FARMLAND LEASING AS A MEANS OF RESOURCE CONTROL IN U. S. LAND-BASED AGRICULTURE

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ABSTRACT

FARMLAND LEASING AS A MEANS OF RESOURCE CONTROL
IN U. S. LAND-BASED AGRICULTURE

By

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Structural changes of considerable magnitude continue to occur within the U. S. farming sector. Key dimensions of change are the process of farm consolidation and growth and the rising capital and credit intensity of agricultural production. The separation of farmland ownership and use through rental is believed to be an influential parameter of the physical, financial, and managerial organization of this sector. This study was launched to analyze (1) the farmland rental process, (2) the institutional framework through which it functions, and (3) the interrelationships of this process with current structural trends.

Based on data from the 1969 Census of Agriculture, about 38 percent of all farmland is rented. Since most of this land is rented from nonoperator landlords, this process must be regarded as an important source of capital input. Moreover, analysis of tenure by acreage size and economic class revealed a heavier emphasis on farmland leasing among the larger farm operations. The largest one-fifth of the operating units (in acres) account for about three-fourths of the rented farmland. No significant difference in

reliance on leasing was observed, however, among the various forms of financial organization.

The tenancy patterns observed confirm that farmland rental is highly interrelated with the structural adjustments occurring over the last few decades. More specifically, farmland rental has taken on a different dimension. Where once tenancy was considered a temporary rung on the tenure ladder to eventual full ownership, leasing is predominantly viewed today as an effective and frequently a permanent tool to achieving use rights to an adequate-size land base. In fact, where capital and credit limitations have prohibited land purchase, rental has been the operator's sole means of acreage size expansion. This is particularly evident in the land-based enterprises such as cash-grain farming. But even where no financial constraints to buying farmland exist, farm operators may prefer rental over purchase for economic reasons; i.e., based on an internal rate of return analysis of farmland investment alternatives over the relevant range of mortgage interest rates, net rents, and opportunity costs, rental is economically preferable unless rather substantial appreciation of farmland values is expected.

Despite the magnitude and importance of farmland leasing, findings of a case study of selected Corn Belt rental markets support the hypothesis that the rental market process is low keyed and informal in nature with little visible competition. The study found the market area to be quite localized with participants usually knowing each other before entering the market. A significant proportion of the leases were family arrangements. Information networks were largely through informal channels. Custom was also

found to be an important factor. As a result, respondents indicated a low incidence of active competition—both at the time of initial rental and at the periodic renewal. What emerges, then, is a rather paradoxical situation in which short-term, unwritten lease contracts are the rule, yet slow turnover rates and stable tenancy patterns prevail.

For the farm operator who has successfully rented farmland, such a market framework appears to be advantageous. The tenant generally can feel that so long as there is reasonable cooperation between himself and his landlord, he can be assured of a continuing agreement. Frequently it is only upon sale of the property or title transfer that the tenant's position is in jeopardy; and even the severity of resource loss due to such an event can be reduced considerably by multiple-unit leasing, which is characteristic of today's situation.

As for farm consolidation and growth process, this analysis supported the hypothesis that the availability of farmland to rent is influential. This was analyzed by incorporating probability factors for (1) renting land previously rented and (2) renting land not previously rented into a simulation growth model of a Corn Belt cash-grain farm. At probability levels representative of findings in the market case study, the effect was significant enough to reduce the ranking of rental strategy over some of the other growth strategies. It is concluded that rental can be the most accessible option of farm acreage size expansion for some farm operators, but certainly not for the farm population as a whole. Availability of land to rent is the crucial factor.

Land rent theory suggests several reasons why leasing prevents maximum resource efficiency. Yet empirical evidence to support this theory is meager and inconclusive. Findings of this study suggest that this is due in part to the failure of static theory to account for dynamic adjustments, such as the realization of size and scale economies of acreage expansion via rental. Also, the assumptions underlying much of the land rent theory no longer reflect conditions as observed in this analysis—most notable being the dominance of part-owner leasing, multiple-unit leasing, and a market setting conducive to strong and mutually beneficial landlord-tenant relationships. It is concluded there is little basis to support the theoretical proposition of resource inefficiency arising from tenancy.

While the present rental process facilitates resource efficiency, other criteria must be considered also. Flexibility of adjustment is hampered by custom, thereby reducing provisions for progress. Due to market imperfections there exists much inequality of access to rental land. The problem of fragmentation of viable operating units in intergenerational transfer is often aggravated by the present rental process. Then, also, environmental considerations as well as recent shifts in food and energy supplies place added pressure on this man-land institution. Because of these factors, the future holds increasing challenge for the policy maker in resolving land tenure conflicts.

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CHAPTER I

INTRODUCTION

". . . and remember the land is mine so you may not sell it permanently. You are merely my tenants and share croppers."

—Leviticus 25:23

Instructions of the Lord to Moses on Mount Sinai

1.1 The Problem Setting

The U. S. farming sector has been and continues to be in a rapid process of change. While there are many dimensions, key structural trends are (1) the process of farm consolidation and growth and (2) the rising capital and credit intensity of agricultural production.[1]

Farm numbers have steadily fallen from 6.1 million farms in 1940 to 2.9 million farms in 1970. Average farm size has more than doubled over this period as smaller units ceased operation and were incorporated into larger farming operations. In addition to this dramatic reduction in aggregate numbers, resource control and agricultural production are now concentrated within the larger operating units. More than half of all production of farm marketings

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[1]In this study the word, structure, will refer to the organization, ownership, and control of agricultural production units. Included in this concept are such factors as farm size and numbers, capital and land tenure characteristics, managerial control, exit and entry opportunities, firm growth, and information flow.

in 1969 took place on the 223,000 largest farms (farms grossing more than $40,000 annually [53].[1] Technological advancement is one of the primary factors underlying this adjustment. Maintaining or expanding farm income through capital-labor substitution and the capturing of size economies have encouraged the expansion of operating units.

Obviously, not all farm operators can or do take the expansion route. Some accept lower returns to their resources than the opportunity costs and do not alter their production unit. Some leave farming entirely, while other operators adjust through supplemental off-farm employment. Nevertheless, in the major crop-producing regions, technological development has encouraged substantial farm consolidation, and with it, changes in the ownership and use patterns of farmland.

Increasing capital requirements within the farming sector have accompanied the farm consolidation process. As stated by a group of researchers studying the financial structure of U. S. agriculture,

> We have been evolving to a capital-intensive farming where decisions are shared by many components of the agricultural industry. Capital requirements have increased so that internal savings are a completely inadequate source of funds for many types of farming. [52]

The obvious manifestation of this has been expanded credit use. Total U. S. farm debt rose from $24.8 billion on January 1, 1960 to $58.1 billion on January 1, 1970 [51]. Based on research by Dr. John R. Brake, Michigan State University and Dr. Emanuel Melichar,

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[1] Bracketed numbers refer to items in the bibliography.

Federal Reserve System, projections of future credit needs range from $120 billion to $136 billion by 1980 [8].

In addition to the expanded role of credit in commercial agriculture, there has also developed among producers, a greater interest in alternative ways to meeting expanding land and capital needs. Equipment leasing, hiring of custom services, and vertical coordination and integration schemes have become more common in recent years. However, in terms of dollar value, the primary alternative to resource ownership continues to be farmland rental.

There is evidence to suggest there is growing separation of use rights or control of farmland and ownership. The proportion of all farmland acreage being rented has increased slightly from about 33 percent in 1949 to 38 percent in 1969. More importantly, however, it appears the composition of tenancy has changed. This is reflected in the trend in farm tenure toward part ownership. In 1949 part-owner farms accounted for about 37 percent of all land in farms and 45 percent of all land rented. By 1969, over half of the nation's farmland was in the part-owner operations and about two-thirds of the rented acreage.[1]

1.2 The Problem

The separation of farmland ownership and use through rental is believed to be an influential parameter of the physical, financial,

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[1]Precise comparisons are not possible between the 1969 Census of Agriculture estimates and statistics from earlier Census years due to changes in tenure definition and classification in the 1969 Census.

and managerial organization of the U. S. farming sector. This is particularly true of those farms in the crop-oriented subsector which is often referred to as land-based agriculture. Furthermore, projections and predictions of economically viable-sized farm units in the future suggest land rental will play an increasing role in organizing those units with asset values approaching 1/4 to 1/2 million dollars [41, 4].

Despite a significant (and signs of an expanding) role in present and emerging structure, the land rental process and the institutions through which it functions have largely been taken as given by the researcher and the policymaker. A comprehensive investigation is called for. In discussing aspects of firm growth and agricultural adjustments, Hottel and Martin noted the increasing need to study such factors:

> With fewer, larger, and more productive farms, externalities between producing units involving problems of land market values, technological progress, resource acquisition, resource use, tenure and structural production, and marketing problems will become more important in the agricultural production industry. There is a void in knowledge and economic theory regarding these important areas, particularly as these questions relate to firm growth and farm adjustments. [26 p. 10].

While obviously not the only influential parameter of structural change, the land rental process is certainly an important one, not only in the firm context but also in broader implications concerning the farming sector itself. In light of this, this study was launched to analyze (1) the farmland rental process, (2) the institutional framework through which it functions, and (3) the interrelationships of this process with current structural trends.

1.3 Research Objectives

1. Describe farmland tenure patterns in the U. S. and identify factors affecting the level of rental activity.
2. Analyze the characteristics of the rental market process using a case study approach.
3. Review and appraise theoretical models pertaining to land leasing.
4. Identify the interrelationship of farmland rental with present and emerging structural organizational trends of U. S. land-based agriculture.
5. Appraise the farmland rental process and the interrelationship with structural trends using selected conduct and performance criteria.

1.4 Study Design and Format

Domestic land tenure research of any empirical nature has generally been concentrated at the two extremes—either the specific firm level, or the aggregate level. The former is so detailed that generalizations to a broader base are precluded. The latter lumps such heterogeneous elements that it, too, cannot provide generalizations of any significant degree of explanable worth.

The initial step of this study is therefore a comprehensive investigation of land tenure patterns across the country. This not only provides meaningful scope to the study, but it also is an empirical base for more detailed analysis of the land rental-structural change relationship. Secondary data, primarily from the 1969 Census of Agriculture, is used in this phase. Analysis of these and related data are presented in Chapter II.

The actual rental process itself is believed to directly influence the characteristics of farmland leasing in U. S. agriculture. Thus, the second phase of this study is an analysis of selected rental markets, identifying what individuals actually do and why in relation to land use. Survey technique and analysis of findings are presented in Chapter III.

Several theoretical models which relate to the issues under study are outlined and discussed in Chapter IV. Past empirical effort to test various aspects of leasing theory is reviewed, and reasons for deviation of the theoretical models from real-world conditions are presented.

The relationship of land rental and structural change is two way. Chapter V centers on the impact of farmland rental on structural trends. One important facet is the use of land leasing in farm acreage expansion. More specifically, the question of availability of rental land is a common real-world constraint that can directly influence the process of firm growth. By modifying a previously developed growth simulation model to include probability factors of land availability, this question and its relevance to objectives of firm growth is studied. Also related to this is analysis of the practice of multiple-unit leasing and the impact of this on the risk and uncertainty of the land base. A third aspect to be considered is the interrelationship of the rental market with the title transfer market. While there are several ramifications, the micro-economic question of "buying versus renting" is a significant portion of the relationship. This specific question will be studied under varying

conditions using a present worth analysis framework. Chapter V concludes with a discussion of land tenure patterns under various forms of firm organization.

Chapter VI summarizes the study and draws the major conclusions. Implications of the farmland rental process concerning various economic and social objectives are also developed using a framework of selected conduct and performance criteria.

CHAPTER II

FARMLAND TENURE PATTERNS IN THE UNITED STATES

In studying the interrelationship of farmland rental and structural change, it is necessary to have a general understanding of farmland tenure patterns, both past and present. This chapter describes and analyzes the nature of the man-land relationship throughout the country using secondary data from the Census of Agriculture. Emphasis is placed primarily on the aspects of controlling farm real estate.[1] Part 1 deals with land tenure relationships of all farms over time and identifies the participants. Part 2 is a more refined analysis of current tenure patterns of Census Economic Classes I - V farms. Part 3 centers on the concentration of the land resource.

2.1 Farmland Tenure Patterns—All Farms

The high productivity and abundance of U. S. agriculture can be traced in large part to its rich resource endowment. In 1969, U. S. land in farms totalled 1.06 billion acres, a slight decline from five years earlier due to shifting use into urban and other

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[1] In this study, control of farmland refers to access to decision-making prerogatives over the land resource such as rights of occupancy and use. Excluded from this concept are claims on income demand which arise solely out of ownership. For a more detailed discussion of these attributes of tenure rights see [40, p.3].

nonagricultural uses.[1] This land base is distributed (unevenly) among approximately 2.7 million farm units ranging from tobacco and truck farms of a few acres in size to wheat farms and cattle ranches of several thousand acres. This heterogeneous nature of farms and farming enterprises greatly reduces the usability of any empirical data at the aggregate level. Thus, the analysis to follow not only considers various characteristics but also reduces the geographical perspective to state and regional levels where possible.

2.1.1 The Rented Portion

The distribution of the total farmland acreage among states and farm production regions is presented in Appendix Table 1. While the rented portion cannot be taken directly from the Census state volumes, it can be estimated from published data in the following manner: (1) the rented portion of part-owner farms at the state level is available in the Census for economic classes I - V farms only; this same ratio is assumed for the other economic classes of farms also; (2) all land rented by part owners and tenants is assumed to be operated by them and not subleased.[2] Based on this estimation procedure, about 38 percent of all land in farms is rented. The

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[1] Due to the specialized nature of their land resources and agricultural enterprises, Alaska and Hawaii are not included in this analysis.

[2] While these assumptions were not tested empirically, the proportion of total acreage affected by the assumptions is minimal. For example, expanding the rented ratio for classes I - V part-owner farms to all part-owner farms is, in effect, using actual data from 96 percent of the total land area to estimate for the remaining 4 percent. Likewise, the question of subleasing is minor since land rented out by part owners is less than 3 percent of the total land acreage in part-owner farms, most of which is probably land owned by part owners.

proportion rented ranges from about 20 percent in the Northeast and Appalachian states to over 40 percent in the Corn Belt, Plains states, and proportions of the Mountain and Pacific regions.

Due to a definitional change in the land tenure classification in the 1969 Census, a precise comparison with earlier years is limited.[1] However, the proportion of farmland rented does appear to have been increasing slightly over the last twenty years. In 1950, 33 percent of all land in farms was rented [40, p. 35]. Prior to that time the proportion of farmland rented had gradually fallen from a previous high of 45 percent in 1935, the midst of the depression.

As indicated in Appendix Table 1, the relative importance of land leasing varies widely geographically. Several factors have been hypothesized as being contributors to this variation. In the Corn Belt states, relatively high land values and the resulting large investment requirement, it is believed, encourage land rental as an alternative to owner operatorship. Then, too, the cash grain type of agriculture which predominates in the Corn Belt has a short planning horizon with fixed investments of secondary importance. In this setting, Dovring argues the relative instability of short-term tenancy proves tolerable [15, p. 1266].

Higher rates of land rented are also prevalent in many Western states where the agricultural enterprises are quite different. Much

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[1]The primary change in the 1969 Census was the dropping of the "Manager" category from the tenure classification. Because this concept was believed to be no longer descriptive of a distinct type of farm management, farms that would have qualified as managed in the prior Census definition were distributed among full owners, part owners, and tenants according to the reported ownership of the land in the 1969 Census.

of the land is being rented for the more extensive type land uses such as summer-fallow wheat production and livestock grazing.[1] Here, the factor of availability may be the primary force on the rate of tenancy. That is, where operating units must be considerably larger than the typical size of ownership unit, then the process of accumulating the land resource base may require reliance on rental as well as purchase. In short, the rate of tenancy may be directly influenced by the size of acreage operation.

Throughout the Northeast, Appalachian, and Southeast regions, relatively lower proportions of farmland is rented. This may be due in part to (1) generally smaller farm units (in terms of acres) which are frequently dependent primarily on dairy or livestock feeding enterprises and (2) the greater reliance on off-farm income sources. Directly and indirectly these factors can reduce the relative importance of the land base to the present and ongoing income and wealth position of the operator.

2.1.2 Part-Owner Dominance

Throughout the country, the major share of land rented is being rented by part owners (operators who operate land they own as well as land rented from others). As shown in Appendix Table 1, in only two states (Illinois and Iowa) do full tenants operate a larger portion.

The fact that two out of every three acres of rented farmland is now operated by part owners is the result of a long-run trend

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[1] Government-owned grazing land is not included in the Census measure.

away from full tenancy. In 1940, the proportion was just reversed with the part-owner group accounting for less than a third of the rented acreage. Since that time, however, the role of tenancy has changed; i.e., in the pre-World War II years tenancy was still predominantly a rung in the traditional "tenure ladder" concept in which an operator would rent a farm until such time that he could purchase it. But with the significant technological advancements of the last three decades and the accompanying trend towards larger, more specialized farms, the role of farmland rental has shifted towards acquiring the additional land base. Capital limitations as well as limited availability of land to purchase has encouraged farm size expansion via rental. Many operators who were once classified as full owners have chosen this route and have consequently been reclassified as part owners.[1] As size expansion has progressed, tracts that were once whole farms operated by full owners or full tenants have been consolidated into larger units, thus contributing further to the increasing predominance of part ownership.

So long as pressures to expand farm size continue, this characteristic of farmland rental will likely become more pronounced. And with it a further separation of resource ownership and control.

2.1.3 Nonoperator Land Ownership

In most states, over 80 percent of the rented acreage is owned by nonoperator landlords. Since active farmers tend to operate all the

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[1] It should also be noted that full tenants have also faced similar motivations for acreage expansion such as excess labor and machinery capacity. And while many of them have rented additional tracts, many others have purchased additional land, which has moved them into the part-owner tenure classification also.

land they own, only a small portion of the rented land is rented from other farm operators. This high incidence of nonoperator ownership must be considered an important source of capital input into the farming sector. Without this degree of input, past trends in farm consolidation and growth would undoubtedly have been slowed.

In terms of dollar value, the total farmland asset contribution by nonoperator landlords is a third of the current market value of farm real estate (Appendix Table 2). There is wide variation geographically, ranging from 13 percent in West Virginia to over 50 percent in Illinois. But while the relative importance varies widely, it is clear that the rental process provides a far greater service in the acquisition of use rights to land than do the credit institutions.

A measure of the relative importance of farmland leasing versus real estate debt can be made after allocating total real estate debt outstanding between farm operators and landlords. This allocation was done by USDA researchers for the total farm real estate debt in 1969 [50]. This aggregate estimate of the operator and landlord shares was assumed to be consistent among all regions of the country. Thus, by using this ratio, regional estimates of farm mortgage debt were adjusted to represent the farm operator share only. When compared with the current market value of real estate rented from nonfarm landlords, the value of the latter is about three times the value of farm mortgage debt outstanding held by farm operators (Table 2.1).

Admittedly, the information in Table 2.1 is a crude measure. Due to land value appreciation, the dollar value of real estate debt outstanding understates the current market value of real estate

controlled via the credit route. In part, this is offset by the fact that leasing arrangements frequently include access to nonland assets as well; i.e., a portion of operating capital under typical share-rent leasing, or livestock under livestock share leasing. But while the refinement of these estimates may be argued, the magnitude of the difference is believed to be significant.

Table 2.1 Value of farmland rented from nonoperator landlords as compared with farm mortgage debt outstanding of farm operators by farm production regions, 1970.

Region	Total market value of farmland and buildings, March, 1970	Percent of Total Value	
		Rented from non-operator landlords, 1969	Farm mortgage debt outstanding of farm operators, Jan. 1, 1970[a]
	Million Dollars	Percent	Percent
Northeast	11,154	22.6	12.9
Lake States . . .	14,597	23.2	15.1
Corn Belt	49,600	41.3	9.0
Northern Plains .	22,778	39.7	8.6
Appalachian . . .	15,949	19.8	9.8
Southeast	13,583	17.9	11.8
Delta	10,972	33.1	12.2
Southern Plains .	27,384	37.4	7.7
Mountain	17,443	34.2	12.1
Pacific	23,593	36.1	15.5
48 States . . .	207,053	33.5	10.8

[a]Total regional debt outstanding adjusted by applying operator share of total aggregate debt as estimated in The Balance Sheet of the Farming Sector—1969. [50, p. 29].

2.2 Tenure Patterns of Economic Classes I - V Farms

Additional information on land tenure is available in the 1969 Census of Agriculture for economic classes I - V farms (farms with annual gross sales of $2,500 or more).[1] Unlike prior Censuses, the 1969 Census provides tabulations of the acreage owned and acreage rented by various characteristics of the operator and the farming operation for economic classes I through V farms. Thus, additional insight can be gained concerning actual ownership and control of farmland and the degree of concentration.

2.2.1 Characteristics by Tenure of Operator

Classification by tenure of operator is a crude form of breakdown due to the ambiguity of the part-owner category. A farm operator may own 1 percent or 99 percent of the land he operates and still be considered a part owner. Yet this classification scheme provides a useful starting point for tenure analysis.

About half of all classes I - V farms are operated by full owners, yet the proportion of land operated by this tenure group is less than 30 percent of the total acreage (Appendix Table 3). In contrast, part-owner operations represent about a third of the farm units but account for about 58 percent of the land base. There is substantial variation among states and regions, however. In the Northeast, Lake States, Appalachian, and portions of the Southeast region, the full-owner class still accounts for the largest share of

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[1] While representing roughly two-thirds of total farm numbers, classes I - V farms account for 86 percent of all land in farms, 95 percent of farmland rented, and over 95 percent of annual cash receipts from farm marketings. Consequently, the analysis is not believed to be limited by the exclusion of the "other farms" categories.

the land base. It is in the Plains region and Western states, particularly where the dominance of part ownership is most evident, both in terms of acreage and real estate value, although to a somewhat less extent with the latter.

Part-owner units are considerably larger than their full-owner counterparts throughout all regions (Appendix Table 4). The difference is most extreme in the Western states where the nature of the farming enterprises tend to differ with tenure. That is, part-owner operations will tend to be the more extensive land use operations, whereas full-owner farms will often be smaller acreage, more intensively used units.

Part owners on average control substantially greater real estate assets than either full owners or full tenants. In the West, the wide differential that was evident in average acreage size was reduced somewhat by lower valued land in part-owner units. However, in most other states, land in part-owner farms has a higher market value than full-owner land due to the greater percentage of cropland in these farms. For example, in the Corn Belt states, 81 percent of the part-owner acreage is cropland as compared with 72 percent of the full-owner acreage.

The larger proportion of cropland and, hence, higher average value of part-owner land again reflects variation in the relative importance of various farming enterprises among tenure classes. Part owners and tenants generally rely more heavily on crop enterprises and therefore need a relatively higher quality land base. In contrast, full-owner operations frequently are specialized livestock units with the land base being either partially or totally replaced by purchased feed inputs.

Of the three tenure classes, part-owner units are also the largest in terms of average annual gross farm receipts (Appendix Table 5). Full-tenant farms are second in average size in most regions. Yet because of their greater numbers, full-owner farms still account for the largest share of cash receipts in five of the ten regions. Looking at the tenure pattern by economic classes also indicates the larger average size of part-owner units relative to full-owner and full-tenant farms. In 1969, 51 percent of class I farms (annual gross sales of $40,000 or more) were part-owner units, and 33 percent were operated by full owners (Appendix Table 6 and Figure 2.1). While in the class V category (annual gross sales of $2,500 to $4,999) only 18% of the farms are part-owner operations, and 69 percent are full-owner units.

This pattern of size variation among the tenure classes would seem to suggest that part owners are generally the more aggressive farmers, while the full owners represent a class that has been less successful in adjusting to economic conditions [33, p. 1555]. Harris has suggested, in fact, that owner-operatorship is attained at the expense of economic-size units for many full owners [20, p. 3]. However, the greater tendency for full-owner farms to be smaller units does not necessarily imply that full owners are failing to generate adequate annual income. A full owner receives all receipts from farm marketings, including the rent share which a tenant would incur as a cost. Therefore, the full-owner operation can be smaller than a rented operation (in terms of acres and cash receipts) and still yield a comparable annual net farm income for the operator. Another factor is that many full owners are older operators who have

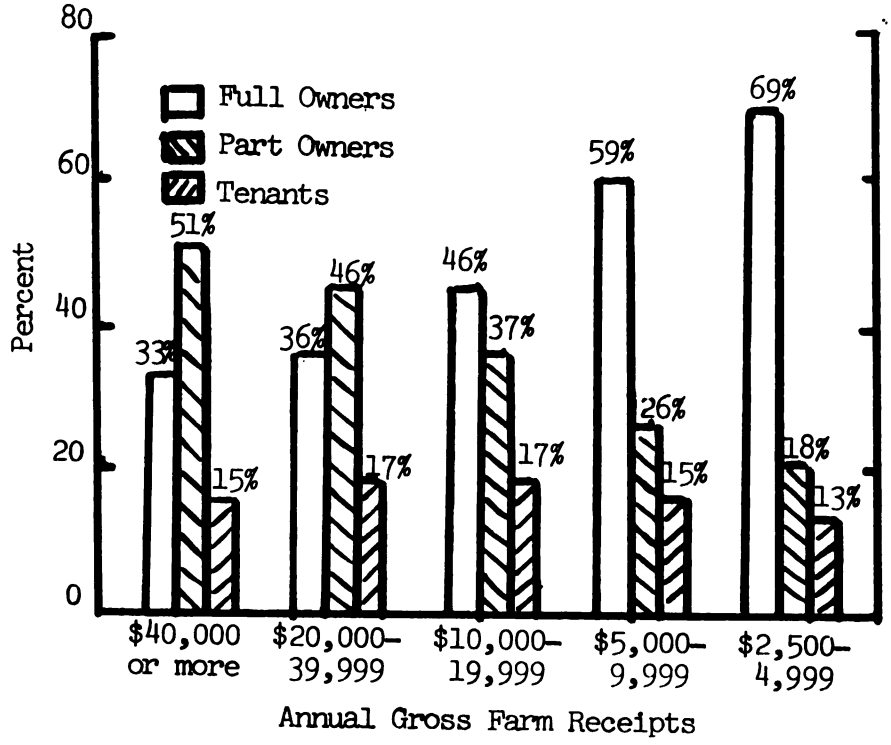

Figure 2.1 Tenure characteristics by economic class of farm, 48 states, 1969.

established financial security and are in the process of scaling down their operations (see section 2.2.2). Then, too, off-farm employment can allow fuller utilization of labor resources and, in turn, supplement farm earnings. Census data on days reported worked off the farm show the incidence of off-farm work to be fairly similar among all tenure groups; the percentage of full owners, part owners, and tenants reporting days worked off farm were 44 percent, 40 percent, and

48 percent, respectively (Table 2.2). Yet the extent of this employment varies significantly.[1] Nearly 60 percent of the full owners who reported off-farm work were working off the farm 200 days or more annually (essentially full time), as compared with less than 40 percent of the part owners and tenants who reported any off-farm employment. This relationship consistently appears in all regions of the country. In effect, then, there does appear to be a higher dependence in the full-owner tenure group on off-farm income sources. But whether or not this greater dependency in the aggregate is influenced more by economic necessity than by personal choice remains unanswered.

Table 2.2 Days reported worked off farm by tenure of operator, 48 states, 1969.[a]

Number of days reported worked off farm annually	Percent of all farm operators reporting days worked off farm by tenure, 1969		
	Full Owners	Part Owners	Tenants
	. . . . . Percent		
1 - 49 Days	8.0	14.8	15.2
50 - 99 Days	3.7	5.0	6.3
100 - 199 Days	6.5	6.0	7.6
200 Days or More	25.6	14.6	18.6
Total	43.8	40.4	47.7

[a]Source: 1969 Census of Agriculture, economic classes I - V farms.

[1]Statistically significant at 1% level of confidence using Chi Square Test of Independence.

2.2.2 Tenancy Patterns by Age of Farm Operator

Since single proprietorship is the primary organizational form within the U. S. farm sector, age of operator is a useful classification in studying tenure. The dynamics of land ownership and rental tie closely to the life cycle of the farm operator. Labor resources, income demand, financial position—these are factors which change over time for the individual operator, and, hence, his relationship to land.

In distributing farm numbers and land in farms into age classes, a skewed distribution pattern towards the older age groups is prevalent. The majority of farm operators, 68 percent, are 45 years of age or older and operate 68 percent of all land in classes I - V farms (Appendix Table 7). This pattern is prevalent in all regions.

On a per-farm basis, the pattern among age groups takes on a somewhat different characteristic. Farm operators of 35 to 54 years of age tend to be farming the largest acreage units (Appendix Table 8). This size distribution is consistent with the labor cycle of most farm operators; many attempt to increase farm size during the period of time when family labor resources are maximum, and then gradually cut back as the operator himself prefers to reduce his own labor output and as his family leaves the farm. Although other factors frequently override the labor resource influence, regional variations add support to this; i.e., most significant size variations are in those regions where land-intensive farm enterprises predominate.

As for actual land tenure changes over the lifespan of farm operators, this study cannot give a comprehensive picture. To fully answer this question would require monitoring and analysis over time

of identified representative farms. However, some insight can be gained by observing tenure characteristics over the age categories, bearing in mind that historical forces can and do distort inter-class comparisons.

The general pattern is one of a high proportion of full tenants in the youngest age class with a shift to a high proportion of full owners in the oldest age class of farm operators (Figure 2.2 and Appendix Table 9). The proportion of part owners reaches a maximum in those age brackets where farm size is maximum, which supports an earlier statement that part ownership is a companion trend of farm size expansion and consolidation.

Using a more precise measure, the proportion of farmland rented, similar significant differences exist among the age categories (Figure 2.3 and Appendix Table 10). Due to both a decrease in average acres rented and an increase in average acres owned, the proportion of the operated land base that is rented drops steadily from the youngest age class to the oldest age class. Rented land is the major portion of land in farms for the youngest age group in all but two regions, being as high as 74 percent in the Corn Belt. For operators 65 years of age or older, the rented portion accounts for a fifth or less of operated acreage throughout the Eastern half of the country and a third or less throughout most Western states.

The tenure pattern over the age classes may partially reflect the influence of the traditional "tenure ladder" concept whereby a young operator begins farming by leasing land, and over time, builds up enough equity and credit to purchase an increasing share of his land. In this respect, the "tenure ladder" notion still appears

to have some validity. What is debatable, however, is the question of ends to which this process is directed; i.e., is unencumbered land ownership still the primary end?

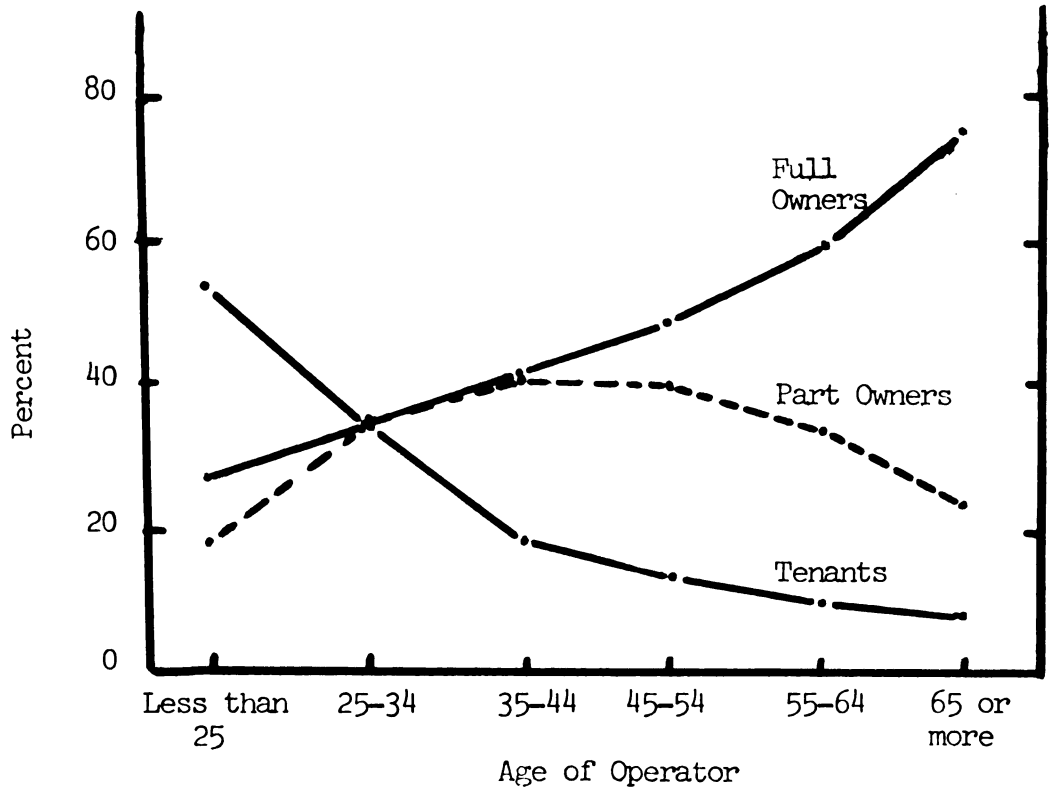

Figure 2.2 Tenure characteristics by age of operator, 48 states, 1969.

Heady has studied this particular issue using a theoretical framework [22]. He constructed a production possibilities curve as in Figure 2.4 and considered utility maximization in the tradeoff between quantity of land ownership and quantity of money income. Representing the individual or group preference system by the

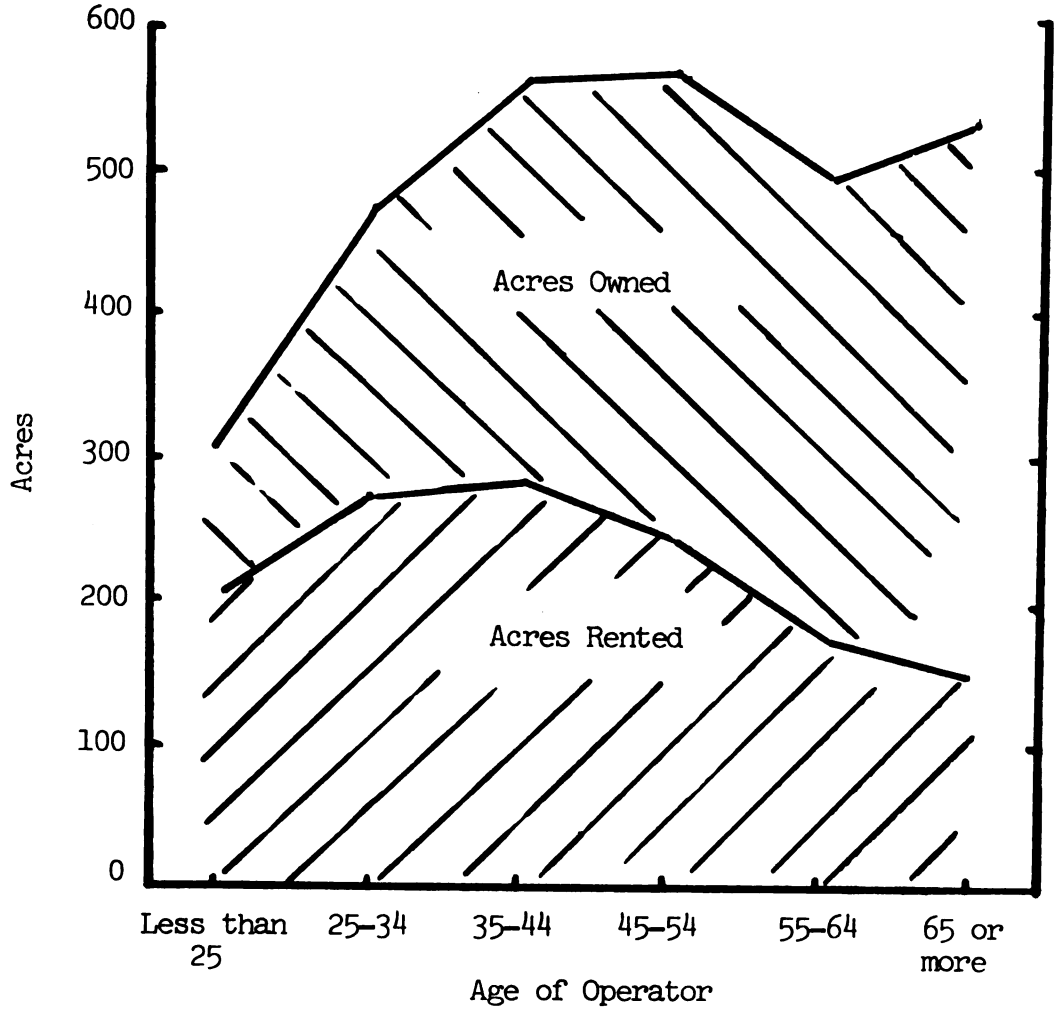

Figure 2.3 Average acreage of owned and rented land in farms by age of operator, 48 states, 1969.

conventional indifference curve, MB, optimization is achieved at less than full ownership (point A). This occurs in that range of the production possibilities relationship where land ownership is in competition with money income; i.e., when the price of land services (rental) is sufficiently lower than (a) the price of the resource through the ownership market and (b) the marginal value productivity of the resources used in production.

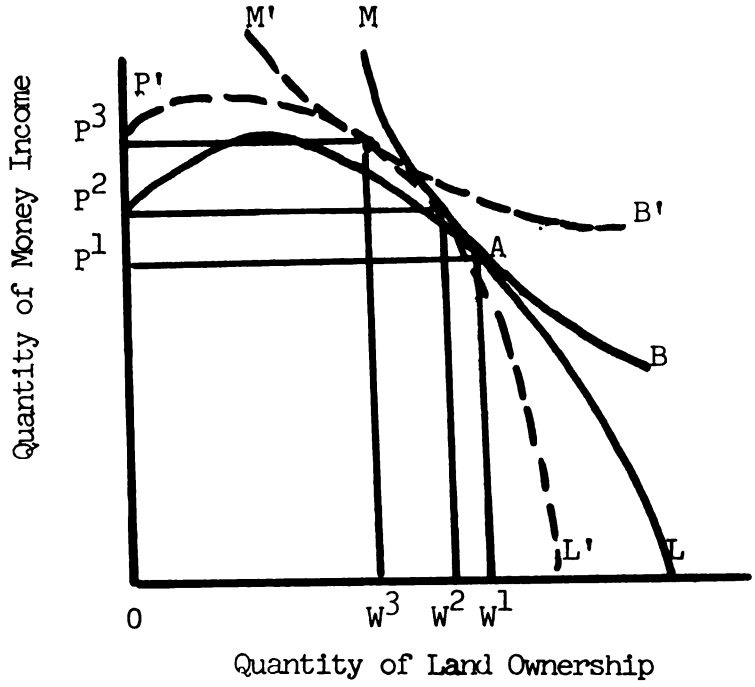

Figure 2.4 Production possibilities and values relating to money income and ownership with welfare maximization.

