tract	0	0	2	2

tracts by the tenants. Twenty of the leases specified the rights of the tenants to farm additional land.

Only 16 of the cash leased tracts (13 percent) had buildings which were utilized by the tenants (Table 18). Separate cash payments for the use of these buildings were not made in any of those leases. Surprisingly, these tracts with buildings had higher average productivity index values and lower rental rates per tillable acre than did the tracts without buildings.

The data indicates that all landowners relinquished control of management of the cash leased tracts to the tenants. None of the 124 leases restricted tillable acreage or specified a crop rotation scheme (Table 18).

Factors Influencing Rental Rates

The influence various characteristics of cash leased tracts in Fayette and Lake Counties had on the cash rental rate was determined using a multiple regression model. The regression analysis results are contrasted to expected theoretical behavior.

Fifty-nine observations were employed by this model. Due to the absence of soils data, no observations from Crockett County could be utilized in the model. The form of the regression model is given below:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 + E$$

Y = Cash Rent per Tillable Acre

X_1 = Soil Based Productivity Index

X_2 = Percent of Total Acres Tillable

X_3 = Number of Tillable Acres

Table 18. Building Use and Managerial Input in Selected Cash Leases in Three Tennessee Counties, 1980

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Number of Cash Leases Studied	28	38	58	124
Building on Tract Utilized by Tenants				
Number	0	1	15	16
Percent of All Cash Leases	-	(3)	(26)	(13)
Cash Payment Made for Use of Buildings (Leases)	0	0	0	0
Average Rental Rate per Tillable Acre				
Tracts with Buildings	-	\$37.50	\$46.03	\$45.36
Tracts without Buildings	\$71.13	\$30.19	\$51.50	\$49.21
Average Soil Based Productivity Index Values per Acre				
Tracts with Buildings	-	84.6	76.8	77.4
Tracts without Buildings	-	69.4	79.3	75.3
Average Farmer Estimated Productivity Index Values per Acre				
Tracts with Buildings	-	58.0	69.0	68.2
Tracts without Buildings	56.0	60.0	73.0	65.7
Managerial Input by Landowners (Leases)				
Managed the Tracts Personally	0	0	0	0
Hired Agents/Managers	0	0	0	0
Let Tenants Manage for Them	28	38	58	124
Managed Mutually with Tenants	0	0	0	0
Maximum Tillable Acres Specified (Leases)	0	0	0	0
Crop Rotations Specified (Leases)	0	0	0	0
Leases in Which Participation in Government Programs Decided by:				
Landowner	0	0	0	0

Table 18 (Continued)

Items	Counties			All Three Counties
	Crockett	Fayette	Lake	
Tenant	26	37	58	121
Both Parties	2	1	0	3
Distribution of Revenue from Government Programs to Tenant (Leases)				
1/2 of the Revenue	0	1	0	1
All of the Revenue	28	35	58	121

X_4 = Years of Occupancy on Tract by Tenant

X_5 = Length of the Lease (Years)

X_6 = Number of Miles from Tenant's Farm Base

The r^2 obtained with this model was .416380, which does not indicate very strong linear relationships between cash rental rate and the independent variables in the model. Yet this r^2 value may be considered high in terms of helping to pinpoint the importance of the independent variables. The regression coefficients, T Values, Partial F Values, and Standard Error of the Estimate are presented in Table 19.

Influence of Soil Productivity on Cash Rental Rates

The Soil Based Productivity Index was used as an independent variable in explaining cash rental rates. How this Soil Based Productivity Index was derived from the county soil maps was described in Chapter I. If this index is accepted as a reliable measure of productivity, economic theory suggests a positive correlation between productivity and cash rent. The estimated regression coefficient for the Productivity Index was positive as expected.

The chance of accepting the regression coefficient of the Soil Based Productivity Index as being significantly different from zero and it in fact being equal to zero was .0059. At this level of probability, the regression coefficient can be accepted as being different from zero. Results of the regression indicate that the productivity of land significantly contributes to the prediction, or explanation, of cash rental rates.

Table 19. Analysis of Parameters Obtained by the Multiple Regression Model

Independent Variables	Regression Coefficients	T Value for H_0	Probability $> T $	F Value	Probability $> F$	Std. Error of Estimate
Soil Based Productivity Index X_1	.42048656	2.87	.0059	8.23	.0059	.14656017
Percent of Total Acres Tillable X_2	.34815460	4.90	.0001	23.99	.0001	.07108400
Number of Tillable Acres X_3	.02985311	2.09	.0414	4.37	.0414	.01428461
Years of Occupancy on Tract X_4	.20520293	.95	.3463	.90	.3463	.21596705
Length of Lease (Years) X_5	-.05131364	-1.14	.2613	1.29	.2613	.04519526
Number of Miles from Tenant's Farm Base X_6	.17081786	.49	.6258	.24	.6258	.34827302

INTERCEPT = -25.35670651

R-SQUARE = .416380

The relationship between cash rental rates and Soil Based Productivity Index values is also examined in Table 20. Although the degree of influence exerted by productivity is not quantified in Table 20, the data does seem to indicate a positive relationship between the two variables. It can also be seen that the variations of the average Productivity Index values were not very great.

Influence of Percent of Total Acreage

Tillable on Cash Rental Rates

On an individual tract basis, the percent of total acreage that was tillable was calculated to give some indication of field shape. A tract with a high percent of tillable land usually has larger and fewer fields. The hypothesis to be tested was whether cash rent rose as the percent of each tract tillable increased. For example, irregular field shape (represented by a low value or percent) should entail somewhat higher operating costs than would a rectangular piece of land. Therefore, all else being equal, the irregular shaped tract of land should rent for less. The sign of the coefficient for the independent variable (percent tillable) was positive. This positive sign concurs with the hypothesis.