Over the last two decades it is likely that the production possibilities curve has been changing. For example, structural trends of increasing farm size and consolidation could alter this curve from PL to P'L'. When production efficiencies of size and scale are prevented due to an inadequate ownership unit and/or a burdensome real estate debt, then relatively less land ownership is preferred (OW^2 versus OW^1). Moreover, there is some reason to expect the indifference curve to have also been shifting. Many financial needs once met by full ownership are now achieved, at least in part, by other institutions; for example, social security and investment

returns from nonfarm sources have reduced the relative importance of land ownership as a source of economic security upon retirement. Then, too, the ever-increasing predominance of separation of ownership and use in an industrialized economy such as this may diminish any social norms advocating full owner-operatorship in the farming sector. Consequently, the indifference curve may logically be shifting from MB to M'B', thus contributing further to a relative reduction of ownership at the optimum.

To conclude, then, the tenure relationships found across age groups cannot be primarily attributed to the goal of full ownership. It is hypothesized that changes in both acreage size and capital requirements of viable units limits ownership potential of today's younger operator much more than that experienced by their older generation counterparts. Then, too, aside from historical changes, it appears that age of operator, is, in fact, a proxy for other factors which change with age and tend to increase the level of ownership irrespective of such a goal. Variation in operator and family labor resources over time, and its impact on size of operating unit has already been mentioned.[1] Secondly, the acquisition of ownership through inheritance, gift, or purchase from a relative (intergenerational transfer) also contributes to a declining dependence on land rental in the later years of the life cycle. This is in

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[1]Not only in the expansion stage but also in the contraction phase is the land and labor resource relationship under change. It is during this contraction phase that the operator of a land-based farming operation will tend to reduce his rented acreage before selling off or renting out land that he owns (thereby reducing labor requirements relatively more than the average level of his farm income).

addition to a credit position that usually improves with years of operation. Thirdly, income demand, more specifically the change in the composition of short-run and long-run income potential changes with age. Short-run or annual earnings are more critical to the consumption patterns of the younger farm family, whereas the older generation farm family may be more interested in investment with long-run income potential. Finally, the aspect of availability of land to purchase is a factor which can delay ownership several years. In part, greater ownership in the older age classes may be simply due to the probability of availability which increases with time.

2.2.3 Tenancy Patterns by Acreage Size of Farm

A wide range of farm acreage size exists due to (1) variation in quality of the land resource and (2) differing land resource demands among farming enterprises. So, even within relatively small geographic areas, farms of virtually all sizes exist. However, the allocation of land acreage among these size groups varies widely among regions (Appendix Table 11). At the extremes are the Mountain and Pacific regions where 92 percent and 80 percent respectively of the total land base is in farming operations of 1,000 acres or more. In contrast, about 75 percent of the land base in the Northeast and Lake States is in farming operations of less than 500 acres in size.

The average values of real estate assets per farm are presented in Appendix Table 12. Here, too, the variability both among and within regions is clearly evident. It should be noted, however, that total asset value per farm may not vary as greatly over these farm acreage classes. Even though real estate on average represents about 75

percent of total asset value, the composition of production resources, including livestock and machinery as well as real estate, can vary greatly by type and size of farm. For example, a unit in the Corn Belt with less than 50 acres may, in fact, be a feedlot with a total asset value of several hundred thousand dollars, whereas the land may constitute essentially all of the production assets of a 1,500 acre wheat farm in Kansas.

As for tenancy, in all regions, the percentage of land rented increases steadily from the smallest units through the 500-999 acres size class (Appendix Table 13). Beyond this size, the proportion drops off somewhat in a number of areas, particularly in those regions where such operations represent capital investments of upwards of a million dollars or more. Nevertheless, it appears that large-scale operations are not synonymous with large holdings of land under the ownership of a single individual or business entity. Rather, these units rely heavily on rental, and therefore generally constitute land ownership holdings of at least two or more individuals.

2.2.4 Tenancy Patterns by Economic Class of Farm

Volume of annual gross receipts from farm marketings is a common measuring tool of farm size. The advantage of using this classification is that size variables can be analyzed in relation to a measure of income potential.[1] The Census of Agriculture uses this

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[1]The ratio of realized net income to gross receipts varies considerably across size classifications. For example, the ratios for class I - V farms based on estimates for 1970 in the Farm Income Situation, F15-218, July 1971, were as follows: class I, 21 percent, class II, 33 percent, class III, 39 percent; class IV, 42 percent; and class V, 48 percent. Thus, gross receipts can be considered only a crude measure of income potential.

system with the following classes: class I - $40,000 or more; class II, $20,000 - $39,999; class III, $10,000 - $19,999; class IV, $5,000 - $9,999; and class V, $2,500 - $4,999.

The distribution of farmland among class I - V farms varies widely both among and within regions (Appendix Table 14). Less than a third of farmland is concentrated in class I farms throughout the East, Midwest, and Northern Plains, while such farms account for over a half of all farmland in most Western states. Part of this variation can be explained by the difference in average farm size (Appendix Table 15). Class I farms are typically two to three times larger than class II farms throughout the West, while the size difference is much more moderate elsewhere.

With real estate asset value usually averaging more than $200,000 per class I farm, the reliance on land rental for such farms is substantial. In the aggregate, 46 percent of the land in class I farms is rented (Appendix Table 16). In contrast, 28 percent of the land in class V farms is rented. While there is variation in degree, this general pattern is evident in all but a few states.

2.2.5 Tenancy Patterns of Cash Grain Farms

Included within the statistics of farms by economic class are all types of farming operations. Some farming operations require a lengthy planning horizon and so, by nature, discourage land leasing, which traditionally has been short term. In other farming enterprises, such as cattle feeding, the land base is relatively unimportant and represents a small part of total investment (see tenure patterns by type of farm in Figure 2.5). The inclusion of these operations,

therefore, creates a downward bias in the relative importance of farmland leasing to land-based agriculture. Because of this, analysis was made of one specific type of farm—cash-grain agriculture.

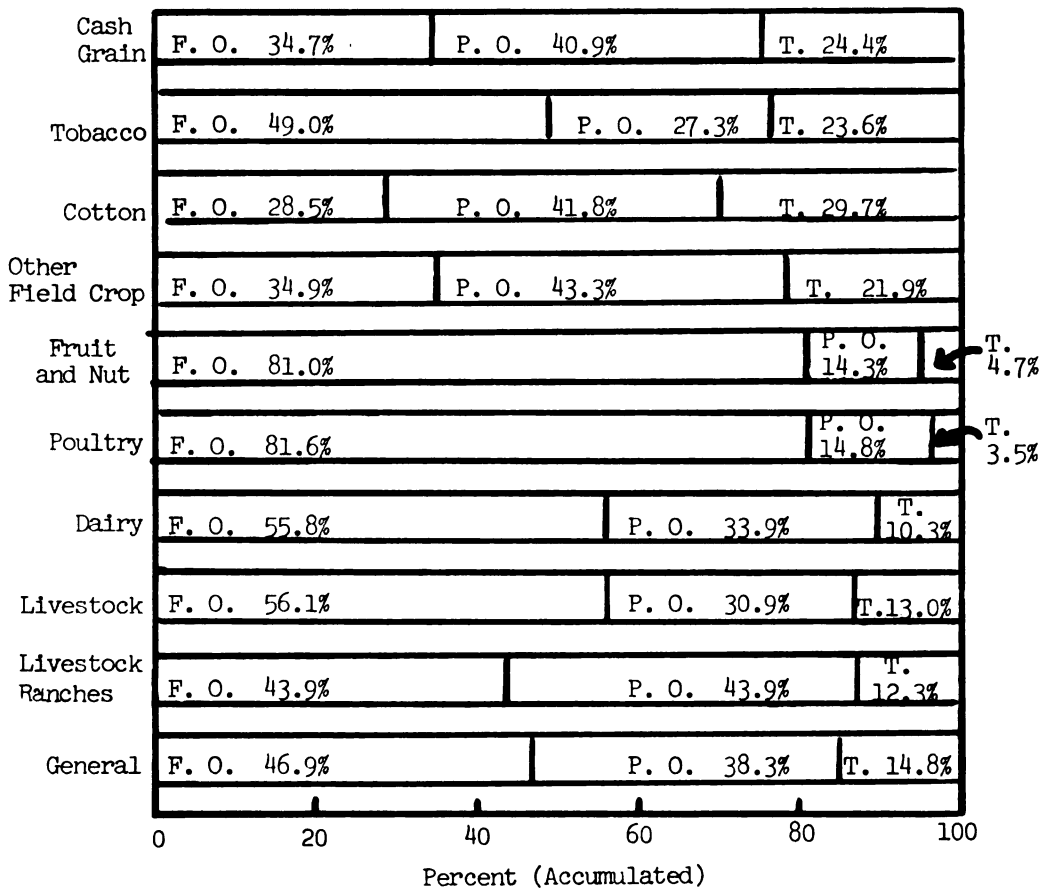

Figure 2.5 Tenure characteristics by type of farm, 48 states, 1969.

As indicated in Appendix Table 17 the majority of cash-grain farms are located in the Corn Belt and Northern Plains states.[1] Sizable numbers of cash-grain operations are also present in the Lake States and Delta regions. The highest concentration of such farms is in Illinois where 53 percent of all farms are classified as cash-grain units and account for 60 percent of the land base.

Asset value of the real estate in cash grain farms will generally run much higher than the all-farm average due to land quality as well as land quantity factors (Appendix Table 18). Average per-farm values were found to be consistently above $300,000 for class I farms grossing $40,000 or more in sales annually. Even class II farms were found to be approaching $200,000 per farm in many states. Investment levels such as this usually negates any opportunity for full ownership of the land base by the operator, unless he is fortunate enough to have access to financial windfalls. This then promotes greater reliance on land resource control via leasing.

For the largest cash-grain farms, rented real estate represents the major share of land in farms in nearly every state (Appendix Table 19). Roughly 60 percent of the land is leased. Assuming this land is approximately equal in per-acre value to the owned share of land, then one can say that about $180,000 of the $300,000 current

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[1]The 1969 Census of Agriculture has detailed data on cash-grain farms in 29 states. While other cash grain farms exist in other states, the relative importance of this enterprise was not sufficient to merit detailed statistics in these states.

market real estate asset value is leased from others. In the average Corn Belt class I farm, over $255,000 of the real estate assets are controlled by lease.

While the proportion of land rented drops in the smaller sales classes, the average for all the classes of cash-grain farms was still over 50 percent. Farmland rental must therefore be regarded as an integral part of the financial structure and growth strategy of cash-grain farms.

2.3 Concentration of Land Ownership and Rental

The preceding analysis indicates that the land resource is distributed quite unevenly among farm operations, with an apparent concentration of farmland in the larger units. However, the existence of owned and rented portions distorts the distributional picture, preventing a valid appraisal of distributional impacts. A more refined measure of concentration is needed.

To accomplish this, the Gini ratio is used to study how unequally land ownership and land rental are distributed among the various classifications of the farm population. This ratio is derived from the Lorenz curve which is a plotting of the cumulative proportion of units arranged in order from the smallest unit size to the largest on the horizontal axis against the cumulative percentage of the aggregate land base on the vertical axis (Figure 2.6). If the land were distributed equally among all operators, the Lorenz curve would be a diagonal line extending from the origin. In this case, the Gini ratio, which is the ratio of the area between the curve and the diagonal and the total area under the diagonal, would be zero. In

contrast, if one member of the population had all the land (perfect inequality), the curve would be the bottom and right straight lines, and the Gini ratio would be one. Ordinarily, the degree of concentration will fall between these two extremes, with a value near zero indicating near equality and a value approaching one showing concentration.

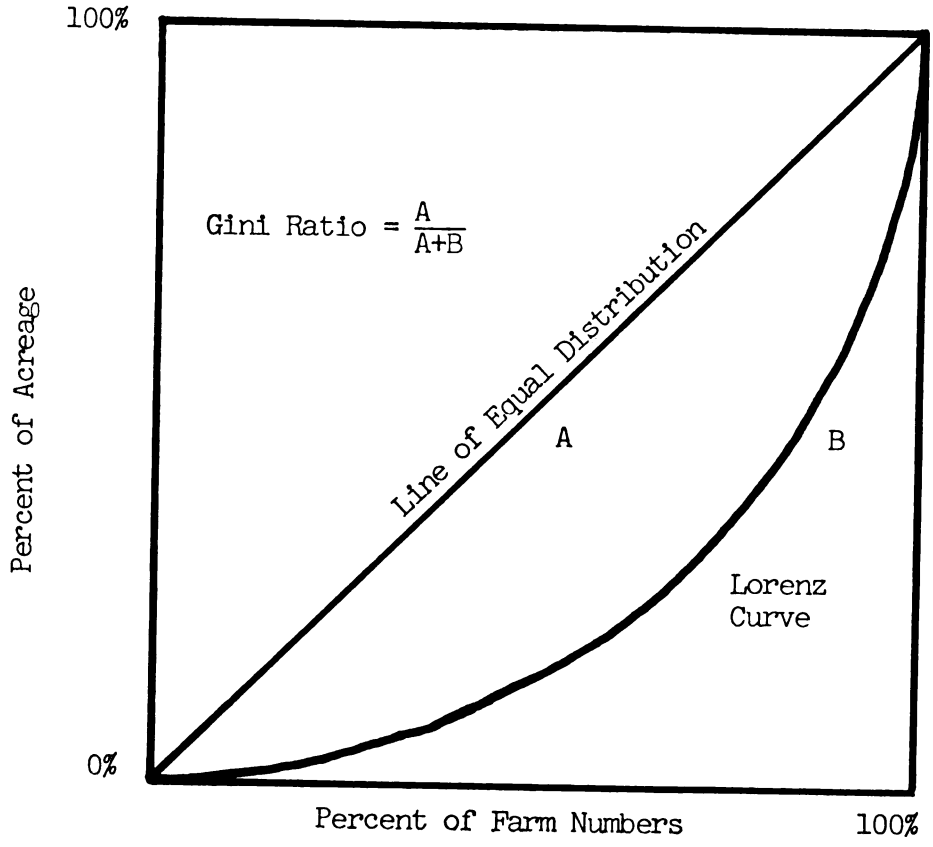

Figure 2.6 Lorenz Curve and Gini Ratio.

2.3.1 Degree of Concentration by Age of Operator

Measures of concentration indicate there is virtually no concentration of the land resource by age of operator. The Gini ratio for the aggregate of all land in farms was .045, or near perfect

equality. Gini estimates of regional distributions of land in farms were consistently below .060. In other words, the total farmland base is distributed across age groups in nearly equal proportions to farm numbers.

It was noted earlier that the proportion of land rented is highest among the youngest age class and decreases steadily across the other age groups. This would suggest some concentration of the rented land among younger farm operators and consequently some concentration of the land owned by farm operators among the older age groups. But separate Gini ratios for rented and owned land across age classes indicate the degree of concentration is insignificant. For the 48-state aggregate the ratio for rented land was .128, and the ratio for land owned by farm operators was .093.[1]

2.3.2 Degree of Concentration by Acreage Size Class

Based on distributions by acreage size of farming operation, a relatively high measure of concentration is found in the aggregate. Based on the 12-element classification by acreage size of farm, the Gini ratio for all land in farms for the 48 states is .67 (Appendix Table 20). When plotted, the accumulated percentage distribution shows that about 70 percent of all land in farms is in the largest one-fifth of the operating units (Figure 2.7). In contrast, the

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[1]The higher Gini ratios for both the owned and rented breakdown than for the all-land average is due to the fact that rental land distributions is skewed somewhat toward the younger age classes, while the distribution of land owned is slightly skewed towards the older age classes. The net effect then is for the combined farmland base to be more equally distributed across age groups.

smallest one-half of the farm units account for less than 10 percent of the total land base.

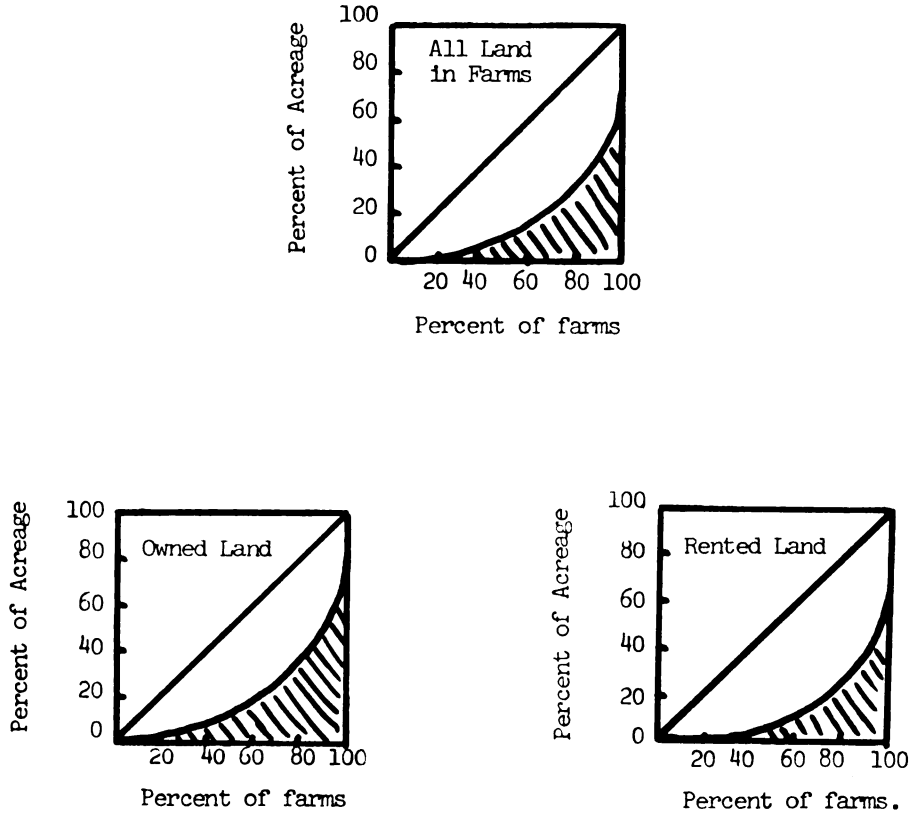

Figure 2.7 Concentration of farmland owned and rented.

On a dollar value basis, a much lower level of concentration is measured at the aggregate level. This is an indication that large acreage operations generally are comprised of lower quality land than the smaller farm units. This is particularly prevalent in the Western states.

Noteworthy is the fact that rented farmland is more concentrated in the larger acreage farms than is the farmland owned by operators. In the aggregate, the Gini ratio for rented land is .72 as compared with .60 for land owned. In other words, three out of every four

acres of rented land is operated by the largest one-fifth of the farms. This indicates that farmland rental is no longer just a temporary step for the beginning operator, but is a key means of resource control for the large, established commercial farm operation.

State and region estimates of concentration generally reveal a similar pattern of relatively greater concentration of rented land than owned land. However, the levels of concentration vary greatly. Lowest concentrations of both land owned and land rented are located in the Lake States and Corn Belt regions, where the nature of the farming enterprises as well as the typical size of operation are relatively more homogeneous than elsewhere. Highest concentration levels are mostly in the Mountain and Pacific regions. On a state basis, California and Florida have the highest degree of concentration of farmland acreage; for all land in farms, the Gini ratios in these states are .85 and .81 respectively. The largest one-fifth of the farming operations in these two states account for about 9 out of every 10 acres of farmland.

In terms of concentration of farm real estate wealth, the data suggest the commercial farming sector is still one of a small landholder type of agriculture.[1] Using the Gini ratio for dollar value as the initial measure of wealth concentration, it is generally fairly low. Moreover, even this ratio overstates the actual degree of

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[1]The inclusion of only economic classes I - V farms in the analysis reduces the level of concentration that would be evident for the total farm population. However, the omission of other farms is not believed to reduce the relevance of this analysis of concentration, since such farms are typically marginal in nature and frequently are nonagricultural activities. So the inclusion of only economic classes I - V farms, it is believed, more accurately defines the population of the commercial farming sector.

concentration due to the aspect of land rental; i.e., while operating units exist which are comprised of huge amounts of real estate wealth, the ownership of that wealth is frequently distributed over several land owners. Consequently, wealth in farm real estate generally does not show high degrees of concentration, even though control of use rights to this asset is quite unevenly distributed in many parts of the country.

2.3.3 Degree of Concentration by Economic Class

About two-thirds of the total rented land base of farms with sales of $2,500 or more is operated by class I and II farms (Appendix Table 21). This ranges from 49 percent in the Appalachian region to 75 percent in the Pacific region. Based on this distribution by economic class, the Gini ratio for rented land at the 48-state level is .44. Land owned by farm operators is less concentrated with a Gini ratio of .33.

The levels of concentration by economic class are considerably lower than those for the acreage size classification since gross income is not necessarily correlated with the acreage base of the operation. Economic class I farms include all types of farming operations—including those types in which the land base is a relatively insignificant part of the total asset investment.

2.4 Chapter Summary

Based on the 1969 Census of Agriculture, about 38 percent of all farmland in the United States is rented. Nearly 90 percent of the rented land is owned by nonoperator landlords. Thus, land leasing

must be considered an important source of external financing for the farming sector.

Following a long-run trend away from full tenancy, the major share is being rented by part-owner operators, who typically operate much larger units than either full tenants or full owners. Over half of economic class I farms ($40,000 or more annual gross sales) were found to be part-owner units, whereas most smaller farms were full-owner operations.

Tenancy patterns vary substantially over the distribution of economic class I - V farms by age of operator. Most operators in the youngest age class are full tenants while those in the oldest age class are generally full owners. Due not only to an increase in acres owned, but also to a decrease in acres rented in later years, the percent of farmland rented drops significantly from 65 percent in the youngest age class down to 27 percent in the oldest age group. This does not necessarily reflect the traditional concept of climbing the tenure ladder towards eventual full ownership, but rather the influence of historical changes in ability to purchase, as well as factors for which age of operator is a proxy.

Reliance on farmland rental increases with increasing acreage size of the farming operation. Consequently, control of farmland via rental is more concentrated than the distribution of farmland owned by operators. The fact that three out of every four acres of rented land is operated by the largest one-fifth of the farms suggests that rental is no longer a temporary step for the beginning operator, but is a key means of resource control for the larger, established commercial farm operation.

The importance of land rented varies widely by type of farming enterprise. Leasing is extremely important to cash-grain farming which is concentrated in the Corn Belt and Northern Plains states. Because the land resource is typically valued in excess of $200,000 per farm on the larger cash-grain units, more than half of acreage is leased.

CHAPTER III

THE FARMLAND RENTAL MARKET PROCESS—A CASE STUDY

In addressing a symposium on land economic research, Kelso stated that one shortcoming of such research is the apparent lack of emphasis on the human process—what people do and why in relation to land use and property relations [31, p. 38]. Early in the conceptualization of this study, it was concluded that such has been true of tenure research, and that the rental market process particularly held key information into a more thorough understanding of the farmland rental-structural change relationship. More specifically, the following was hypothesized: (1) the rental market is highly personal with little opportunity for competitive bidding and (2) due to the short-term nature of the rental contract, the rental route provides the primary means of farm consolidation and growth. To test these hypotheses, a case study investigation of two selected rental markets was conducted [29].

3.1 Survey Design and Execution

Due to the spacial dimension of the land resource, the rental market, is by nature, localized. Therefore, the investigation took a case study approach. The major objectives of the study were: (1) to identify characteristics of participants in selected land rental markets, (2) to analyze the farmland rental process in terms of

information flow, type, and extent of competition, landlord-tenant bargaining, and security of tenancy, and (3) to identify the interrelationship of rental with size and organizational adjustments of the firms.

Two study areas were selected to be representative of the Corn Belt, the region, as noted in the previous chapter, where the relative role of farmland leasing appears most important. One area was in Michigan. The other was in Illinois.

The Michigan area consisted of a five-township block in southern Lenawee County (Figure 3.1). Forming the state's south-central border, this area is characterized by highly productive farmland. Cash-grain production is the primary agricultural enterprise, although some dairying and special crop production exists. Approximately 35 percent of the farmland in this county is rented.

The second area was a four-township block in Champaign County, Illinois (Figure 3.2). The area, located in east central Illinois, is often referred to as the "heart of the Black Prairie". Heavy loam soil with almost flat terrain and moderate rainfall make this area one of the most productive cash-grain regions of the world. An exceptionally high rate of tenancy is present—over 70 percent of the land is tenant operated.

County ASCS records provided a name list of farm operators within the areas who rented all or part of their land. Since participation rates in the feed grains program are over 90 percent in both areas, the name list was fairly complete and current. A random sample of these operations was personally contacted and interviewed during the

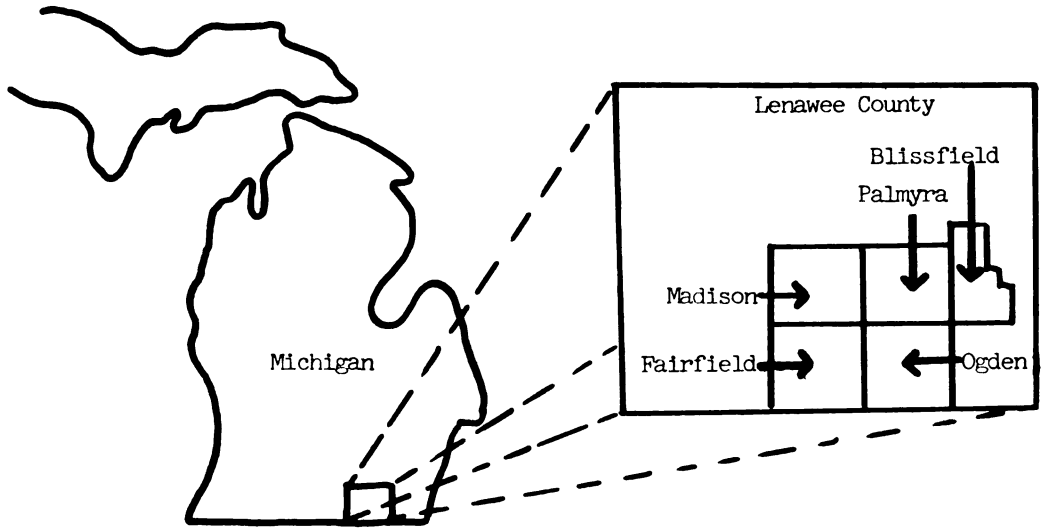

Figure 3.1 Michigan Study Area.

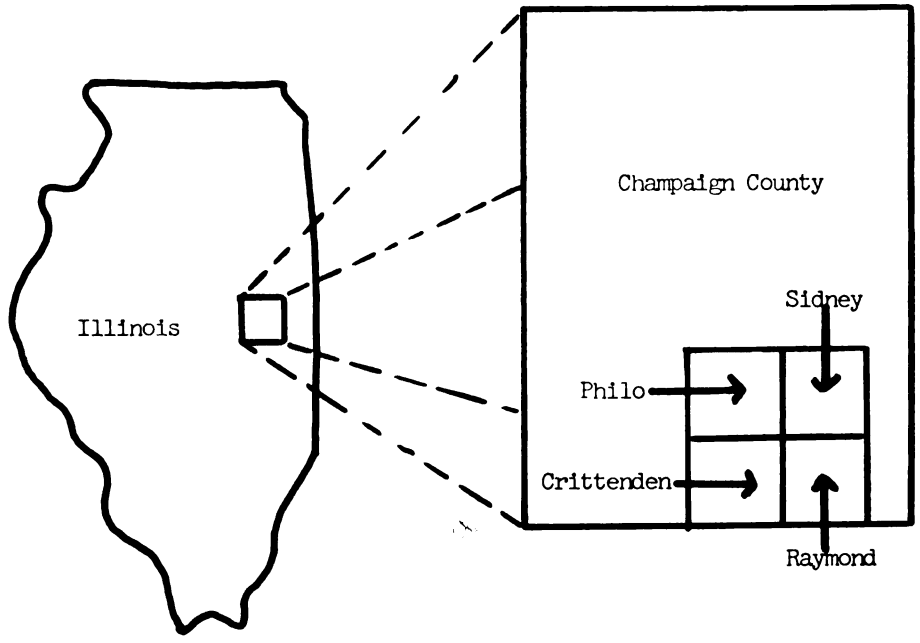

Figure 3.2 Illinois Study Area.

summer of 1971. In total, 63 operators in Michigan and 60 operators in Illinois were interviewed.

Information collected included 1) characteristics of the operation and the operators, 2) characteristics of the rented land, and 3) the nature of the landlord-tenant relationship in the rental process. Because many tenants lease from more than one landlord, parts 2 and 3 were directed at each rental unit; and about 300 separate rental arrangements are included in the analysis.

3.2 The Market Participants

3.2.1 The Tenants

The operator interviewed was farming an average of 435 acres. Of this, 112 acres were owned or being purchased and the remaining 323 acres were rented (Table 3.1). In total 74 percent of the land was being rented. The tenancy rate of these operations (the proportion of farmland rented) was considerably higher in Illinois, 86 percent, as compared with 61 percent in Michigan. Twenty-five of the 60 Illinois operators interviewed (42 percent) were full tenants compared with eight of the 60 Michigan operators (13 percent).

Being a random sample, the survey covered a wide ranging acreage size distribution of operating units (Table 3.2). The proportion of farmland rented increased somewhat with acreage size of operation, as was found to exist in the national tenure data (Appendix Table 13). However, in this case, variation in tenancy was not found to be significant.[1]

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[1]Based on Chi Square Test of Independence at the 5 percent level of Significance.

Table 3.1 Number of farm operators interviewed, average acreage operated, owned, and rented; and percent of farmland rented, selected areas, 1971.

Areas	Farm operators interviewed	Average Acreage			Proportion of farmland rented
		Operated	Owned	Rented	
	Number	Acres	Acres	Acres	Percent
Michigan	63	400	157	243	61
Illinois	60	472	66	406	86
Total	123	435	112	323	74

Another measure of farm size, annual gross receipts from farm marketings, was used to classify operators within the sample to observe variation in tenancy rates. More than half of the operators reported receipts of $40,000 or more the previous year, and thus would be classified as economic class I farms (Table 3.3). The proportion of farmland rented was not found to vary significantly among the economic classes. As noted earlier in the discussion of U. S. tenure patterns, the inclusion of various livestock operations, yielding high gross receipts but requiring a relatively small land base, tend to distort the tenancy picture across economic classes. Recognizing this, a classification was also made for the crop portion only of gross receipts; and here a significant relationship did emerge in Illinois, with tenancy increasing with volume of sales.

In the previous chapter, it was noted that rate of tenancy and age of operator vary indirectly with the proportion of farmland rented, dropping as the operator ages. Correlated with this, it would be expected that rate of tenancy would vary inversely with number of years farmed. This relationship did, in fact, exist among the

Table 3.2 Percentage of farm operators interviewed and proportion of farmland rented by acreage size class, selected areas, 1971.

Acreage size of operation	Areas					
	Michigan		Illinois		Total	
	Percent of operators	Proportion of farmland rented	Percent of operators	Proportion of farmland rented	Percent of operators	Proportion of farmland rented
	Percent	Percent	Percent	Percent	Percent	Percent
Less than 200 acres	22	59	15	77	19	67
200 - 379	36	62	30	83	33	71
380 - 499	11	56	13	85	12	72
500 - 699	16	62	28	88	22	78
700 or more	15	62	13	88	14	75
	100		100		100	

Table 3.3 Percentage of farm operators interviewed and average rate of tenancy by gross receipts from farm marketings in 1970, selected areas, 1971.

Annual gross sales (1970)	Areas			
	Michigan		Illinois	
	Percent of operators	Average rate of tenancy	Percent of operators	Average rate of tenancy
	Percent	Percent	Percent	Percent
Total Receipts				
Less than $10,000	7	57	2	80
$10,000 - $19,999	21	67	14	79
$20,000 - $39,999	26	59	27	81
$40,000 or more	46	60	57	89
	100		100	
Crops Only				
Less than $10,000	12	59	3	73
$10,000 - $19,999	26	62	20	70
$20,000 - $39,999	37	62	23	90
$40,000 or more	25	60	54	89
	100		100	

survey respondents, with higher tenancy rates observed among those farm operators who had farmed less than 10 years and the lower rates found among farmers who had farmed 30 years or more (Table 3.4). This was particularly evident in Illinois.

Off-farm employment is an important income source to today's farmers. In this survey half the respondents in each study area reported income from off-farm employment of themselves or another member of their household. When asked what proportion of their household income was from off-farm employment in 1970, it was evident that heavier reliance was placed on this in Michigan. In Michigan,

Table 3.4 Percentage of farm operators interviewed and average rate of tenancy by number of years farmed, selected areas, 1971.

Years farmed	Areas			
	Michigan		Illinois	
	Percent of operators	Average rate of tenancy	Percent of operators	Average rate of tenancy
	Percent	Percent	Percent	Percent
Less than 10 years	2	100	12	94
10 - 19 years	21	72	23	91
20 - 29 years	41	59	42	87
30 years or more	36	65	23	72
	100		100	

28 percent reported less than 30 percent; 44 percent reported between 30 and 69 percent; and 28 percent reported 70 percent or more from off-farm employment. In contrast, 64 percent of those in Illinois who reported such income said it accounted for less than 30 percent of total income, with the remainder indicating from 30 to 69 percent of total household income.

This is consistent with county data obtained from the 1969 Census of Agriculture. A total of 69 percent of all farm operators in Lenawee County, Michigan reported working off the farm, with 50 percent working off the farm 200 days or more (essentially full-time employment).[1] In Champaign County, Illinois, 51 percent reported working off the farm, with 16 percent working 200 days or more.

[1]The relatively high dependency on off-farm employment in Michigan is due in part to the nature of the state's economy. The high incidence of industrial plants results in very good off-farm work opportunities as well as higher average daily wage rates than the national average. See [55, pp. 52-53].

As would be expected, size of farm operation was found to be inversely related to off-farm employment. In this study, the value of farm production assets operated by farmers with no off-farm employment averaged $341,000 while those reporting 70 percent or more of total household income coming from off-farm employment operated production assets valued at $80,000 per farm operation.

3.2.2 The Landlords

Some indication of landlord characteristics was gained from questions directed to the tenants. Since tenants usually were renting from two or more landlords, information was collected for approximately 280 landlords.

Nearly four out of every ten landlords (38 percent) were related to their tenants in some manner.[1] This ranged from 29 percent in Michigan to 43 percent in Illinois. The incidence of family arrangements indicates the importance of leasing in intergenerational transfer and in inheritance arrangements. And as will be discussed in the following section, the family arrangement has implications on the competitive aspects of the rental process.

Landlords in general had a strong orientation to farming (Table 3.5). Retired farmers and widows of farmers were the primary groups.[2]

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[1] An aggregate measure of the relative importance of family tenancy arrangements was gained from the 1965 Sample Survey of Agriculture (a supplementary survey for the 1964 Census of Agriculture). The survey found one out of three farm operators renting farmland in 1965 leased some land from a relative.

[2] More than 90 percent of the landlords were individuals with the remainder being primarily estates.

Table 3.5 Occupation of landlords, selected areas, 1971.

Occupation of landlord	Areas	
	Michigan	Illinois
	Percent	Percent
Retired farmer	46	26
Widow of farmer	30	37
Active farmer	3	5
Nonfarm business	12	12
Retired nonfarmer	5	11
Other*	4	9
	100	100

*Includes salaried and professional people.

The proposition that a significant amount of land is rented from absentee landlords was disputed somewhat by the survey findings. More than two-thirds of the Michigan landlords lived on the property, while in Illinois, more than half of the landlords lived in a nearby town (Table 3.6). In total, only 10 percent of the Michigan landlords and 15 percent of the Illinois landlords could be classified as absentee landlords (living out of the county or state).

Earlier it was noted that farmland investment by nonoperator landlords is an important source of capital for the farming sector. In this respect, nonfarm ownership is similar to stockholder investment in business corporations. However, this data on landlord characteristics indicates one cannot identify the nonoperator landlord as being synonymous with the "Wall Street" type of investor. If not retired farmers themselves, the majority of landlords are either members of farm families or closely associated with agriculture through the small rural community environment in which they live. So, while

the financial aspects of land leasing may parallel equity financing, the interrelationship of the resource owner and the resource user differs greatly—the landlord-tenant relationship being much more personal and informal.

Table 3.6 Residence of landlords, selected areas, 1971.

Residence of the landlord	Areas	
	Michigan	Illinois
	Percent	Percent
On the property	66	20
Nearby farm	8	13
Nearby town	16	52
Out-of-county	2	5
Out-of-state	8	10
	100	100

3.3 The Market Process

The characteristics of the market participants give partial insight into the land rental market. However, the key element is the actual negotiation itself. It is the activity which ultimately influences, and is influenced by, the structural changes which take place.

3.3.1 The Land Rented

The continual expansion of the size of operating units beyond the typical ownership unit has promoted multiple leasing (tenants leasing from more than one landlord). In this survey, respondents in both Michigan and Illinois rented, on average, from three separate landlords. Because each arrangement is unique, a series of questions was directed at the tenant pertaining to each of his rental arrangements.

The average size of tract rented was 120 acres. The units tended to be smaller in Michigan, 97 acres, than in Illinois, 141 acres. This variation mainly reflects the difference in ownership patterns between the two areas.[1]

Typically, the tenancy arrangements had existed for a considerable length of time. In Michigan, the same tenant had operated the rental unit for an average of 11 years. In Illinois, the leasing arrangemnts had extended to an average of 14 years. About one-third of the leases had been in effect five years or less (Table 3.7). Roughly one in six leases had existed for 20 years or more.

The length of tenure agreements seems paradoxical since most lease arrangements are made from year to year. Apparently tenure arrangements tend to be fairly stable over time, even though there is a very low incidence of long-term lease contracts. Nine out of every ten leases in this survey were for one year.

One might raise the question why one-year leases are the rule when tenancies generally run much longer. Aside from the importance of custom, short-term arrangements have specific advantages for both parties. The tenant can maintain greater flexibility in adjusting the size of his operation (however, if he is plagued by insecurity of tenure, then a short-term lease can reduce his managerial freedom). For the landlord, a short-term lease provides a means of managerial

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[1]The modal size of ownership unit was 40 acres in the Michigan area and 80 acres in the Illinois area.

Table 3.7 Length of time tenant has rented the property, selected areas, 1971.

Number of years farmed	Areas			
	Michigan		Illinois	
	Number of leases	Percent	Number of leases	Percent
	Number	Percent	Number	Percent
1 year	8	6	8	5
2 years	16	11	5	3
3 years	8	6	11	7
4 years	9	6	5	3
5 years	15	11	11	7
6-7 years	7	5	13	8
8-9 years	10	7	9	6
10-14 years	32	23	27	18
15-19 years	25	18	26	17
20-24 years	2	1	22	14
25-29 years	5	3	12	8
30 or more years	5	3	6	4
	142	100	155	100

control over possible undesirable farming practices by the tenant, as well as allowing greater short-run freedom to sell the property.[1]

The length of the tenure agreements suggest that the rental turnover rate may be considerably lower than what might be implied by the typical length of a lease contract. In this study, an average of 8 percent of the existing leases in the Michigan area and 5 percent of the leases in the Illinois area had gone into effect in each of the three previous years. These, of course, are crude approximations of turnover rates, not only because of limited sample size but also because the inherent assumptions of 1) uniform size of rental tracts and 2) no termination of contracts arranged in this previous three-year period. Nevertheless, when compared with the average annual turnover rate for all farmland via title transfer of about 3 percent per year, there is no basis of support to the hypothesis that the rental route plays a greater role in farm consolidation and growth than title transfer due to the more rapid turnover of rental contracts.