The probability that the regression coefficient for the variable, Percent of Total Acres Tillable, is significantly different from zero is .9999. Thus, it appears that the percentage of a given tract that was tillable is reflected in cash rental rate to a significant degree.

The average percent tillable figures for the cash rent categories (Table 21) did not exhibit any distinctive patterns on a county basis as

Table 20. Relationship Between Cash Rental Rates per Tillable Acre and Soil Based Productivity Index Values for Selected Cash Leased Tracts in Two Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
<u>Fayette County</u>											
Number of Tracts	3	20	6	3	0	0	0	0	0	0	
Number of Tillable Acres	310	2,596	1,112	400	0	0	0	0	0	0	
Average Productivity Index per Acre	61.5	65.2	79.3	85.6	-	-	-	-	-	-	
<u>Lake County</u>											
Number of Tracts	0	3	6	27	5	5	5	0	1	0	
Number of Tillable Acres	0	588	690	4,304	1,566	1,136	0	50	0	0	
Average Productivity Index per Acre	-	73.5	78.1	81.4	75.5	72.1	-	72.8	-	-	

Table 20 (Continued)

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
Fayette and Lake Counties											
Number of Tracts	3	23	12	30	5	5	5	0	1	0	
Number of Till- able Acres	310	3,184	1,802	4,704	1,566	1,136	0	50	0	0	
Average Pro- ductivity Index per Acre	61.5	66.7	78.8	81.8	75.5	72.1	-	72.8	-	-	

Table 21. Relationship Between Cash Rental Rates per Tillable Acre and Percent of Total Acreage Tillable for Selected Cash Leased Tracts in Two Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre								
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100
<u>Fayette County</u>										
Number of Tracts	3	17	5	3	0	0	0	0	0	0
Average Percent of Tracts Tillable	69.3	64.7	53.4	58.5	-	-	-	-	-	-
<u>Lake County</u>										
Number of Tracts	0	1	5	20	4	3	0	1	0	0
Average Percent of Tracts Tillable	-	63.8	96.4	91.7	92.8	95.2	-	100.0	-	-
<u>Both Counties</u>										
Number of Tracts	3	18	10	23	4	3	0	1	0	0
Average Percent of Tracts Tillable	69.3	64.6	74.9	87.4	92.8	95.2	-	100.0	-	-

cash rent increased. However, the average percent tillable figures for Fayette and Lake Counties combined seem to indicate a direct relationship between the two variables.

Influence of Tract Size on the Cash Rental Rate

The number of tillable acres in the tracts was an independent variable used to represent size in the regression model. The estimated regression coefficient was positive, which indicates that cash rent per tillable acre increased as the size of the tract increased. The coefficient could be considered significantly different from zero with only .0414 probability of error.

An examination of the data in Table 22 by county seems to support the regression results. Apparently, the size of the tracts does help explain the cash rental rates. The relationship would probably become clearer if the study included more cash leases.

Influence of Years of Occupancy by Tenants on Cash Rental Rate

It is plausible that landowners might be willing to accept relatively lower cash rents from tenants with proven production capacities. To examine this possibility, the number of years of occupancy on tracts by the tenants was used as an independent variable in the regression model. The coefficient obtained had a positive sign which does not appear to support the negative relationship expected between cash rental rates and years of occupancy by tenants.

Table 22. Relationship Between Cash Rental Rates per Tillable Acre and Number of Tillable Acres per Selected Cash Leased Tract in Three Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
<u>Crockett County</u>											
Number of Tracts	-	-	2	2	5	9	7	2	1		
Average Number of Tillable Acres per Tract	-	-	18	32	125	122	139	35	175		
<u>Fayette County</u>											
Number of Tracts	3	21	7	3	0	0	0	0	0		
Average Number of Tillable Acres per Tract	103	141	171	133	-	-	-	-	-		
<u>Lake County</u>											
Number of Tracts	1	3	7	34	5	5	0	1	0		
Average Number of Tillable Acres per Tract	60	196	111	168	313	227	-	50	-	86	

Table 22 (Continued)

Cash Rent in Dollars per Tillable Acre										
	10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
All Three Counties										
Number of Tracts	4	24	16	39	10	14	7	3	1	
Average Number of Tillable Acres per Tract	93	147	126	159	219	160	139	40	175	

The regression coefficient for the variable, Years of Occupancy, was significantly different from zero at the .3463 level. Therefore, it is not likely that this independent variable contributes to the prediction of cash rental rates. Additional information concerning the relationship between years of occupancy and the cash rental rate is provided in Table 23.

Influence of Length of the Lease on Cash Rental Rate

Intuitively, it seems that the longer the lease, the higher the cash rental rate should be. For example, during the span of a five-year lease, land values would be expected to increase. If the landowner sets the rental rates such that he would receive a satisfactory return on his contributions the first year of a five-year lease, in the fifth year the rate of return might be considerably lower than what he desired. It follows that the landowner might require a relatively higher rental rate for a five-year lease than for a shorter term lease.