3.3.2 The Leasing Arrangement

The type of lease used varied widely between the two areas (Table 3.8). In Illinois, virtually all were crop-share leases. Variable expenses were generally shared in the same proportion as the crop. A very insignificant number were cash leases. In Michigan, the incidence of crop-share and cash leasing was roughly equal.

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[1] As noted by Cheung, landlords exercise managerial control not only by the option of changing tenants via the short-term contract but also be selling the property [9, p. 28].

Table 3.8 Type of lease used, selected areas, 1971.

Type of lease	Areas			
	Michigan		Illinois	
	Number of leases	Percent	Number of leases	Percent
	Number	Percent	Number	Percent
Cash	70	48	5	3
Crop share	76	52	153	97
	146	100	158	100

There is some evidence that interest in cash leasing is increasing in many regions where crop-share arrangements had previously dominated [44, p. 7]. The cash farm facilitates a bidding process where demand is active. Then, too, tenants may see the cash lease as rendering greater managerial freedom; this becomes of increasing importance as managerial sophistication and the incidence of multiple-unit leasing expands. Landlords may prefer to cash rent because of the assurance of a fixed income from the property.

Despite these advantages to cash leasing, the share-rent lease predominates throughout most of the Corn Belt. This study did not document an explicit explanation for this. But from informal conversations with survey respondents, several possible reasons emerged. First, some tenants were fearful of cash arrangements because (1) the tenant must assume the full risk of price and yield variation, (2) competitive advantage may arise to the larger operators under cash leasing, and (3) long-run security of tenancy may be diminished.

Tenants are also aware of another advantage of share leasing over cash leasing. Under the typical share arrangements, the tenant not only gains control of the land asset under deferred payments but also half of the major non-labor variable inputs. In many areas in this amount may represent $20 to $30 per acre. To tenants having inadequate operating capital or credit, sharing of the costs of putting in the crop is an important economic consideration.

Landlords, too, may be reluctant to enter into a cash arrangement. Part of this reluctance may stem from no appreciable gain seen in switching from share to cash. For example, throughout much of the Corn Belt, crop yields are stable enough to assure landlords a fairly stable rental return under share arrangements. Also, where rental customs have become so routine that landlords play an insignificant role in the managerial process, the landlord sees little gain in switching to a management-free cash lease. Finally, one cannot ignore institutional inertia. Landlords may be reluctant to break from custom, especially if doing so may create ill-will within the community.

3.3.3 The Formality of Leases

The majority of leases in the study were verbal agreements—roughly two-thirds of the leases were oral (Table 3.9).[1] Written arrangements were used more frequently on larger tracts; so in terms

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[1] Frequently, respondents said they had originally formed written leasing arrangements, but had not formally renewed these leases over time. However, according to tenure law in most states, the lease has renewed itself. Where nothing is said, both parties are governed by the agreements of the original lease consistent with the new situation, and the terms of the lease are then from "year to year". [5, p. 126].

Table 3.9 Percentage of written leases by selected characteristics, selected areas, 1971.

Selected characteristics	Percent written leases in area			
	Michigan		Illinois	
	Number	Acres*	Number	Acres*
	Percent	Percent	Percent	Percent
Type				
Cash	54	66	40	45
Crop share	17	20	27	37
Length of lease				
1 year	27	36	24	32
More than 1 year	85	79	100	100
Number of years rented				
Less than 5 years	51	50	24	43
5- 9 years	44	51	15	22
10-19 years	23	30	28	42
20 years or more	17	21	42	39
Relationship with landlord				
Unrelated	34	41	31	43
Related	28	36	21	25

*Refers to percent of acreage under written contract. For example, 66 percent of the land acreage that is cash rented in Michigan is under written contract.

of acreage, a larger percentage of the land rented was under a written lease. Cash leases were more frequently written agreements than crop-share leases. The latter form has become institutionalized to the extent that margin for disagreement has narrowed. In contrast, cash leasing represents more of an outright purchase of use rights, and therefore both parties may tend to prefer a more formal arrangement.

It is difficult to determine if the emergence of a highly technical, commercialized agriculture has promoted greater formality of leases. In Michigan, some evidence of this is a higher proportion of the more recent leases being written. In Illinois, where crop-share leasing has dominated, no such trend is evident. In fact, the highest proportion of written arrangements was observed among tracts rented for 20 years or more.

A lower proportion of written leases occurred where the landlord was a relative. When the tenant and landlord are related, mutual trust would likely be greater. In fact, several of the tenants interviewed said the mere suggestion of a written contract by one party in a family relationship may offend the other party.

No significant variation in the proportion of written leases was observed among other characteristics of the landlords such as occupation or residence.

The length of lease had a positive influence on the formality of the agreement. Of those contracts set up for more than one year, 90 percent were written leases.

3.3.4 Land Tracts Prior to Rental

About half of the land rented had previously been operated by other tenants; the remainder had been farmed by the owners and thus primarily represented land moving into tenancy for the first time. There was considerable variation between the areas. In Michigan, 68 percent of the acreage had been operated by the owner as compared to 28 percent in Illinois. The high percentage of the land in first-term tenancy reveals the more general increase in rented land in south central Michigan. Much of this increase has taken place during the last decade [12].

Farm consolidation frequently accompanied rental. Of the acreage rented by the survey respondents, 55 percent had previously comprised complete farm units. Most of these tracts when rented, formed portions of larger units.

In most instances, the land had become available to rent because of the previous operator (either owner or tenant) quitting farming (Table 3.10). This correlates directly with the high incidence of landlords who are retired farmers or widows of farms. Only 10 percent of the tracts in Michigan and 15 percent in Illinois came on the market as a result of the landlord terminating the previous lease.

Of the tracts which had previously been rented, about two-thirds of the leases had been terminated by the tenant as a result of his quitting farming, scaling down, or substituting other land. For 35 percent of these tracts in Michigan and 32 percent of the tracts in Illinois, the previous lease had been terminated by the landlord.

This suggests the permanence of leasing arrangements is more dependent on the decisions of tenants than on landlords.

Table 3.10 Reason why land became available for rent, selected areas, 1971.

Reason why land became available for rent	Areas	
	Michigan	Illinois
	Percent	Percent
Previous operator -		
Quit farming	79	62
Scaled down operation	6	13
Took other land	5	8
Landlord terminated lease	10	15
Other	1	2
	100	100

3.3.5 The Flow of Information

An important aspect of any market is the flow of information among the potential participants. Respondents were asked how they had learned the land was available for rent. In about 75 percent of the cases they replied either "directly from the landlord" or "from a family member" (Table 3.11). Community knowledge was the source of information only about 10 percent of the time. Of course, when the tenant was related to the landlord, the initial knowledge was almost exclusively gained from the landlord or some other family member. But even when no family relationship existed, about 60 percent of the tenants indicated that the landlord himself or a family member had told them the land was available to rent. In these situations, community knowledge still played a rather minor role—in only 20 percent of non-family tenancies in Michigan and 11 percent in Illinois had information been obtained in this manner.

Table 3.11 Source of market information, selected areas, 1971.

How tenant learned land was available for rent	Areas	
	Michigan	Illinois
	Percent	Percent
Directly from landlord	61	21
Agent for landlord	3	7
Family member	12	52
Neighbor	5	7
Community knowledge	14	7
Went to landlord	3	6
Other	2	6
	100	100

The rather personal communication linkages suggest the dissemination of market information largely takes place after the fact. This was further substantiated by the response to the question, "Were other operators aware of the land being available to rent?" In both Michigan and Illinois, less than half the tenants replied "yes"—42 percent and 47 percent, respectively. In approximately equal proportions, the remainder replied "no" or "uncertain". Although the awareness tended to be greater in nonfamily relationships, still in only half the cases did tenants know of others who were aware the land was available.

When tenants responded "no" or "uncertain", they were then asked if the landlord made an effort to inform others.[1] Nearly all said the landlord had not—97 percent in Michigan and 90 percent in Illinois.

[1]There were, undoubtedly, frequent instances where other operators had been aware even though the landlord had not deliberately tried to inform others.

In light of the relative importance of land rental, this fragmentation of market information seems somewhat paradoxical. Of course, the high incidence of family relationships means the market interaction is frequently bypassed. However, even in nonfamily relationships, there was seldom widespread knowledge of the land being available. There are two possible reasons for this. First, the landlord may have no incentive to advertise if he intends to rent on a typical crop-share arrangement.[1] Under this condition, the profitability to the landlord depends on attributes of the tenant and his operation, such as his equipment, size of operation, managerial ability, and other personal qualities such as honesty. These characteristics are generally appraised from close personal contact over the course of time. Consequently, the landlord may prefer to rent to an operator who he knows personally, not only as a favor, but also because he has evaluated the potential tenant on traits which normally do not surface in a more competitive market exchange between strangers.

Although the landlord's economic welfare is not as dependent on these traits when he is cash renting, there even appears to be some reluctance by the cash-rent landlord to advertise his land. Numerous tenants indicated that landlords in the neighborhood had contacted them about renting land even though they could have easily received equal or even higher cash rents by renting to outsiders.

A second possible reason for landlord preference for interpersonal arrangements stems from noneconomic motives. Friendship and goodwill are regarded highly in the small rural community atmosphere.

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[1] If he intends to cash rent, then he may be more interested in actively advertising.

As a result, landlords may be reluctant to rent their land in a competitive market exchange for fear of ill-will created among the unsuccessful bidders.

3.3.6 Competition at Time of Rental

With the information flow being what it is, competition in the land rental market takes on a more subtle form than might be expected. Outright competition in terms of price and nonprice bidding was found to be the exception rather than the rule.

If the respondents indicated that other operators had been aware of the land being available when they initially rented it, they were asked if these individuals were interested in renting the tract. Their answers varied greatly between the study areas indicating, in part, the difference in the demand for rental land. In Michigan, respondents said 36 percent of those farm operators aware of the upcoming transfer were interested, 24 percent were not interested and, in the remaining cases, the respondent was uncertain of their interest. In contrast, Illinois respondents said 71 percent of these individuals were definitely interested in renting the land and only 8 percent were not interested.

Despite the interest of others which the respondents were aware of (and, undoubtedly, some which they did not know of) actual competition was infrequent. Tenants encountered active competition in 8 percent of the cases from one or more operators. In half of these instances, managerial reputation was involved in the bidding. Bidding on cash rental rates was reported infrequently. In the remainder, there was no special bidding other than one or more other operators asking for the land.

The nature of the information flow and competition implies the beginning operator may have extreme difficulty in renting farmland. Unless he is fortunate enough to bring family influence to bear, he will be competing at a relative disadvantage with the established operator on two counts. First, he may be less likely to be aware of farmland available to rent. Second, without an established reputation of being an efficient farm manager, this individual would be less likely to be selected so long as other interested parties have such a reputation. Thus, the relatively greater reliance on land rental by younger farm operators as noted earlier may tell only part of the story. It is also possible that the incidence of unsuccessful applicants for rental land is much higher among younger potential farm operators.

3.3.7 Negotiation at Lease Renewal

The periodic renewal of short-term leases can be as important as the initial market process. Not only does it involve tenant-landlord interaction, but it also provides a situation in which potential competition can arise.

Despite the potential, however, the survey found the lease renewal process to be insignificant. In two out of three instances, tenants discussed nothing with their landlords (Table 3.12). When discussion had taken place, it most often involved farming practices and not factors pertaining to the actual leasing arrangements.

Landlord-tenant interaction occurred more frequently among nonfamily contracts than among family tenancies--for the two areas combined, 37 percent as compared to 28 percent. Discussion also

Table 3.12 Incidence of discussion and negotiation between the tenant and the landlord at lease renewal, selected areas, 1971.

Factors discussed and negotiated at lease renewal	Areas					
	Michigan		Illinois		Total	
	Dis-cussed	Nego-tiated	Dis-cussed	Nego-tiated	Dis-cussed	Nego-tiated
	Percent	Percent	Percent	Percent	Percent	Percent
Nothing	68	86	64	89	66	88
Type of lease	2	2	1	1	1	1
Cash rates or crop shares	7	7	1	1	4	4
Share expenses	—	—	2	—	1	—
Farming practices	14	14	29	6	23	6
Property improvement	2	—	3	3	2	1
Two or more of above	7	—	—	—	3	—
	100	100	100	100	100	100

depended on who the tenant dealt with; that is, when the landlord's business affairs were handled by an agent or when an administrator was responsible for an estate, discussion with the tenant generally took place.

A sharper measure of interaction was gained from asking tenants what actually was negotiated. They revealed that frequently the discussion had primarily been for the purpose of informing the landlord and was not done in the spirit of negotiation. This was particularly true of farming practices.

The rather slight evidence of negotiation implies that the landlord plays a very minor managerial role in the joint farm enterprise. A number of tenants replied, "My landlord leaves it all up to me."

The fact that tenants have this wide discretion in the operation of the farm unit gives them more flexibility in the coordination of their total operation. This is especially important in multiple-leasing operations.

There are several possible explanations for the lack of landlord decision making. In family rental relationships a strong element of trust usually prevails. Likewise, mutual confidence may often be present in other arrangements as well, and continues to grow between landlord and tenant over the years. Then, too, some landlords are not familiar enough with the operating unit, the farm programs, or modern farming techniques to enter into the management decision making; and they follow the suggestions of their tenant.[1] The lack of negotiation may also arise from the tenant's reluctance to suggest alterations in the arrangement. Where demand for rental land is keen, the tenant may feel he is in no bargaining position to modify the rental agreement. He may also hesitate for fear of creating ill will in the business relationship.

3.3.8 Competition at Lease Renewal

Those tenants who had renewed their leases were asked if they knew of other operators who were interested in renting the particular tract. In Michigan, nine out of every ten tenants replied they knew of none. Seven of ten respondents in Illinois were not aware of other

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[1] In this situation, the landlord is not necessarily relinquishing control to the tenant but rather shifting his managerial influence to a different phase; i.e., instead of actively participating in the ongoing management, the landlord may practice greater discretion in his initial selection of a tenant.

operators' interest. When they knew of interest, however, they generally replied that several were interested; but only a few tenants reported actual competition with bidding for the property.[1]

The opportunity for a third party to dissolve the landlord-tenant agreement is somewhat limited. Even in cash arrangements, a higher cash offer may not be sufficient. It appears conflicts of interest within the landlord-tenant relationship must exist before outside offers will be considered. Time is also a factor. As one respondent replied, "Potential competition is greater during the first year or two of the agreement; and the longer the contract exists, the less the opportunity for others to compete."

3.3.9 Expectations of the Future

The uncertainty of tenancy has commonly been considered a drawback to long-run decision making. Moreover, the increasing size and sophistication of today's commercial farming operation has placed even greater emphasis on the long-term planning horizon.

Thus far, it has been implied from the length of rental agreements and from the greater occurrence of tenant termination as compared to landlord termination that rental arrangements tend to be

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[1] In many cases, the tenant may never know of the inquiries directed to the landlord. Yet, the fact that the landlord does not inform the tenant about these outside interests in itself suggests competition was not present.

secure.[1] Also, the lack of competition at lease renewal suggests relatively permanent contracts even though most leases are from year to year. Yet does the tenant, in fact, feel secure? Or more specifically, is the element of tenure uncertainty great enough to significantly discount the future, and to alter long-run economic planning?

The survey attempted to answer these questions in part by asking a series of questions pertaining to the future rental of each tract. Tenants were first asked if they had discussed long-range plans (five years or more) with the landlord. Long-run plans had been discussed for only 7 percent of the leases in Michigan and 20 percent of those in Illinois.[2] Despite the absence of discussion, tenants responded that the majority of tracts could continue to be rented indefinitely or at least until the land was sold (Table 3.13) In only a small percentage of cases did tenants specify a specific length of time. Substantial differences in responses occurred between the areas with a considerably higher level of certainty being observed in Michigan. Greater demand for farmland in Illinois relative to Michigan may be one explanation; due to more demand, there may be a greater chance that a tenant in Illinois will lose the tract when a change of ownership takes place.

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[1] While the survey indicated stability and high levels of security of tenure, it should be noted that the sample consists of successful tenants only. Little or no evidence exists about the incidence of tenants who have lost rental land, or about individuals who were unsuccessful in finding land to rent.

[2] The somewhat higher incidence of long-range planning in Illinois may be due to (1) the higher proportion of family relationships and (2) the greater scarcity of farmland available to rent in Illinois, which may encourage tenants to be more concerned about future tenancy.

Table 3.13 Tenants' opinion of ability to rent tract in the future, selected areas, 1971.

Length of time tenant will be able to rent tract	Areas	
	Michigan	Illinois
	Percent	Percent
Indefinitely	73	41
Until land is sold	12	52
Less than 10 years	9	1
Don't know	6	6
	100	100

Uncertainty of tenure when influenced by ownership transfer depends on the turnover rate of ownership. National estimates show that about 3 percent of the farmland is transferred each year [49, p. 28]. Hence, ownership to a typical tract of land would transfer on average about once every 23 years. However, from the tenant's standpoint, it is more relevant to consider the age and health of the landlord and the likelihood of an estate settlement than aggregate estimates of turnover. Many tenants are faced with a high risk of losing the property in the near future (one to five years) unless they are in a position to purchase the property or make an agreement with the heirs, should they decide to maintain ownership.[1]

Counteracting the long-run uncertainty of tenure is multiple-unit leasing. The greater the number of rental units (and, therefore

[1]Occasionally a landlord will specify in his will that the present tenant would be allowed to continue renting after estate settlement. In other cases, heirs who are unfamiliar with farming or the community may prefer to keep the present tenant.

landlords), the lower the magnitude of loss when a particular landlord terminates the lease. Diversification via leasing from several landlords simultaneously can be as relevant to the stability of land resource control as is a balanced portfolio to the investor who wants to minimize risk.

In order to compare expectations with aspirations, respondents were also asked how long they would like to rent the property (Table 3.14). Most hoped to rent the land indefinitely, particularly in Illinois where demand for such land is keen. Only a small proportion of operators hoped to rent the property only until they had the opportunity and financial ability to purchase the tract. This further supports the conclusion that the primary role of farmland leasing is no longer one of a temporary step towards eventual full ownership but is instead a means to acquiring the necessary land base.

Table 3.14 Tenants' desire to rent tract in the future, selected areas, 1971.

Length of time tenant would desire to rent tract	Areas	
	Michigan	Illinois
	Percent	Percent
Indefinitely	67	86
Until can buy the tract	16	11
Less than 15 years	15	1
Don't know	2	2
	100	100

3.4 Land Rental and Farm Adjustment

Aggregate tenure patterns indicate that farmland rental plays an increasing role in structural change as the disparity between size of ownership unit and operating unit increases. Yet cross-sectional analysis of aggregate data cannot document the dynamics of firms over time. To accomplish this, a comprehensive time series analysis of specific firms is necessary to understand how rental interacts specifically with changes in the farm firms. Consequently, a series of questions was directed at survey respondents concerning land acquisition and use patterns, and the characteristics of asset control.

3.4.1 Land Use and Acquisition

Multiple unit operations are the rule rather than the exception in today's land-based agriculture. Generally, the farming operation is not located on one continuous block of land. In this study, about four out of every five operations (81 percent) involved nonadjoining land units. Those units which were complete blocks were generally smaller operations, averaging 288 acres, than the discontinuous operations, which average 470 acres. Little difference in the proportion of land rented was observed between the block and the discontinuous units.

It is commonly believed that the growing tenure class of part owners reveals an increasing tendency for farm operators to own a headquarters unit while leasing additional land for expansion purposes. Such an arrangement supposedly gives the operator two distinct advantages: (1) ownership of a headquarters unit gives greater security and managerial flexibility than under full tenancy

and (2) larger size and greater production efficiency than otherwise possible under full ownership. In this study, however, part owners did not necessarily own their headquarters unit. While 95 percent of the part owners interviewed in Michigan owned the headquarters unit, only 52 percent of the part owners in Illinois owned this unit. This variation can be explained in part by the differences in agricultural enterprises existing between the areas. The Michigan area, while relying most heavily on cash grain crops, does have some dairy and livestock feeding enterprises. When such enterprises exist, the facilities of an operator's headquarters are more important. Thus, he may prefer to own this unit to adjust his physical plant to meet the needs of his livestock enterprise(s). In contrast, agriculture in the Illinois area is almost exclusively cash-grain farming. With the exception of machinery storage and possibly grain storage, operators may not place special interest on the headquarters unit. An additional possible explanation for the variation between the areas is the higher incidence of family arrangements in Illinois. In these instances, a tenant would be less hesitant to make building improvements or any other modification of the headquarters unit. Because of the family relationship, security may be as great as that under owner operatorship.

Part owners in the Michigan area on average owned 42 percent of their total operated acreage while in Illinois the owned portion was less—22 percent (Table 3.15). This land which operators held title to had generally not been acquired in a single unit. Rather, acquisition usually had taken place in increments over time. The units averaged 80 acres in size. Acquisition by the present operators had

been an average of 14 years previously in Michigan and 12 years before in Illinois.

Table 3.15 Land base characteristics of part owners and tenants, selected areas, 1971.

Acreage size characteristics by tenure	Areas	
	Michigan	Illinois
	Average acreage	Average acreage
Part owners—		
Acres operated	428	486
Acres owned	178	108
Full tenants—		
Acres operated	229	407

The method of acquisition of owned land differed significantly between study areas. In Michigan about two-thirds of the land had been purchased from a nonrelative with the remainder largely purchased from a relative (Table 3.16). In Illinois the frequency of relative purchases and inheritances was much higher.

Much of the land acquired had previously been rented. The proportion was somewhat higher in Illinois than in Michigan, reflecting the greater tendency for land rental to be used in the intergenerational transition.

Half of the respondents reported a change in acreage size of their operating unit over the previous five years. The generalization that larger farms comprise the expanding sector of farming industry was borne out in part by the variation in gross sales among farms increasing, remaining the same, and increasing in acreage size. Over three-fourths of those expanding operations reported gross sales

volumes of $40,000 or more in 1970. In contrast, only 32 percent of the farms remaining constant in size and 22 percent of those decreasing in size reported sales of $40,000 or more.

Table 3.16 Method of acquisition of owned land and incidence of previous rental, selected areas, 1971.

Method of acquisition and incidence of previous rental	Areas	
	Michigan	Illinois
	Percent[a]	Percent[a]
How acquired—		
Nonrelative purchase	65	42
Relative purchase	28	39
Inheritance	4	19
Gift	1	—
Other	2	—
Total	100	100
Previously rented—		
Yes	39	54
No	61	46
Total	100	100

[a] Percentage based on numbers of tracts.

In terms of acreage, the farms which had expanded in size were larger than the all-farm average, 585 acres as compared to 435 acres (Table 3.17). The rate of tenancy was essentially the same. The percent increase in acreage average was 14 percent over the five-year period.

The expansion process was most heavily dependent on land rental. In Michigan, three out of every five acres added were rented, while in Illinois, more than three out of every four acres added were rented. This parallels findings of an aggregate measure of farm size adjustments provided by the 1966 Pesticide and General Farm Survey

conducted by Economic Research Service, USDA. In this national survey, a representative sample of farm operators was asked about changes in acreage operated between 1964 and 1966. When expansion occurred, land rental was the primary means of acreage expansion. Over two acres of additional land was rented for each acre of additional land purchased.

Table 3.17 Tenure characteristics of farms expanding in acreage size over last five years, selected areas, 1971.

Subject	Areas		Total
	Michigan	Illinois	
Average acreage in 1971:			
Owned	230	77	165
Rented	327	545	420
Operated	557	622	585
Average acreage in 1966:			
Owned	167	38	111
Rented	231	411	308
Operated	398	449	419
Average acreage added:			
Owned	63	39	54
Rented	96	134	112
Operated	159	173	166
Percent increase in total acreage:	14	14	14
Percent rental land of total added acreage:	60	77	67

Analysis of aggregate tenure patterns by age of operator in the previous chapter seem to suggest that reliance on leasing in acreage expansion will tend to diminish over the life of the operator. That is, as his financial position builds up over time, the operator will more frequently purchase rather than lease additional land. This

survey however, found no evidence to support this generalization. Using number of years farmed as a rough proxy for financial well being, the study found operators who had farmed for 30 years or more were relying as heavily on leasing for expansion purposes as were their younger cohorts.

The relative importance of land rental was also evident in the future intentions of respondents. About 90 percent intended to continue renting land for at least five years (Table 3.18). Those who did not were usually nearing retirement age and were considering quitting farming or scaling down their operations.

Table 3.18 Farm operators' intentions for land rental in the future, selected areas, 1971.

Intentions for land rental in the future	Areas		Total
	Michigan	Illinois	
	Percent	Percent	Percent
Continue renting?			
Yes	85	93	89
No	10	5	8
Don't know	5	2	3
	100	100	100
Expand rental acreage?			
Yes	33	45	39
No	55	52	53
Don't know	12	3	8
	100	100	100

When asked if they intended to rent more land within the next five years, 39 percent replied "yes". A somewhat higher percentage intended to expand their rental acreage in Illinois than in Michigan. Respondents frequently commented they would expand *if* rental land

became available. This was particularly noticeable in Illinois, where nearly all respondents reported available rental land to be hard to find. Apparently, the scarcity of rental property is a major constraint on farm expansion. And this limitation frequently overrides the operator's intentions for acreage expansion.

3.4.2 Land Rental and Asset Control

When asked to estimate the current market value of all their production assets (real estate and nonreal estate) survey respondents reported a substantial portion to be rented real estate (Table 3.19). In terms of current market value, the rented portion accounted for an average of 75 percent of the total production asset value. Production assets averaged over $300,000 per farm. Both the degree of rental and level of asset value per farm correspond closely to aggregate data on cash-grain farms.

Variation in the proportion of rental asset value among the various farm size classifications was not significant. Similarly, no definite pattern was evident between the proportion of rented asset value and volume of gross sales. Apparently, a relatively high reliance on rental is prevalent in these study areas, regardless of acreage size and dollar volume of the operation.

3.5 Chapter Summary

Assuming the markets studied are generally representative of rental market institutions within the North Central States the evidence would support the hypothesis that such markets are highly personal with little opportunity for competitive bidding. The market area was found to be quite localized with participants generally

Table 3.19 Average value of real estate and total production asset value and relative importance of rental land value to total by selected characteristics of tenant and part-owner farms, selected areas, 1971.

	Michigan				Illinois				Total			
	Average real estate value	Average total production asset value[a]	Rented value as % of total real estate	Rented value as % of total asset value	Average real estate value	Average total production asset value[a]	Rented value as % of total real estate	Rented value as % of total asset value	Average real estate value	Average total production asset value[a]	Rented value as % of total real estate	Rented value as % of total asset value
	$1000	$1000	Percent	Percent	$1000	$1000	Percent	Percent	$1000	$1000	Percent	Percent
Size of farm (acres)												
Less than 220	82	92	69	62	113	120	84	79	94	103	76	69
220-379	131	154	63	53	118	205	81	75	157	176	72	64
380-499	210	280	47	38	303	338	83	75	262	312	70	59
500-699	305	372	58	48	450	491	87	80	397	447	79	70
700+	511	596	64	55	733	777	86	81	608	675	75	68
All farms	212	255	61	51	333	360	95	79	271	306	75	66
Volume of gross sales												
Less than $20,000	85	92	69	64	214	227	78	74	132	141	74	69
20,000-39,999	152	172	62	55	165	180	82	75	158	175	72	65
40,000-99,999	250	290	69	59	410	445	88	81	355	392	83	75
100,000+	448	471	52	50	673	724	79	74	504	609	61	60
Years farmed												
Less than 10	b	b	b	b	436	471	94	87	413	443	94	88
10-19	307	349	75	66	299	327	91	83	302	337	83	75
20-29	148	187	55	44	269	292	89	82	216	246	78	69
30 or more	170	197	65	56	276	299	68	63	216	241	66	59

[a]Total production assets include farm real estate, livestock, and machinery and motor vehicles.

[b]Less than 4 respondents.

knowing each other before entering the market. A significant proportion of the leases were family arrangements. Information networks are largely through informal channels with general awareness of availability frequently occurring after the fact. Moreover, custom and inherent need for social acceptability play important roles. As a result, respondents indicated a low incidence of active competition—both at the time of initial rental and at the periodic renewal. Even in the Michigan study area where approximately half of the leases were cash agreements, active competition was minor. What emerges, then, is a rather paradoxical situation in which short-term lease contracts are the rule, yet slow turnover rates and stable tenancy patterns prevail.

For the operator who has successfully rented farmland, such a market framework appears to be advantageous. For, as noted by Krausz and Reiss, a highly competitive rental market could greatly increase tenure uncertainty [32, p. 1375]. The tenant generally can feel that so long as there is reasonable cooperation between himself and his landlord, he can be assured of a continuing agreement. Frequently, it is only upon sale of the property or title transfer that the tenant's position is in jeopardy; and even this can be bypassed in part by multiple-unit leasing which is characteristic of today's situation.

Accompanying this low-keyed market interaction is a management process which tends to be heavily weighted to the tenant. Usually, the landlord plays a passive role in ongoing management—especially if the agreement has functioned for several years, or the landlord is elderly and not familiar with present farming technology. Lease renewal, then, is usually automatic with negotiation being little more

than the tenant informing the landlord of his cropping intentions. This is particularly beneficial to the tenant who is controlling a land resource investment of a quarter million dollars or more largely through leasing from a number of separate landlords. Managerial coordination is critical if the most efficient operation of the total unit is to be realized. And this would be most difficult if each landlord demanded a more positive managerial role.

It should also be noted that the landlord is not necessarily relinquishing his managerial influence. Rather, he may be transferring it from ongoing management responsibilities to the initial selection of a tenant capable of full responsibility. Thus, the informal and noncompetitive nature of the rental market can create a climate of mutual trust and responsibility that can be of benefit to both parties.

As to the hypothesis that farmland rental is the primary means for farm consolidation and growth due to the short-term nature of the rental contract, this case study presents conflicting evidence. Respondents in this survey had relied heavily on rental for expansion purposes. Three out of five acres in Michigan and over three out of four of the acres in Illinois which had been added during the previous five years were rented. And a substantial portion of such tracts had previously been farmed as complete farm units; thus, consolidation frequently had accompanied expansion. But to appraise the role of rental in the aggregate requires investigation of the total farm population and not just that element which has successfully rented farmland. In this perspective, the rate of rental land turnover gives partial insight into the potential reliance on rental relative to farmland purchase. Based on this sample of leases, the turnover rate

of rental property is likely less than 10 percent per year and possibly as low as 5 percent. So the difference between this rate of the rental acreage and an average of 3 percent turnover of farmland title for the total farmland base may not be significant.[1] In short, it appears that rental is the most accessable option of farm acreage size expansion for some farm operators, but certainly not for the farm population as a whole. Availability of land to rent is the crucial factor.

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[1]In addition to the flow aspects, the stock aspect of the rental land resource must also be considered; i.e., since the proportion of all farmland rented varies from less than 20 percent to over 50 percent in states where land-based farming is important, the relative influence of rental on the farm consolidation and growth process will vary accordingly.

CHAPTER IV

LAND RENT THEORY—RELEVANCE AND IRRELEVANCE

An extensive body of land rent theory has been developed over time. As true of all theories, it is an attempt to construct simplifying frameworks by which complexities of reality can be reduced to meaningful relationships. This chapter reviews these traditional constructs and evaluates them in terms of applicability to present land tenure conditions within the farm sector. Part I outlines basic land rent theory. Part II reviews past empirical effort to test such theory, and Part III presents factors believed relevant to explaining observed deviations between theory and reality.

4.1 Land Rent Theory Reviewed

The earliest economists expressed concern over the effects of leasing. Adam Smith condemned share rents because the landlord benefits from capital outlays of the tenant without contributing toward these investments. Mill and Marshall continued the study of share renting and the inherent problem of discouraging improvements [38, 36]. More recently, Schickele evaluated various tenure systems on the basis of efficiency criteria of (1) marginal revenue equal marginal costs and (2) all factors of production yield equimarginal returns [45]. He emphasized the inherent deviation from the optimum of various leasing methods due to separation of control or decision making and

the different perspectives of the landlord and tenant concerning durable and nondurable factors. Schickele also employed marginal analysis to share renting to clarify the resource inefficiency dilemma noted by earlier writers. A decade later Heady merged and expanded the major ideas of land rent theory that had been developed [21]. It is this effort which serves as the primary basis for the discussion to follow.

Heady initially develops criteria for evaluating leasing systems which center on efficiency and equity. Assuming private ownership, competition, and an operating pricing and exchange system, Heady says a perfect leasing system must therefore result in (1) the most efficient organization of resources on the farm firm relative to consumer demand as expressed in market prices and (2) an equitable division of products among the owners of the various resources employed in production. In the term, equitable, Heady is referring to the condition where return to any of the resource owners is based on the marginal value productivity of the resources that the owner contributes. This standard is directly related to efficiency, in that if a resource owner receives either more or less than the marginal value product of his resources he will be motivated to use them in ways that reduce the

efficiency of the firm. Consequently, emphasis is placed on efficiency since the equity will necessarily follow.[1]

Having defined the concept of efficiency, Heady then identifies various ways in which leasing can distort the attainment of this end.

4.1.1 Resource Use Intensity in the Short Run

The short run is defined as the period in which there is no opportunity for the tenant or landlord to alter the agreement. In this time frame, the participants' preferences can be in conflict. This is illustrated by Adams' and Rask's share lease model in Figure 4.1 [1]. Assuming a 50-50 output share lease without cost sharing, line AQ_3 represents the marginal value product (MVP) to the firm for the variable factor X_1, holding land and all other factors constant. Line BC represents the firm's marginal factor cost (MFC) for the variable input. The profit maximizing owner-operator would produce where MVP = MFC or at the Q_2 level of input.[2] This represents the optimum output level of the firm.

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[1] Efficiency takes on the same conditions then of the equilibrium conditions of the profit maximizing firm--namely, the attainment of: (1) factor-product relationships and cost structures must be retained over time consistent with short-run technological conditions. The scale of the firm must be one which defines maximum return; (2) marginal value productivity of substitute resources must be equated, and factor-factor relationships must not be distorted; (3) product combination will equate marginal returns on the last unit of resources employed for each product at a given point in time; (4) product combinations must be such that marginal value products are equated over time (discounted) for all resource units; (5) economic activity must not increase uncertainty above that normally existing in the market.

[2] The cash rent tenant would also prefer to operate at this level since he would appropriate all production the same as the owner-operator.

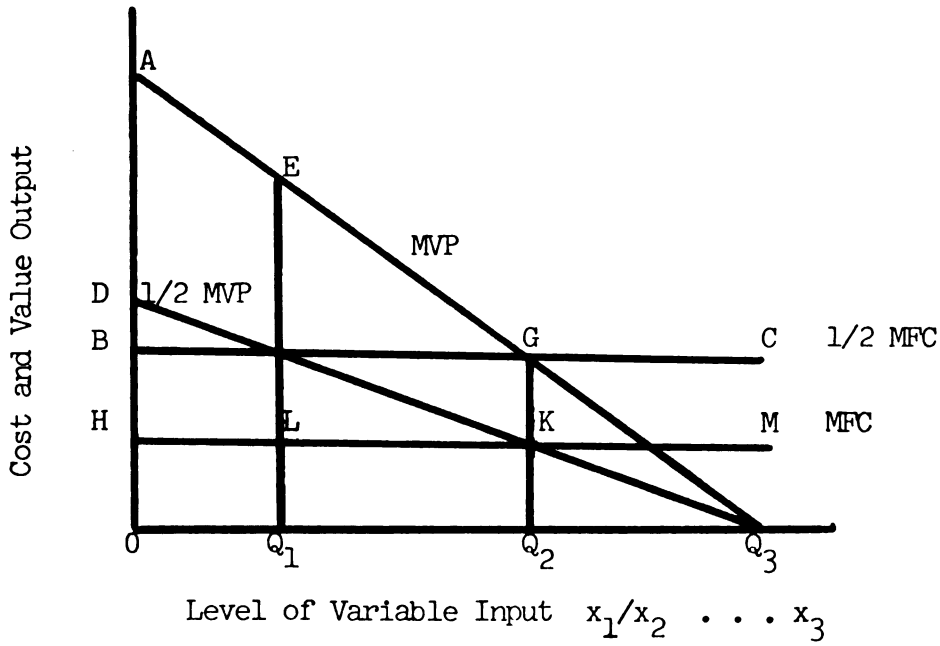

Figure 4.1 Share lease model with cost sharing.

For the 50-50 share tenant however, line DQ_3 is perceived by him as his MVP schedule. Thus, he would wish to produce at the Q_1 level where his own MVP = MFC. At this level inefficiency is introduced into the firm since MVP is twice as large as MFC. The landlord in this situation would take an entirely different perspective. Since the MFC of the variable input is zero to him, he would desire production at the Q_3 output level (as equally inefficient in the firm context as the tenant's preference). Thus, conflict between landlord and tenant exists; and it is only by chance that the bargaining power of each would be balanced so as to arrive at the most efficient level of production, Q_2.

To resolve the share rent discrepancy, Heady says that the cost of variable factors (where land is fixed) must be divided between the

landlord and tenant in proportions paralleling the division of the product [21, p. 600].[1] This is illustrated in Figure 4.1 by line HM. Given this, the share tenant's MVP would intersect the new MFC line at point K; and optimum resource use would be attained.

4.1.2 Resource Use Intensity in the Long Run

A corollary misallocation of resources occurs in the long run which can also be illustrated by the model in Figure 4.1. In brief, tenants having essentially zero marginal factor costs with respect to the resource land, would want to farm extensively using the maximum amount of land (Q_3 in Figure 4.1 if the variable was referring to the land resource). In contrast, the cash rent tenant faces an incremental cost with each land unit and would choose to operate more intensively on a smaller sized operation, operating at Q_2, the optimum resource combination. For the landlord with a share lease, his desire would be for the tenant to farm only Q_1 units of land, thereby equalizing his MFC and MVP of the land resource. As with the short-run condition, the long-run imperfections can be remedied with sharing provisions of the inputs. But the process is more complex since the resources of both the landlord and the tenant are variable. Heady notes perfection can be brought about only if both parties own some of each category of resource, the proportion depending on the share of product received by each. "Thus, perfect share leases would almost always require complete partnership arrangements." [21, p. 601].

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[1] Just what are considered variable factors and what are considered fixed factors remains a critical issue. Elefson notes that researchers have arbitrarily assigned inputs to these categories without explicitly recognizing this fact [16, p. 134].

4.1.3 Resource Allocation Among Competing Enterprises

Farm firms are frequently comprised of more than one major enterprise. Moreover, the major share of rental land is operated by part owners. Theory suggests that these situations can lead to resource misallocation. More specifically, variation in the tenant's marginal value product between different crop enterprises or between his owned land and rented land will introduce inefficiency.

First, enterprise combinations under differing share leases. Consider a situation in which two major crop enterprises are produced, Y_1 and Y_2, with Y_1 at 50-50 shares and Y_2 and a 1/3 to 2/3 share agreement. The production possibility curve AB in Figure 4.2 shows the various combinations of the two products which can be produced. Based on the price relationships of the products, the optimum combination is at the intersection of price line, ab, and production possibilities curve, AB, or point C. However, the tenant's production possibility curve is DE. And because of differing lease shares, its shape differs from the firm's curve. When the price line is applied to the tenant's curve, the resource combination varies; and when transferred to the firm context, production would take place at point F, or less than maximum efficiency.

The remedy for this imperfection is for rental shares of each enterprise to be equal. In so doing both tenant and landlord preferences will not deviate from the optimum enterprise combination.

In a somewhat similar vein, resource misallocation can arise in partownership where the tenant is allocating resources among land acreage owned as well as land rented. To illustrate this, production possibilities between the owned and the rented portions are analyzed

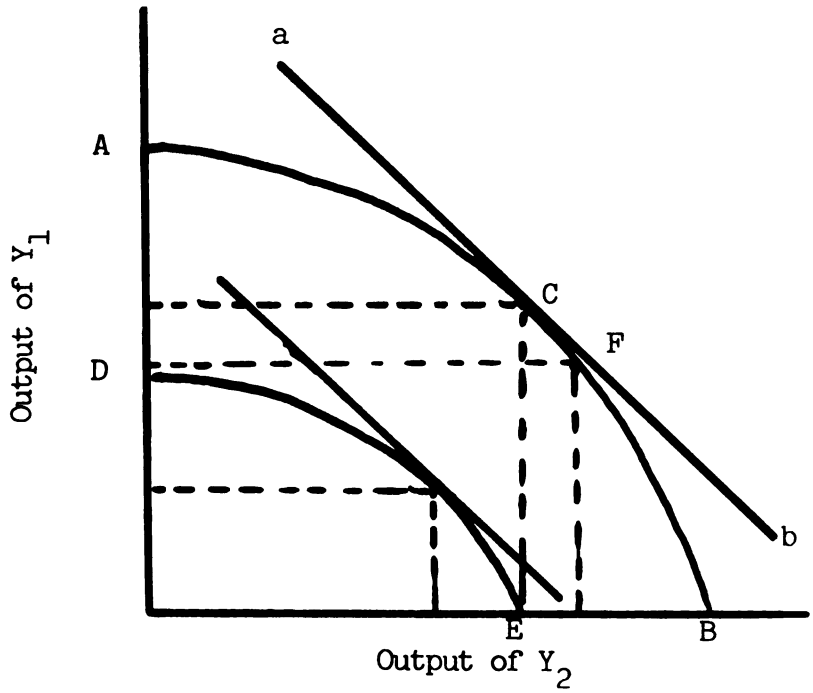

Figure 4.2 Production possibilities with different rental shares between competing enterprises.

as in Figure 4.3. Again, assuming part-owner and landlord resources are fixed in quantity, the production possibilities for the firm can be represented by AB in Figure 4.3. Likewise, the combination providing greatest returns would be point C, the intersection of the production possibility curve and the product price line, ab. But the part owner's production possibilities curve is AD, since he receives only half of the product from the rental acreage. Thus, the part owner can produce relatively more with his labor and capital resources if he uses more of these inputs on his owned acreage. However, the combination of resources which give the part owner highest returns (point E on the total production possibility curve) is not optimum from the standpoint of the firm.

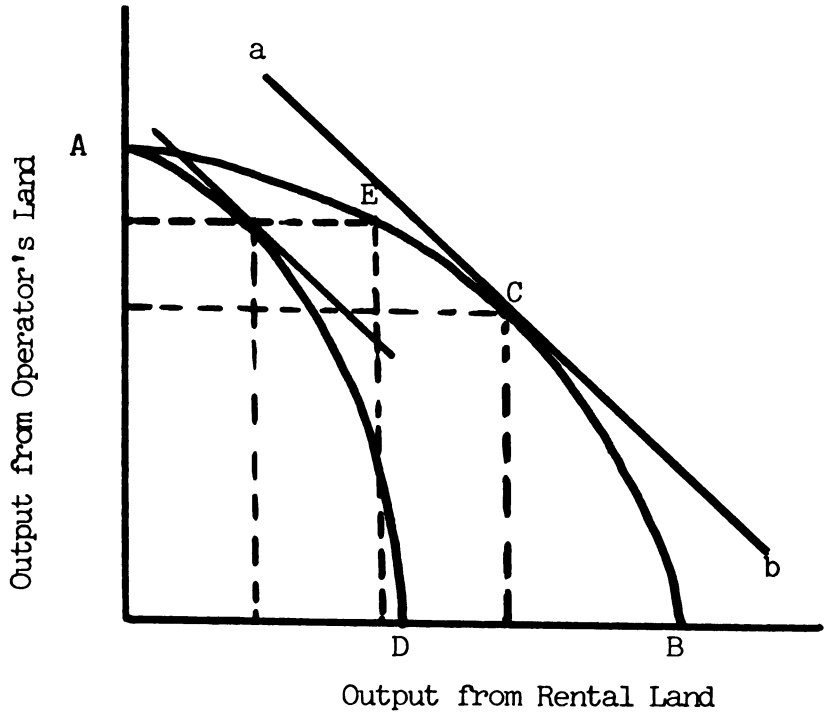

Figure 4.3 Production possibilities for part-owner operations.

As with the inherent problem of differing shares between enterprises, the equal sharing of resource inputs between tenant and landlord will prevent this distortion of the opportunity curve. When this is done, return per dollar of resources invested by the tenant will have the same value productivity as a dollar of resources applied to his own land [21, p. 611].

4.1.4 Tenure Uncertainty and Time Relationships in Leasing

Because of the short-term nature of lease contracts, there is a tendency among tenants to contribute only those inputs whose benefits will accrue within the period covered by the lease. Theory suggests this leads to inefficiency, since the enterprises and resources with quick returns will be chosen even though other

enterprises and other uses of resources could provide larger profits in the long run [16, p. 24].

Resource inefficiency due to tenure uncertainty can occur in all types of leases, cash and share leases alike. Special provisions to increase security of tenure such as lengthening lease contracts or compensating unexhausted tenant inputs can reduce this defect. However, these actions do not entirely eliminate uncertainty, since it is highly unlikely that such efforts are perfect substitutes for something so complex and immeasurable as tenant uncertainty of the future.

4.2 A Review of Past Empirical Research Testing Rent Theory

Rent theory generally indicates that deviation from optimum resource allocation can take place due to certain features of lease agreements. Unless special provisions to eliminate these elements exist, empirical tests should reveal resource inefficiency under various leasing conditions.

However, Elefson notes there are two aspects to be recognized in such testing [16, pp. 30-33]. First, when there is motivation to depart from efficiency, the motivations of the tenant and the landlord are frequently counteracting. For example, when the tenant wants to farm extensively so that the marginal product of land is zero, the landlord is motivated to encourage the tenant to farm so intensively that the marginal product of tenant's resources are zero. Thus, to the extent that bargaining power is distributed evenly between the participants, the degree of inefficiency found in any empirical test would be reduced. A second

aspect to consider is the fact that motivations exogenous to the lease contract can result in distortions in optimum resource use. In other words, any relationship found in the empirical test must be critically evaluated to see if inefficiency did, in fact, arise because of the lease itself. Bearing these potential limitations in mind, specific empirical efforts can be studied.

4.2.1 Intensity of Resource Use

In what is now considered a pioneering effort in testing leasing theory, Heady and Kehrberg tested the hypothesis that cash rent farms are operated more intensively than share rent operations (assuming the tenant dominates decision making) [24]. Survey results of their study gave no supporting evidence to this hypothesis. While the researchers found cash tenants to be farming somewhat more intensively than their crop-share counterparts, the authors note that variation appears to be due largely to variation in capital and equity positions among the tenure groups and not because of the lease type [24, p. 664].

Related to this, these researchers also looked at a specific input use (fertilizer) with and without cost sharing. Here, too, the survey evidence was less than significant. Elefson has summarized the findings of this particular study by saying, "There is a strong suggestion that the desire to utilize fertilizer leads to cost sharing arrangements and that causation does not run in the opposite direction." [16, p. 43].

More sophisticated techniques have also been used to test for the above relationships. Using Cobb-Douglas analysis, Miller fitted

equations to cross sectional data to compare resource efficiency under various tenure groups [39]. In looking at three tenure classes, (1) full owners, (2) livestock-share renters, and (3) crop-share cash renters, Miller concluded: ". . . differences between tenure classes in the average deviations of actual costs of productive services from the minimum costs attainable, that is, in the overall inefficiencies, are not significant in a probability sense." [39, pp. 4 and 5].

4.2.2 Lease Types and Enterprise Combinations

Several attempts have been made to test the hypothesis that enterprise selection as well as level of input use will vary among tenure groups. Cormack found relatively few significant differences with respect to the dependent variables betweeen the various groups [11]. He stated:

> It appeared that other variables were more powerful in affecting enterprise selection and the level of variable inputs than were those suggested by the hypotheses. . . . Enterprise selection may be more a function of long-run considerations, facilities available, price relationships, custom, or location rather than those which were hypothesized. [11, pp. 82-83].

In their earlier study, Heady and Kehrberg also discounted the minor cropping variation they observed between cash and share rented farms by suggesting it was due to exogenous factors such as capital and managerial differences.

4.2.3 Resource Efficiency in the Long Run

The Heady-Kehrberg study also looked specifically at the question of long-run intensity of resource use and the hypothesis that share rented operations will tend to be larger than cash rented

or owner operated farms. Their sample data revealed no significant difference in acreage size between the two types.

In a broader study of the North Central States, the variation in size of operation suggested by theory was somewhat apparent; i.e., crop-share-cash tenants were operating somewhat larger units than the owner-operator group. But unlike theory which suggests this extensive resource use of tenancy is inefficient relative to the optimum of owner-operatorship, Hurlburt's conclusions were contrary [27]. After analyzing the relative efficiencies of the tenure groups he concluded that land is limiting in all three tenures but more so for owner-operators [27, p. 20]. In other words, the acreage expansion of tenants (cash and share alike) leads to greater efficiency than possible with the smaller owner-operator units. In this perspective, size of operation and resource use efficiency are directly related.

As to the inherent problem of uncertainty within short-term leases and the implied distortion of resource use between short-run and long-run returns, empirical evidence is again inconclusive. Elefson studied this question from a framework of asking tenants if they would alter production techniques if they were owner-operators [16]. His findings found no significant changes. The case analysis of selected markets in this study would seem to suggest similar conclusions. Apparently, while it is possible that the short-term lease contract can lead to inefficiency, this can also motivate tenants to make more cautious decisions and to work more diligently.

4.2.4 Overview of Empirical Testing of Leasing Theory

To date, the empirical evidence to support leasing theory is scarce. While some studies have identified certain relationships suggested by theory, most findings have not. Moreover, in many cases where support was identified, there is considerable reservation that other explanations are perhaps more plausible than those given by leasing theory [16, p. 71]. Thus, there is reason to doubt that inefficient resource allocation does in fact arise from the nature of leasing.

4.3 Reasons for Deviation of Findings from Theory

Aside from the possibility of measurement error, there are a number of factors which help to explain why the body of leasing theory is generally not reflective of the actual situation. Among these are (1) size economies and the dynamics of the sectors, (2) internal inconsistencies with the theoretical framework itself, and (3) invalid underlying assumptions given the nature of the rental institution. These will be discussed in detail.

4.3.1 Leasing Under Pressures for Farm Expansion

More than three decades ago Schultz stated, "All too often farm tenancy is looked upon as being primarily a problem in economics. It is not such." [46, p. 309]. He went on to suggest that more profitable use of available resources can arise from the various forms of land leasing than under owner-operatorship with limited capital resources. The gist of the argument behind this is that economies of size associated with technological change have necessitated farm size expansion beyond levels attainable via full ownership for the

average operator.[1] Thus, to the extent that farmland rental facilitates size expansion, efficiency of resource use is enhanced by firms operating at a lower point on their long-run average cost curve (Figure 4.4). And, so long as distortions due to rental agreements do not entirely negate this, tenancy is preferable to full ownership in terms of resource efficiency.

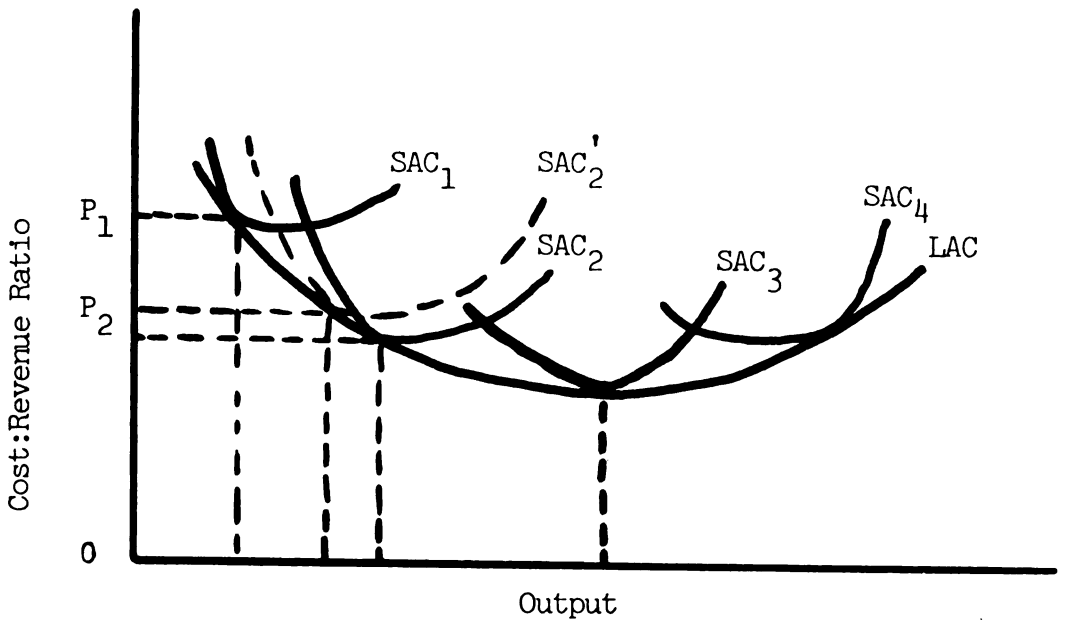

Figure 4.4 Long-run adjustment of firm size.

It follows, then, that the validity of such an argument rests on whether or not economies of size do exist over the relevant size range of commercial farm firms.

A number of studies of farm size economies have been made of various types of farm operations. Van Arsdall and Elder analyzed various sized cash-grain and corn farms in Illinois and found that on

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[1]Primarily this is prevented by capital rationing of either external or internal types.

a one-man farm with four row equipment, a gross income of about $20,000 is needed to break even [54, p. 52]. Further, they found that average costs drop rapidly as annual gross income increased to $58,000. Expansion beyond this level for one-man units resulted in diseconomies. This particular study also found the efficiently-operated one-man unit could essentially compete quite effectively with the much larger units; in short the one-man unit could capture essentially all the size economies as his two-, three-, or six-man counterpart. The relevance of this particular study to significance of farmland rental can be seen by recalling the tenure patterns of cash grain farms in the Corn Belt in 1969. For example, the average class III Corn Belt cash-grain farm (gross sales of $10,000 - $19,999 per year) was 275 acres in 1969 of which 152 acres were rented. By contrast, the average class I farm (gross sales of $40,000 or more annually) was 711 acres of which 493 acres were rented. In essence, nearly 80 percent of the size difference is rented land. This would suggest that expansion via rental does lead to achieving significant size economies for cash-grain operations.

In two separate but similar studies of cash-grain farms in Iowa, cost per unit of product was found to decline dramatically with increasing acreage size [28, 25]. Using synthetic budgeting techniques, average costs for all types of one-man and two-man farm organizations considered declined as acreage size increased from 160 acres to 320 acres. And for those operations where labor and machinery was less constrained, average costs continued to decrease to a size of 640 acres.

Other studies of size-efficiency relationships on various types of farms have found technical economies to exist across the range where most of the farm population exists. However, as Madden notes, findings of synthetic firm analysis such as these must be interpreted with care since these studies typically ignore many financial factors and dynamic growth considerations facing actual firms [35, p. 95]. Thus, factors influencing economies as well as diseconomies do not enter into the analysis. In other words, the synthetic firm may not be representative of an actual element of farm firms. The alternative empirical approach used in studies of economies of size is Cobb-Douglas analysis of actual farm data. In contrast to the synthetic firm method, this type of analysis measures the aggregate influence of all factors. But because such elements are not standardized according to level and combination in the data used, the Cobb-Douglas analysis invariably concludes no significant size economies exist. Hence, findings using this approach must also be interpreted with caution.

Nonetheless, given the limitation of this empirical research, it is reasonable to conclude that efficiency gains from size expansion are significant. And where capital or credit constraints prevent size adjustment, farmland rental can facilitate increased resource efficiency even though the lease itself may partially negate the gains.[1] This is illustrated in Figure 4.4. Size expansion via land purchase

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[1]The situation is synonymous with a highly concentrated industry in which substantial size and scale economies are captured by the existence of a few large firms. Despite the distortion of resource efficiency due to an imperfect oligopolistic market, higher levels of resource efficiency result than possible with many undersized, competitive firms.

may not be possible, and the firm must therefore remain at SAC_1. By renting farmland, however, the firm can expand to a more efficient size, SAC_2. And while the rental contract may introduce some inefficiency , SAC_2', greater resource efficiency in terms of lower cost per unit of production still results, OP_2 versus OP_1

In brief, because of dynamic pressures to expand farm size, farmland rental can play an expanding role in increasing efficiency, even though static rent theory suggests otherwise.

4.3.2 Internal Inconsistency in Leasing Theory

Theory has been developed to argue that the main distortion of efficiency in leasing arises in the share-rent agreement. Theorists have proceeded to argue that variable costs must be shared in the same proportion as output in order to eliminate inefficiency. Yet, in reality, share leasing is still being used extensively without the cost-share provision.

This has led to reconsideration of the theoretical framework. Johnson has noted that two important problems relating to the share contract have not been considered adequately by the theorist: (1) the issue of how the tenant determines the amount of land to rent (instead of soley the allocation of resources on a given farm) and (2) the type of adjustments that landlords and tenants make in their mutual relations to make crop-share tenancy function reasonably well [30, pp. 114-115]. Johnson suggests the tenant considers the value of the marginal product of his labor in non-farm alternatives or in farming under a cash lease. Therefore, the landlord cannot coerce the prospective tenant to farm so intensively as to drive the MVP

of his labor input to zero. In similar fashion, the landlord always has the option of renting for cash independent of output. "This," says Johnson, "presumably represents the minimum aggregate amount of rent that he will accept for the farm." [30, p. 117]. Given these bargaining positions, Johnson then says mutual agreement can be achieved via three routes, one of which is the classical suggestion of sharing expenses of variable inputs. A second is employment of detailed leased contracts. The third, and what Johnson considers the most important element, is the inherent restraint within the short-term lease. Because of the short-term lease, both landlord and tenant can terminate the lease contract should returns to their inputs fall below opportunity costs. Consequently, while disadvantages to short-term leasing exist, it does create a condition within which the crop-share lease results in reasonably efficient utilization of land.

More recently, Cheung has incorporated similar considerations into the theoretical framework and concludes the traditional share tenancy model is inconsistent with the underlying assumptions of perfect competition in the leasing market [9]. His analysis is based on the premise of wealth maximization subject to the constraints of private property rights in a free market with zero cost of contracting. Cheung proceeds to modify the traditional framework by assuming a constant supply of land belonging to the landlord, Q_1 in Figure 4.5. The MVP of tenant labor is represented by AB; and assuming 50-50 share leasing, line CD would be tenant returns, or what Cheung calls "marginal contract rent." Tenant returns to labor would therefore be area ABCD and landlord returns would be CDQ_1O. So long as the

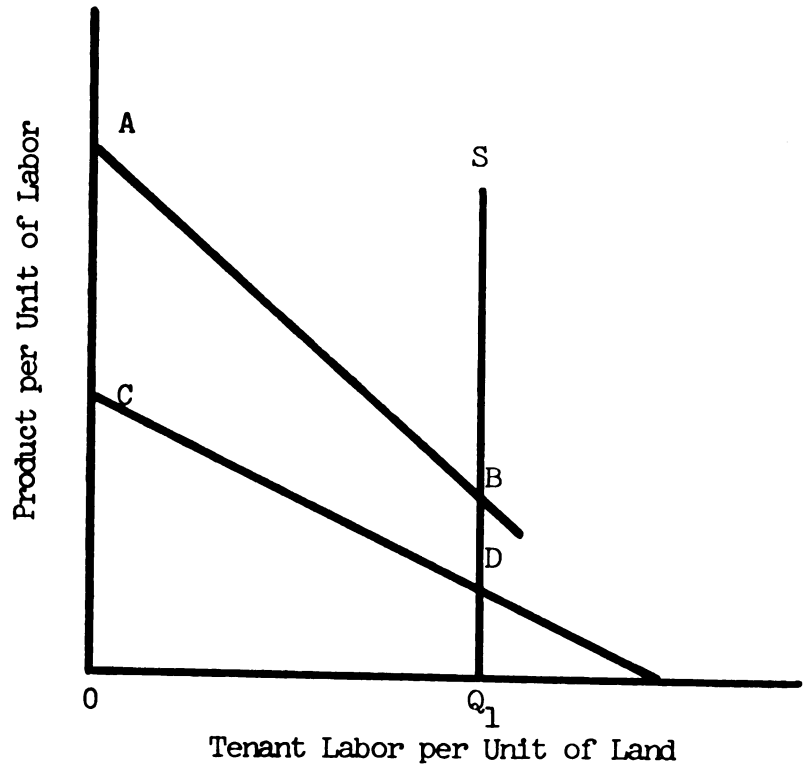

Figure 4.5 Share leasing with one tenant.

tenant's income is as high or higher than his alternative earnings, the tenant will continue to farm. He will use all the land available to him on the farm as long as marginal productivity of the land is greater than zero (other inputs held constant) [9, p. 17].

For the landlord, his returns are maximized if he can increase his rental share (marginal contract curve) until the tenant's income from farming just equals his alternative earnings. However, in the assumed competitive state, the landlord has yet another variable which can be adjusted to maximize wealth—the amount of land leased to any one tenant. That is, a landlord will not allow one man to operate all the land he owns if parceling his land to several tenants will result in a higher total rent. This is illustrated in Figure 4.6 where the

land owned by a landlord is parceled and leased to four separate tenants. As the number of tenants increases, the marginal value product of the landlord's property increases relative to a single tenant operation.

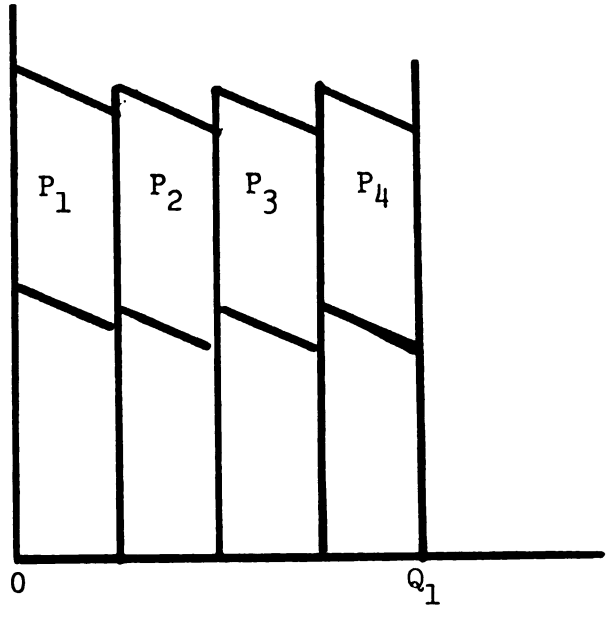

Figure 4.6 Share leasing with multiple tenants.

For the tenant, the situation is somewhat similar. He will prefer to parcel out his own labor resource among a number of landlords so long as total earnings increase. Moreover, because of the tenant's non-farm labor earnings options, the landlord will need to decrease his share of output as size of unit declines. This decrease in landlord share will obviously lead to a lower rent received from each tenant, and if the land size per tenant continues decreasing, the rental percentage will eventually become so low that total rent from land will decline [9, p. 19].

The conclusion, then, is that in reaching a mutually agreeable contract, the landlord and tenant must agree to three conditions: (1) the share rate, (2) the amount of land the landlord will contribute, and (3) the amount of labor a tenant will supply [7, p. 531]. Together, these conditions assure maximization of firm returns without the cost sharing provision so long as viable alternatives exist for each participant.

This is more clearly illustrated in Figure 4.7 which is merely an expanded version of Figure 4.1. As previously stated, the MVP of tenant labor is represented by AQ_4, and the MVP received by

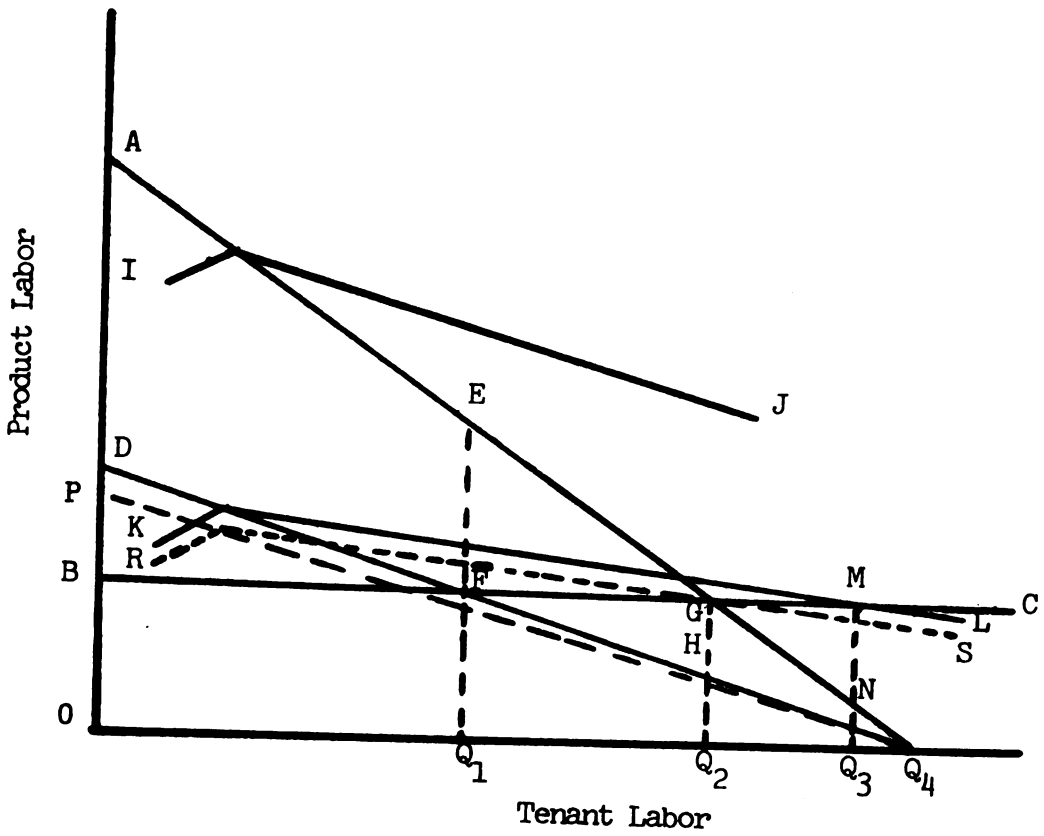

Figure 4.7 Maximization of firm efficiency under share tenancy without cost sharing.

tenants under 50-50 share leasing is shown by DQ_4. Line BC, which before represented MFC of the variable input now refers specifically to tenant labor or alternative earning capacity. According to traditional theory, equilibrium will occur at point E, with OQ_1 of labor input. This, of course, is an inefficient level of input since MFC tenure labor < MVP tenant labor. But now, assuming that OQ_2 inputs of labor are agreed upon, the following can be observed: (1) the landlord's share of the total product is area DAGH, which is greater than before (DAEF); and (2) the tenant's share (area $ODHQ_2$) is still greater than his alternative earnings, since BDF is larger than FGH. This also means that total landlord rent DAGH is smaller than the return under owner operatorship or a fixed cash lease, area BAG. To observe what will happen in this situation requires the interjection of average value product of tenant labor, LJ, and the corresponding average tenant receipt of KL. Given these, landlords could stipulate the tenants work up to Q_3 where average tenure receipts equal income from his alternative earnings.

But with the tenant input pushed to OQ_3, the landlord would receive rent equal to area BAG less GMN, an amount smaller than possible under owner operatorship or fixed cash rent leasing. Therefore, in order to maximize his return subject to tenant costs, the landlord would raise his share of output to r*, line PQ_4, which in turn lowers average tenant returns to RS. OQ_2 of tenant labor is used resulting in: (1) landlord return equal to that under owner operatorship, and (2) tenant return equal to that of his earnings alternative.

Given homogeneous factors of production, landlords will choose among competing tenants who offer rental shares as high as r*, while competition among landowners implies the share rates will not go any higher [9, p. 54]. Thus, Q_2 at r* share rate represents a market equilibrium where the MVP of tenant labor equals MFC for the tenant. Simultaneously, the MVP of the firm equals its MFC. Therefore, resources are allocated efficiently.

While revealing the inconsistency of the traditional model given the assumption of a competitive state, Cheung's model is not itself free from criticism. A primary reservation, of which Cheung is the first to acknowledge, is the assumption of zero transaction costs [9, p. 55]. In reality, parceling inputs among several different landlords involves some costs including the cost of contracting as well as transportation expenses. Inclusion of these costs in the analysis would distort the equilibrium level from the point of maximum efficiency.

A second aspect to consider is the flexibility of landlords; i.e., is it physically feasible for most landlords to parcelize their property? If this is not possible, the landlord does not have as viable an economic alternative from which to gain bargaining strength.

The third and perhaps most important aspect of Cheung's model to critically consider is the type of competition and the degree to which it exists in leasing activity. For example, how feasible is the landlord option to alter share rates when custom prevails? Are the market information channels adequate for competitive bidding? Of markets surveyed in this study, there did not appear to be the types of conditions assumed in the model.

Nonetheless, the case studies do reveal (1) a tacit form of competition among tenants, (2) the parceling nature in the form of multiple-unit leasing, (3) the ready alternative of off-farm employment for most tenants, and (4) the prevalence of short-term leases and the inherent opportunity for landlord control. All these elements are conducive to a landlord-tenant relationship in which both parties can bargain from strength, and resource efficiency ultimately results.

To conclude, the Cheung model incorporates the competitive elements into the share-rent framework and reveals that resource inefficiency is not inherent within this lease type. It follows, then, that the cost-share provision of variable inputs is not in itself a perfect remedy. Rather, it is entirely possible for share-rent leasing without cost sharing to lead to maximum resource efficiency. Whether or not this is attained is contingent upon the same variable influential in all tenure forms—the competitive nature of the market.

4.3.3 Assumptions Behind the Theory

In addition to dynamic versus static conditions and internal inconsistencies within share-rent theory, the assumptions underlying the theoretical frameworks must also be considered in determining why leasing theory has little supportive evidence.

The present predominance of leasing by part owners is considerably different than when the body of leasing theory was being formulated. It is reasonable to assume that today's part owner renting farmland for expansion purposes reacts much differently than the full tenant of a few generations ago who viewed rental simply as

a step in the tenure ladder. For example, because most rental land today is operated as part of larger operations, the risk and uncertainty of the farming operation are not tied as directly to the specific lease. With less uncertainty of loss, the tenant operates from a larger planning horizon. This suggests greater managerial efficiency as well as greater social and community stability in high tenancy areas than once believed possible.

The prevalence of multiple-unit leasing—leasing from more than one landlord—is another factor which traditional theory has not accounted for. As will be demonstrated in the following chapter, the uncertainty of short-term tenancy is substantially reduced by such a practice, specifically with respect to the size of the total land base.

Finally, the rental market introduces deviations into the underlying assumptions of traditional leasing theory. The highly personal nature of the rental market found in this study appears to be quite a contrast to a primary assumption of individual profit maximization. A sizable portion of rental agreements are family agreements and therefore noneconomic factors frequently override the profit-maximizing individual incentive. But more importantly, the leasing agreement usually involves a personal relationship (family or nonfamily) between the participants which strengthens with time. And even though the landlord frequently is quite passive in the management decision making, the established relationship is such that it is more of a partnership. In this context, both participants act from the standpoint of welfare of the firm. Mutual trust and

responsibility encourages efficient resource allocation irrespective of the theoretical imperfections of the lease contract.[1]

4.4 Chapter Summary

Leasing theory in general concludes there is inefficient allocation of resources when land is operated under tenancy. Yet empirical evidence to support this theory is meager and inconclusive. Partial explanation for this lack of support lies in the inherent inability of static theory to represent a dynamic setting. Secondly, there are internal inconsistencies within the theoretical framework of share renting which appear to negate the validity of the framework. Finally, certain assumptions cannot be considered realistic in light of structural changes and the findings of this study concerning the market process.

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[1] Even though some leases do not evolve around such a relationship, the fact this is the norm means that custom forces efficient resource allocation on the total rental population.

CHAPTER V

THE FARMLAND RENTAL-STRUCTURAL CHANGE INTERFACE— SPECIFIC ASPECTS

The preceding chapters have identified a number of interrelationships between farmland rental and current structural trends. In this chapter, four specific aspects of this interface are analyzed in depth. Included are (1) the impact of rental land availability on the process of firm growth; (2) the effect of multiple-unit leasing on tenure uncertainty; (3) the economies of buying versus renting farmland; and (4) land tenure under various forms of business organization.

5.1 Rental Land Availability and Firm Growth

5.1.1 Probability Analysis of Renting Farmland

In discussing conditions for growth of farm business firms, Bailey states that one of the five necessary conditions is that added resources are procurable [2]. Other researchers have referred specifically to the availability of the land resource as being critical to the growth process of the firm [48]. Yet in most studies of firm growth, these availability aspects have not been empirically considered; i.e., a perfectly elastic supply of land to either purchase or rent has been assumed.

Findings of this study would suggest, however, that this assumption may be unrealistic, with respect to the availability of rental land. The observed stability of leasing arrangements and the distortions of the market itself seem to imply that farm operators or prospective operators cannot and do not look to the rental market as being a ready source of land. Availability at any given point in time may be highly uncertain.

The probability of farmland being available to rent is dependent on several factors. Among these are (1) the proportion of all farmland rented within the area, (2) turnover rate of rental land, (3) effective market radius considered by the potential tenant, (4) particular land ownership patterns, and (5) the relative ease of information flow and degree of open competition. Because of the complexity created by these factors, a specific probability is very evasive and hypothetical. However, probability analyses based on varying levels of each of these factors can be illustrative.

To begin such an analysis requires the rather straightforward estimation of total rental acreage available annually using various tenancy and turnover rates (Table 5.1). Three tenancy rates were used, 35 percent, 50 percent, and 65 percent. The low rate approximates the tenancy rate in the Michigan study area, while the high rate is similar to the rate of tenancy in the Illinois area (nationally, the 35 percent rate is most representative). Turnover rates of 2, 5, and 10 percent were then applied to each of these tenancy levels to arrive at the annual acreage of rental land changing hands. These

Table 5.1 Estimation of rental acreage available annually based on effective market radius, percent of tenancy, and annual turnover rate of rental property.[a]

Effective market radius	Total acreage[a]	% rented	Rental acreage	Turnover rate (%)	Annual rental acreage available (acres)
1 mile radius	2,010	35%	703	2	14
				5	35
				10	70
		50%	1,005	2	20
				5	50
				10	100
		65%	1,307	2	26
				5	65
				10	131
2 mile radius	8,042	35%	2,815	2	56
				5	141
				10	282
		50%	4,021	2	80
				5	201
				10	402
		65%	5,227	2	105
				5	261
				10	523
3 mile radius	18,096	35%	6,334	2	127
				5	317
				10	633
		50%	9,048	2	181
				5	452
				10	905
		65%	11,762	2	235
				5	588
				10	1,176
4 mile radius	32,170	35%	11,260	2	225
				5	563
				10	1,126
		50%	16,085	2	322
				5	804
				10	1,609
		65%	20,911	2	418
				5	1,046
				10	2,091
5 mile radius	50,265	35%	17,593	2	352
				5	880
				10	1,759
		50%	25,133	2	503
				5	1,257
				10	2,513
		65%	32,672	2	653
				5	1,634
				10	3,267
6 mile radius	72,382	35%	25,334	2	507
				5	1,267
				10	2,533
		50%	36,191	2	724
				5	1,810
				10	3,619
		65%	47,048	2	941
				5	2,352
				10	4,705
8 mile radius	128,680	35%	45,038	2	901
				5	2,252
				10	4,504
		50%	64,340	2	1,287
				5	3,217
				10	6,434
		65%	83,642	2	1,673
				5	4,182
				10	8,364
10 mile radius	201,062	35%	70,372	2	1,407
				5	3,519
				10	7,037
		50%	100,531	2	2,011
				5	5,027
				10	10,053
		65%	130,690	2	2,614
				5	6,535
				10	13,069

[a]For simplicity of illustration, the total land area is assumed to be farmland. If the percentage of farmland of the total land base could be determined, then annual availability of farmland could be adjusted accordingly.

turnover percentages were based on the distribution of tracts by number of years rented (refer to Table 3.7).[1]

The annual rental acreage available varies considerably. For example, a prospective tenant looking for rental land within a two-mile radius of his base, where 35 percent of the land is tenant operated, with a turnover of 5 percent per year, would be able to bid on about 140 acres in any given year. In contrast, a potential renter living in an area of 50 percent tenancy with 5 percent turnover who is willing to rent within a five-mile radius may compete for any of approximately 1,260 acres annually.

While these estimations may represent the total market movement, the individual operator still cannot appraise the potential availability of the land he needs. To accomplish this, two additional steps are needed. First, the implied assumption of incremental flow of rental acreages must be dropped. The land resource is a lumpy input, typically transferring in increments of 40, 80, and 160 acres or divisable fractions thereof (as determined by the rectangular survey). Second, it must also be recognized that demand for rental land tends to be categorized in terms of size; that is, a potential renter may be looking for a particular-sized tract. This is especially common where demand is for farm enlargement purposes, which accounts for the major portion of demand.

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[1]Assuming a constant net volume of total rental property, the distribution of tracts by years rented suggested an average turnover rate of 5 to 6 percent. There were instances when as high as 11 percent and as low as 3 percent of the total tracts were rented in any year. Consequently, the 2 percent and 10 percent turnover rates were adopted to illustrate the extremes.