The regression coefficient estimated for X_5 , Length of the Lease, had a negative sign which does not support the above hypothesis. The proposed theory may well be legitimate yet be insignificant when all other variables are taken into account. Unfortunately, the data collected in this study did not consider whether 1980 was year one or later in multi-year leases. The analysis revealed that there was .2613 chance of the regression coefficient being not different from zero. It may therefore be concluded that the length of the lease had little or no

Table 23. Relationship Between Cash Rental Rates per Tillable Acre and Years of Occupancy of Tenants on Selected Cash Leased Tracts in Three Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
<u>Crockett County</u>											
Number of Tracts	0	0	2	2	5	9	7	2	1		
Average Number of Years of Occupancy	-	-	16.5	16	8.4	11.1	5.7	1.5	6		
<u>Fayette County</u>											
Number of Tracts	3	21	7	3	0	0	0	0	0		
Average Number of Years of Occupancy	9.3	6.4	5.6	8.7	-	-	-	-	-		
<u>Lake County</u>											
Number of Tracts	1	3	7	34	5	5	0	1	0		
Average Number of Years of Occupancy	32	4	12.9	12.6	14	11	-	2	-		

Table 23 (Continued)

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
All Three Counties											
Number of Tracts	4	24	16	39	10	14	7	3	1		
Average Number of Years of Occupancy	15	6.1	10.1	12.4	11.2	11.1	5.7	1.7	6		

influence on the cash rental rate. No conclusion can be drawn about the relationship between the length of the lease and the cash rental rate from the data in Table 24. It is interesting to note that there are no indefinite term leases under which cash rental rates are above sixty dollars per tillable acre.

Influence of Distance of Tracts from Tenants'

Farming Bases on Cash Rental Rates

The underlying theory in using distance as an independent variable in the regression model is that the greater the distance a given tract is from an operator's base, *ceteris paribus*, the higher the marginal costs of operating on the tract. It follows that tenants should be willing to pay more to lease tracts close to their farm bases. But, the estimated regression coefficient had a positive sign which indicates the opposite. It is possible that the marginal costs associated with travel to leased tracts were negligible within the distances involved. Tenants may not have considered it practical to lease tracts that would have involved considerably higher marginal costs due to location. Also, where competition between operators for land to lease existed, those operators with locational advantages could bid up the rental rates. Operators with farm bases more distantly located would have to pay rental rates equal to that operators closer to the tracts would be willing to pay.

Results of the regression analysis indicate that the coefficient for the distance variable is insignificant. Data in Table 25 appear to support this conclusion. Although it is likely that tenants would

Table 24. Relationship Between Cash Rental Rates per Tillable Acre and Length of Leases for Selected Cash Leased Tracts in Three Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
Crockett County											
Number of Leases		0	0	2	2	5	9	7	2	1	
Average Length of Leases that have Specified Terms (Years)		-	-	1	1	1	1.44	1	1	3	
Number of Leases with Indefinite Length		0	0	0	0	1	0	0	0	0	
Fayette County											
Number of Leases		3	21	7	3	0	0	0	0	0	
Average Length of Leases that have Specified Terms (Years)		1.67	2.43	3.14	1.67	-	-	-	-	-	
Number of Leases with Indefinite Length		0	0	0	0	0	0	0	0	0	
											92

Table 24 (Continued)

Cash Rent in Dollars per Tillable Acre										
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100
<u>Lake County</u>										
Number of Leases	1	3	7	34	5	5	0	1	1	0
Average Length of Leases that have Specified Terms (Years)	1	-	1	1	1	1.80	-	1	1	-
Number of Leases with Indefinite Length	0	3	3	11	1	0	0	0	0	0
<u>All Three Counties</u>										
Number of Leases	4	24	16	39	10	14	7	3	3	1
Average Length of Leases that have Specified Terms (Years)	1.50	2.43	2.15	1.07	1	1.57	1	1	1	3
Number of Leases with Indefinite Length	0	3	3	11	2	0	0	0	0	0
										93

Table 25. Relationship Between Cash Rental Rates per Tillable Acre and Distance of Selected Cash Leased Tracts from Tenants' Farming Bases in Three Tennessee Counties, 1980

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
<u>Crockett County</u>											
Number of Tracts	0	0	1	1	5	9	7	2	1		
Average Distance of Tracts from Bases (mi.)	-	-	2	0	5.6	5.4	4.7	3.5	2		
<u>Fayette County</u>											
Number of Tracts	3	21	7	3	0	0	0	0	0		
Average Distance of Tracts from Bases (mi.)	9.3	3.5	4.9	10.3	-	-	-	-	-		
<u>Lake County</u>											
Number of Tracts	1	3	7	33	5	5	0	1	0		
Average Distance of Tracts from Bases (mi.)	3	3	5	6.2	5.2	5.2	-	4	-		

Table 25 (Continued)

		Cash Rent in Dollars per Tillable Acre									
		10-20	20.01-30	30.01-40	40.01-50	50.01-60	60.01-70	70.01-80	80.01-90	90.01-100	
All Three Counties											
Number of Tracts	4	24	15	37	10	14	7	3	1		
Average Distance of Tracts from Bases (mi.)	7.8	3.4	4.7	6.3	5.4	5.4	4.7	3.7	2		

intuitively try to equate marginal costs and marginal revenues, other factors such as availability of tracts could have been more important.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Summary

Crop-Share Leases

With crop-share leases, variable expenses and crop revenue should be shared in the same proportion in order to have the optimal combination of inputs employed. This principle was often violated by the crop-share leases examined in this study. It was not unusual for tenants to pay 100 percent of certain variable costs of production. Exceptions were fertilizer costs, which were generally shared by landowners in proportion to the share of the crops they received. Associated costs (lime, brush killer, and various maintenance items) were shared in almost every conceivable manner. In addition to proportionate sharing of the revenue and variable costs, each competitive crop should be shared in the same proportion. Otherwise, the parties to the lease would have incentives to move away from the profit maximizing combination of crop enterprises. Landowners received equal shares of gross production for competitive crops grown on the same leased tracts in all but four leases examined. Generally, landowners received 1/4 or 1/3 of the crop production as payment for crop-share leased tracts.