The annual probability of a particular-sized unit being available is dependent to a large extent upon the land ownership patterns. More specifically, it is dependent on the percentages of land area in each particular size unit. An example will clarify this. Return again to the situation of a 35 percent tenancy rate with a 5 percent turnover rate, and a potential tenant looking within a two-mile radius of his base. Assume he is looking for an 80-acre tract to rent. Since the total annual acreage turnover is 141 acres, there is a maximum potential of 1.76 80-acre tracts available annually (141 ÷ 80). However, this assumes that all land is divided into 80-acre ownership units. In reality, only a portion of the land is in 80-acre units; thus, a second adjustment is needed to arrive at a probability. If 42 percent of the land is in 80-acre tracts, then the maximum potential (1.76) must be adjusted (1.76 x .42 = .74). So, less than one 80-acre tract per year becomes available within a two-mile radius; or one 80-acre tract comes up for rent in about three out of four years.

This same technique has been used on other tract sizes for other various conditions to arrive at the array of probabilities in Table 5.2.

Probability analysis such as this illustrates the relationship of time and distance to the expected availability. In short, a trade-off exists. For example, if an operator wants to rent an additional 80 acres within a one-mile proximity of his headquarters,

Table 5.2 Annual probability of farmland being available for rent, by rate of tenancy, annual turnover rate, effective market radius, and size of tract.[a]

Effective market radius and size of tract	35% farmland rented			65% farmland rented		
	Annual turnover rates			Annual turnover rates		
	2	5	10	2	5	10
	. . . . . No. of tracts available					
1 mile market radius						
40 acres	.08	.19	.39	.14	.36	.72
80 acres	.07	.18	.37	.14	.34	.69
120 acres	.02	.04	.09	.03	.08	.16
160 acres	.02	.05	.09	.03	.09	.17
2 mile market radius						
40 acres	.31	.78	1.56	.58	1.44	2.89
80 acres	.30	.74	1.49	.55	1.38	2.76
120 acres	.07	.18	.35	.13	.33	.66
160 acres	.08	.19	.37	.14	.34	.69
5 mile market radius						
40 acres	1.94	4.84	9.68	3.59	8.99	17.97
80 acres	1.85	4.62	9.24	3.43	8.58	17.15
120 acres	.44	1.01	2.20	.82	2.04	4.08
160 acres	.46	1.16	2.31	.86	2.15	4.29
10 mile market radius						
40 acres	7.74	19.36	38.73	14.38	35.96	71.92
80 acres	7.39	18.48	36.97	13.72	34.33	68.65
120 acres	1.76	4.40	8.80	3.27	8.17	16.35
160 acres	1.85	4.62	9.34	3.43	8.58	17.16

[a]Based on analysis of size of ownership units in the two study areas, the land area was estimated to be allocated among ownership units as follows: 40 acres, 22%; 80 acres, 42%; 120 acres, 15%; and 160 acres, 21%.

he may need to wait several years for a tract to become available.[1] If timeliness is more important, then an operator may choose to expand his effective market radius. (The probability factor increases at a rate equal to the square of the market radius). Larger operators particularly may not heavily discount the increasing radius of their land base. In many instances, they are more interested in the location of a potential tract with respect to another tract they are already renting, rather than from the headquarters unit; their mobility reduces the importance of operating from a base unit. And while some knowledge of the physical qualities and needs of the tract may be sacrificed, they more readily gain their necessary land base. Moreover, they may also gain some degree of production stability by geographic dispersion.

Thus far, the probability analysis has assumed perfect knowledge and open competition. In reality, the rental market has been found to be highly personal and informal in nature with very restricted flow of information. This study found in less than half the cases that others were aware of the land being available to rent. In effect, the estimated annual probabilities could be halved. It would also be realistic to assume that market knowledge is a decreasing function of distance; the farther the potential renter is from the rental tract; i.e., the less his opportunity to become aware of its availability. Thus, any adjustment for imperfect information flow would

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[1]Besides the locational advantages and lower transportation costs of farming land within close proximity, operators may also place higher value on land close by because of their familiarity with soil fertility, past land use, and need for special farming practices.

increasingly discount the probabilities attached to distance of market radius.

Several implications can be drawn from this model of rental land availability. First, despite the short-term tendencies of rental contracts, the potential supply of rental land available is limited at a given point in time. Unlike the title transfer market, where "one can always buy farmland—if he's willing to pay for it," the rental market offers little opportunity for such bidding (especially if crop-share leasing prevails). Highly inelastic supply means that someone looking for farmland to rent may be constrained by the availability. Moreover, market imperfections reduce aggregate supply considerably. Thus, even if a potential tenant looks for land over a wide area, his decisions will still be predicated on the relative chance of finding land to rent. For the operator hoping to expand his acreage base, this uncertainty of availability may motivate him to choose another means of land asset control such as mortgage or low equity financing. But if such alternatives do not exist, the growth sequence of his farming operation will conform closely to the supply of land to rent.

To the beginning farmer, access to rental property may be especially limited. Unless he has special options arising from kinship or personal friendship, he may have difficulty in competing with farm operators whose managerial reputations are already established.

Quality of the land available is yet another parameter to consider. A realistic assumption is that tracts of poorer quality or tracts owned by uncooperative landlords may experience a higher

turnover rate than average. Thus, land being offered for rent may carry a somewhat higher risk for the prospective tenant.

5.1.2 Rental Land Availability in the Firm Growth Process—A Model

A number of firm growth studies have determined that farmland rental can be the optimum strategy for reaching the growth objectives under limited equity and credit conditions. For example, a study by Martin and Plaxico of the rolling plains of Oklahoma and Texas found land rental was preferable to purchase in maximizing net worth over time [37]. In maximizing cash return objectives, Bostwick found growth by renting optimal due to the greater investment leverage of this strategy over equity alternatives [6]. When maximizing net worth, Bostwick's growth model also indicated rental was preferable in the early stages of the growth cycle in order to increase scale of resource use. For similar reasons, a simulation growth model of Corn Belt farms developed by Lins identified the rental strategy as achieving higher net worth when consumption and minimum size of purchase or rental were both high [34].

Findings of this study and others concerning the relatively greater reliance on rental in farm expansion would support the results of these growth models. Yet these models do not consider that rental land may not be available. Likewise, the empirical supporting evidence refers only to the successful expansion operator who is only a sub-group of a larger population of operators who may have wished to expand their acreage; i.e., the data does not indicate the degree of constraint on the successful and unsuccessful expansion operator alike due to unavailability.

Consequently, the following hypothesis was proposed: The availability of rental land significantly influences the desirability of farmland leasing in attaining firm growth objectives. In other words, the supply of rental land available at any given point in time follows essentially a random geographic pattern.[1] This sporatic nature of land availability can override the commonly considered financial constraints on firm growth; and in turn, alter the relative advantage of leasing over other strategies. To test this hypothesis, a previously developed growth simulation model was modified to account for various levels of rental land availability.[2]

The model selected was one developed by Lins that was initially designed to examine alternative land investment strategies common to Midwest cash grain farms [34]. Evaluation included consideration of the relative merits of each strategy in achieving specific goals.

This particular model was chosen for two reasons. First, the data was representative of the geographic area and type of farming in which the land resource is crucial to growth and rental is a

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[1]Inherent within this statement is the assumption of inelastic supply of rental land. Hence, supply will not respond significantly to price (rent) changes, and availability is predicated on chance. The case study of selected rental markets indicates the market is personal in nature with very limited price competition. So, the assumption above appears realistic.

[2]Similar probability conditions were not assigned to the purchase market, even though it too may demonstrate sporatic availability. However, the purchase market appears to offer more opportunity for bidding on land, thus bringing into the market land that might not otherwise be available. Then, too, rental is most critical in the early stages of the growth process when financial constraints prevent purchase; therefore, the availability of the rental land is the more crucial of the two markets. For these reasons, analysis of the effects of availability are limited to rental land only.

commonly used alternative to ownership. Secondly, the model could be easily modified to include a random probability factor for finding land to rent in any given year.[1]

The mechanics of this model are a beginning base unit farm of 185 owned tillable acres [34, pp. 6 and 7]. It was believed this was representative of a well-established unit in the Midwest which could be supported independently of off-farm income and capable of growth. Production coefficients were developed for a cropping pattern of two-thirds corn and one-third soybeans. Total assets at the beginning of the 15-year growth period are valued at $135,000 with debts of $59,600 leaving a beginning net worth of $75,400. Land values are assumed to be appreciating 3 percent per year. Farmland is assumed to be rented for cash at 5.75 percent of land value. The effects on the growth of this base firm were analyzed for five different land investment strategies: (1) fixed land investment; (2) conventional mortgage contract with no refinancing; (3) conventional mortgage with refinancing; (4) land contract; and (5) cash rent.[2] In addition

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[1]In essence, this simulation model is nothing more than a series of financial budgets for a hypothetical farm firm. These annual budgets are linked together over a period of time in order to compare the performance of various growth strategies over a probability array of rental land availability. The advantages of simulation over basic farm budgeting is (1) speed of data processing and (2) reduction of human error in hand calculation.

[2]While referring to cash rent only, this strategy is assumed to be representative of all leasing arrangements, including the dominant crop-share arrangement. While operators may incur somewhat lower rent under cash leases than under share arrangements, the difference could be viewed as what the tenants' discount cash leases because they are assuming a relatively greater amount of the uncertainty. Thus, rental changes should be consistent among all lease types; and growth, as measured by accumulated net worth, should not be altered appreciably by lease type.

to the average conditions described, the model considered the influence of other factors such as interest rate on debt; percent equity on debt, size of purchased or rented land unit, and operator goals.

The rental strategy consisted of a year-end decision to rent or not to rent based on available cash at the start of each production period (see decision flow process in Figure 5.1). More specifically, cash and nonfarm asset value has to be equal to or greater than one-half the rental fee on the particular-sized rental unit(s) under question before rental is allowed. A penalty element is included for a reduction of rented acres below the level of the previous year; this reflects depreciation of unused machinery that may occur if the number of crop acres rented fluctuates from year to year. Adjustments in machinery investment are then made as appropriate with external financing if cash is inadequate.

The availability element of rental land was built into the model at two different levels: (1) the probability of renting land previously rented (PRLPR), and (2) the probability of renting land not previously rented (PRLNPR). The latter is what is typically influential in the growth process. However, the former needs to be considered also since, as previously noted, land is generally leased on a one-year or year-to-year arrangement, and therefore the growth process can be subject to the periodic decision of the landlord.

A random probability scheme was devised to interject various probability levels of availability at the two levels. The procedure was as follows: using a table of random numbers, a number between 0 and 9 was selected at random and assigned to each of the 15 years in

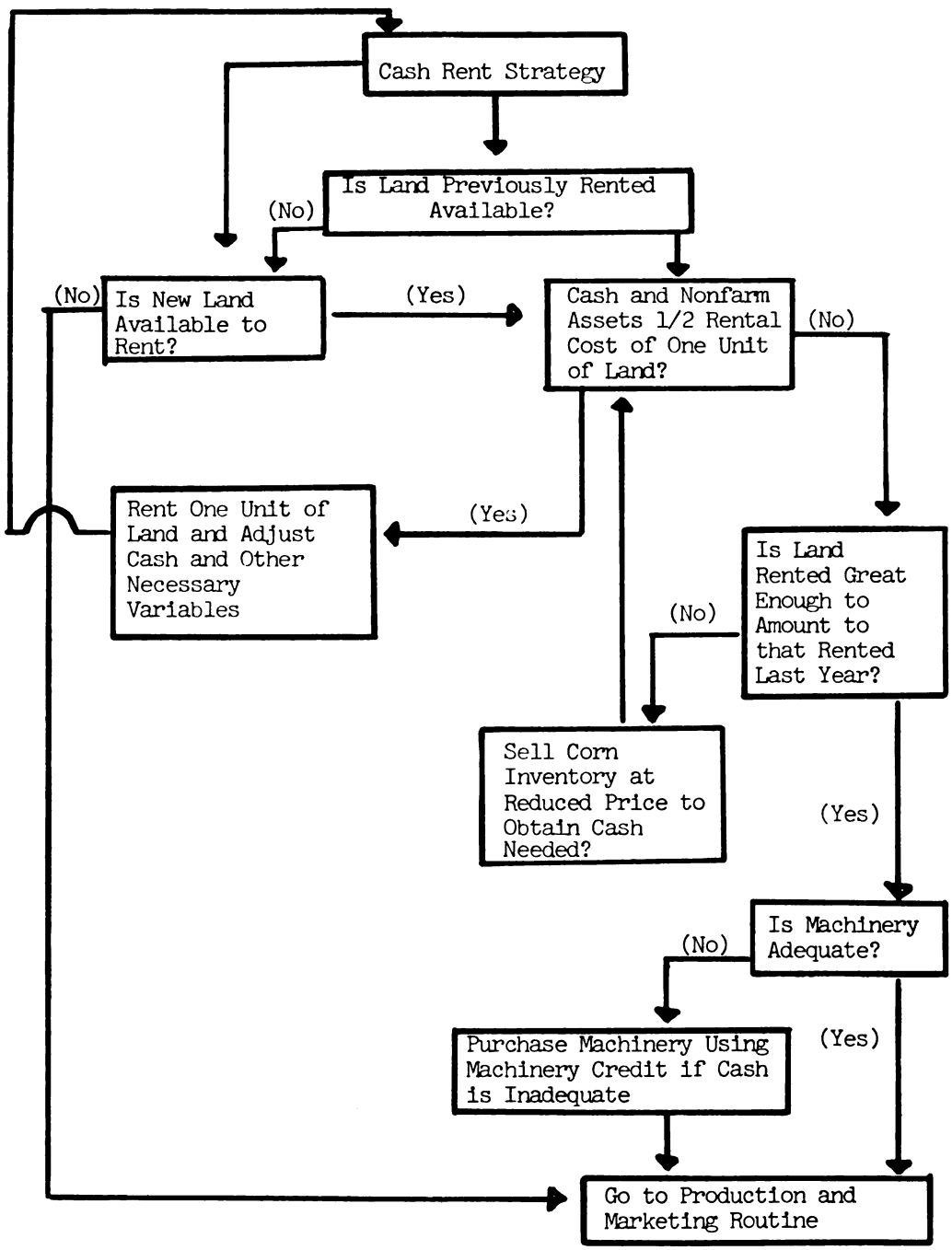

Figure 5.1 Year-end decision flow chart.

the planning horizon. A separate random combination was assigned to each rental tract, recognizing that even though two or more tracts may have the same probability of being available, it does not necessarily follow that such tracts would be available in the same year. Various levels of probability of renting could then be assigned based on the random number arrays. For example, suppose one assigned a 40 percent chance of renting land which had not previously been rented and a 90 percent chance of renting land which had previously been rented. Then, new renting would be allowed in those years assigned a number of 0 through 3; and renting of land which had previously been rented would be allowed in all years assigned a number of 0 through 8.

5.1.3 Analysis of Findings

Runs for the 15-year growth period using the land rental strategy were made for the following levels of availability: probability of renting land not previously rented of .20, .40, .60, and .80; and probability of renting land previously rented of .80, .90, and 1.00. The ranges of probabilities chosen were based on the survey findings of this study; i.e., the probability of renting land not previously rented appeared to cover the whole range with respondents in Illinois frequently commenting available rental land was virtually nonexistent, while some Michigan operators could rent all they wanted. As for land now rented by the operators, such arrangements showed much stability; thus, a range of relatively high probabilities was assigned to the maintenance of existing leases. Combining these two elements of rental land availability yielded 12 different probability combinations to use in analysis.

Accumulated net worth and acreage operated over the 15-year period were compared for each of the 12 levels of probability (Table 5.3). When availability is no problem (probabilities = 1.00), accumulated net worth after the 15-year period is $247,600 with a total of 640 acres of land eventually being rented. On an annual basis, the growth rate of net worth averages 4.7 percent. As probabilities of availability of rental land decrease, growth of net worth declined steadily also.[1] At the lowest probability levels, PRLPR = .80 and PRLNPR = .20, net worth totalled $223,900 after 15 years, or 10 percent less than under conditions of unlimited availability. Growth rate is reduced to 3.6 percent annually.

The relative importance of each of the two availability factors is somewhat evident in the pattern of accumulated net worth under various probability combinations. When there is no chance of losing land already rented (PRLPR = 1.00), and a probability of renting land of .20, final net worth falls to $232,700. When a probability element of renting land previously rented of .80 is added, total net worth falls to $223,900. In other words, about 30 percent of the total reduction could be attributed to the risk of losing land already being rented, and the remainder is due to the risk of finding other land to rent.

The probability of renting land not previously rented influences the eventual size of the operating unit. As shown in Table 5.3, the

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[1]In using probability analysis of this nature, it is necessary to interpret empirical estimates cautiously. That is, the values for net worth derived in Table 5.3 represent a particular set of random numbers. It is highly unlikely that these same values could result from different random draw. However, the values derived on average should approximate the same levels.

Table 5.3 Growth of accumulated net worth and crop acres for various probability levels of renting land not previously rented (PRLNPR) and of renting land previously rented (PRLPR).[a]

Year	PRLPR = 1.00 PRLNPR = 1.00		PRLPR = 1.00 PRLNPR = .80		PRLPR = 1.00 PRLNPR = .60		PRLPR = 1.00 PRLNPR = .40		PRLPR = 1.00 PRLNPR = .20		PRLPR = .90 PRLNPR = .80		PRLPR = .90 PRLNPR = .60		PRLPR = .90 PRLNPR = .40		PRLPR = .90 PRLNPR = .20		PRLPR = .80 PRLNPR = .80		PRLPR = .80 PRLNPR = .60		PRLPR = .80 PRLNPR = .40		PRLPR = .80 PRLNPR = .20	
	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth	Acres	Net worth
		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000		$1000
1	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6	0	82.6
2	160	93.3	80	91.6	80	91.6	0	89.4	0	89.4	80	91.6	80	91.6	0	89.4	0	89.4	80	91.6	80	91.6	0	89.4	0	89.4
3	160	101.8	80	99.5	80	99.5	160	100.5	0	96.4	80	99.5	80	99.5	160	100.5	0	96.4	80	99.5	80	99.5	160	100.5	0	96.4
4	240	112.2	240	111.3	80	107.9	160	109.3	0	103.9	240	111.3	80	107.9	160	109.3	0	103.9	240	111.3	80	107.9	160	109.3	0	103.9
5	240	121.6	240	120.9	160	118.5	240	120.1	0	111.7	240	120.9	160	118.5	240	120.1	0	111.7	240	120.9	160	118.5	240	120.1	0	111.7
6	400	134.7	240	130.6	160	128.1	400	129.8	0	119.8	160	128.5	80	125.8	160	127.7	0	119.8	80	126.1	80	125.8	80	125.3	0	119.8
7	400	145.3	400	144.0	320	141.5	400	143.2	160	132.8	480	142.4	320	139.5	480	141.6	160	132.8	400	140.0	320	139.5	400	139.2	160	132.8
8	400	156.1	400	155.0	320	152.3	400	154.1	160	143.2	320	149.3	160	146.1	320	148.5	80	140.8	240	146.8	160	146.1	240	146.0	80	140.8
9	480	169.0	400	166.1	320	163.4	400	165.2	160	154.0	240	157.7	320	160.5	240	156.8	80	150.8	480	161.9	320	160.5	400	160.5	80	150.8
10	480	180.6	560	180.9	480	176.2	400	178.8	160	165.3	160	166.0	240	170.1	160	165.1	80	161.2	400	171.9	240	170.1	320	170.3	80	161.2
11	560	194.3	560	193.1	480	190.3	400	188.9	160	177.1	320	180.6	240	181.8	160	175.5	80	172.1	240	179.3	160	179.6	160	177.6	80	172.1
12	560	206.8	560	205.4	480	202.7	400	201.5	160	189.4	320	192.6	240	194.1	160	186.4	80	183.5	640	196.0	160	191.4	160	189.1	80	183.5
13	640	221.2	640	219.6	560	217.0	560	217.7	320	205.6	240	202.7	160	204.6	240	199.9	240	199.6	560	207.4	320	208.0	320	205.3	240	199.6
14	640	234.2	640	232.5	560	230.0	560	231.0	320	219.0	240	215.2	160	217.5	240	212.2	240	212.7	480	218.5	240	219.5	240	216.5	160	210.5
15	640	247.6	640	245.7	640	244.9	560	244.5	320	232.7	320	230.2	560	235.4	320	227.2	240	226.5	400	229.7	400	237.1	400	234.2	160	223.9
%Δ		199.76		197.46		196.49		196.00		181.72		178.69		185.00		175.06		174.21		178.09		187.05		183.54		171.07
Annual %Δ		4.72		4.64		4.60		4.59		4.06		3.94		4.18		3.80		3.77		3.92		4.26		4.13		3.64

[a]Representative cash-grain farm with beginning base of 185 owned cropland acres. Add-on tracts are assumed to be 80 acres in size with random probabilities assigned to each individual tract. For description of model see: A Simulation Model of Land Investment and Growth on Midwest Cash Grain Farms, David A. Lins, Agricultural Finance Working Paper, FPED, ERS, USDA, Feb. 1969 [34].

final size of rented acreage drops from 640 acres to 320 acres as PRLNPR goes from 1.00 to .20 while holding PRLPR at 1.00. This, of course, would reduce the volume of cash receipts from the operation over time; and, in turn, reduce net worth buildup.

What appears to be contributing even more to a lower accumulation of net worth is the erratic size of operating unit over time and the resulting over investment in machinery. When the acreage base of an operation doubles in a few short years, only to contract as rapidly due to such unforeseen circumstances, serious resource misallocations are likely.[1]

It was believed that the size increment of acreage change could significantly alter the impact of rental land availability on the growth process. Consequently, the previous assumption of rental tracts averaging 80 acres in size was altered to be 160 acres; and runs at the various probability combinations were made. While the frequency of size adjustment declined over the 15-year period, the impact on size and total net worth at the end of the period did not vary significantly.[2]

Results of this model prior to the modification for rental land availability ranked the cash leasing strategy as number one in maximizing net worth under shorter planning horizons of five and ten

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[1]To adjust to this situation the operator has two alternatives: (1) he could under-invest in equipment and custom hire in those years when his acreage is large, or (2) maintain an adequate machinery investment and do custom work himself when his acreage is down. Either option, however, may come at an economic cost.

[2]Based on Chi Square Test of Independence at the 5 percent level of significance.

years. Under the more limited degrees of availability as presented in Table 5.3, total net worth under the rental strategy is reduced about 10 percent in the shorter time horizons as well as over the entire period. This reduced the ranking of the rental strategy to a third position behind a land contract strategy and the mortgage with refinancing route. No specific measure of impact on the growth objective of maximum cash returns was possible with this particular model. However, here too, the erratic pattern of annual income and periodic over-investment in machinery due to tenure uncertainty would suggest a significant decrease in maximizing this objective. Thus, from this analysis and given the assumptions and parameters of this particular simulation model, the hypothesis that availability of rental land significantly alters the relative desirability of farmland rental in reaching growth objectives is supported.

5.2 Multiple-Unit Leasing and Uncertainty

Related to the firm growth issue is the question of the firm maintaining a viable-sized acreage base. Leasing interjects an element of uncertainty. Unless long-term leasing contracts exist, there is always the risk of losing the land unit because of the landlord's decision to sell or to change tenants. This, coupled with the lack of other available land to rent, can pose a serious uncertainty to the operator of a land-based operation. Moreover, this uncertainty becomes more critical as the increasing size and financial sophistication of the farm firms demand longer planning horizons. But, with expanded farm size there has also emerged serendipitously a particular characteristic of the farmland rental situation which,

it is hypothesized, effectively reduces tenure uncertainty—multiple-unit leasing (renting parcels from several different landlords simultaneously).

The operator who is renting from a number of independent landlords, perhaps unwittingly, reduces tenure uncertainty with each additional rental agreement made. While the relative risk of termination remains unchanged on each parcel, the operator effectively reduces the probability of losing a substantial portion of his land base in any given year. In so doing his planning horizon can be longer; and, in turn, his long-run managerial decision making more efficient.

In the case analysis of selected markets in Michigan and Illinois, operators interviewed were, on average, renting tracts of land from three different landlords. These findings are likely to be representative of U. S. land-based agriculture in general, since the trend of an increasing gap between size of operating unit and ownership unit appears to be widespread.

5.2.1 A Framework for Analysis

To test this hypothesis, a representative farming operation was constructed with the following assumptions: (1) a 480-acre farming operation with all the land being rented, and (2) the probability of the tenant operator losing any leashold is .10 (one year out of ten, the operator could expect to be unable to renew his lease due to the landlord's preference). Several different forms of rental arrangements are then considered, ranging from a single lease for the entire 480 acres to six separate leaseholds of 80 acres each.

Annual probabilities of losing part or all of the rental property were then calculated using the binomial distribution formula [18, p. 137]. This formula is:

$$F(X) = {}_{x}^{n}P^{x}(1 - P)^{n-x} \quad \text{where} \quad {}_{x}^{n} = \frac{n!}{(n-x)!x!}$$

n = Number of trials (number of separate leaseholds)

x = Number of occurrences (number of leaseholds lost)

P = Probability of occurrence (probability of losing leasehold = .10).

5.2.2 The Findings

Table 5.4 illustrates the annual probabilities of losing one or more tracts under various leasing combinations. In terms of incidence of loss the annual probabilities range from .100 for a single leasehold to .468 for the multiple-unit operation having six leaseholds. This would appear to suggest that multiple-unit operations are at a disadvantage in terms of risk of resource availability. And, indeed, if circumstances required that specific parcels comprising the total land base be maintained, the single leasehold is preferable.

However, generally the more important measure is the extent of loss incurred. It is this aspect which is the value of multiple-unit leasing. For example, while the six-unit operation faces a 47 percent chance of losing some land annually, it faces less than a 10 percent chance of losing more than a third of its total acreage in any given year. In contrast, the operation having just three leaseholds faces a 27 percent chance of losing more than a third of its acreage annually. In another perspective, the single leasehold unit faces a 10 percent chance of losing its entire acreage in any given year,

Table 5.4 Annual probability of losing various land increments on a hypothetical 480-acre rented farm under different leasing combinations.[a]

Organization of landholding	Annual Probability of Losing								
	80 acres	120 acres	160 acres	240 acres	320 acres	360 acres	400 acres	480 acres	One or more tracts
Six separate leaseholds (80 acres each	.354		.098	.015	.001		b	b	.468
Four separate leaseholds (120 acres each)		.292		.049		.005		b	.346
Three separate leaseholds (160 acres each)			.240		.027			.001	.268
Two separate leaseholds (240 acres each)				.180				.01	.190
One single leasehold (480 acres)								.100	.100

[a]Based on the probability of renting each tract previously rented of .90.

[b]Less than .001.

while the likelihood of this occurring under any of the other organizational patterns is one percent or less.

While multiple-unit leasing clearly reduces risk in this hypothetical analysis, the validity of the underlying assumptions of constant probabilities for tracts across all organizational forms could be questioned. First, there is the issue of coordinating the total operation when dealing with several landlords. The possibility of conflicting interests is real if landlords enter actively into management, thereby suggesting an increasing probability of loss of each tract as more landlords are involved. However, evidence of this study suggests that landlords usually play a rather minor managerial role, so this is unlikely to be a significant factor. What is more likely to arise is the relatively greater motive of a tenant to please the landlord of the large leasehold and attempt to solidify their relationship and promote a more refined agreement. And, if renting his entire rented base from a single landlord, the tenant may be in better managerial position to satisfy the landlord with special services—in effect reducing uncertainty by paying a hidden privilege rent [45]. Thus, it may be possible that probability of lease termination does decline somewhat with ownership concentration of rented land. Nonetheless, this does not negate the fact that multiple-unit leasing does effectively reduce tenure uncertainty for the majority of operators, who must combine parcels from several landlords in order to gain access to an economically viable land base.

5.2.3 The Implications

As to just how these different probability levels can influence the economic structure of the farm firm, it is relevant to introduce the notion of a threshold level; i.e., that degree of cutback in acreage base that would create serious financial difficulties. For example, suppose such a point in the 480-acre hypothetical farm was a reduction to 240 acres. In theory, such a point may be that level of output below which the firm's average revenue (also marginal revenue assuming a competitive market) falls short of average variable costs. In other words, it is not economically rational to continue operating even in the short run; and the firm would cease operation. However, the threshold point may be viewed somewhat differently by the farm operator. He may visualize such a point as that minimum net revenue necessary to allow adequate family consumption and to carry the debt obligations of the operation. Therefore, the operator would like to minimize this probability as much as possible because of the magnitude of implications.[1]

As shown in Table 5.4, the operator with several independent rental parcels can essentially reduce the possibility of exceeding this threshold point to virtually zero while those with one or two leaseholds face a much higher risk of maintaining a minimum land base from year to year.

Obviously not all tenure uncertainty is eliminated by multiple-unit leasing. Any long-run investment which a tenant may want to make

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[1]This is particularly true if replacement units are scarce and alternative income generating activities are not available. Both these conditions imply a longer duration to the situation.

regarding a particular tract of rental land is still subject to uncertainty. Likewise, the landlord, too, faces similar risk in any plans having longer ramifications than the length of the rental agreement. This aspect of uncertainty remains. Yet, where the maintenance of a viable land base is the critical factor, multiple-unit leasing offers considerable advantage.

Then, too, there is a corollary of this which is the concept of flexibility. Heady describes this as more nearly a method of preventing the sacrifice of large gains [21, pp. 524-29]. Flexibility allows for changing plans as time passes. Here, also, there is value in multiple-unit leasing, despite increased effort of coordination of the total operation. Basically, it not only frees the individual manager from constraining land debt, but also allows greater year-to-year opportunity to make incremental adjustments in the size of his land base.[1]

5.3 The Decision to Rent or Buy

In the process of firm growth and farm consolidation, land purchase as well as rental takes place. Assuming farmland is available to rent, which the previous analysis reveals is generally probabilistic, the rental route has several advantages. Rental offers the attractiveness of virtually no capital requirements while purchase can place substantial capital constraints on the operator. As a supplement or substitute to equity capital and credit, rental can

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[1] Land is a discrete resource. Marginal product theory suggests that the smaller the incremental unit of a discrete resource relative to the total quantity used by the firm, the closer the firm can come to achieving full utilization of that resource.

strengthen repayment capacity of the operation, and, depending on the type of lease, even increase risk bearing ability [41]. And, as noted in the previous section, the short-term nature of the rental contract allows greater flexibility of land resource adjustments over time to the operator. On the other hand, the operator who rents faces an element of uncertainty concerning the availability of the rental parcel beyond the contract point, as well as potential managerial constraints. More importantly, the rental route bypasses the investment aspect, which in recent years has been attractive because of the combination of steady appreciation in land values and capital gains tax provisions.[1] Other factors also influence the decision, including any intangible benefits of land ownership.

At the heart of the rental versus purchase decision is the relationship of rent to market value. Over the last two decades, farmland values have moved upward briskly despite an apparent low rate of return. Nationally, net rents of farms rented for cash have fluctuated slightly between 3.5 percent and 4.5 percent of market value [43].[2] While there are variations among regions and states, net rents generally fall below 5 percent of market value—an annual rate of return readily accessible in the most conservative and risk-free investment options. Given the opportunity costs and cost of mortgage credit, the historical average of farmland rents seems low. Hence,

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[1]The inclusion of appreciation as collateral for further short-run and long-run credit needs is an additional incentive to choose ownership over rental. See [17].

[2]Net rents are reported gross rents less landlord expenditures for fire and wind insurance, maintenance, depreciation, and accidental damage on improvements, and real estate taxes.

the following was hypothesized: farmland rental is economically preferable to farmland purchase as a means of attaining land use rights, unless substantial appreciation of both values and rents can be anticipated in the future.

5.3.1 The Present Worth Analysis Framework

Being immobile and serving as a spacial dimension for production, land reflects future income streams in terms of present value. Consequently, to test the above hypothesis, a present worth analysis of the relevant range of financing and potential returns is employed. The independent variables of this analysis are: (1) expected land value appreciation, (2) mortgage interest rates, (3) downpayment levels, and (4) net rents.

The assumptions are:

1. Since land is usually purchased over time, a 25-year amortization period was chosen so as to minimize cash flow problems that could arise from much shorter repayment periods.
2. Land is available for purchase and for rent at the same time.
3. Net rents of 2%, 4%, and 6% of current market value are assumed to be the relevant range of net rents. While it is based on reported cash rents, it is believed that market forces would adjust all types of leasing to similar average levels of returns.
4. Net rents are assumed to vary directly with land value appreciation. Recent findings suggest this is a valid assumption in regions having a stable agricultural base [42].

5. No difference in physical productivity exists between rented farmland and farmland owned by the operator; i.e., rental contracts do not distort resource efficiency.

The model is a modified income capitalization formula designed to determine the internal rate of return which will make the present value of the anticipated income stream (net rents minus loan payments) and anticipated net sale proceeds (sale price at time of sale) equal to the downpayment [13]. In equation form:

$$xV_{to} = \sum_{t=0}^{n} \left[\frac{a_o(1+g)^t - LP_t}{(1+r)^t} \right] + \frac{V_{to}(1+h)^n}{(1+r)^n}$$

Where: xV_{to} = downpayment (x is percent of purchase price).

$a_o(1+g)^t$ = annual net rent expected to change "g" percent per year, where a_o is the level of net rent at the end of year 1. Rents received at end of each year.

LP = amortized loan payment.

r = internal rate of return used to discount future net rents and sale proceeds.

$V_{to}(1+h)^n$ = expected market value of the property at end of year n with expected annual percentage change, h. Initially, h = g which means a constant net rent to current market value ratio.

Various combinations of (1) land value appreciation rates (h), (2) net rents (a_o), and (3) financing arrangements (LP, which varies with mortgage interest rate and downpayment) were entered into the formula, which was then solved for the internal rate of return (r).

These values were then arranged to comprise a form of decision matrix for the orderly appraisal of the buy versus rent decision.

5.3.2 A Decision Matrix

Table 5.5 is an array of internal rates of return when annual net rent is assumed to be 4 percent of each year's current market value. For example, assume the purchase price of farmland is $600 per acre and the potential investor calculated initial net rent of $24 per acre. He could then turn to this table and by identifying the financing arrangements he would need and the appreciation expected, he could read off the internal rate of return on his investment. By comparing this rate with the opportunity cost he places on that investment, he would be able to rationally decide whether or not to buy, or in the case of the expansion-minded operator, to buy or rent. For instance, if this operator could make a 10 percent downpayment with a 25-year mortgage at 9 percent interest; and he anticipates 4 percent annual appreciation of land values and rents, the internal rate of return on investment is 7 percent.[1] If

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[1]It should be recognized that this return is prior to income tax. Because interest payments are a deductible allowance, the actual rate of return depends on the individual investor's tax bracket. For example, if the investor above is in the 22 percent tax bracket, he is essentially paying only a 7 percent mortgage interest rate [.09 - .22(.09)]. Thus, his expected internal rate of return would be higher. If he were in the 44 percent tax bracket, he would be paying only 5% mortgage interest after tax deductions, thereby increasing expected return even more. Likewise, the deduction of property tax from federal and state taxable income also increases the effective internal rate of return somewhat. These two deduction allowances, plus the capital gains tax provisions, combine to make the profitability of farmland investment highly contingent upon the income position of the potential investor, with considerable financial advantage to those in the higher tax brackets. Thus, the tax aspects of the farmland investment must be an implicit variable in the analysis to follow.

Table 5.5 Annual internal rate of return on investment under selected rates of land value appreciation, mortgage interest rates, and downpayment levels.[a]

Mortgage Interest rate and Downpayment	Annual Appreciation Expected Over 25 Year Period										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Internal Rate of Return (Percent)										
10% Mortgage interest											
10% Downpayment	-3.9	-1.0	1.6	3.9	6.0	8.0	9.9	11.7	13.5	15.1	16.8
20% Downpayment	-2.6	0.0	2.3	4.4	6.4	8.2	9.9	11.6	13.2	14.7	16.2
30% Downpayment	-1.5	0.9	3.0	4.9	6.7	8.4	10.0	11.5	13.0	14.4	15.8
40% Downpayment	-0.4	1.7	3.6	5.3	7.0	8.5	10.0	11.4	12.8	14.1	15.4
50% Downpayment	0.6	2.5	4.1	5.7	7.2	8.6	10.0	11.3	12.6	13.8	15.1
9% Mortgage interest											
10% Downpayment	-2.7	0.1	2.6	4.9	7.0	9.0	10.9	12.7	14.4	16.0	17.7
20% Downpayment	-1.6	0.9	3.2	5.3	7.2	9.0	10.7	12.3	13.9	15.4	16.9
30% Downpayment	-0.5	1.7	3.8	5.6	7.4	9.0	10.6	12.1	13.5	14.9	16.3
40% Downpayment	0.4	2.4	4.3	5.9	7.5	9.0	10.4	11.8	13.2	14.5	15.8
50% Downpayment	1.3	3.0	4.6	6.2	7.6	9.0	10.3	11.6	12.9	14.2	15.4
8% Mortgage interest											
10% Downpayment	-1.3	1.4	3.8	6.0	8.1	10.0	11.9	13.7	15.4	17.1	18.7
20% Downpayment	-0.3	2.1	4.2	6.2	8.1	9.9	11.5	13.1	14.7	16.2	17.6
30% Downpayment	0.5	2.7	4.6	6.4	8.1	9.7	11.2	12.7	14.1	15.5	16.8
40% Downpayment	1.3	3.2	4.9	6.5	8.1	9.5	10.9	12.3	13.6	14.9	16.2
50% Downpayment	1.9	3.6	5.2	6.6	8.0	9.4	10.7	12.0	13.3	14.5	15.7
7% Mortgage interest											
10% Downpayment	-0.2	2.4	4.8	7.0	9.0	11.0	12.8	14.6	16.3	17.9	20.0
20% Downpayment	0.6	2.9	5.0	7.0	8.8	10.5	12.2	13.8	15.3	16.8	18.2
30% Downpayment	1.3	3.4	5.2	7.0	8.6	10.2	11.7	13.2	14.6	15.9	17.3
40% Downpayment	1.9	3.7	5.4	7.0	8.5	9.9	11.3	12.7	14.0	15.3	16.5
50% Downpayment	2.4	4.0	5.5	7.0	8.4	9.7	11.0	12.3	13.5	14.7	15.9
6% Mortgage interest											
10% Downpayment	1.1	3.7	6.0	8.2	10.2	12.1	13.9	15.7	17.4	19.0	20.6
20% Downpayment	1.7	4.0	6.0	7.9	9.7	11.4	13.0	14.5	16.0	17.5	18.9
30% Downpayment	2.2	4.2	6.0	7.7	9.3	10.8	12.3	13.7	15.1	16.4	17.8
40% Downpayment	2.6	4.4	6.0	7.5	9.0	10.4	11.8	13.1	14.4	15.6	16.9
50% Downpayment	2.9	4.5	6.0	7.4	8.8	10.1	11.3	12.6	13.8	15.0	16.2

[a]Assuming: 1) Net rent is 4% of each year's current market value, and 2) a 25-year amortization period.

he could earn a higher rate of return (adjusted for risk) elsewhere, he could not economically justify land purchase.[1] And, if he needs land, he would rent it. However, if he could expect no more than 6 percent on his alternative investments, purchase would be profitable.

There are several noteworthy aspects of the decision process which are revealed in this Table. First, there is evidence to support the hypothesis that rental is economically preferable to purchase unless sizable appreciation rates are expected. With net rents at about the national average, 4 percent, and current mortgage interest rates, no less than 4 percent anticipated annual appreciation would be necessary for purchase to be profitable to most potential investors.[2] Even when net rents are higher, 6 percent, the profitability of the investment would still be contingent upon the anticipation of some appreciation (Table 5.6).

Secondly, it is important to note that mortgage interest rates can significantly influence the decision to rent or buy. For example, an operator who purchased farmland five years ago at 20 percent down and 7 percent interest now may face a current financing situation of 20 percent down at 9 percent interest. If he continues to anticipate 4 percent appreciation and maintain an 8 percent opportunity cost rate, the interest rate increase would shift operator preference from purchase to rental.

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[1] Assuming all intangible benefits and costs are negligible.

[2] Tax considerations may make lower appreciation rates profitable, particularly for those investors in higher tax brackets.

Table 5.6 Annual internal rate of return on investment under selected rates of land value appreciation, mortgage interest rates, and downpayment levels.[a]

Mortgage Interest rate and Downpayment	Annual Appreciation Expected Over 25 Year Period										
	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Internal Rate of Return (Percent)										
10% Mortgage Interest											
10% Downpayment	-0.7	2.4	5.1	7.6	9.9	12.1	14.1	16.1	17.9	19.8	21.5
20% Downpayment	0.6	3.3	5.7	7.9	9.9	11.8	13.6	15.3	17.0	18.6	20.2
30% Downpayment	1.7	4.1	6.2	8.1	10.0	11.6	13.3	14.8	16.3	17.8	19.2
40% Downpayment	2.7	4.7	6.6	8.3	10.0	11.5	13.0	14.4	15.8	17.1	18.5
50% Downpayment	3.5	5.3	6.9	8.5	10.0	11.4	12.7	14.1	15.4	16.6	17.9
9% Mortgage Interest											
10% Downpayment	0.9	3.9	6.5	9.0	11.3	13.4	15.5	17.4	19.3	21.1	22.9
20% Downpayment	1.9	4.5	6.9	9.0	11.0	12.8	14.6	16.3	17.9	19.5	21.1
30% Downpayment	2.8	5.1	7.1	9.0	10.8	12.4	14.0	15.5	17.0	18.4	19.8
40% Downpayment	3.6	5.5	7.3	9.0	10.6	12.1	13.5	14.9	16.3	17.6	18.9
50% Downpayment	4.2	5.9	7.5	9.0	10.5	11.8	13.2	14.5	15.7	17.0	18.2
8% Mortgage Interest											
10% Downpayment	2.6	5.5	8.2	10.6	12.9	15.0	17.1	19.0	20.9	22.8	24.5
20% Downpayment	3.4	5.9	8.1	10.2	12.2	14.0	15.7	17.4	19.0	20.6	22.1
30% Downpayment	4.0	6.1	8.1	9.9	11.6	13.3	14.8	16.3	17.7	19.2	20.5
40% Downpayment	4.5	6.4	8.1	9.7	11.2	12.7	14.1	15.5	16.8	18.1	19.4
50% Downpayment	4.9	6.5	8.1	9.5	10.9	12.3	13.6	14.9	16.1	17.4	18.6
7% Mortgage Interest											
10% Downpayment	4.1	7.0	9.6	12.0	14.3	16.5	18.5	20.4	22.3	24.2	25.9
20% Downpayment	4.6	7.0	9.2	11.2	13.1	14.9	16.6	18.3	19.9	21.4	22.9
30% Downpayment	4.9	7.0	8.9	10.7	12.3	13.9	15.4	16.9	18.3	19.7	21.1
40% Downpayment	5.2	7.0	8.7	10.3	11.8	13.2	14.6	15.9	17.3	18.5	19.8
50% Downpayment	5.4	7.0	8.5	10.0	11.3	12.6	13.9	15.2	16.4	17.6	18.8
6% Mortgage Interest											
10% Downpayment	6.0	8.8	11.5	13.9	16.1	18.3	20.3	22.3	24.1	26.0	27.7
20% Downpayment	6.0	8.3	10.5	12.4	14.3	16.0	17.7	19.3	20.9	22.4	23.9
30% Downpayment	6.0	8.0	9.8	11.5	13.1	14.7	16.2	17.6	19.0	20.4	21.7
40% Downpayment	6.0	7.7	9.3	10.9	12.3	13.7	15.1	16.4	17.7	19.0	20.3
50% Downpayment	6.0	7.5	9.0	10.4	11.7	13.0	14.3	15.6	16.8	18.0	19.2

[a]Assuming: 1) Net rent is 6% of each year's current market value, and 2) a 25-year amortization period.

Given the steady rise in farmland values over the last two decades of nearly 6 percent per year, it would be reasonable to expect potential farmland investors to anticipate similar gains into the future. And, consequently, a general preference of purchase over rental would seem likely among operators. The fact that such a trend towards owner-operatorship does not exist reflects the financial constraints facing operators.

These constraints are manifested in essentially three ways. Financing for real estate purchase may simply be unavailable due to lending requirements of the institutions; i.e., a form of external capital rationing.

Then, also, the operator himself may place constraints upon purchase. As is true of many operators who are becoming established, the use of available equity capital may yield much higher returns in short run uses such as fertilizer inputs. In effect, then, the operator may face opportunity costs of 20 percent or more in the short run and may therefore impose capital rationing upon himself.

Finally, the question of repayment capacity is a critical consideration to the lender as well as to the loan applicant. The fact that appreciation represents a very significant part of the returns to land ownership infers that it is a long-term investment decision. As Hottel and Martin point out, "The key point to be made in such an analysis is that land ownership takes place because the entrepreneur is interested in returns from the standpoint of both a farm operator and a land owner." [26]. This is true because returns are not distributed evenly but rather are clustered at the end of the planning horizon when capital gains are eventually realized. For

instance, in this analysis where the debt load was amortized over a 25-year period, annual interest and principal payments exceeded net rents during the first 15 to 20 years of the period depending upon downpayment levels, mortgage interest rates, and rents. Consequently, cash flow problems may arise because of purchase. For the younger operator already facing difficulty in maintaining an income flow adequate for meeting family consumption needs, land purchase would probably be prohibitive, even though profitability in the long run may be high.

Of course there are some counteracting considerations which individuals must also weigh into the buy versus rent decision; as noted earlier, there may be increased access to short-run and long-run credit via ownership and the inclusion of appreciated land values as collateral. In essence, this represents a benefit to appreciation before realization of capital gains at time of sale. Also, security of access to particular land units may be crucial to the efficient long-run organization of the firm and therefore require ownership. Nevertheless, it could be concluded that, in general, where both alternatives exist, rental is the economically preferable means to obtaining access to use of the land resource in the short run. Only when the decision maker is financially capable of considering long-run benefits of ownership, as realization of capital gains, is land purchase in competition with the rental option.

5.4 Farmland Rental and Business Organization in the Farming Sector

With increasing land and capital requirements of farm firms has come greater interest in more sophisticated forms of business

organization. Partnership and sub-chapter S corporations frequently can better facilitate financial and managerial needs of larger operations than possible under single proprietorships.

Concern has been raised over the possible influence of such organizational forms on farmland tenure patterns—more specifically the potential accumulation of large ownership holdings. While the ramifications of such a trend (whether actual or potential) are not the issues at this juncture, there are reasons to support the argument of ownership concentration. As noted, partnership or incorporation may provide greater access to equity capital and credit than under single proprietorship. Secondly, the removal of a single generation planning horizon such as with a corporation would imply greater interest in land purchase from the standpoint of long-term investment. Thirdly, the potential for nonfarm investment is enhanced and with it greater emphasis on tax considerations of farmland investment. Finally, the very personal, informal nature of the rental market suggested by the case study may result in the more sophisticated, impersonal type of organization being at a distinct disadvantage in competing for rental land.

Based on these arguments it was hypothesized that rate of land tenancy differs significantly among organizational forms with lowest rates among farming corporations and highest among individual proprietorships. This hypothesis was tested using tenure data for economic classes I - V farms in the 1969 Census of Agriculture.

The predominant form of organization is the individual or family proprietorship throughout all areas of the country. Over 70 percent of all land in economic classes I - V farms is under this

form of organization (Table 5.7). The proportion ranges from 61 percent in the Mountain region to 84 percent in the Lake States. The partnership form controls the next largest portion of the total land base, generally accounting for 15 to 20 percent. Corporations account for only small amounts of farmland acreage throughout much of the country. The exceptions are the Southeast, Mountain, and Pacific regions where 13 percent, 21 percent, and 14 percent, respectively, of the land is in incorporated units. On a state basis, the highest incidence of farming corporations is found in Florida where 33 percent of the farmland area is controlled under this organizational form. California runs second with corporations accounting for 15 percent of the land in farms. The greater importance of the corporate form in these areas can be attributed in part to the types of farming enterprises in which they are engaged. These operations typically involve enterprises demanding large land units as a comparison of average farm size suggests (Table 5.8).

But are tenure patterns significantly different among the various forms of business organization? A comparative analysis of farm numbers and land in farms by tenure for each organizational form reveals no evidence to support this (Table 5.9). At the aggregate level, no significant difference in tenure patterns is apparent for either the distribution of farm numbers or land in farms.[1] On a rate of tenancy basis (proportion of land rented), differences do appear when the distinction is made between corporations of ten or fewer

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[1]Based on Chi Square Test of Independence at the 5 percent level of Significance.

Table 5.7 Percent of: farm numbers, land in farms, and market value of land and buildings of economic classes I - V farms, by farm production regions, 1969.[a]

Regions	Percent of Farm Numbers				Percent of Land in Farms				% of Total Mkt. Value of Land & Bldg.			
			Corporation				Corporation				Corporation	
	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders
	Percent				Percent				Percent			
Northeast	87.6	10.6	1.7	0.1	82.3	13.8	3.3	0.6	78.7	14.3	6.0	1.0
Lake States	87.7	11.7	0.6	0.1	83.6	14.7	1.4	0.3	82.5	15.1	1.9	0.5
Corn Belt	84.9	14.4	0.6	0.1	80.8	17.8	1.3	0.2	80.2	18.0	1.5	0.2
Northern Plains	87.2	12.2	0.6	0.0	80.6	16.3	2.8	0.3	82.5	15.3	2.0	0.2
Appalachian	84.4	14.6	1.0	0.1	78.8	18.4	2.3	0.5	78.5	18.4	2.7	0.4
Southeast	85.6	11.8	2.5	0.2	71.8	15.4	8.8	4.0	66.5	15.7	12.7	5.1
Delta	86.5	11.8	1.5	0.2	74.6	18.4	5.5	1.6	72.9	18.9	6.6	1.6
Southern Plains	87.7	11.5	0.7	0.1	74.1	20.0	4.4	1.6	79.8	16.8	2.7	0.7
Mountain	83.7	12.7	3.3	0.2	60.7	18.4	18.1	2.8	67.2	17.4	14.0	1.4
Pacific	83.7	13.2	2.9	0.3	64.3	21.9	11.0	2.8	62.0	22.2	11.7	4.1
48 States	85.9	12.9	1.1	0.1	73.3	18.0	7.2	1.5	76.0	17.5	5.2	1.3

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24.

Table 5.8 Average farm size and average market value of land and buildings per farm, for economic classes I - V farms, by farm production region, 1969.[a]

Region	Average Farm Size				Market Value of Land and Buildings per Farm			
			Corporation				Corporation	
	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders
	Acres				$1,000			
Northeast	198	274	412	1,174	73,600	111,000	288,400	817,100
Lake States	234	307	596	1,196	57,200	78,300	197,100	450,200
Corn Belt	251	326	559	728	95,000	125,600	257,900	415,500
Northern Plains	743	1,072	3,838	5,562	95,300	127,400	344,200	356,300
Appalachian	183	248	461	1,279	50,500	68,500	148,000	312,700
Southeast	323	502	1,376	7,833	76,800	132,200	508,000	2,555,100
Delta	350	633	1,507	2,897	92,800	176,200	493,400	786,300
Southern Plains	786	1,620	5,575	16,680	123,600	199,000	498,500	1,116,900
Mountain	1,668	3,322	12,500	31,919	133,300	226,700	699,000	1,109,000
Pacific	538	1,164	2,696	6,559	167,800	381,900	933,800	3,138,400
48 States	450	739	3,337	7,756	91,100	140,200	471,100	1,273,900

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24.

Table 5.9 Percent of farm numbers and percent of land in farms by type of organization and by tenure for economic classes I - V farms by farm production region, 1969.[a]

	Percent of Farm Numbers[b]			Percent of Land in Farms[b]		
	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants
	Percent			Percent		
	Individual or Family Farm Organization					
Northeast	60.8	30.8	8.4	50.6	42.4	7.0
Lake States	62.3	29.0	8.6	50.0	41.2	8.8
Corn Belt	51.3	30.3	18.3	37.8	42.9	19.3
Northern Plains	34.2	47.1	18.6	22.1	64.4	13.5
Appalachian	60.1	26.5	13.4	56.3	35.6	8.1
Southeast	60.3	29.5	10.2	48.6	43.8	7.6
Delta	52.3	33.4	14.3	38.5	47.7	13.8
Southern Plains	43.8	38.8	17.4	28.7	55.3	16.0
Mountain	46.3	41.5	12.2	18.6	72.8	8.6
Pacific	62.4	26.5	11.2	25.4	61.0	13.6
48 States	52.4	33.2	14.5	31.1	56.0	12.9
	Partnership					
Northeast	50.3	39.2	10.5	40.1	51.6	8.3
Lake States	51.2	33.1	15.7	39.4	47.0	13.6
Corn Belt	34.9	33.5	31.7	25.3	44.8	29.9
Northern Plains	28.0	47.7	24.3	17.7	65.1	17.2
Appalachian	48.8	31.9	19.3	45.7	41.5	12.9
Southeast	51.5	34.0	14.5	43.0	46.3	10.7
Delta	39.6	40.0	20.4	29.4	53.8	16.8
Southern Plains	35.6	40.6	23.8	24.6	51.0	24.4
Mountain	37.4	46.5	16.0	16.0	73.9	10.1
Pacific	52.3	30.9	16.8	20.6	60.2	19.2
48 States	40.9	36.7	22.5	24.0	58.1	17.9
	Corporation					
Northeast	55.4	32.1	12.5	35.7	55.5	8.8
Lake States	56.9	29.0	14.1	37.4	49.2	13.4
Corn Belt	52.1	27.2	20.7	40.8	42.3	16.9
Northern Plains	33.8	45.8	20.4	13.5	73.0	13.5
Appalachian	49.1	27.0	23.8	50.1	36.7	13.2
Southeast	62.8	20.6	16.7	61.5	32.7	5.8
Delta	38.3	33.4	28.4	39.1	40.8	20.1
Southern Plains	43.1	29.4	27.5	22.2	59.7	18.1
Mountain	34.5	54.3	11.2	8.5	81.0	10.5
Pacific	46.8	32.9	20.3	20.4	70.2	9.4
48 States	47.8	33.4	18.8	18.1	70.3	11.6

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24.

[b]Percentages may not add to 100.0 due to rounding.

shareholders and those of more than ten shareholders. Yet even with this greater classification refinement, a consistent pattern is not evident (Table 5.10). For example, corporations of more than ten shareholders rent a high proportion of their land in a number of midwestern states. Frequently, these operations are involved in specialized crop enterprises and rent a large land base on long-term contract. In contrast, such corporations may, on average, rent very little of their total acreage in a neighboring state—all depending on the nature of the specific enterprises involved. One must conclude, then, that this comparative analysis offers no empirical support to the hypothesis that tenure patterns are altered by organizational form. More specifically, there is no evidence to suggest a tendency towards land ownership among large-scale operations such as corporations with more than ten shareholders. In fact, these business entities may be controlling a larger portion of their land resources via rental than the operation organized around an individual. It could be proposed that decisions regarding the use rights to land are more sensitive to the physical land needs of the enterprise than to the variation in financial flexibility among the various organizational forms.

5.5 Chapter Summary

Farmland rental is an integral part of the process of farm consolidation and growth. Firm growth researchers have frequently advocated the rental route in attaining various growth objectives, particularly when capital and/or credit constraints exist. Yet in concentrating on the firms, research has tended to ignore the aggregate

Table 5.10 Percent of land in farms rented by type of farm organization for economic classes I - V farms, 48 states, 1969.[a]

State and Region	Percent of Land in Farms Rented				
			Corporation		
	Individual or family	Partnership	10 or fewer shareholders	More than 10 shareholders	All Corporations
	Percent				
New England States[b]	16.0	17.4	15.3	13.5	14.9
New York	19.1	22.1	28.6	14.3	27.7
New Jersey	37.3	36.7	50.6	33.3	50.0
Pennsylvania	23.4	27.2	29.1	25.0	28.3
Delaware	40.1	43.6	34.1	9.1	28.8
Maryland	35.4	45.2	42.9	30.4	40.4
NORTHEAST	22.5	26.7	29.4	19.3	27.9
Michigan	25.3	36.5	32.6	13.3	30.7
Wisconsin	16.7	27.0	25.5	61.1	33.7
Minnesota	32.2	38.1	36.8	78.2	44.4
LAKE STATES	26.2	34.5	30.9	62.4	36.9
Ohio	37.6	54.0	37.1	11.8	35.2
Indiana	42.3	58.7	33.2	35.7	33.3
Illinois	55.3	63.4	39.4	74.3	46.0
Iowa	45.0	57.1	37.5	20.7	35.0
Missouri	28.9	43.4	43.5	26.9	42.5
CORN BELT	42.5	55.5	38.9	42.2	39.2
North Dakota	37.3	42.6	42.5	60.0	43.0
South Dakota	37.8	38.0	29.8	15.0	29.4
Nebraska	45.4	45.7	29.7	14.0	27.4
Kansas	53.1	54.7	55.6	81.3	58.8
NORTHERN PLAINS	43.9	45.5	33.1	23.1	32.0
Virginia	23.0	29.2	27.8	39.3	29.5
West Virginia	17.2	21.0	27.5	25.0	27.3
North Carolina	31.6	36.1	28.3	10.4	24.9
Kentucky	18.3	33.2	26.0	10.0	24.1
Tennessee	24.8	34.6	33.9	32.5	33.5
APPALACHIAN	23.8	33.0	28.4	23.4	27.5
South Carolina	30.0	29.9	25.4	17.5	24.3
Georgia	23.1	26.2	16.1	6.0	15.2
Florida	37.8	43.8	22.3	7.2	16.8
Alabama	29.3	30.4	29.1	10.3	26.7
SOUTHEAST	29.3	32.2	22.0	7.5	17.5
Mississippi	31.8	38.7	42.7	17.4	39.8
Arkansas	42.0	53.3	47.4	35.1	45.8
Louisiana	50.1	49.7	44.5	15.3	32.7
DELTA	40.3	47.0	44.9	19.3	39.2
Oklahoma	43.4	45.7	45.6	25.0	45.0
Texas	48.4	52.3	45.3	19.8	38.1
SOUTHERN PLAINS	47.3	51.2	45.3	19.9	38.5
Montana	36.0	38.4	33.3	36.8	33.5
Idaho	33.7	39.7	40.0	44.8	40.3
Wyoming	41.4	41.7	41.5	26.1	40.4
Colorado	39.0	39.0	38.0	53.6	40.2
New Mexico	49.0	41.0	44.9	39.5	44.0
Arizona	69.7	61.9	68.5	49.5	61.4
Utah	36.2	39.2	30.9	17.5	30.0
Nevada	55.1	37.4	73.7	37.8	67.5
MOUNTAIN	42.2	41.4	44.6	42.0	44.2
Washington	48.7	49.8	60.2	72.5	60.6
Oregon	33.3	37.9	30.0	15.1	28.8
California	56.0	60.2	55.1	26.6	46.5
PACIFIC	48.4	53.1	47.6	26.3	43.3
48 STATES	40.8	45.7	42.2	29.9	40.1

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24. Calculated assuming all land that is rented by part owners and tenants is operated and not subleased.

[b]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

dimensions of farmland leasing. One such aspect is the question of availability. Analysis using hypothetical models and case study findings on tenure stability revealed (1) that availability is probabilistic and (2) that at apparent rates of turnover, the limited availability of rental land can significantly alter the desirability of rental over other growth strategies.

The analysis suggests that the probability of maintaining a rental contract from year to year is more critical to the growth process than is the availability of rental land for add-on purposes—reflecting resource misallocation of fluctuating operation size. Part of this problem of tenure uncertainty is buffered by the high incidence of multiple-unit leasing. By leasing from several landlords simultaneously, the operator reduces the chance of losing a significant proportion of his acreage base in any given year.

When availability is no problem, rental is preferable to purchase of farmland over a wide range of financial conditions and expectations. Present worth analysis using a representative decision framework indicates appreciation of 4 percent or more per year generally must be anticipated (virtually risk free) before purchase is economically preferable to rental. In other words, rental is the most economical means of attaining use rights to land in the short run. Only with consideration of profitable long-run investment aspects of land ownership is purchase a more desirable route.

Despite the greater inherent motivations to consider these long-run investment aspects, the farm corporation and other more sophisticated organizational forms do not show a tendency towards land ownership. No significant difference in tenancy patterns between

these types of business organizations and sole proprietorships was found. Apparently, the short-run advantage of land use control via rental is primary, regardless of the type of business organization.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

6.1 Summary and Conclusions

Analysis of U. S. farmland tenure patterns indicates that rental is a widely used means of obtaining use rights to the land resource. Based on the 1969 Census of Agriculture, about 38 percent of all land in farms (in terms of both acreage and market value) is being rented. Since the bulk of this rented portion is leased from nonoperator landlords, leasing must be regarded as an important source of capital for the farming sector. Relative to estimated real estate debt outstanding held by farm operators, the capital input via farmland leasing is roughly three times as great.

Further insight beyond these aggregate means is gained by observing tenure patterns across various classifications of classes I - V farms. For example, classifications of farm firms by acreage size and by economic class both revealed a relatively heavier emphasis on farmland leasing among the larger farm units. On average, roughly four out of every nine acres of farmland in class I and II farms were rented while less than 30 percent was rented in class V farms. Units of 500 acres or more were leasing twice as much of their land as those operations of 100 to 139 acres in size. In terms of concentration, the largest one-fifth of the operating units (in acres) account for about three-fourths of the rented farmland. No significant

variation in reliance on tenancy was observed among the various forms of financial organization. Hence, even though more sophisticated organization units may increase in incidence, it does not infer that less reliance on farmland leasing will follow.

Wide variation in the relative importance of rental is also evident among age classes of operators, with younger farmers relying much more heavily on leasing than older farmers. While there are numerous variables influencing this pattern, the dramatic increase in dollar volume of the real estate needs of the current generation farm unit over its predecessor appears to be an important factor.

The tenancy patterns that are observed, then, confirm that farmland rental is highly interrelated with the structural adjustments that have occurred over the last few decades. More specifically, farmland rental has taken on a different dimension. Where once tenancy was considered as a temporary rung on the tenure ladder to eventual full ownership, leasing is predominantly viewed today as an effective and frequently a permanent tool to achieving use rights to an adequate-sized land base. In fact, where capital and credit limitations have prohibited land purchase, rental has been the operator's sole means of acreage size expansion. This is particularly true of land-based production such as cash-grain farming.

But even when an operator is not financially constrained from buying farmland, he may still choose to rent, given the anticipated returns on investment he could expect. In fact, over the relevant range of mortgage interest rates, net rents, and opportunity costs, rental would be preferable unless rather substantial appreciation in farmland values is anticipated.

Despite the magnitude of farmland leasing and its past and present role in the process of farm consolidation and growth, evidence of this study supports the hypothesis that the rental market process is low keyed and informal in nature with little visible competition. In part, this can be attributed to the significant number of family tenancies—38 percent of those in this case study analysis. Also, because of the inherent motivations of both landlords and tenants to make rental arrangements within their friendship circles, a price-competitive market is discouraged. Correlated with this is the existence of poorly developed market information channels, a rather slow adjustment to technological change as custom prevails, and very slow turnover rates of rental arrangements. So, even where motivations for price competition may arise, the market system offers little opportunity.

The above is not to say the market is devoid of competition. Quite the contrary, an effective system of checks and balances appears to be operating which forms a type of tacit competition. Findings of this study indicate the landlord typically plays a very minor managerial role, thus allowing the tenant considerable latitude in managing his total operation. Moreover, renewal of short-term leases often is essentially risk free so long as land ownership is not transferred. Yet, landlord exploitation by the tenant is discouraged by (1) custom within the area and (2) the potential termination of a short-term lease by the landlord. This, in addition to the personal relationship of the tenant and his landlord, results in a form of partnership in which maximum resource efficiency equilibrium is approached, even though active price competition does not exist.

For the farm operator who has successfully rented land and has his desirable land base, the nature of the rental market process is quite beneficial in that tenure uncertainty is reduced substantially. Yet, the process of achieving that rented land base may have been much slower than desired. Then, too, his prospect of future acreage expansion may be highly uncertain due to the issue of rental land availability. Likewise, the potential farm operator may often find the accumulation of a land base via rental to be highly risky. In short, in moving from the firm perspective to the more aggregate concept of the market, the question of rental land availability becomes crucial.

A significant finding of this study was that the characteristic short-term lease contract does not necessarily create rapid turnover of rental land and thus a reduction in the problem of availability. Despite the fact that 90 percent of the leases studied were one-year arrangements, they had existed an average of 13 years. Crude measures of the turnover rate of rental land indicate that less than 10 percent may become available in any given year. Given this low rate of turnover, a potential tenant could expect rather limited opportunity to rent farmland within a reasonable operating radius.

The question then is, does this limitation affect the farm consolidation and growth process significantly? This was analyzed by incorporating probability factors for (1) renting land previously rented and (2) renting land not previously rented into a simulation growth model. Under the more limited degrees of availability, the annual compound growth rate of accumulated net worth was reduced about

one percentage point. This was significant enough to reduce the ranking of a cash rent growth strategy over some of the other growth strategies.

To the extent that rental land is being used by larger farms, the findings above could suggest that the farm consolidation and expansion process has been constrained by the unavailability; i.e., the speed of growth has been governed by the availability of rented land. Respondents surveyed in this study would support this hypothesis, in that about 40 percent hoped to expand their rental acreage in the future "if," as numerous operators added, "I can find land to rent." However, there is also a counter argument to this in that lack of land to rent can encourage operators of smaller units to sell out and potential entrants to seek nonfarm employment. Thus, limited availability could also speed up aggregate adjustment in farm size and numbers.

For the established operator, the key issue of availability of rental land is maintaining the land base over his planning horizon. Though leases exhibit high levels of stability, an element of tenure uncertainty lingers, simply from the possibility of ownership transfer. However, because of a particular aspect of leasing today, this uncertainty is being effectively reduced by multiple-unit leasing. By leasing land from several landlords, a tenant serendipitously reduces the risk of losing a substantial portion of his land base in any given year. In so doing, he can more efficiently manage his operation in the long run.

This suggests that some credit institutions may need to reconsider their credit policies in the case of applicants with

sizable reliance on farmland rental. In essence, the enhancement of repayment capacity via leasing does not necessarily carry negative connotations with regards to risk and uncertainty, which previously demanded high equity levels of the loan applicant.

Given (1) the magnitude of farmland leasing in U. S. land-based agriculture and (2) the low-keyed, imperfect nature of the rental market, the body of leasing theory would suggest there is serious misallocation of the land resource. For several reasons, the theory infers that deviation from maximum resource efficiency results when the firm moves from the optimum of owner-operatorship into tenancy. However, a review of empirical research efforts to test such theory reveals very little supporting evidence. In part, this can be explained by the failure of static theory to account for dynamic adjustments, such as the realization of size and scale economies of size expansion. There is also criticism of the share-rent portion of theory in that it is internally inconsistent with the underlying assumptions of perfect competition. The nature of the market process revealed by this study (i.e., a form of tacit competition with strong bargaining positions of both tenant and landlord) would further support such a conclusion. Finally, the assumptions underlying much of the theory no longer appear to reflect real-world conditions—most notable being the dominance of part-owner leasing, multiple-unit leasing, and a market setting conducive to strong and mutually beneficial landlord-tenant relationships. Thus, it is concluded there is little basis to support the theoretical proposition of resource inefficiency arising from tenancy.

6.2 Implications

Inquiring into institutional relationships invariably becomes quite complex and multidimensional. This analysis is no exception. There are a number of social-economic implications arising from the findings of this study, which, while defying quantitative measurement, should not be ignored.

In order to recognize and appraise the various implications requires that one first broaden the perspective of the analysis. In addition to efficient resource use, other objectives which are generally accepted by society as improving general welfare must also be considered. Then, too, the conduct and performance aspects of the rental market process need consideration along with the structural factors.

Many objectives have been proposed to which the ideal land tenure system is to be directed. Harris, however, has outlined several tenure objectives which essentially represent the thinking of many researchers [19, p. 7]. These are (1) efficient resource use, (2) stability of resource productivity, (3) equality of access to land by individuals, (4) provisions for progress, (5) improved equality of income, and (6) maintenance of the family farm. For this discussion, all but the sixth objective are considered; maintenance of the family farm is omitted simply because there is no concensus on the definition of the family farm.

As to appraisal of the market process per se in terms of conduct and performance, Sosnick has advocated that conditions for effective competition be stated explicitly [47]. He proceeds to list twenty-five flaws which can negate effective competition and therefore

the socially desirable state of affairs. Ten of these conditions Sosnick regards as undesirable, both in themselves and in their effects. These are: (1) unsatisfactory products, (2) underuse or overuse of production plants, (3) inefficient exchange, (4) inefficient production, (5) bad externalities, (6) spoilation, (7) exploitation, (8) unfair tactics, (9) wasteful advertising, and (10) irrationality. Fifteen other criteria Sosnick considers undesirable only because of their effects. These are: (1) undue profits or losses, (2) inadequate research, (3) predation, (4) pre-emption, (5) tying arrangements, (6) resale price maintenance, (7) refusals to deal, (8) undesirable discrimination, (9) misallocation of risk, (10) undesirable collaboration, (11) undesirable mergers, (12) undesirable entry, (13) misinformation, (14) inefficient rules for trading, and (15) misregulation. Obviously, many of Sosnick's criteria are directed more at the large-scale, industrial market and do not apply to the farmland rental market process. Nevertheless, it is a comprehensive framework by which to consider conduct and performance aspects and is therefore used in this context.

6.2.1 Land Tenure in the Future

Findings of this study indicate a direct relationship between acreage size of farm firms and reliance on land leasing. At present, it appears the trend towards increased farm size will continue. It follows that rental land may continue to become more concentrated on larger operations.

As to whether or not the magnitude of farmland rental will increase, the future is less certain. Increasing capital and credit

demands associated with larger units would seem to suggest the affirmative. But, as noted by Nelson, a number of customs and practices, as well as attitudes of farmers and the public, probably would need to be modified for renting to increase significantly in magnitude as a source of capital [41, p. 1388].

Nevertheless, the conditions for a substantial modification of the land tenure system in terms of ownership as well as control of use rights appear to exist. For example, today many farm operators in the older age classes are accruing large capital gains on land which had been acquired twenty or thirty years earlier. The growth in the wealth position via appreciated land values has greatly improved their credit positions and thus has facilitated acreage expansion through purchase as well as rental. This is in sharp contrast with today's younger operator who faces a more difficult and costly task of purchasing farmland, particularly in the quantity necessary for an economically viable unit. This would confirm an earlier conclusion of greater permanence to the emphasis on land leasing by younger farmers today than that of earlier generations. If such is the case, the relative importance of inheritance and intergenerational family transfers to the next generation could decline. Then, too, any decline in the relative importance of land investment as a long-term income source places greater demands on the annual income generating potential—thus encouraging further expansion of farm operation size. So, in effect, the tenure system could gradually shift towards increased ownership by the investment-oriented nonfarmer.

In terms of the general objectives, the present tenure system contributes to efficient resource use. Operation size can expand beyond the typical capital and credit constraints of full-owner operatorship and capture size economies. Likewise, the apparent stability of leasing arrangements is conducive to stability of resource productivity.

There is some question, however, of the provisions for progress within the tenure process. While facilitating size economies and the inherent application of new technology, there is some evidence to suggest the contrary. A case in point. Landlords in Illinois have traditionally paid a certain per bushel rate for the tenant to shell their share of the corn crop. With the introduction of field shelling, this cost has been incorporated into the tenant's costs. Leases have generally not been altered for this change, leaving the landlord with a windfall and the tenant with less incentive for adopting this technological improvement. In the Sosnick framework, this is essentially an example of inefficient exchange, in that standardization of leasing arrangements due to custom reduces flexibility in adjusting to technological developments.

Should landlord-tenant agriculture increase in magnitude, new flaws within the market process could also develop. Absentee landlordism could alter the personal informal market relationship and require greater emphasis on legal means. In essence, even though imperfections previously promoted by custom would be reduced, the more formal market setting would place greater demands on such aspects as information networks and price competition.

6.2.2 Entry and Exit

The concentration of rental land on larger units raises the issue of accessability. Due to a number of market imperfections, there apparently is much inequality of access to rental land. The existence of tying arrangements in the form of family tenancies discriminates against the nonrelative. The beginning or inexperienced operator who is considered a higher-risk also faces discrimination, since the market rates are often inflexible. Then, too, market misinformation and inefficient rules for trading (little or no open bidding) reduce availability to varying degrees for all potential tenants, resulting in access at any point in time being largely by chance.

The objective itself of equal access is deeply ingrained in the democratic and capitalistic nature of our society. Hence, deviation is considered undesirable from the standpoint of human rights as well as potential resource inefficiency. Yet, there is a positive aspect to inequality of access; i.e., a gate-keeping function of limiting potential entrants and thereby facilitating farm consolidation and eventually, more efficient organization of the sector. That inequality does injustice to the unsuccessful applicant could also be questioned, in that production practices and technology of today do not allow organization of units in sizes and numbers as those of a few generations ago. If such units were allowed by the market, many would not be economically viable, and therefore yield insufficient income and returns to the individual's resources. Thus, from the standpoint of the individual's welfare as

well as the broader welfare considerations of society, the objective of equal access must be carefully weighed.

6.2.3 Organizational Impact and Income Distribution

For two reasons, the farmland rental process tends to contribute to the objective of greater income equality. First, because of about one-third of the value of farmland being held by nonfarm operators, a substantial share of the returns (annual as well as capital gains on investment) earned in this sector are widely distributed to more than a million resource owners outside the sector. Moreover, even though farm gross receipts are heavily concentrated among the larger units, these units rely more heavily on farmland rental, which further disperses economic returns.

Secondly, the use of farmland rental in expansion purposes allows the individual proprietorship to remain competitive with industrial-type firms that have the advantage of greater capital reserves. This is particularly true within land-based enterprises. The result is the continuing dominance of U. S. agriculture by the individually held farm firm even though per-farm capital and asset levels have far surpassed the cumulative capacity via individual owner operatorship.

Ownership and control of farmland is further dispersed by the process of intergenerational transfer. And as the gap between ownership size and size of operatorship expands, fragmentation of operating units becomes more extreme. But while contributing to greater dispersion of farm income and wealth, such fragmentation of viable operating units can lead to inefficient resource use. In

Sosnick terms, this could be termed inefficient exchange. It appears that farmland rental, with respect to this particular resource allocation problem, is a mixed blessing. In the case of family tenancies, rental frequently is providing a smooth ownership transition, and continuity of the operation bridges the intergenerational gap. But in nonfamily rental agreements, rental can magnify the fragmentation dilemma. Incorporation or the formation of two-generation partnerships are increasingly being employed to maintain a farming operation, both in terms of owned and rented assets. However, where there is no personal incentive to do so, public policy may need to be considered. This could take the form of governmental encouragement of long-term lease contracts much like the European system [14].

6.2.4 Environmental Issues and the Quality of Life

It is becoming increasingly apparent that serious problems are confronting virtually every thread of our social fabric. To consider the nature of the rental institution within the farm sector while ignoring the fact that it is part of a larger set of social-economic factors is folly.

Two basic issues bear heavily on the social welfare implications of the farmland tenure system including the rental process. One is population patterns. Excessive population concentrations and decay of urban cores initially come to mind. Farm outmigration has contributed to these present urban ills. But there is also the more subtle but equally severe extreme of social decay in rural areas experiencing population loss [23]. To the extent that rental has

facilitated farm consolidation, it has indirectly added to these undesirable states. It has also been detrimental to the rural areas in that income and wealth in varying degrees is transferred away from the economic base of the rural community to absentee landlords.

Given these conditions, it is reasonable to at least raise the possibility of future public policy to attain more socially desirable population dispersion. Rural resettlement would be a logical portion. This could result in an altered view of farm size expansion from the now "unlimited" position to one of prohibiting units larger than the levels where major size economies are exhausted. Absentee landownership might also be discouraged under a comprehensive resettlement policy.

A second major problem area is environmental constraints which appear to be increasing both in magnitude and complexity. Farmers already are experiencing environmental constraints in the production process and, undoubtedly, will experience more. Simultaneously, policy measures are being taken which attempt to alter property rights so as to internalize various externalities. Private ownership of land, which once was considered to be virtually free of public influence, is now increasingly coming under public constraints [3, p. 28].

Increased public influence in private land ownership is becoming a "third party" so to speak, in the traditional landlord-tenant relationship. It is reasonable to foresee the rather personal, informal relationship of the present being no longer as functional under public pressure; these limitations may require more complex and legally documented rental relationships in the future.

In addition to reacting to these outside forces, it should not be forgotten that the farmland rental process, itself, represents a potential tool for implementing desirable changes in land use. A case in point. Society is becoming increasingly concerned about land in the rural-to-urban transition. Partly the problem stems from the economically and aesthetically undesirable aspects of leap-frog development. Also there is increasing pressure to maintain the inventory of higher-quality agricultural land—which is all to often threatened by urban sprawl. Thus, on two fronts there is interest in establishing green belt areas around urban areas. Various mechanisms for property taxation at agricultural value have been devised which indirectly help to preserve farmland and to discourage disorderly development. However, the success of such efforts is questionable, since high property taxes are only one factor leading to farm liquidation. Possibly equally significant is the fact that farm consolidation and enlargement is much more difficult in these areas due to inflated land prices. Consequently, commercial agriculture may largely move out of the urban periphery long before the land moves into the more intensive use. In short, there is a time lag in which farmland will revert to scrubland, and be economically useless and aesthetically unpleasing.

A more viable farmland rental market in these transitional areas could do much to improve these conditions. Farmers in need of larger land acreages could then expand via rental instead of relocating in areas of lower-valued farmland. Moreover, in encouraging long-term leases of five- to ten-year terms, public policy could also contribute to a more gradual, orderly development process.

As land use conflicts intensify in the rural-urban interface, new policy tools must be forged to meet these problems. Most likely, these measures will fall between the one extreme of outright public ownership and the other of nearly absolute private rights. The rental market process represents just such a mechanism.

6.2.5 Shortages in Today's Setting

In a very pronounced way, U. S. commercial agriculture has found itself moving in recent months from the perennial dilemma of surplus to one of shortage. Rising world demand for U. S. farm commodities, due to both short-run and long-run effects, has driven up farm prices dramatically. Coupled with this has been a rapidly developing shortage of fossil fuels—the economic effects of which remain to be seen.