Of the crop-share leases included in this study, a majority of the lease forms introduced additional uncertainty (above that normally existing in agricultural production) into crop production. Fifty-six percent of all

crop-share leases examined were for one year, with no provisions for automatic renewal. Twenty percent were one-year leases with automatic renewal. Sixteen percent of the crop-share leases had no specified length. The remaining 8 percent of the leases had terms of 3, 5, or 10 years. Only 14 percent of the crop-share leases studied were under written agreements. Tracts leased with written agreements averaged almost twice the number of tillable acres as those involving oral agreements. Fifteen percent of the crop-share leases studied contained reimbursement agreements. Thirteen of these leases (10 percent of the total number studied) provided for reimbursement for lime and 7 leases (6 percent) specified reimbursement for soil conservation structures. In 72 percent of the crop-share leases examined, neither party reserved any specific rights. The most common right reserved was that the landowner prohibited subleasing by the tenant.

Cash Leases

Results of this study indicated that the landowners with cash leases in Crockett County received the highest average rent per tillable acre. Fayette County landowners received the lowest average rent per tillable acre. None of the cash leases were adjusted by indices to account for changes in input costs, crop prices or yields. Six leases in Lake County did adjust cash rental payments in the event of flooding.

Forty-five percent of the leases were one year in duration and contained no provision for automatic renewal, which can incorporate additional uncertainty to the production process. An additional 14

percent were one-year leases with automatic renewal. Fourteen percent of the cash leases were for 3 years and 15 percent were of an unspecified length. Forty-five percent of the cash leases were written. Only a slight difference existed in average number of tillable acres per tract between those cash leased under written and oral agreements. Sixteen percent of the cash leases in this study contained reimbursement agreements. Fourteen of these leases (11 percent of the total) dealt with reimbursement for lime and 5 (4 percent) specified reimbursement for soil conservation structures. In 64 percent of the cash leases, neither party reserved any specific rights. When rights were reserved in the leases, they most often prohibited the tenants from subleasing the tracts.

Results of the multiple regression model employed in this study indicated that the productivity of the cash leased tracts significantly affected their cash rental rates. There was a significant, positive relationship between the percent of total acres that were tillable on cash leased tracts and the cash rental amounts. In addition, cash rent per tillable acre was positively related to the size of cash leased tracts measured in tillable acres. Other independent variables employed in the regression model (number of years of occupancy by tenants, length of the leases, and distance of tracts from tenants' farming bases) were not significantly related to cash rental rates.

Conclusions and Implications

Variable expenses associated with crop production were usually not equitably shared in the crop-share leases studied. Due to such inequities, parties involved did not have the same incentives to use the

optimum amounts of inputs. Therefore, it is doubtful that the profits of the various crops were at the optimum levels.

There is no doubt that the form of many of the cash and crop-share leases introduced excessive uncertainty into the production processes. The absence of written agreements, reimbursement clauses, and reservation of specific rights in the majority of the leases studied support this conclusion. Omission of these important components of efficient leases likely resulted in some degree of exploitation of these tracts.

Obviously, many farm operators found it necessary to expand their land bases by leasing. Apparently they were willing to pay higher rents for relatively larger tracts. This relationship may be explained by the time and monetary savings operators could realize by not having to relocate machinery and other necessary inputs. There was also evidence that landowners preferred to lease tracts that were high in productivity and contained a large percent of tillable acres. Average costs of production per unit output, excluding the cost of land, would be relatively low on land of this quality.

LIST OF REFERENCES

LIST OF REFERENCES

1. Barry, P. J., J. A. Hopkin, and C. B. Baker. Financial Management in Agriculture. The Interstate Printers and Publishers, Inc., Danville, Ill., 1979.
2. Case, H. C. M., and F. J. Reiss. Farm Leases for Illinois. College of Agriculture, Ext. Ser. in Ag. and Home Econ., University of Ill., Circular 781, Sept. 1957.
3. Census of Agriculture, 1978. U.S. Dept. of Commerce, Bureau of the Census, TN. State and County Data, Vol. 1, Part 42, April 1981.
4. Chryst, W. E., and J. F. Timmons. Adjusting Farm Rents to Changes in Prices, Costs and Production. Agr. Exp. Sta., Iowa State College, Special Report No. 9, April 1955.
5. Doll, John P., and Frank Orazem. Production Economics. Grid Inc., Columbus, Ohio, 1978.
6. Falconer, J. I., and H. R. Moore. Ohio Farm Leases. Ohio Agr. Exp. Sta., Ohio State University, Research Bulletin 749, Oct. 1954.
7. Farm Real Estate Market Developments. Economics, Statistics, and Cooperative Service, USDA, CD-83, July 1978.
8. Heady, E. O. "Economics of Farm Leasing Systems." Journal of Farm Economics, Vol. 29, No. 3, August 1947, pp. 659-678.
9. Heady, E. O., and E. W. Kehrberg. Relationship of Crop-Share and Cash Leasing to Farming Efficiency. Dept. of Economics and Sociology, Agr. Exp. Sta., Iowa State College, Research Bulletin 386, May 1952.
10. Heady, E. O. Economics of Agricultural Production and Resource Use. Prentice-Hall, Inc., New York, 1952, pp. 587-638.
11. Heady, E. O. Marginal Productivity of Resources and Imputation of Shares For Cash and Share Rented Farms. Dept. of Economics and Sociology, Agr. Exp. Sta., Iowa State College, Research Bulletin 433, Oct. 1955.
12. Ho, S. P. S. "Uncertainty and the Choice of Tenure Arrangements: Some Hypothesis." American Journal of Agricultural Economics, Vol. 58, No. 1, Feb. 1976, pp. 88-92.