In no small way do these recent developments affect farmland tenure. Yet, this new dimension contains both acting and counter-acting forces, leaving the outcome highly uncertain. Hence, only issues can be raised and relationships identified.

First, the production side. A series of circumstances have contributed to the demand increase for U. S. farm commodities. Short crops, new trade agreements, the dollar devaluation—these have been important short-run factors. However, experts also point out long-run aspects of rapid world population increases and rising living standards (and associated eating habits) of numerous countries. While the short-run causes may change, it is generally believed that world demand is moving upward. For the U. S. farming sector, it follows that farm commodity price relationships have essentially moved

to a higher place, and will not return to levels of a few short years ago.

In those basically agricultural areas of the country where farmland value still relates primarily to agricultural potential, higher commodity prices tend to encourage land values to increase accordingly. The 13 percent increase in the national index of farm real estate values from March 1, 1972 to March 1, 1973 would support this relationship. While this would be additional incentive among farm operators to purchase farmland from a long-term investment standpoint, a counteracting force is the declining ability of producers to achieve high equity levels in their necessary resource base. Given the increase in the proportion of farmland rented over the past twenty years, during which land values rose steadily, it appears the latter force (capital and credit constraints) is the dominant force. And any further rise in real estate values in the future may be accompanied by greater reliance among operators on rental.

On the input side, the impact of energy shortages on land tenure relationships can be studied in terms of input substitution. Historical data on agricultural production over the past thirty years indicate two important substitution relationships [10, p. 6]. One has been the substitution of capital for labor. The other is the substitution of capital for land. The former, which refers to such substitution as mechanization techniques and fossil energy inputs, indirectly can bear on the land resource and the relationship with other inputs. In short, as noted in the introductory chapter, mechanization and other capital substitutes for labor have encouraged and often times necessitated expansion of farm unit size. The

result has been heavy reliance on rental to expand the land base accordingly.

The substitution of capital for land has been no less dramatic. Manufactured fertilizers and pesticides, irrigation, drainage, and improved seed varieties have all contributed to a sizable decrease in the land base necessary for producing a given level of output. Largely this has represented the substitution of one form of energy, fossil fuels, for another, solar energy which land represents.

It appears now that shortages of fossil fuels will continue to be a long-term reality and with them the rippling of structural and land tenure adjustments. At the minimum, a slowdown of trends towards mechanization and other forms of capitalization is likely. Even if agriculture was considered a top priority sector of the economy in terms of energy allocation, the cost relationships could still dampen further substitution incentives. This does not necessarily mean that a return to a more land-based agriculture is in store for the future. As Connor notes, virgin farmland in the U. S. is essentially exhausted, while farmland continues to move out of production into nonfarm uses (10, p. 8]. Thus, such a trend would represent a cutback in total production—an unrealistic and undesirable outcome given the supply demand situation of U. S. and world food needs. Nevertheless, the price of energy in the form of land and labor inputs relative to capital inputs, which is essentially fossil fuels, will probably be altered dramatically. It is this which appears to hold significant implications for future land tenure patterns.

As the allocative process (either the market mechanism or policy mandate) creates a price increase in the scarce fossil fuels,

demand for and prices of substitutes will also adjust upward accordingly—including farmland. This will influence annual rents as well as market value. For reasons previously discussed, further price increases may well encourage greater reliance on farmland rental and thus more aggressive competition in this market. It might also be proposed that the uncertainty which the energy crisis interjects into the long-run economic outlook may in turn reduce the relative weighting of long-run appreciation versus annual returns in the form of rents; in short, a higher rent-to-value ratio may develop over time.

Specific adjustments may develop in share-rent arrangements. Operator labor, machinery, and fuel inputs have not normally been shared by the tenant and landlord. The tenant may be faced then with (1) significantly higher prices on the fuel inputs he contributes entirely and (2) greater need to apply labor inputs instead of purchased capital inputs (example: more frequent cultivation versus pesticide application). As indicated in the theoretical framework presented on page 99, these factors will enter into the bargaining process and could result in an increase in the relative share going to the tenant.

Shortages of processed fertilizer and pesticides also suggest the necessary lengthening of the rental planning horizon; i.e., more reliance on crop rotations for soil buildup and pest control would suggest the greater need for long-term rental contracts than now necessary with continuous cropping specialization year after year.

In summary, the present energy crisis suggests that technological inputs which are land and labor substitutes may become too

expensive to allow the rate of capitalization of the sector to continue. In fact, given the resource availabilities, it may be that the present capital intensity of this sector has proceeded too far; i.e., technological developments have not fully accounted for either real-world resource constraints or social externalities. Non-marginal change in resource allocation in agricultural production appears imminent. And this will take place in the face of rising world food needs. To the extent that the farmland rental process is flexible and adaptable, it will contribute to the adjustment necessary.

6.2.6 The Perspective of the Policy Maker

The man-to-land relationship and the institutions through which it functions is a key variable within the social fabric of a country. The policy maker in his role as a representative of society cannot ignore it nor belittle it. This study reveals that the consequences of farmland rental, only one facet of the larger relationship, extends far beyond the landlord-tenant level of interaction. Leasing as a means of resource control is significantly integrated with the structural changes which have occurred within the commercial farming sector. Moreover, the implications in terms of conduct and performance extend into the complex social welfare matrix.

The present system is generally satisfactory. Yet, as the implications are drawn more heavily from the total context of social-economic welfare and less from the more isolated standpoint of commercial agriculture, the future appears to hold an increasing

challenge to the policy maker in resolving land tenure conflicts. Comprehensive understanding and continual monitoring of the system will be necessary in order for proper adjustments to be made. Further research into the various tenure aspects will enhance the likelihood of institutional innovations with positive social benefits.

APPENDIX

Table A.1 Farmland rented: acreage, percent of all land rented, percent of rented portion rented by part owners, and percent of rented portion rented from nonoperator landlords, 48 states, 1969.[a]

State and Region	Land in Farms		Percent of all land rented	Percent of rented portion rented by part owners	Percent of rented portion rented from Nonoperator landlords
	Total	Rented[b]			
	. . 1,000 acres . . .		. . . . . Percent		
New England States[c]	5,597	758	13.5	78.1	93.0
New York	10,149	1,754	17.3	76.6	90.8
New Jersey	1,036	349	33.7	58.7	89.0
Pennsylvania	8,900	1,742	19.6	63.8	87.3
Delaware	674	252	37.4	65.5	98.6
Maryland	2,803	919	32.8	51.6	86.7
NORTHEAST	29,159	5,774	19.8	67.4	91.5
Michigan	11,903	2,588	21.7	76.2	88.3
Wisconsin	18,110	3,074	17.0	57.9	74.4
Minnesota	28,845	8,981	31.1	62.9	89.3
LAKE STATES	58,858	14,643	24.9	64.2	86.0
Ohio	17,112	5,970	34.9	58.0	90.6
Indiana	17,573	7,223	41.1	61.0	90.5
Illinois	29,914	16,255	54.3	47.6	91.1
Iowa	33,569	15,329	45.7	43.6	88.1
Missouri	32,418	8,998	27.8	63.5	84.5
CORN BELT	130,586	53,775	41.2	52.1	89.0
North Dakota	43,118	16,953	39.3	67.1	91.3
South Dakota	45,584	15,678	34.4	68.5	90.3
Nebraska	45,834	19,989	43.6	57.6	88.9
Kansas	49,391	25,695	52.0	68.5	88.4
NORTHERN PLAINS	183,927	78,315	42.6	65.4	89.5
Virginia	10,650	2,126	20.0	69.0	86.7
West Virginia	4,340	541	12.5	72.2	90.1
North Carolina	12,734	3,273	25.7	61.1	84.8
Kentucky	15,968	2,741	17.2	53.8	79.1
Tennessee	15,057	3,065	20.4	67.1	83.7
APPALACHIAN	58,749	11,746	20.0	62.9	83.7
South Carolina	6,992	1,704	24.4	75.1	89.6
Georgia	15,806	3,155	20.0	69.1	67.5
Florida	14,032	4,148	29.6	67.6	79.9
Alabama	13,655	3,262	23.9	72.2	81.6
SOUTHEAST	50,485	12,269	24.3	70.3	78.4
Mississippi	16,040	4,388	27.4	68.4	83.7
Arkansas	15,694	5,976	38.1	58.1	83.0
Louisiana	9,789	4,232	43.2	63.4	81.5
DELTA STATES	41,523	14,596	35.2	62.8	82.8
Oklahoma	36,008	14,790	41.1	70.4	87.7
Texas	142,567	65,136	45.7	59.0	85.0
SOUTHERN PLAINS	178,575	79,926	44.8	61.1	85.5
Montana	62,918	21,638	34.4	78.5	92.7
Idaho	14,416	5,098	35.4	70.3	90.4
Wyoming	35,477	14,358	40.5	75.4	93.0
Colorado	36,697	13,937	38.0	74.2	87.4
New Mexico	46,792	18,284	39.1	77.7	95.1
Arizona	38,203	11,441	29.9	85.1	97.9
Utah	11,314	3,973	35.1	90.6	93.7
Nevada	10,709	5,475	51.1	56.2	98.3
MOUNTAIN	256,526	94,204	36.7	76.8	93.4
Washington	17,559	7,717	43.9	72.2	90.7
Oregon	18,019	5,838	32.4	75.4	92.4
California	35,723	19,110	53.5	67.1	86.5
PACIFIC	71,301	32,665	45.8	69.8	88.5
48 STATES	1,059,689	397,913	37.5	65.8	88.6

[a]Source: 1969 Census of Agriculture, State Summary Volumes

[b]Derived from Census data with the assumptions that (1) the rented portion of part-owner farms at the state level is the same for all farms as it is for economic classes I - V farms, and (2) all land rented by part owners and tenants is operated by them and not subleased.

[c]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.2 Total value of farm real estate, value of rented portion and percent of total, and value of portion rented from nonfarm landlords and percent of total, 48 states, 1969.

State and Region	Total Market Value of Farmland and Buildings March, 1970[a]	Total Market Value of Farmland and Buildings Rented[b]	Percent of Total Value Rented	Total Market Value of Farmland and Buildings Rented from Nonfarm Landlords[c]	Percent of Total Value Rented from Nonfarm Landlords
	Million Dollars	Million Dollars	Percent	Million Dollars	Percent
New England States[d]	1,803	314	17.4	293	16.3
New York	2,772	581	21.0	527	19.0
New Jersey	1,132	403	35.6	358	31.6
Pennsylvania	3,319	804	24.2	702	21.2
Delaware	336	123	36.6	121	36.0
Maryland	1,793	599	33.4	519	28.9
NORTHEAST	11,154	2,824	25.3	2,520	22.6
Michigan	3,883	923	23.8	815	21.0
Wisconsin	4,201	842	20.0	626	14.9
Minnesota	6,512	2,184	33.5	1,951	30.0
LAKE STATES	14,597	3,949	27.1	3,392	23.2
Ohio	6,819	2,584	37.9	2,341	34.3
Indiana	7,136	3,115	43.7	2,819	39.5
Illinois	14,643	8,435	57.6	7,685	52.5
Iowa	13,733	6,397	46.6	5,636	41.0
Missouri	7,269	2,370	32.6	2,003	27.6
CORN BELT	49,600	22,901	46.2	20,484	41.3
North Dakota	4,045	1,598	39.5	1,459	36.1
South Dakota	3,815	1,389	36.4	1,254	32.9
Nebraska	7,076	3,241	45.8	2,881	40.7
Kansas	7,842	3,906	49.8	3,453	44.0
NORTHERN PLAINS	22,778	10,133	44.5	9,047	39.7
Virginia	3,047	680	22.3	589	19.3
West Virginia	589	84	14.3	76	12.9
North Carolina	4,244	1,265	29.8	1,073	25.3
Kentucky	4,041	831	20.6	657	16.3
Tennessee	4,028	910	22.6	761	18.9
APPALACHIAN	15,949	3,770	23.6	3,156	19.8
South Carolina	1,827	475	26.0	426	23.3
Georgia	3,701	745	20.1	503	13.6
Florida	5,330	1,205	22.6	963	18.1
Alabama	2,725	666	24.4	544	20.0
SOUTHEAST	13,583	3,091	22.8	2,436	17.9
Mississippi	3,746	1,134	30.3	949	25.3
Arkansas	4,081	1,803	44.2	1,497	36.7
Louisiana	3,145	1,456	46.3	1,187	37.7
DELTA STATES	10,972	4,393	40.0	3,633	33.1
Oklahoma	6,214	2,577	41.5	2,260	36.4
Texas	21,170	9,384	44.3	7,977	37.7
SOUTHERN PLAINS	27,384	11,961	43.7	10,237	37.4
Montana	3,748	1,227	32.7	1,137	30.3
Idaho	2,545	881	34.6	796	31.3
Wyoming	1,445	531	36.7	494	34.2
Colorado	3,471	1,314	37.9	1,149	33.1
New Mexico	1,959	734	37.5	698	35.6
Arizona	2,664	1,213	45.5	1,187	44.6
Utah	1,040	333	32.0	312	30.0
Nevada	571	204	35.7	201	35.2
MOUNTAIN	17,443	6,437	36.9	5,974	34.2
Washington	3,930	1,450	36.9	1,315	33.5
Oregon	2,707	802	29.6	741	27.4
California	16,956	7,476	44.1	6,467	38.1
PACIFIC	23,593	9,728	41.2	8,523	36.1
48 STATES	207,053	79,187	38.2	69,402	33.5

[a] Based on estimates of current Market Value provided in the 1969 Census of Agriculture.

[b] Value of Land and Buildings rented by tenants is taken directly from Census values. Value for the rented share of part-owner land and buildings derived by assuming state per-acre values of owned and rented land are equal; therefore, the percent of land acreage rented can be used as a proxy for the value breakdown of owned and rented land in part-owner farms. Since the above data is available for Economic Classes I - V farms only, value and total acreage rented of "other farms" was assumed to be a residual, with the value of rented land in this category again derived using the proportion of acreage rented as a proxy.

[c] Based on assumption that per-acre value of farmland rented from farm and nonfarm landlords is identical. Consequently the percent of land acreage rented from nonfarm landlords is used to estimate value at the State level and then summed to regions.

[d] New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.3 Percent of: farm numbers, land in farms, and market value of land and buildings for economic classes I - V farms, by tenure, 48 states, 1969.[a]

State and Region	Percent of Farm Numbers			Percent of Land in Farms[b]			Percent of Total Market Value of Land and Buildings[b]		
	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants
	. . . .	Percent		. . . .	Percent		. . . .	Percent	
New England[c] States	61.9	32.8	5.3	52.3	44.3	3.4	45.8	49.0	5.2
New York	58.7	35.9	5.3	48.9	46.8	4.3	42.7	49.5	7.8
New Jersey	57.3	28.4	14.3	38.5	45.7	15.7	35.8	45.4	18.8
Pennsylvania	60.5	29.6	9.9	50.7	41.0	8.3	44.1	43.4	12.4
Delaware	55.1	31.4	13.5	31.7	54.9	13.4	35.2	50.1	14.7
Maryland	57.6	25.5	16.9	42.8	39.5	17.7	41.9	39.5	18.7
NORTHEAST	59.6	31.6	8.8	48.6	44.1	7.3	42.5	45.6	11.9
Michigan	59.8	34.0	6.2	46.8	47.4	5.8	43.0	49.7	7.3
Wisconsin	68.5	23.7	7.7	60.2	32.1	7.7	53.9	36.4	9.7
Minnesota	54.9	32.1	12.9	41.5	46.3	12.2	39.0	46.7	14.2
LAKE STATES	60.9	29.5	9.6	48.2	42.1	9.6	44.3	44.4	11.3
Ohio	53.1	31.6	15.3	38.1	45.1	16.8	34.1	47.1	18.8
Indiana	51.3	33.4	15.3	33.9	48.6	17.5	30.1	50.5	19.3
Illinois	37.5	34.2	28.4	24.7	46.0	29.4	21.6	45.3	33.1
Iowa	46.2	27.8	25.9	34.4	39.3	26.3	31.5	40.2	28.3
Missouri	61.0	27.9	11.2	48.1	40.7	11.2	41.0	43.9	15.1
CORN BELT	48.9	30.7	20.4	35.6	43.1	21.3	29.8	44.6	25.5
North Dakota	35.1	51.1	13.7	25.0	64.5	10.5	24.4	64.1	11.5
South Dakota	33.6	49.2	17.2	21.0	68.2	10.8	22.7	64.1	13.2
Nebraska	34.5	40.2	25.3	22.0	59.7	18.4	22.0	55.3	22.6
Kansas	31.5	49.8	18.7	17.4	66.5	16.2	18.1	65.5	16.4
NORTHERN PLAINS	33.5	47.1	19.4	21.2	64.7	14.2	21.2	61.8	16.9
Virginia	57.6	31.2	11.2	51.5	41.4	7.1	46.8	44.3	8.9
West Virginia	69.7	25.6	4.7	61.2	34.5	4.3	56.9	36.7	6.4
North Carolina	46.8	31.4	21.8	45.0	42.8	12.2	37.9	45.6	16.5
Kentucky	66.6	21.1	12.3	62.2	28.0	9.8	56.6	30.8	12.6
Tennessee	63.5	27.4	9.1	54.2	37.6	8.2	43.4	41.6	10.0
APPALACHIAN	58.5	27.3	14.2	54.2	36.7	9.2	47.6	40.2	12.2
South Carolina	45.2	38.5	16.4	42.2	51.3	6.6	38.0	53.5	8.5
Georgia	60.8	28.2	11.0	53.1	40.2	6.7	51.6	41.6	6.8
Florida	73.0	19.5	7.5	52.3	37.8	9.9	63.7	27.9	8.4
Alabama	56.6	33.5	9.9	45.5	47.3	7.2	43.0	48.8	8.2
SOUTHEAST	59.4	29.7	10.9	49.6	42.6	7.8	53.5	38.5	7.9
Mississippi	56.0	33.9	10.0	40.6	49.4	10.0	36.6	51.0	12.4
Arkansas	52.2	30.9	16.9	36.7	45.1	18.3	30.2	47.0	22.8
Louisiana	40.2	39.8	20.1	32.2	50.8	17.0	27.8	50.5	21.7
DELTA STATES	50.5	34.1	15.4	37.0	48.1	15.0	31.6	49.3	19.2
Oklahoma	41.0	43.9	15.1	26.2	61.7	12.1	25.7	61.0	13.3
Texas	43.7	36.6	19.7	28.2	52.8	19.0	29.0	51.5	19.4
SOUTHERN PLAINS	42.9	38.8	18.3	27.8	54.5	17.7	28.3	53.7	18.0
Montana	36.4	52.0	11.7	15.8	76.6	7.7	21.4	70.5	8.1
Idaho	53.9	34.3	11.8	29.6	61.1	9.4	34.9	53.4	11.7
Wyoming	36.6	49.6	13.8	8.8	82.7	8.4	16.4	74.4	9.2
Colorado	42.6	40.6	16.8	20.5	69.7	9.8	27.3	57.8	14.9
New Mexico	40.2	46.5	13.3	15.1	74.9	10.0	22.3	65.9	11.8
Arizona	49.0	36.0	15.1	6.5	83.8	9.7	20.2	61.4	18.4
Utah	54.5	40.0	5.5	25.1	72.1	2.8	35.7	60.2	4.2
Nevada	69.1	23.4	7.4	19.6	56.4	24.0	43.6	43.0	13.4
MOUNTAIN	44.8	42.5	12.7	16.1	74.6	9.3	25.8	62.4	11.8
Washington	55.7	33.3	11.0	17.9	68.0	14.1	33.2	53.1	13.7
Oregon	60.3	31.4	8.3	30.4	62.5	7.2	38.5	53.1	8.4
California	62.6	23.3	14.1	23.2	59.0	17.8	37.6	44.8	17.6
PACIFIC	60.6	27.1	12.3	23.8	61.9	14.3	37.0	47.0	16.0
48 STATES	50.8	33.5	15.6	28.8	57.5	13.7	33.4	49.3	17.3

[a] Source, 1969 Census of Agriculture, State Summary Volumes, Table 24.

[b] Percentages may not add to 100.0 due to rounding.

[c] New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.4 Average farm size and average market value of land and buildings per farm for economic classes I - V farms, by tenure, 48 states, 1969.[a]

State and Region	Average Farm Size						Market Value of Land and Buildings per Farm			
	Full Owner	Part Owner			Tenant	All Farms	Full Owner	Part Owner	Tenant	All Farms
		Owned	Rented	Total						
	Acres						$1,000			
New England States[b]	202	230	92	322	153	238	57.1	115.4	75.5	77.1
New York	203	213	104	317	194	243	48.5	91.9	27.1	66.7
New Jersey	105	128	123	251	171	155	104.0	266.2	218.9	166.4
Pennsylvania	148	152	93	245	148	177	50.4	101.5	86.9	69.2
Delaware	127	203	183	386	219	221	70.1	175.5	100.1	109.9
Maryland	154	165	156	321	217	207	95.5	203.2	145.2	131.4
NORTHEAST	172	188	106	294	176	211	58.6	118.4	111.6	82.2
Michigan	162	165	124	289	192	207	49.0	99.3	79.7	68.0
Wisconsin	182	185	95	280	208	207	38.0	74.0	60.6	48.3
Minnesota	224	235	193	428	279	297	48.3	98.8	74.7	67.9
LAKE STATES	194	203	147	350	246	245	44.2	91.6	71.2	60.8
Ohio	150	140	157	297	229	209	54.5	126.2	104.0	84.8
Indiana	152	144	192	336	263	230	54.9	141.6	117.9	93.5
Illinois	187	159	222	381	293	283	79.9	184.0	162.1	138.8
Iowa	196	178	193	371	266	263	70.0	148.7	111.9	102.8
Missouri	247	230	227	457	314	313	47.8	111.9	96.0	71.0
CORN BELT	192	171	201	372	275	264	61.4	146.5	125.8	100.6
North Dakota	691	702	524	1,226	745	972	65.4	118.1	78.6	94.2
South Dakota	611	830	527	1,357	613	978	59.0	113.7	67.0	87.3
Nebraska	448	598	448	1,046	512	705	68.7	148.0	96.2	107.5
Kansas	381	413	511	924	597	692	62.0	142.5	94.7	108.2
NORTHERN PLAINS	508	603	501	1,104	587	804	64.2	133.0	88.4	101.3
Virginia	228	200	138	338	162	255	59.9	104.6	58.5	73.7
West Virginia	305	284	184	468	318	347	39.7	69.7	65.6	48.6
North Carolina	140	108	90	198	81	145	39.0	67.0	36.5	48.2
Kentucky	177	147	104	251	151	190	42.3	72.7	51.2	49.8
Tennessee	185	153	144	297	196	217	43.5	86.5	62.7	57.0
APPALACHIAN	182	148	116	264	127	196	44.2	80.1	46.8	54.4
South Carolina	279	222	176	398	120	299	63.6	105.2	39.4	75.6
Georgia	293	285	195	480	204	336	64.8	112.8	47.2	76.4
Florida	454	539	687	1,226	835	633	195.4	320.2	249.8	223.8
Alabama	269	256	216	472	244	334	48.4	92.9	52.7	63.8
SOUTHEAST	323	294	260	554	277	386	91.0	130.9	73.4	101.0
Mississippi	316	337	299	636	432	436	68.5	157.7	129.7	104.9
Arkansas	267	244	313	557	413	381	50.4	158.8	141.0	104.4
Louisiana	327	209	312	521	345	408	88.1	161.7	137.5	127.3
DELTA STATES	297	265	308	573	395	406	68.9	159.3	137.4	110.2
Oklahoma	393	428	438	866	495	616	65.2	144.7	92.3	104.2
Texas	696	718	838	1,556	1,040	1,078	100.0	212.1	148.2	150.5
SOUTHERN PLAINS	609	619	703	1,322	906	940	90.1	189.2	134.4	136.6
Montana	1,214	2,616	1,513	4,129	1,840	2,802	98.5	226.4	115.9	167.0
Idaho	357	658	499	1,157	515	650	77.1	185.2	118.4	119.0
Wyoming	1,038	4,370	2,814	7,184	2,624	4,303	82.5	277.4	122.8	184.7
Colorado	760	1,586	1,135	2,721	922	1,583	93.8	208.9	129.5	146.5
New Mexico	1,839	4,066	3,832	7,898	3,696	4,902	115.3	295.4	186.0	208.4
Arizona	539	3,172	6,219	9,391	2,596	4,032	182.5	756.5	539.9	442.8
Utah	521	1,141	894	2,035	577	1,130	66.9	153.4	77.9	102.1
Nevada	1,649	6,019	7,960	13,979	18,669	5,802	198.7	579.3	567.1	315.2
MOUNTAIN	826	2,267	1,783	4,050	1,685	2,304	95.6	244.5	154.1	166.3
Washington	215	653	711	1,364	860	669	88.2	235.6	183.9	147.8
Oregon	487	1,123	798	1,921	837	967	85.4	226.2	136.5	133.9
California	234	591	1,003	1,594	798	630	173.2	555.4	360.6	288.7
PACIFIC	276	722	875	1,597	816	701	138.8	393.4	295.9	227.3
48 STATES	299	473	433	906	463	528	67.9	151.9	114.5	103.3

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24.

[b]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.5 Average per farm value of agricultural products sold and distribution of total receipts for economic classes I - V farms, by tenure, by farm production regions, 1969.[a]

Region	Average market value of all agricultural products sold				Percent of total market value			
	Full owner	Part owner	Tenant	All farms	Full owner	Part owner	Tenant	
	$1,000				Percent[b]			
Northeast	24.0	38.7	27.4	29.9	49.4	42.2	8.3	
Lake States	15.2	26.1	19.1	18.8	49.3	40.9	9.8	
Corn Belt	16.5	31.7	25.1	22.9	35.2	42.5	22.3	
Northern Plains	21.5	31.9	21.6	26.4	27.3	56.8	15.9	
Appalachian	11.9	20.0	13.2	14.3	48.8	38.2	13.0	
Southeast	27.2	36.6	24.3	29.7	54.4	36.6	8.9	
Delta	22.2	30.3	26.1	25.6	43.9	40.5	15.7	
Southern Plains	21.4	28.1	21.3	23.9	38.2	45.4	16.3	
Mountain	34.3	49.4	93.7	48.3	31.9	43.4	24.7	
Pacific	34.7	89.5	82.9	55.5	37.9	43.8	18.4	
48 States	20.1	33.9	27.8	25.9	39.4	43.9	16.8	

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 24.

[b]Percentages may not add to 100.0 due to rounding.

Table A.6 Tenure characteristics by economic class for economic classes, by farm production regions, 1969.[a]

Region	I			II			III			IV			V		
	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants
	Percent			Percent			Percent			Percent			Percent		
Northeast	44.5	47.8	7.7	49.1	40.8	10.1	61.1	29.7	9.2	72.0	19.7	8.4	77.4	15.1	7.6
Lake States	37.5	53.4	9.1	45.9	42.6	11.4	58.7	30.8	10.4	71.2	19.9	8.9	79.4	13.3	7.3
Corn Belt	25.9	50.1	24.1	31.2	41.4	27.4	45.6	31.7	22.7	62.7	21.0	16.2	74.5	13.9	11.6
Northern Plains	17.5	68.1	14.1	20.2	61.4	18.4	29.8	50.1	20.0	45.1	33.8	21.1	58.5	20.1	21.4
Appalachian	42.8	47.8	9.4	42.0	42.7	15.3	47.5	34.3	18.2	60.1	24.4	15.5	70.5	17.9	11.6
Southeast	54.6	38.4	7.0	54.6	37.2	8.3	52.8	34.9	12.3	59.8	27.0	13.2	68.4	19.7	11.9
Delta	42.8	42.3	14.9	41.4	41.3	17.3	39.9	41.4	18.7	51.8	33.2	14.9	63.3	23.3	13.4
Southern Plains	26.2	57.6	16.2	27.6	53.1	19.3	33.0	47.2	19.8	45.2	36.2	18.6	58.0	24.5	17.5
Mountain	28.8	59.2	12.0	33.2	53.4	13.4	42.3	44.7	13.1	55.9	31.6	12.5	65.7	21.7	12.6
Pacific	39.8	43.4	16.8	51.7	34.8	13.5	62.3	25.8	11.8	73.3	16.9	9.9	78.4	12.8	8.8
48 States	33.2	51.3	15.4	36.4	45.5	18.1	45.9	36.8	17.3	59.3	25.8	15.0	69.4	18.0	12.6

[a] Source: 1969 Census of Agriculture, State Summary Volumes, Table 27.

Table A.7 Percent distributions of farm numbers, land in farms, and total market value of land and buildings by age of operator for economic classes I - V farms, by farm production regions, 1969.[a]

Region	Farm Numbers[b]						Land in Farms[b]						Total Market Value of Land and Buildings[b]					
	Less than 25	25-34	35-44	45-54	55-64	65 or more	Less than 25	25-34	35-44	45-54	55-64	65 or more	Less than 25	25-34	35-44	45-54	55-64	65 or more
	Percent						Percent						Percent					
Northeast	2.0	10.1	21.5	28.8	24.2	13.4	1.8	9.9	22.8	30.5	23.3	11.7	1.7	9.9	23.4	30.1	23.2	11.6
Lake States	2.1	11.6	22.2	29.3	24.7	10.1	1.8	12.1	24.6	30.9	22.7	7.9	1.9	12.7	25.6	30.8	21.8	7.3
Corn Belt	2.3	12.0	20.7	28.0	25.2	12.0	1.8	12.1	23.1	30.4	23.5	9.1	1.8	12.7	24.1	30.9	22.6	7.9
Northern Plains	2.2	11.4	20.9	27.5	26.1	11.9	1.3	10.3	23.5	29.9	24.8	10.3	1.4	11.1	24.0	30.0	24.4	9.0
Appalachian	1.5	9.0	19.0	28.2	27.7	14.7	1.1	8.3	19.5	29.1	27.2	14.9	1.2	9.3	20.7	29.8	25.8	13.3
Southeast	1.4	8.8	19.0	28.5	28.2	14.2	1.2	7.7	19.5	29.7	26.7	15.2	1.0	8.1	21.3	29.7	26.4	13.5
Delta	1.4	10.0	19.3	28.2	28.9	12.2	1.0	10.3	21.1	29.6	26.7	11.3	1.1	11.5	22.5	30.3	25.5	9.2
Southern Plains	1.6	8.7	17.6	26.0	29.0	17.1	0.9	8.0	18.3	29.5	25.6	17.6	1.2	9.1	20.2	29.0	26.1	14.4
Mountain	1.4	9.8	20.7	29.3	26.1	12.6	0.6	7.7	21.8	31.6	24.0	14.2	1.0	8.6	22.1	32.9	23.5	11.9
Pacific	1.0	7.8	18.9	30.1	27.2	15.1	0.7	7.8	19.1	31.8	25.1	15.4	0.7	7.6	19.3	33.3	25.4	13.8
48 States	1.9	10.4	20.2	28.2	26.4	13.0	1.1	9.2	21.5	30.4	24.7	13.1	1.4	10.4	22.4	30.8	24.2	10.8

[a] Source: 1969 Census of Agriculture, State Summary Volumes, Table 25.

[b] Percentages may not add to 100.0 due to rounding.

Table A.8 Average acreage size of farm and average market value of land and buildings by age of operator for economic classes I - V farms, by farm production regions, 1969.[a]

Region	Average Farm Size						Average Value of Land and Buildings per Farm					
	Less than 25	25 - 34	35 - 44	45 - 54	55 - 64	65 or more	Less than 25	25 - 34	35 - 44	45 - 54	55 - 64	65 or more
	Acres						$1,000					
Northeast	184	206	223	223	202	184	70.2	81.1	89.6	86.2	78.6	70.8
Lake States	211	256	271	258	224	191	54.6	66.2	69.8	64.1	53.5	43.9
Corn Belt	204	267	295	287	246	200	81.6	107.1	117.3	111.2	90.3	66.2
Northern Plains	458	729	903	871	764	695	65.4	99.3	116.1	110.5	94.6	77.2
Appalachian	139	180	202	202	192	199	43.5	56.3	59.3	57.4	50.6	49.2
Southeast	326	341	395	403	365	414	70.0	93.2	113.3	105.1	94.6	96.4
Delta	282	416	445	426	375	377	81.4	126.2	128.8	118.2	97.2	83.6
Southern Plains	521	857	981	1,066	832	968	100.1	142.5	157.3	152.0	123.2	115.3
Mountain	1,039	1,795	2,426	2,483	2,118	2,610	119.5	145.9	177.2	186.5	149.5	157.4
Pacific	505	705	711	741	646	715	152.9	221.5	232.3	251.7	211.8	208.1
48 States	312	468	562	570	495	530	75.6	103.2	115.0	112.8	94.9	86.0

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 25.

Table A.9 Tenure characteristics by age of operator for economic classes I - V farms, by farm production region, 1969.[a]

Region	Less than 25[b]			25-34[b]			35-44[b]			45-54[b]			55-64[b]			65 or more[b]		
	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants	Full Owners	Part Owners	Tenants
	Percent			Percent			Percent			Percent			Percent			Percent		
Northeast	34.1	26.7	39.3	43.9	32.8	23.4	51.5	37.4	11.1	58.1	35.6	6.2	66.9	29.4	3.7	77.1	20.1	2.8
Lake States	33.3	23.3	43.4	42.8	33.1	24.1	51.9	37.0	11.1	60.1	33.4	6.5	70.8	25.0	4.1	83.9	13.5	2.6
Corn Belt	25.2	14.1	60.7	32.5	28.9	38.6	38.5	37.5	23.9	45.0	37.4	17.7	58.0	30.1	12.0	76.5	16.2	7.3
Northern Plains	18.1	18.6	63.3	19.5	38.8	41.7	21.5	55.6	23.0	29.1	56.0	14.9	42.2	47.8	10.0	59.9	32.4	7.7
Appalachian	35.8	20.0	44.1	40.6	30.8	28.6	48.4	34.9	16.7	54.3	32.8	12.9	63.8	26.0	10.2	79.1	14.2	6.8
Southeast	36.1	24.1	39.8	42.6	33.6	23.8	51.6	35.6	12.8	56.5	34.2	9.3	62.0	30.0	8.0	77.9	16.9	5.2
Delta	27.4	25.0	47.6	31.7	36.0	32.3	42.4	40.1	17.4	48.6	38.6	12.9	55.7	33.7	10.6	70.3	22.9	6.8
Southern Plains	22.3	17.8	60.0	25.2	35.8	38.9	33.2	44.7	22.1	38.7	45.9	15.4	46.4	40.9	12.7	62.1	29.6	8.3
Mountain	32.3	19.0	48.7	33.3	36.3	30.4	37.9	46.8	15.4	42.5	48.0	9.5	49.9	42.9	7.2	59.0	36.0	5.0
Pacific	35.5	16.3	48.2	43.1	28.8	28.1	52.5	32.2	15.3	57.9	31.3	10.8	65.6	26.5	7.9	76.0	18.9	5.1
48 States	27.8	18.9	53.3	34.0	32.7	33.2	41.3	40.3	18.4	47.9	39.3	12.8	57.7	32.9	9.4	72.7	21.0	6.2

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 25.

[b]Percentages may not add to 100.0 due to rounding

Table A.10 Percent of land in farms rented by age of operator for economic classes I - V farms, 48 states, 1969.[a]

State and Region	Percent of Land in Farms Rented					
	Less than 25	25 - 34	35 - 44	45 - 54	55 - 64	65 or more
	. . . . . Percent					
New England[b] States	39.3	28.3	17.9	16.0	13.2	8.9
New York	38.7	30.2	23.3	18.9	15.4	10.9
New Jersey	76.9	62.2	46.8	36.8	28.6	27.0
Pennsylvania	48.0	39.8	28.7	23.2	16.5	11.3
Delaware	45.5	56.4	54.5	36.1	28.8	27.1
Maryland	63.9	62.8	48.4	36.5	27.2	16.9
NORTHEAST	45.2	37.8	28.0	22.5	17.4	12.3
Michigan	54.9	45.3	32.0	24.6	20.9	11.7
Wisconsin	48.8	35.2	22.2	16.2	11.0	7.0
Minnesota	64.6	53.6	39.7	31.1	21.5	15.1
LAKE STATES	57.1	46.7	33.0	25.3	18.3	11.8
Ohio	71.2	59.6	50.2	40.4	30.4	17.5
Indiana	76.4	63.4	53.0	45.5	34.9	20.3
Illinois	80.6	73.6	66.4	57.5	45.6	29.0
Iowa	78.7	68.5	56.1	45.2	32.0	17.8
Missouri	61.3	52.2	40.2	32.1	23.7	12.2
CORN BELT	74.2	64.7	54.3	44.9	33.3	18.7
North Dakota	66.8	61.5	46.1	35.3	27.3	18.7
South Dakota	68.7	57.5	45.6	36.1	27.6	21.7
Nebraska	71.7	65.1	56.3	45.1	31.4	21.6
Kansas	79.3	70.9	63.8	55.9	43.8	33.2
NORTHERN PLAINS	71.7	63.9	53.1	43.6	33.2	24.8
Virginia	42.9	42.1	33.4	26.9	19.1	11.4
West Virginia	30.0	34.5	25.8	18.8	14.5	9.4
North Carolina	53.6	53.1	42.5	33.6	24.2	11.9
Kentucky	46.5	39.1	29.0	21.7	16.2	7.3
Tennessee	46.2	45.2	35.5	28.0	22.1	10.1
APPALACHIAN	46.5	44.0	34.5	27.0	19.9	10.0
South Carolina	36.8	45.1	39.2	31.9	23.4	12.1
Georgia	47.7	41.8	32.9	22.8	17.7	9.1
Florida	74.4	49.8	38.7	30.4	25.9	21.0
Alabama	51.5	45.5	35.3	31.9	26.0	14.0
SOUTHEAST	59.1	45.6	36.2	28.6	22.9	15.0
Mississippi	49.5	40.9	42.5	34.6	28.2	17.0
Arkansas	66.9	64.8	53.0	43.1	36.0	21.1
Louisiana	75.0	67.2	59.5	46.9	41.8	26.2
DELTA STATES	63.8	61.2	51.0	41.0	34.5	20.7
Oklahoma	72.6	62.1	53.8	45.3	37.4	25.9
Texas	72.0	64.7	59.7	48.3	45.4	32.5
SOUTHERN PLAINS	72.2	64.2	58.4	47.7	43.7	31.4
Montana	47.9	48.5	43.1	36.7	29.8	23.2
Idaho	72.5	51.5	39.8	35.0	31.0	31.1
Wyoming	21.9	52.8	48.6	43.5	36.3	29.8
Colorado	46.5	50.3	47.6	40.3	34.3	25.7
New Mexico	57.9	54.6	50.2	48.0	47.8	35.0
Arizona	34.8	71.4	64.1	68.4	62.6	64.9
Utah	20.7	58.8	34.6	34.5	34.1	27.7
Nevada	42.9	36.8	75.7	44.2	57.4	37.9
MOUNTAIN	48.1	52.5	49.1	42.7	38.6	32.5
Washington	69.6	69.2	55.5	52.7	41.9	31.8
Oregon	50.6	42.4	40.9	34.2	28.3	24.7
California	72.2	66.4	65.0	57.0	50.5	45.4
PACIFIC	68.0	60.2	56.5	50.0	43.2	38.4
48 STATES	64.6	58.1	49.8	41.7	34.8	26.8

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 25. Calculated assuming all land that is rented by part owners and tenants is operated and not subleased.

[b]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.11 Percent distribution of land in farms by acreage size class of economic classes I - V farms, by farm production region, 1969.[a]

Region	Percent of Land in Farms[b]											
	1 - 9 acres	10-49 acres	50-69 acres	70-99 acres	100-139 acres	140-179 acres	180-219 acres	220-259 acres	260-499 acres	500-999 acres	1,000-1,999 acres	2,000 or more acres
	Percent											
Northeast	0.1	1.3	1.5	3.6	7.9	9.1	9.3	8.7	32.6	17.4	5.7	2.8
Lake States	0.1	0.5	0.6	3.1	6.2	11.1	9.1	9.8	34.4	17.2	5.5	2.6
Corn Belt	c	0.5	0.6	2.8	5.0	8.3	7.3	8.5	36.4	22.8	5.9	1.9
Northern Plains	c	c	c	0.2	0.3	1.5	0.8	1.6	12.9	23.3	25.2	33.9
Appalachian	0.1	2.2	2.6	5.4	8.8	8.5	7.8	6.7	24.5	18.3	9.1	6.0
Southeast	c	1.1	1.0	2.1	3.3	3.4	3.5	3.2	14.9	17.4	14.7	35.4
Delta	c	0.6	0.7	2.0	3.1	3.8	3.7	3.7	17.6	22.0	19.8	23.1
Southern Plains	c	0.1	0.1	0.4	0.7	1.5	1.2	1.4	9.7	15.4	14.7	54.7
Mountain	c	0.1	0.1	0.2	0.3	0.5	0.3	0.4	2.2	4.4	8.8	82.9
Pacific	c	1.1	0.6	0.9	1.1	1.2	1.0	0.9	4.9	7.8	11.4	69.0
48 States	c	0.4	0.4	1.2	2.2	3.3	2.8	3.1	14.9	15.4	13.1	42.9

[a]Source: 1969 Census of Agriculture, State Summary Volumes Table 26.

[b]Percentages may not add to 100.0 due to rounding.

[c]Less than 0.1 percent.

Table A.12 Average market value of farmland and buildings per farm by acreage size class of economic classes I - V farms by farm production region, 1969.[a]

Region	Average Market Value of Farmland and Buildings Per Farm											
	1 - 9 acres	10-49 acres	50-69 acres	70-99 acres	100-139 acres	140-179 acres	180-219 acres	220-259 acres	260-499 acres	500-999 acres	1,000-1,999 ac.	2,000 ac. or more
	$1,000											
Northeast	30.5	44.8	48.7	56.3	57.3	65.4	75.4	77.8	108.2	197.9	439.0	1,152.8
Lake States	18.1	26.1	28.5	28.6	34.9	42.0	50.4	58.3	81.7	142.6	263.2	591.2
Corn Belt	16.1	26.8	29.3	36.3	45.3	62.1	74.7	91.1	135.3	237.9	425.8	939.9
Northern Plains	11.6	19.0	21.5	25.7	32.2	38.4	49.8	56.0	73.6	106.1	155.3	311.8
Appalachian	13.6	20.5	25.1	30.9	35.1	42.6	52.0	60.4	86.2	162.8	321.0	719.9
Southeast	18.4	28.4	31.3	35.1	40.4	48.1	55.1	64.5	92.8	165.3	332.9	1,196.4
Delta	16.2	21.5	25.0	30.5	37.6	43.8	52.5	64.0	92.4	180.1	365.4	968.3
Southern Plains	14.6	27.6	30.2	32.7	38.4	46.1	53.3	61.3	87.1	150.8	252.4	619.5
Mountain	22.3	40.4	51.2	52.4	63.2	71.0	84.4	89.4	104.9	130.3	166.1	407.5
Pacific	42.8	73.1	110.7	123.8	145.7	160.2	187.7	214.6	256.7	363.2	463.1	1,126.3
48 States	21.3	36.9	38.2	39.9	45.5	54.6	65.5	75.9	105.8	166.1	243.6	571.6

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 26.

Table A.13 Percent of land in farms rented by acreage size class of economic classes I - V farms, by farm production region, 1969.[a]

State and Region	Percent of Land in Farms Rented[b]							
	100-139 acres	140-179 acres	180-219 acres	220-259 acres	260-499 acres	500-999 acres	1,000-1,999 ac.	2,000 acres or more
	Percent							
New England States[c]	16.4	15.8	16.7	17.0	16.5	16.9	14.3	10.5
New York	13.4	14.3	16.4	17.4	20.7	24.4	23.5	28.3
New Jersey	26.5	29.2	42.5	42.4	45.4	48.4	52.8	38.1
Pennsylvania	18.9	21.1	24.2	24.7	26.9	27.2	33.0	20.9
Delaware	26.3	31.6	33.3	38.1	41.1	49.0	52.4	23.5
Maryland	23.5	29.6	30.1	33.7	39.9	45.1	48.4	44.2
NORTHEAST	18.1	19.6	21.6	22.3	24.1	27.0	29.4	25.2
Michigan	22.4	17.5	21.6	22.9	31.4	38.7	36.4	34.6
Wisconsin	11.5	13.7	17.0	18.7	21.5	25.4	27.7	35.0
Minnesota	15.2	19.2	21.5	27.8	34.7	40.7	43.5	49.9
LAKE STATES	15.2	16.7	19.6	23.8	30.3	37.4	40.3	45.6
Ohio	22.6	27.0	34.1	39.6	48.8	55.6	51.7	46.7
Indiana	21.7	27.9	34.5	41.4	52.9	61.3	55.8	26.8
Illinois	29.9	40.4	45.3	53.7	62.5	65.0	58.1	42.2
Iowa	24.2	34.6	38.4	45.1	52.8	54.1	47.1	36.0
Missouri	15.0	17.6	20.3	22.2	30.2	40.2	41.3	35.6
CORN BELT	22.8	30.9	35.2	41.9	50.4	54.2	48.5	36.9
North Dakota	45.8	32.3	36.0	30.6	31.9	35.6	40.8	39.8
South Dakota	35.2	31.6	36.1	37.6	43.9	42.7	37.9	33.8
Nebraska	35.9	38.1	43.1	47.1	51.8	50.3	46.5	37.6
Kansas	31.4	29.3	38.2	37.5	46.6	54.8	57.7	55.7
NORTHERN PLAINS	34.3	33.6	39.8	41.3	45.6	46.1	46.1	40.5
Virginia	20.0	20.2	21.9	22.5	25.0	27.1	28.2	19.1
West Virginia	11.8	11.2	11.8	16.0	17.1	20.0	22.7	17.8
North Carolina	30.4	29.9	32.6	32.6	34.5	34.2	32.7	17.5
Kentucky	14.2	16.8	17.7	22.0	23.8	28.2	31.8	26.1
Tennessee	16.9	18.7	20.2	21.5	26.1	33.7	41.1	39.3
APPALACHIAN	19.8	20.6	21.9	23.9	26.3	29.7	32.3	24.8
South Carolina	28.6	27.4	28.8	28.8	29.0	31.1	32.8	24.3
Georgia	22.3	21.4	23.1	23.3	24.8	26.0	25.5	17.1
Florida	17.4	16.7	19.1	17.6	22.2	25.1	30.2	35.5
Alabama	25.8	24.9	27.0	30.9	31.3	33.2	32.4	25.7
SOUTHEAST	23.7	22.7	24.6	25.6	26.9	28.7	29.5	29.8
Mississippi	20.2	20.2	21.6	23.9	28.6	34.7	41.9	36.9
Arkansas	26.7	28.9	31.7	35.0	42.1	50.5	52.5	44.0
Louisiana	37.7	39.9	45.9	45.9	52.7	58.4	53.2	38.9
DELTA STATES	27.2	28.2	31.5	33.4	40.0	47.2	48.7	39.5
Oklahoma	28.1	29.8	31.3	32.7	40.2	46.3	48.1	43.9
Texas	30.1	33.1	35.2	42.3	44.0	50.1	50.2	48.7
SOUTHERN PLAINS	29.6	31.9	34.2	39.0	42.7	48.9	49.6	48.3
Montana	27.7	23.5	32.9	29.0	31.3	33.9	35.5	36.3
Idaho	29.2	30.4	32.3	30.7	31.3	32.8	35.6	39.1
Wyoming	29.2	30.8	36.8	35.8	29.5	36.2	34.9	41.8
Colorado	35.5	35.0	44.4	40.8	39.3	37.9	39.1	39.2
New Mexico	30.0	31.7	33.3	38.5	37.4	40.2	38.3	47.2
Arizona	31.8	28.6	33.3	31.8	40.8	41.3	50.0	67.2
Utah	22.9	23.1	24.2	23.1	22.9	22.0	26.1	38.1
Nevada	20.0	51.4	50.0	50.0	52.0	50.7	52.5	50.4
MOUNTAIN	29.0	31.0	34.9	33.4	34.0	35.5	37.0	43.4
Washington	22.0	20.5	25.3	24.7	34.1	46.9	53.4	54.6
Oregon	20.0	21.3	24.7	25.0	29.2	32.1	35.5	34.7
California	31.4	35.5	39.8	39.2	45.8	50.2	51.9	59.6
PACIFIC	26.4	27.8	32.0	31.8	38.4	45.3	49.2	52.0
48 States	21.9	26.0	28.9	33.8	40.5	44.6	44.3	44.3

[a] Source: 1969 Census of Agriculture, State Summary Volumes, Table 26. Calculated assuming all land that is rented by part owners and tenants is operated and not subleased.

[b] Units of less than 100 acres were excluded due to (1) small percentage of land represented by these farms (2 percent in the aggregate) and (2) the ambiguity of land leasing among these size classes; i.e., many small units are leasing land and, in turn, subleasing.

[c] New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.14 Land in farms by economic class and distribution of land among economic classes, 48 states, 1969.[a]

State and Region	Land in Farms					Percent Distribution of Land Among Classes				
	I	II	III	IV	V	I	II	III	IV	V
	1,000 Acres					Percent				
New England States[b]	1,484	1,376	764	416	397	33.4	31.0	17.2	9.4	8.9
New York	2,337	2,878	1,678	808	671	27.9	34.4	20.0	9.7	8.0
New Jersey	413	193	102	82	86	47.1	22.0	11.6	9.4	9.8
Pennsylvania	1,445	1,974	1,466	965	879	21.5	29.3	21.8	14.3	13.1
Delaware	316	110	80	67	49	50.8	17.7	12.9	10.8	7.9
Maryland	867	570	381	330	256	36.1	23.7	15.8	13.7	10.6
NORTHEAST	6,862	7,101	4,471	2,668	2,338	29.3	30.3	19.1	11.4	10.0
Michigan	1,719	2,096	1,968	1,774	1,587	18.8	22.9	21.5	19.4	17.4
Wisconsin	2,393	4,737	4,774	2,588	1,447	15.0	29.7	30.0	16.2	9.1
Minnesota	4,601	7,368	7,518	4,494	2,439	17.4	27.9	28.5	17.0	9.2
LAKE STATES	8,713	14,201	14,260	8,856	5,473	16.9	27.6	27.7	17.2	10.6
Ohio	2,642	3,449	3,151	2,542	2,041	19.1	24.9	22.8	18.4	14.8
Indiana	3,989	4,193	3,320	2,304	1,690	25.7	27.1	21.4	14.9	10.9
Illinois	8,981	8,821	6,013	3,033	1,615	31.6	31.0	21.1	10.7	5.7
Iowa	1',316	10,505	7,076	3,203	1,368	31.8	32.4	21.8	9.9	4.2
Missouri	4,908	6,011	6,420	5,491	4,260	18.1	22.2	23.7	20.3	15.7
CORN BELT	30,836	32,979	25,980	16,573	10,974	26.3	28.1	22.1	14.1	9.4
North Dakota	6,085	12,441	14,065	5,932	1,852	15.1	30.8	34.8	14.7	4.6
South Dakota	12,104	12,608	9,647	3,769	1,457	30.6	31.9	24.4	9.5	3.7
Nebraska	17,762	12,115	9,069	4,045	1,668	39.8	27.1	20.3	9.1	3.7
Kansas	14,254	12,368	11,235	6,431	3,007	30.1	26.2	23.8	13.6	6.4
NORTHERN PLAINS	50,205	49,532	44,016	20,177	7,984	29.2	28.8	25.6	11.7	4.6
Virginia	1,884	1,417	1,470	1,649	1,506	23.8	17.9	18.5	20.8	19.0
West Virginia	255	335	413	610	701	11.0	14.5	17.8	26.4	30.3
North Carolina	2,407	1,940	1,912	1,764	1,514	25.2	20.3	20.0	18.5	15.9
Kentucky	1,575	1,832	2,500	2,990	2,636	13.7	15.9	21.7	25.9	22.9
Tennessee	1,562	1,603	1,858	2,431	2,603	15.5	15.9	18.5	24.2	25.9
APPALACHIAN	7,683	7,127	8,153	9,444	8,960	18.6	17.2	19.7	22.8	21.7
South Carolina	1,732	996	872	798	810	33.3	19.1	16.7	15.3	15.6
Georgia	4,615	2,557	1,995	1,837	1,641	36.5	20.2	15.8	14.5	13.0
Florida	7,556	1,658	1,296	1,090	1,118	59.4	13.0	10.2	8.6	8.8
Alabama	2,857	1,905	1,744	1,674	1,733	28.8	19.2	17.6	16.9	17.5
SOUTHEAST	16,760	7,116	5,907	5,399	5,302	41.4	17.6	14.6	13.3	13.1
Mississippi	4,770	1,879	1,657	1,641	1,873	40.4	15.9	14.0	13.9	15.8
Arkansas	5,240	2,190	1,813	1,772	1,823	40.8	17.1	14.1	13.8	14.2
Louisiana	3,767	1,497	1,126	882	916	46.0	18.3	13.8	10.8	11.2
DELTA STATES	13,777	5,566	4,596	4,295	4,612	41.9	16.9	14.0	13.1	14.0
Oklahoma	8,179	6,557	7,131	5,822	4,163	25.7	20.6	22.4	18.3	13.1
Texas	59,944	23,012	19,557	15,111	12,625	46.0	17.7	15.0	11.6	9.7
SOUTHERN PLAINS	68,123	29,569	26,688	20,933	16,788	42.0	18.2	16.5	12.9	10.4
Montana	27,337	15,835	9,624	3,413	1,525	47.3	27.4	16.7	5.9	2.6
Idaho	6,153	2,871	2,085	1,017	546	48.6	22.7	16.5	8.0	4.3
Wyoming	19,945	5,453	3,312	1,494	682	64.6	17.7	10.7	4.8	2.2
Colorado	15,188	7,288	5,940	3,269	2,094	45.0	21.6	17.6	9.7	6.2
New Mexico	22,723	6,145	4,370	2,585	1,971	60.1	16.3	11.6	6.8	5.2
Arizona	11,435	2,108	1,537	1,134	932	66.7	12.3	9.0	6.6	5.4
Utah	4,986	1,690	1,370	860	604	52.4	17.8	14.4	9.0	6.4
Nevada	5,909	844	1,129	391	922	64.3	9.2	12.3	4.3	10.0
MOUNTAIN	113,676	42,234	29,367	14,163	9,276	54.5	20.2	14.1	6.8	4.4
Washington	6,751	3,599	2,349	1,134	735	46.3	24.7	16.1	7.8	5.0
Oregon	8,933	3,413	2,179	1,117	792	54.4	20.8	13.3	6.8	4.8
California	22,632	4,542	3,066	1,908	1,907	66.5	13.3	9.0	5.6	5.6
PACIFIC	38,316	11,554	7,594	4,159	3,434	58.9	17.8	11.7	6.4	5.3
48 STATES	354,951	206,979	171,032	106,667	75,141	38.8	22.6	18.7	11.7	8.2

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 27.

[b]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.15 Average acreage size and average market value of land and buildings, by economic class, 48 states, 1969.[a]

State and Region	Average Farm Size					Average Market Value of Land and Buildings Per Farm				
	I	II	III	IV	V	I	II	III	IV	V
	Acres					$1,000				
New England States[b]	351	266	192	158	152	138.4	75.3	51.4	48.8	49.3
New York	412	274	205	153	139	155.4	61.9	44.8	38.4	40.5
New Jersey	294	150	105	89	79	290.4	168.4	119.8	107.1	94.9
Pennsylvania	300	202	163	135	118	160.5	77.4	54.0	45.4	40.3
Delaware	337	202	186	154	103	166.0	104.0	80.3	93.0	47.9
Maryland	367	243	186	143	100	236.3	143.1	119.3	90.4	70.1
NORTHEAST	353	240	182	142	123	173.1	81.2	59.0	53.6	49.0
Michigan	432	281	212	162	126	170.0	94.7	66.8	48.0	38.1
Wisconsin	450	255	192	151	128	148.8	64.6	38.3	28.2	26.3
Minnesota	628	377	277	214	172	175.9	94.5	60.7	41.0	29.3
LAKE STATES	524	311	233	181	144	165.9	82.3	52.5	38.1	31.3
Ohio	446	296	215	154	115	218.7	125.4	84.3	55.9	40.3
Indiana	516	330	222	146	104	234.7	136.6	86.7	53.7	37.2
Illinois	540	341	239	161	113	296.4	170.8	108.5	66.4	44.9
Iowa	432	301	221	155	111	187.4	117.1	80.6	53.6	37.8
Missouri	768	461	330	235	175	219.2	113.6	71.5	45.8	33.2
CORN BELT	509	336	245	174	129	229.9	134.3	86.9	54.6	38.1
North Dakota	2,340	1,401	932	593	371	266.6	136.8	84.2	55.3	36.2
South Dakota	2,630	1,225	746	464	320	206.8	109.6	71.5	46.6	35.3
Nebraska	1,680	761	512	333	234	227.9	125.0	83.1	55.5	38.6
Kansas	1,807	943	631	385	233	276.7	147.1	97.3	61.6	40.9
NORTHERN PLAINS	1,956	1,028	693	430	270	243.0	129.9	85.0	56.1	38.7
Virginia	669	401	276	188	141	239.1	118.2	71.6	46.2	39.0
West Virginia	605	513	413	346	247	136.5	79.2	55.5	41.1	30.6
North Carolina	404	220	140	94	81	135.4	75.2	47.2	30.7	26.0
Kentucky	699	333	231	156	113	249.5	99.2	58.7	36.6	25.4
Tennessee	744	389	271	182	129	230.2	108.3	70.8	44.5	31.9
APPALACHIAN	567	315	216	153	118	190.7	93.9	54.5	38.0	29.4
South Carolina	911	467	269	174	145	236.7	112.9	68.3	45.1	35.9
Georgia	702	362	282	227	185	163.3	83.3	64.1	48.3	41.7
Florida	1,865	636	388	240	200	717.4	169.1	114.5	74.3	77.8
Alabama	764	407	350	251	180	160.6	75.0	63.0	44.6	34.3
SOUTHEAST	1,031	432	317	226	179	309.3	98.4	73.6	51.6	45.0
Mississippi	1,195	567	436	276	186	343.3	130.3	88.0	55.1	37.7
Arkansas	808	384	341	266	191	268.0	106.3	85.4	55.8	36.5
Louisiana	1,193	451	326	211	152	371.7	145.1	101.2	65.0	47.1
DELTA STATES	1,010	451	366	256	180	314.1	123.2	90.5	57.9	39.5
Oklahoma	2,195	970	662	408	257	334.9	174.7	112.4	70.3	46.0
Texas	4,427	1,432	896	523	311	483.1	212.6	144.3	90.8	60.8
SOUTHERN PLAINS	3,945	1,295	819	485	295	451.1	201.3	133.7	84.0	56.6
Montana	8,835	2,986	1,670	898	576	438.8	186.3	118.5	72.1	52.2
Idaho	1,952	675	428	252	170	317.2	134.4	81.7	54.6	41.3
Wyoming	13,359	3,511	1,923	1,125	629	497.1	169.6	100.8	70.4	49.4
Colorado	3,834	1,711	1,224	750	534	320.1	163.6	116.4	78.8	64.9
New Mexico	16,406	4,823	2,727	1,556	1,102	610.2	210.9	138.1	90.8	67.7
Arizona	7,178	3,427	2,640	1,747	1,146	900.2	261.6	202.0	128.1	106.9
Utah	4,404	1,258	733	434	288	281.8	121.5	86.9	58.7	47.1
Nevada	14,921	3,284	3,473	1,303	3,003	673.9	217.2	270.8	146.5	146.6
MOUNTAIN	7,014	2,240	1,360	782	585	446.3	168.0	111.6	73.2	58.6
Washington	1,552	744	525	291	173	333.3	158.7	105.5	70.6	60.6
Oregon	2,921	1,102	669	317	194	332.4	152.2	97.9	67.6	57.0
California	1,518	541	331	196	161	675.1	223.0	149.5	114.2	99.6
PACIFIC	1,717	707	447	243	170	561.5	190.6	128.0	94.7	82.7
48 STATES	1,603	625	432	273	190	296.8	126.1	83.3	55.9	42.7

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 27. Economic Class based on value of Agricultural products sold: Class I - $40,000 and over; Class II - $20,000 - $39,999; Class III - $10,000 - $9,999; Class IV - $5,000 - $9,999; and Class V - $2,5-0 - $4,999

[b]New England States include: Main, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.16 Percent of land in farms rented by economic class, by farm production regions, 1969.[a]

State and Region	Percent of Land in Farms Rented				
	I	II	III	IV	V
	Percent				
New England States[b]	18.3	18.6	14.9	9.4	8.6
New York	25.2	20.4	16.9	14.0	12.2
New Jersey	41.9	45.6	35.3	26.8	20.9
Pennsylvania	31.7	28.1	22.5	16.1	12.9
Delaware	43.4	41.8	41.2	28.4	22.4
Maryland	47.2	42.8	32.3	23.6	15.6
NORTHEAST	29.7	25.0	20.6	16.0	12.7
Michigan	33.4	32.5	27.5	23.6	17.1
Wisconsin	29.8	22.7	16.4	11.2	8.6
Minnesota	42.6	39.6	32.2	24.3	16.7
LAKE STATES	37.2	32.9	26.3	20.3	14.7
Ohio	51.3	51.2	41.9	31.4	20.2
Indiana	56.6	55.9	43.6	29.9	18.7
Illinois	63.8	62.6	52.8	41.2	29.5
Iowa	52.5	52.2	43.0	31.2	23.3
Missouri	43.0	40.7	32.4	22.6	15.8
CORN BELT	54.7	53.3	42.6	30.0	20.0
North Dakota	43.4	42.1	36.0	33.0	30.5
South Dakota	36.1	38.7	38.9	36.3	31.8
Nebraska	40.4	49.7	46.6	41.1	37.8
Kansas	56.0	56.5	54.0	46.9	39.9
NORTHERN PLAINS	44.2	46.7	43.4	39.7	35.8
Virginia	32.7	29.8	25.0	19.6	13.3
West Virginia	25.9	23.3	18.4	16.1	13.7
North Carolina	36.1	41.0	35.6	25.7	17.4
Kentucky	33.9	31.4	24.9	16.5	10.6
Tennessee	44.5	36.1	30.5	19.8	14.4
APPALACHIAN	36.2	34.3	28.4	19.6	13.6
South Carolina	37.1	33.3	29.1	22.7	16.0
Georgia	26.3	26.8	24.6	18.3	13.0
Florida	28.7	33.6	41.4	33.2	33.7
Alabama	32.7	35.1	31.3	24.6	20.3
SOUTHEAST	29.6	31.5	30.9	23.9	20.2
Mississippi	41.6	38.0	31.0	23.3	19.9
Arkansas	53.5	50.2	45.6	30.5	22.3
Louisiana	47.5	58.9	50.4	42.2	37.2
DELTA STATES	47.7	48.4	41.5	30.1	24.3
Oklahoma	46.1	49.7	45.4	39.8	32.4
Texas	50.9	51.7	48.0	42.9	35.5
SOUTHERN PLAINS	50.3	51.2	47.3	42.0	34.8
Montana	35.8	36.9	36.3	34.2	32.5
Idaho	39.8	36.1	32.3	26.4	20.9
Wyoming	42.2	38.7	39.6	39.3	41.3
Colorado	39.5	39.9	39.8	37.4	34.6
New Mexico	46.1	47.8	47.9	45.8	45.9
Arizona	62.9	70.5	74.0	62.7	76.1
Utah	67.3	62.7	69.0	70.6	77.6
Nevada	43.6	65.9	80.4	76.5	89.6
MOUNTAIN	44.2	42.5	44.0	42.7	48.8
Washington	54.8	50.5	46.8	36.6	32.5
Oregon	35.2	35.4	31.7	25.4	22.1
California	59.6	45.6	53.7	45.6	42.9
PACIFIC	53.1	44.1	45.2	37.7	35.9
48 STATES	46.1	44.8	40.9	33.8	28.2

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 27. Calculated assuming all land is rented by part owners and tenants is operated and not subleased.

[b]New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.17 Number of farms and land in farms for economic classes I - V cash grain farms, by selected states and farm production regions, 1969.[a]

State and Region	Farm Numbers						Land in Cash Grain Farms					
	I	II	III	IV	V	Total	I	II	III	IV	V	Total
	Number						1,000 Acres					
Northeast	294	479	631	808	874	3,086	306	227	171	144	102	950
Michigan	220	908	2,048	3,317	4,350	10,843	175	385	565	596	558	2,279
Wisconsin	99	196	404	765	1,240	2,704	84	83	108	150	179	604
Minnesota	1,053	3,924	6,436	6,508	4,926	22,847	1,245	2,238	2,379	1,599	905	8,366
Lake States	1,372	5,028	8,888	10,590	10,516	36,394	1,504	2,706	3,052	2,345	1,642	11,249
Ohio	828	2,663	4,615	6,433	7,537	22,076	645	1,188	1,304	1,108	868	5,113
Indiana	2,274	4,980	6,397	7,124	7,897	28,672	1,604	2,097	1,745	1,196	871	7,513
Illinois	6,940	14,400	15,141	11,083	7,593	55,157	4,614	5,595	3,948	1,933	927	17,017
Iowa	2,592	7,579	9,630	7,973	4,801	32,575	1,727	2,954	2,448	1,352	591	9,072
Missouri	1,071	2,599	3,891	4,222	4,488	16,271	1,160	1,540	1,471	1,067	772	6,010
Corn Belt	13,705	32,221	39,674	36,835	32,316	154,751	9,750	13,374	10,916	6,656	4,029	44,725
North Dakota	1,279	5,404	9,154	6,276	3,083	25,256	3,016	7,400	8,150	3,612	1,158	23,336
South Dakota	339	1,240	2,073	1,980	1,524	7,156	886	1,429	1,438	826	490	5,069
Nebraska	1,674	4,916	6,487	5,178	3,004	21,329	1,670	3,220	2,952	1,624	664	10,130
Kansas	1,721	4,667	7,765	7,568	5,836	27,557	3,402	5,169	5,541	3,391	1,627	19,130
Northern Plains	5,013	16,357	25,479	21,002	13,447	81,298	8,974	17,218	18,081	9,453	3,939	57,665
Appalachain	765	1,247	1,905	2,718	3,568	10,203	890	673	585	529	491	3,168
Southeast	160	247	388	577	986	2,358	263	217	193	163	190	1,026
Mississippi	649	502	571	709	993	3,424	1,183	379	266	184	163	2,175
Arkansas	2,338	1,859	1,898	1,706	1,889	9,690	2,992	1,003	682	372	248	5,297
Louisiana	1,165	1,285	1,185	954	888	5,477	1,524	684	381	182	122	2,893
Delta	4,152	3,646	3,654	3,369	3,770	18,591	5,699	2,066	1,329	738	533	10,365
Oklahoma	333	1,344	2,667	3,054	2,613	10,011	647	1,457	1,828	1,309	691	5,932
Texas	2,993	3,455	3,848	3,407	3,543	17,246	4,923	2,716	2,169	1,271	859	11,938
Southern Plains	3,326	4,799	6,515	6,461	6,156	27,257	5,570	4,173	3,997	2,580	1,550	17,870
Mountain	1,419	3,667	4,545	3,052	2,038	14,721	5,656	7,357	5,725	2,374	1,070	22,182
Pacific	1,191	1,939	1,585	945	571	6,231	3,774	3,155	1,741	564	210	9,444
48 States	31,397	69,630	93,264	86,357	74,242	354,890	42,386	51,166	45,790	25,546	13,756	178,644

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 29.

Table A.18 Average acreage size and average market value of land and buildings per farm for economic classes I - V cash grain farms, by selected states and farm production regions, 1969.[a]

	Average Farm Size						Average Market Value of Land and Buildings per Farm					
	I	II	III	IV	V	All	I	II	III	IV	V	All
	Acres						$1,000					
Northeast	1,041	474	271	178	117	308	295.8	181.2	115.0	86.1	56.0	102.4
Michigan	795	424	276	180	128	210	336.9	177.9	105.4	64.1	45.6	61.3
Wisconsin	848	423	267	196	144	223	382.8	165.1	97.4	61.4	38.4	58.0
Minnesota	1,182	570	370	246	184	366	302.2	143.6	90.9	57.5	37.2	80.6
Lake States	1,096	538	343	221	156	309	313.6	150.6	94.6	59.8	40.8	73.1
Ohio	779	446	283	172	115	232	381.4	207.4	123.8	73.0	48.8	86.5
Indiana	705	421	273	168	110	262	340.0	183.2	115.5	67.6	43.1	101.3
Illinois	665	389	261	174	122	309	394.3	207.8	128.1	79.5	51.5	155.0
Iowa	666	390	254	170	123	278	310.5	174.5	108.4	68.0	46.8	114.0
Missouri	1,083	593	378	253	172	369	391.0	184.0	106.9	67.5	42.7	98.2
Corn Belt	711	415	275	181	125	289	368.4	194.2	118.7	72.2	46.9	120.7
North Dakota	2,358	1,354	890	576	376	924	290.0	147.9	90.5	59.9	38.5	94.4
South Dakota	2,614	1,152	694	417	322	708	285.3	140.2	85.7	52.9	37.5	77.3
Nebraska	998	646	455	314	221	475	287.7	164.3	102.8	66.6	42.7	108.4
Kansas	1,977	1,108	714	448	279	694	361.7	188.0	116.2	74.9	47.8	107.7
Northern Plains	1,790	1,053	710	450	293	709	313.6	163.8	101.1	66.3	43.4	101.1
Appalachian	1,163	540	307	195	138	310	392.2	160.9	88.2	53.0	36.3	79.6
Southeast	1,644	879	497	282	193	435	412.0	195.9	104.2	62.7	43.4	81.0
Mississippi	1,823	755	466	260	164	635	571.2	197.3	112.5	62.9	37.3	169.0
Arkansas	1,280	540	359	218	131	547	437.0	164.1	102.9	63.0	34.8	168.2
Louisiana	1,308	532	322	191	138	528	398.1	171.6	104.1	63.1	45.0	158.5
Delta	1,373	567	364	219	141	558	447.1	171.3	104.6	63.0	37.9	165.5
Oklahoma	1,943	1,084	685	429	264	593	416.6	233.2	144.7	89.0	54.7	110.9
Texas	1,645	786	564	373	242	692	487.8	227.3	150.2	94.6	57.3	182.4
Southern Plains	1,675	870	614	399	252	656	480.7	228.9	148.0	91.9	56.2	156.1
Mountain	3,986	2,006	1,260	778	525	1,507	429.9	207.5	125.1	83.0	54.8	149.0
Pacific	3,169	1,627	1,098	597	368	1,516	546.0	260.6	156.6	98.1	66.9	240.2
48 States	1,350	735	491	296	185	503	389.2	187.0	113.3	70.5	45.6	118.1

[a]Source: 1969 Census of Agriculture, State Summary Volumes Table 29.

Table A.19 Percent of farmland rented of land in farms for economic classes I - V cash grain farms, by selected states and farm production regions, 1969.[a]

State and Region	Percent of Farmland Rented of Land in Farms					
	I	II	III	IV	V	All
	Percent					
Northeast	60.1	51.5	42.7	31.9	22.5	46.6
Michigan	58.3	53.0	42.7	30.0	28.3	38.8
Wisconsin	50.0	41.0	32.4	19.3	13.4	27.2
Minnesota	51.7	49.8	43.3	34.4	24.5	42.6
Lake States	52.4	50.0	42.8	32.3	24.6	41.0
Ohio	66.5	64.8	54.8	41.0	27.1	50.9
Indiana	69.1	65.3	53.0	37.8	25.8	54.3
Illinois	72.8	69.9	59.3	48.8	36.0	64.0
Iowa	66.3	63.7	53.2	38.5	30.8	55.5
Missouri	62.7	59.5	50.8	40.4	29.0	50.7
Corn Belt	69.4	66.2	55.2	42.1	29.8	57.3
North Dakota	51.0	48.3	41.3	37.0	32.3	43.7
South Dakota	44.6	48.1	49.0	45.9	35.5	46.2
Nebraska	59.1	60.6	55.4	49.4	44.4	56.0
Kansas	62.0	61.7	59.4	54.1	48.4	58.6
Northern Plains	56.0	54.6	49.8	46.0	41.4	51.0
Appalachian	60.8	54.1	50.8	34.6	25.1	47.6
Southeast	47.9	35.5	38.9	30.7	22.6	36.2
Mississippi	50.1	53.8	44.4	41.3	28.2	47.7
Arkansas	59.1	65.7	62.5	53.8	40.7	59.5
Louisiana	60.9	73.2	61.9	57.1	48.4	63.2
Delta	57.7	66.0	58.7	51.5	38.6	58.1
Oklahoma	58.1	59.2	56.5	52.0	45.2	55.0
Texas	64.6	62.8	60.9	55.4	47.6	61.3
Southern Plains	63.9	61.6	58.9	53.7	46.5	59.2
Mountain	40.4	45.5	44.5	41.0	38.4	43.1
Pacific	57.4	56.4	52.1	47.0	39.0	55.1
48 States	58.3	57.1	51.0	43.8	35.2	52.3

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 29. Calculated assuming all land that is rented by Part Owners and Tenants is operated and not subleased.

Table A.20 Coefficients of concentration of land in economic classes I - V farms, 48 states, 1969.[a]

State and Region	All Land Owned[b]	All Land Rented[c]	All Land in Farms	Total Real Estate Value in Farms
New England States[d]	.44	.49	.45	.23
New York	.36	.48	.39	.21
New Jersey	.50	.66	.57	.45
Pennsylvania	.36	.48	.41	.25
Delaware	.51	.66	.59	.52
Maryland	.43	.61	.51	.44
NORTHEAST	.42	.51	.43	.28
Michigan	.32	.53	.40	.31
Wisconsin	.29	.49	.35	.27
Minnesota	.29	.51	.38	.30
LAKE STATES	.30	.54	.38	.30
Ohio	.27	.55	.41	.36
Indiana	.26	.57	.42	.41
Illinois	.24	.46	.37	.37
Iowa	.23	.43	.34	.32
Missouri	.34	.55	.42	.39
CORN BELT	.28	.50	.39	.36
North Dakota	.32	.39	.36	.29
South Dakota	.55	.51	.54	.34
Nebraska	.56	.54	.55	.32
Kansas	.39	.53	.48	.39
NORTHERN PLAINS	.48	.50	.50	.33
Virginia	.49	.55	.52	.45
West Virginia	.43	.55	.46	.31
North Carolina	.57	.55	.57	.41
Kentucky	.40	.58	.47	.39
Tennessee	.43	.61	.49	.40
APPALACHIAN	.49	.56	.52	.41
South Carolina	.62	.60	.62	.49
Georgia	.60	.58	.59	.48
Florida	.77	.86	.81	.65
Alabama	.60	.64	.62	.48
SOUTHEAST	.66	.70	.68	.56
Mississippi	.54	.66	.58	.57
Arkansas	.50	.62	.55	.52
Louisiana	.60	.63	.62	.55
DELTA STATES	.54	.63	.58	.54
Oklahoma	.46	.56	.52	.41
Texas	.65	.71	.69	.48
SOUTHERN PLAINS	.61	.69	.66	.47
Montana	.49	.51	.50	.36
Idaho	.65	.73	.70	.44
Wyoming	.55	.58	.57	.41
Colorado	.62	.64	.64	.36
New Mexico	.61	.64	.63	.40
Arizona	.73	.79	.77	.52
Utah	.76	.83	.79	.38
Nevada	.74	.75	.75	.51
MOUNTAIN	.65	.70	.68	.41
Washington	.68	.80	.74	.41
Oregon	.75	.81	.78	.42
California	.78	.88	.85	.57
PACIFIC	.76	.85	.81	.50
48 STATES	.60	.72	.67	.41

[a] Derived from data in the 1969 Census of Agriculture, State Summary Volumes, Table 26. The data is tabulated into a 12-element classification by acreage size of farm. Coefficients of concentration (Gini ratios) are bounded by ratios of 0 (percent equality) and 1 (perfect inequality or monopoly).

[b] All land owned by farm operators. This is the sum of land in full-owner farms, the owned portion of part-owner farms, and a small amount of land owned and rented out by full tenants.

[c] All land rented by farm operators is the sum of land in full-tenant farms and the rented portion of part-owner operations.

[d] New England States include: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

Table A.21 Percent of: all land owned and all land rented by economic class, by farm production regions, 1969.[a]

Region	Percent of all land owned[b]					Percent of all land rented[b]				
	I	II	III	IV	V	I	II	III	IV	V
	Percent					Percent				
Northeast	26.6	29.6	19.6	12.6	11.6	37.3	32.6	16.9	7.8	5.5
Lake States	14.4	25.1	27.9	19.3	13.2	22.7	32.7	26.3	12.6	5.6
Corn Belt	21.4	23.3	22.8	18.3	14.1	32.0	33.3	21.0	9.5	4.2
Northern Plains	28.3	26.6	25.6	13.2	6.3	26.9	28.1	23.2	18.2	3.5
Appalachian	15.8	15.1	18.9	24.7	25.4	26.2	23.1	21.8	17.4	11.5
Southeast	40.1	17.4	13.8	14.1	14.6	43.6	19.7	16.0	11.3	9.4
Delta	38.2	14.8	13.8	15.3	18.0	48.4	19.8	14.0	9.5	8.2
Southern Plains	39.3	17.0	16.3	14.2	13.2	44.7	19.7	16.5	11.5	7.6
Mountain	53.3	20.5	14.2	7.3	4.7	54.8	19.6	14.1	6.6	4.9
Pacific	53.7	18.6	12.4	7.9	7.3	65.0	14.9	10.7	5.1	4.3
48 States	35.7	21.2	18.9	13.6	10.7	41.7	23.8	18.0	11.1	5.5

[a]Source: 1969 Census of Agriculture, State Summary Volumes, Table 27.

[b]Percentages may not add to 100.0 due to rounding.

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