13. Hurlburt, V. L. Farm Rental Practices and Problems in the Midwest. Agr. Exp. Sta., Iowa State College, Research Bulletin 416, Oct. 1954.
14. Lee, Warren F., et al. Agricultural Finance. The Iowa State University Press, Ames, 1980.
15. Moore, J. M. Leasing Land for Cash Grain. Dept. of Agr. Economics, Cooperative Extension Service, Virginia Polytechnic Institute and State University, No. 299, Feb. 1979.
16. Reiss, F. J. Farm Lease Practices in East-Central Illinois. Agr. Exp. Sta., University of Illinois, Bulletin 677, Sept. 1961.
17. Reiss, F. J. What is a Fair Crop-Share Lease. College of Agriculture, Cooperative Extension Service, Univ. of Illinois, Circular 918, Oct. 1965.
18. Reiss, F. J. Farm Lease Practices in Western Illinois. Agr. Exp. Sta., Univ. of Illinois, Bulletin 728, March 1968.
19. Reiss, F. J. Farm Leasing Practices in Southern Illinois. Agr. Exp. Sta., Univ. of Illinois, Bulletin 745, Dec. 1973.
20. Reiss, F. J., and R. E. Lahne. Farm Leasing Practices in Six Northwestern Illinois Counties in 1979. Agr. Exp. Sta., Univ. of Illinois, Bulletin AE-4483, August 1979.
21. Rutz, Glen. "Land Leases Commonly Handicap Farmers' Efforts to Make Profits." Delta Farm Press, January 1, 1982, pp. 10-11, 38.
22. Rutz, Glen. "Cash Crop Leases: Flexing Formula Adjusts for Yield, Price, Cost." Delta Farm Press, January 15, 1982, pp. 32-33.
23. Schickele, R. "Effect of Tenure Systems on Agricultural Efficiency." Journal of Farm Economics, Vol. 23, No. 1, Feb. 1941, pp. 185-207.
24. Tennessee County Estimates, Corn 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 8, 1981.
25. Tennessee County Estimates, Cotton 1979-1980. Tennessee Crop Reporting Service, U.S. Dept. of Agr., May 28, 1981.
26. Tennessee County Estimates, Soybeans 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 21, 1981.
27. Tennessee County Estimates, Wheat 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., March 16, 1981.

28. Tennessee Farm Facts, Tennessee Crop Reporting Service, U.S. Dept. of Agr., August 1979.
29. Timmons, J. F. Improving Farm Rental Arrangements in Iowa. Dept. of Economics and Sociology, Agr. Exp. Sta., Iowa State College, Research Bulletin 393, January 1953.

APPENDICES

APPENDIX A

DATA LIMITATIONS

The operators included in this study can in no way be considered as statistically representative of Tennessee, or of the counties concerned. It should be noted that the amount of data collected concerning each of the four crop categories is not statistically related to the actual acreage of each crop in the three counties, but gives enough responses to find economic efficiency or lack thereof in the leases. This data is presented in Tables 26 and 27. Operators leasing more than one tract of land were requested to provide information on as many of their leases as possible. However, cases arose where it would have been an imposition on the operators to attempt obtaining data on each of 10 or more tracts.

Operators were requested to identify each of the leased tracts on soil maps for use in examining the productivity of the leaseholds. In conducting the study, the use of soil maps uncovered some difficulties. Perhaps the most limiting factor was that no soil map was available for Crockett County at the time of the study. In addition, many operators in Fayette and Lake Counties had difficulty outlining the tracts they leased on the soil maps.¹¹ Errors were made in the amount of acreage which some tracts contained which influenced the Soil Based Productivity

¹¹The latest soil maps available were made in 1970. Many leased tracts contained fields that had been changed in this ten-year period.

Table 26. Acreage of Corn, Cotton, Soybeans, and Wheat on Selected Cash and Crop-Share Leased Tracts in Three Tennessee Counties, 1980

Crop	Counties						All Three Counties	
	Crockett		Fayette		Lake		Acres	Percent
	Acres	Percent	Acres	Percent	Acres	Percent		
Corn	5	(0)	832	(7)	320	(1)	1,157	(3)
Cotton	5,916	(60)	2,410	(22)	695	(3)	9,021	(21)
Soybeans	3,217	(33)	7,375	(66)	14,481	(65)	25,073	(58)
Wheat	714	(7)	525	(5)	6,653	(30)	7,892	(18)

Table 27. Preliminary Acreage of Corn,^a Cotton,^b Soybeans,^c and Wheat^d in Three Tennessee Counties, 1980

Crop	Counties						All Three Counties	
	Crockett		Fayette		Lake		Acres	Percent
	Acres	Percent	Acres	Percent	Acres	Percent		
Corn	3,200	(2)	8,000	(5)	500	(1)	11,700	(3)
Cotton	62,300	(47)	29,200	(18)	4,560	(5)	96,060	(24)
Soybeans	59,000	(45)	121,000	(74)	77,000	(78)	257,000	(65)
Wheat	7,500	(6)	4,700	(3)	17,300	(17)	29,500	(8)

^aTennessee County Estimates, Corn 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 8, 1981.

^bTennessee County Estimates, Cotton 1979-1980. Tennessee Crop Reporting Service, U.S. Dept. of Agr., May 28, 1981.

^cTennessee County Estimates, Soybeans 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., April 21, 1981.

^dTennessee County Estimates, Wheat 1980 Preliminary. Tennessee Crop Reporting Service, U.S. Dept. of Agr., March 16, 1981.

Indices of those tracts. In cases in which such an error was suspected, the resulting Soil Based Productivity Index was deleted from the analysis.

Without doubt, a more extensive study using random sampling would have been desirable. However, in Lake County the population of tenants and part-owners was not very large. This limited number added to the degree of difficulty in obtaining a good random sample with the time and financial restraints that were imposed. Despite the lack of random sampling techniques employed, common inefficiencies in the leases studied were apparent. Even though statistical inferences from this study must be made with caution, weaknesses found in the leases studied undoubtedly exist in leases throughout Tennessee.

APPENDIX B

QUESTIONNAIRE

County _____

Interview # _____

GENERAL INFORMATION

Education level obtained by operator _____

[By observation: approximate age of operator _____]

How many acres do you own? _____ (acres)

How many acres are in each leased tract of land?

	Tract A	Tract B	Tract C	Tract D	Tract E
Cash leased	_____	_____	_____	_____	_____
	Tract F	Tract G	Tract H	Tract I	Tract J
Crop-share leased	_____	_____	_____	_____	_____

Do you have any additional leases involving a livestock operation? If yes, how many? ____ Yes; ____ No

Is base (headquarters) for farming operation on owned land? ____ Yes ____ No
If no, which tract(s) of land is base on? ____ [letter of tract(s)]

Approximate distances of leased tracts from base: (miles)

Tract A	Tract B	Tract C	Tract D	Tract E	Tract F	Tract G	Tract H
_____	_____	_____	_____	_____	_____	_____	_____
Tract I	Tract J						
_____	_____						

List the letters of tracts leased from the same landowner: _____

Others working with you on the farming operation this year:

- Wife _____ (months)
- Son(s) or son(s)-in-law _____ (months)
- Father or father-in-law _____ (months)
- Others (specify) _____ (months)

County _____

Interview # _____

Cash Rented Tracts

	Tract A	Tract B	Tract C	Tract D	Tract E
Size of cash rented tract total acres					
acres cropped					
acres in pasture or hay					
Cash rent for 1980 total rent					
If specified in lease: rent per cropped acre					
rent per acre pasture or hay					
What percentage of the 1980 crop is the rent?					
Is the rent the 1980 value of a standing amount of the product?	____ Yes ____ No	____ Yes ____ No	____ Yes ____ No	____ Yes ____ No	____ Yes ____ No
If yes, how is the dollar value determined? [Be sure to specify letter of the tract(s)]					

[Use back if necessary]

Is the cash rent adjusted by an index each year to account for changes in costs, prices, or crop yields?

A	B	C	D	E
☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ No	☐ No	☐ No	☐ No	☐ No

If yes, what method is used?
[specify tracts]

Are there any provisions in the lease to account for drastic price reductions or crop failure?

A	B	C	D	E
☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ No	☐ No	☐ No	☐ No	☐ No

If yes, what method is used?
[specify tracts]

How and when is the cash rent payable

Dates of payments in
1980

A	B	C	D	E

Acres of each crop on leased tracts

	A	B	C	D	E
Corn					
Cotton					
Soybeans					
Small Grains					
Other [specify]					
If double crop rotation indicate due crops					
Yield per acre [average of past 3 years]					
Corn					
Cotton					
Soybeans					
Small Grains					
Other [specify]					

CRANESFEST CRIST

	A	B	C	D	E
List buildings and storage facilities on cash-rented tract if their use goes with rent					
List any of the above facilities <u>not</u> used in the operation					
What extra cash amount is included in the lease for buildings?	\$	\$	\$	\$	\$
How long have you been farming this tract of land? [years]					
Is this cash lease in writing?	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
Lease period is for:	Yr(s)	Yr(s)	Yr(s)	Yr(s)	Yr(s)
In what month does your lease year begin?					
Is automatic renewal specified in the lease?	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
How long prior to the end of the lease period must notice of termination be given by LLD?					
How long prior to the end of the lease period must notice of termination be given by operator?					
	Tract A	Tract B	Tract C	Tract D	Tract E
Is a reimbursement clause associated with or attached to the lease?	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
If yes, check items below that are included and indicate method of reimbursement used					
limestone method					
rock phosphate method					
terraces method					
other soil conserving structures [i.e., ponds, dams] method					
relocating fences method					
drainage tiles, grass waterways, permanent ditches method					
improvements on buildings method					

[i.e., a) landowner reimburses operator for full cost and takes possession, b) costs shared in proportion to benefits received, c) yearly depreciated value calculated and operator reimbursed for any unused benefits]

	Tract A	Tract B	Tract C	Tract D	Tract E
Soil conservation: Is a maximum # of acres that can be tilled specified?					
Is a minimum # of acres that must be left in grass specified?					
Is a crop rotation plan specified?					
What soil conserving struc- tures do you feel are needed on the tract?					
How is land owned?	////////	////////	////////	////////	////////
fee simple					
life estate					
estate or trust					
corporate					
List any benefits you receive not specified in the lease [i.e., keeping livestock for personal consumption, garden plot, firewood, etc.]					
Location of tracts on soil map [page #]					

County _____
Interview # _____

Crop-Share Rented Tracts

	Tract F	Tract G	Tract H	Tract I	Tract J
Size of crop-share rented tracts	////////	////////	////////	////////	////////
total acres					
acres cropped					
acres in pasture/hay					
List buildings and storage facilities on share-rented tracts if their use is included in lease					
List any of the above facilities <u>not</u> used in the operation					
List any of the facilities for which a separate cash payment is made and amounts paid					
How long have you been farming this tract of land? [years]					
How long do you expect to be operating on this tract					
Is this lease written?	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
Lease period is for:	Yr(s)	Yr(s)	Yr(s)	Yr(s)	Yr(s)
In what month does your lease year begin?					
Is automatic renewal specified in the lease	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
How long prior to the end of the lease period must notice of termination be given by landowner?					
How long prior to the end of the lease period must notice of termination be given by operator?					
	Tract F	Tract G	Tract H	Tract I	Tract J
Is a reimbursement clause associated with or attached to the lease	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>	<u>Yes</u> <u>No</u>
If yes, check items below that are included and indicate method of reimbursement used	[i.e., a) landowner reimburses operator for full cost and takes possession, b) costs shared in proportion to benefits received, c) yearly depreciation value calculated and operator reimbursed for any unused benefits]				
limestone method					
rock phosphate method					
terraces method					
other soil conserving structures [ponds, dams] method					
relocating fences method					

	Tract F	Tract G	Tract H	Tract I	Tract J
Reserved by operator:					
to farm additional land					
to hold off-farm job					
to remove crop residues					
or hay					
other [specify]					
Soil Conservation:					
Is a maximum # of acres that can be tilled specified?					
Is a minimum # of acres that must be left in grass specified?					
Is a crop rotation plan specified?					
What soil conserving structures do you feel are needed on the tract?					
How is land owned?	////////	////////	////////	////////	////////
fee simple					
life estate					
estate or trust					
corporate					
List any benefits you receive not specified in the lease [i.e., keeping livestock for personal consumption, garden plot, firewood, etc.]					
If grew corn	Tract F	Tract G	Tract H	Tract I	Tract J
double cropped with:					
acres grown					
approx. yield per acre [average of last 3 yrs.]					
number of rent payments per year					
dates of payments [1980]	___	___	___	___	___
	___	___	___	___	___
[Basis for actual payment]					
Is the unit price for crop determined on specific date?	Yes ___ No	Yes ___ No	Yes ___ No	Yes ___ No	Yes ___ No
Unit price determined on specific market/location?	Yes ___ No	Yes ___ No	Yes ___ No	Yes ___ No	Yes ___ No

	Tract F	Tract G	Tract H	Tract I	Tract J
If grew cotton					
double cropped with:					
acres grown					
approx. yield per acre					
[average of last 3					
yrs]					
number of rent payments					
per year					
dates of payments					
[1980]					
[Basis for actual payment]					
Is the unit price for crop	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
determined on specific	☐ No	☐ No	☐ No	☐ No	☐ No
date?					
Unit price determined on	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
specific market/location?	☐ No	☐ No	☐ No	☐ No	☐ No
If grew soybeans double					
cropped with:					
acres grown					
approx. yield per acre					
[average of last 3					
yrs.]					
number of rent payments					
per year					
dates of payments					
[1980]					
[Basis for actual payment]					
Is the unit price for crop	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
determined on specific	☐ No	☐ No	☐ No	☐ No	☐ No
date?					
Unit price determined on	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
specific market/location?	☐ No	☐ No	☐ No	☐ No	☐ No
If grew small grains (speci-					
fy) double cropped with:					
acres grown					
approx. yield per acre					
[average of last 3					
years]					
number of rent payments					
per year					
dates of payments [1980]					
[Basis for actual payment]					
Is the unit price for crop	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
determined on specific	☐ No	☐ No	☐ No	☐ No	☐ No
date?					
Unit price determined on	☐ Yes	☐ Yes	☐ Yes	☐ Yes	☐ Yes
specific market/location?	☐ No	☐ No	☐ No	☐ No	☐ No

		Tract F	Tract G	Tract H	Tract I	Tract J
Share of crop landowner receives [i.e., none, 1/3, 2/5, 1/2, etc.] or portion of custom rate						
	corn					
	cotton					
	soybeans					
	small grains					
Landowner's share of costs [i.e., none, all, 1/3, 2/5, 1/2, etc.]						
SEED	corn					
	cotton					
	soybeans					
	small grains					
FUNGICIDES	corn					
	cotton					
	soybeans					
	small grains					
HERBICIDES	corn					
	cotton					
	soybeans					
	small grains					
INSECTICIDES	corn					
	cotton					
	soybeans					
	small grains					
DEFOLIANT						
LIME	corn					
	cotton					
	soybeans					
	small grains					
NITROGEN	corn					
	cotton					
	soybeans					
	small grains					
FERTILIZER P ₂ O ₅	corn					
	cotton					
	soybeans					
	small grains					
K ₂ O	corn					
	cotton					
	soybeans					
	small grains					
BRUSH KILLER						
FUEL FOR TRACTORS						
FUEL FOR TRUCKS [CARS]						
POWER FOR CROP DRYING						
	picking ear corn					
	silage cutting and filling					
	corn					
	Combining soybeans					
	small grains					
PICKING COTTON						
BALING STRAW						
COTTON GINNING						

	Tract F	Tract G	Tract H	Tract I	Tract J
HAULING to market					
OF to off-farm storage					
PRODUCT beyond ____ miles					
OTHER					
LIST EQUIPMENT [OR PORTION OF] SUPPLIED BY LANDOWNER [specify and indicate portion by: all, 1/3, 2/5, 1/2, etc.]					
MAINTENANCE					
Who furnishes paint for buildings	_L _O	_L _O	_L _O	_L _O	_L _O
Who pays for/does painting	_L _O	_L _O	_L _O	_L _O	_L _O
Furnishes material for bldg repair	_L _O	_L _O	_L _O	_L _O	_L _O
Furnishes material for fence repair	_L _O	_L _O	_L _O	_L _O	_L _O
Who pays for/does bldg. repair	_L _O	_L _O	_L _O	_L _O	_L _O
Who pays for/does fence repair	_L _O	_L _O	_L _O	_L _O	_L _O
Who maintains farm driveway	_L _O	_L _O	_L _O	_L _O	_L _O
Who maintains farm terraces	_L _O	_L _O	_L _O	_L _O	_L _O
Who maintains farm waterways, ditches, dams, etc.	_L _O	_L _O	_L _O	_L _O	_L _O
Location of tracts on soil map [page #]					



APPENDIX C

EXAMPLE OF THE CALCULATION OF PRODUCTIVITY INDEX

Best Estimated Yields in West Tennessee

Soybeans	46 bu.
Cotton	900 lbs.
Corn	125 bu.
Wheat	56 bu.

<u>Soil Types</u>	<u>Predicted Yields</u>			
	<u>Soybeans</u>	<u>Cotton</u>	<u>Corn</u>	<u>Wheat</u>
Adler silt loam	46 bu.	900#	125 bu.	52 bu.
Commerce silt loam	38 bu.	775#	100 bu.	36 bu.
Bowdre silty clay	40 bu.	650#	80 bu.	42 bu.

Determination of Crop Yield for Bowdre Silty Clay

		<u>Crop Weight^a</u>
Soybeans:	$\frac{100}{46 \text{ bu.}} = \frac{X1}{40 \text{ bu.}}$	$X1 = 86.96 \times .794 = 69.0$
Cotton:	$\frac{100}{900\#} = \frac{X2}{650\#}$	$X2 = 72.22 \times .112 = 8.1$
Corn:	$\frac{100}{125 \text{ bu.}} = \frac{X3}{80 \text{ bu.}}$	$X3 = 64.00 \times .040 = 2.6$
Wheat:	$\frac{100}{56 \text{ bu.}} = \frac{X4}{42 \text{ bu.}}$	$X4 = 75.00 \times .054 = \underline{4.1}$
		83.8

(Repeat for each soil type)

productivity of
Bowdre silty clay

EXAMPLE OF THE CALCULATION OF PRODUCTIVITY INDEX
(Continued)

<u>Soil Type</u>	<u>Acre/Tract</u>	<u>% of Tract</u>		<u>Productivity of Soil Type</u>		
Adler	50.8	38	x	99.6	=	37.8
Commerce	80.7	60	x	81.9	=	49.1
Bowdre	<u>3.0</u>	2	x	83.8	=	<u>1.7</u>
	134.5					88.6*

^aCrop weight figures were calculated according to the proportion of total cropped acreage used in the production of each crop in Lake and Fayette Counties for the 1978 and 1979 production periods (24:25:26:27).

* Productivity Index of Tract.

EXAMPLE OF THE CALCULATION OF FARMER
ESTIMATED PRODUCTIVITY INDEX

<u>Crop</u>	<u>Yield</u>		<u>Crop Yield Index (A)</u>	<u>Acres Grown</u>	<u>% of Tract (B)</u>	<u>(A x B)</u>
Soybeans	22 bu.	$\frac{100 \times 22}{46} =$	47.8	200	70	33.46
Wheat	36 bu.	$\frac{100 \times 36}{56} =$	64.3	86	30	<u>19.29</u>
						52.75*

* Farmer Estimated Productivity Index.

APPENDIX D

DETERMINATION OF AN EQUITABLE REVENUE-SHARING ARRANGEMENT

A hypothetical crop-share leased tract will be used to demonstrate a method of determining an equitable revenue-sharing arrangement. Assume that 100 acres of soybeans double-cropped with wheat are produced on the leased tract.

Initially all fixed and associated cost items must be listed and an annual value placed on each of them. That list can then be subdivided to determine the contributions of each party to the fixed and associated costs. As can be seen in Table 28, the landowner contributed the crop land, use of a building, and lime. These contributions amounted to \$5,233 per year. All other fixed and associated cost items were provided by the tenant, totaling \$7,703. The landowner's contribution amounted to 40 percent of the total fixed and associated costs. Therefore, an equitable lease would provide that the landowner pay 40 percent of the variable costs and receive 40 percent of the crop revenue.

In reality, estimating the value of each parties' contributions is not an easy task. Choice of the interest rate for a satisfactory return on the land and buildings can greatly influence the results. Intangible items such as the value of the landowner's and/or tenant's management inputs are difficult to place values on. Nonetheless, the use of reasonable cost estimates in such an analysis gives each party a valuable basis for evaluating the lease.

Table 28. Determination of an Equitable Revenue-Sharing Arrangement

Items	Annual Value of Contributions		
	Total	Landlord	Tenant
Fixed and Associated Expenses:			
Land (Including interest, taxes, and insurance)	\$ 4,120	\$4,120	---
Buildings	250	250	---
Machinery Expenses (Fixed)	3,503	---	\$3,503
Labor (Tenant's and Family)	2,425	---	2,425
Lime ^a	863	863	---
Management	1,450	---	1,450
Maintenance of Waterways	325	---	325
Totals	\$12,936	\$5,233	\$7,703
Percent	100	40.5	59.5
Variable Expenses: ^b			
Seed	\$ 1,730	\$ 700	\$1,030
Fertilizer	3,000	1,200	1,800
Herbicide ^c	1,500	600	900
Machinery	3,000	1,200	1,800
Transportation of Crops	400	160	240
Totals	\$ 9,630	\$3,860	\$5,770
Percent	100	40.1	59.9

^aLime expense may be contributed by either party. Percent distribution of variable costs and revenue would be altered if the tenant financed the lime expense.

^bVariable expenses for both soybeans and wheat are incorporated in these estimated expenses.

^cProportionate sharing of the herbicide expense is based on the assumption that there is no substitution between herbicide and machinery use.

It is doubtful that the actual results of this type of analysis would indicate that an equitable lease could be attained by sharing costs and returns exactly in any traditional percentage. However, various associated costs, or portion of them, can be shifted between the parties in order to obtain an equitable sharing arrangement which is easily calculated.

VITA

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